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Examining Physical Activity Behaviors and Psychometric Beliefs of College Students Before and After the COVID-19 Shutdown

James White III
Winthrop University, james.whiteiii22@yahoo.com

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To the Dean of the Graduate School:

We are submitting a thesis written by James White III entitled Examining Physical Activity Behaviors and Psychometric Beliefs of College Students Before and After the COVID-19 Shutdown

We recommend acceptance in partial fulfillment of the requirements for the degree of Master of Science in Sport and Fitness Administration.

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Dr. Joni M. Boyd, Thesis Advisor

_____

Dr. Jason Chung, Committee Member

_____

Dr. Logan Daughtry, Committee Member

_____

Dr. Jennie Rakestraw, Dean, College of Education

_____

Dr. Jack E. DeRochi, Dean, Graduate School

Examining Physical Activity Behaviors and Psychometric Beliefs of College Students Before

and After the COVID-19 Shutdown

A Thesis

Presented to the Faculty

Of the

Richard W. Riley College of Education

In Partial Fulfillment

Of the

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Of

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Abstract

Objectives: The purpose of this study was to examine PA behaviors, social support and self-efficacy for PA, Rosenberg self-esteem, and perceptions of body weight before and after the COVID-19 shutdown (March 15, 2020) among the college demographic.

Participants: 311 college students from a four-year, comprehensive, southeastern university in the United States were included in the study from December 1, 2020 until March 5, 2021.

Methods: Surveys were conducted via Qualtrics, an online survey system, and consisted of approximately 40 items, including demographic information, PA behaviors, social support and exercise, self-esteem, self-efficacy to exercise, and perceptions of body weight and self-image. Additionally, the questionnaires included pre-screening questions related to age, enrollment at a southeastern university, COVID-19 results, and contact tracing associated with COVID-19.

Results: Dependent (paired samples) t-tests suggested that all measured variables were significantly higher before the COVID-19 shutdown occurred (prior to March 15, 2020) than after the shutdown: vigorous PA (M= 2.57; M= 2.00; p= <.001), moderate PA (M= 3.29; M= 2.68; p= <.001), walking-only PA (M= 4.64; M= 4.17; p= <.001), social support for PA (M=22.47; M=21.06; p=.007), self-efficacy for PA (M=15.16; M=13.96; p=<.001), self-esteem (M=24.05; M=24.88; p=.002), and body image (M=8.72; M=9.11; p =.002).

Conclusion: These results suggest that the PA levels measured significantly decreased upon the COVID-19 shutdown, as well as several psychometric factors that could be related to physical well-being, highlighting the importance of PA. Campuses and recreation centers should continue to offer safe and effective recreational activities and health services, whether students are on or off campus.

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Chapter 1: Introduction

According to the World Health Organization (WHO), COVID-19 cases are rising rapidly

and globally as there were 135,646,617 confirmed cases, 2,930,732 deaths, and 223 countries or

areas with cases as of April 12, 2021(WHO, 2021). The global pandemic has impacted everyone

in various ways, including mental and physical well-being. To curb the spread of the virus,

numerous government mandates, such as social distancing, staying at home, avoiding crowds,

wearing masks in public places, and temporary closures of gyms and fitness centers, were put in

place (WHO, 2021). These strict mandates may have presented a unique obstacle for maintaining

physical activity (PA) behaviors and beliefs in the population. During the Spring 2020 semester,

colleges and universities experienced sudden campus closures, forcing many institutions to

cancel in-person classes or shift to remote learning. Since then, colleges and universities have

adopted several measures to merge in-person instruction (with social distancing) and online

learning, which have presented a new set of challenges for college students (Smalley, 2021).

There are several physiological and psychological benefits associated with exercise and

PA, which is why it is critical to investigate PA behavior changes ˙amidst the COVID-19 crisis.

According to research by Simpson et al. (2020) and Nieman and Wentz (2019), the immune

system is highly responsive to moderate-to-vigorous exercise or PA, suggesting that regular

moderate PA may reduce the risk and severity of the virus (Nieman & Wentz, 2019; Simpson et

al., 2020). Furthermore, the positive effects of PA may lower the risk of cardiovascular disease

and its comorbidities (e.g., hypertension, type-2 diabetes, and obesity), which are classified as

critical risk factors of COVID-19 (Nieman, 2020; Guo et al., 2020). Hamer et al. (2020)

observed a significantly lower risk of COVID-19 for individuals that were physically active at

relatively low levels (i.e, < 150 minutes of moderate to vigorous exercise), while there was no dose-response relationship at higher levels (Hamer et al., 2020).

Additionally, a large exercise study conducted in the U.S. found that there was a link between PA and significantly fewer poor mental health days in the last month, even after adjusting for several sociodemographic and well-being factors that are known to contribute to poor mental health (Chekroud, 2018). A systematic review revealed that physical inactivity resulted in negative psychological outcomes, like depressive symptoms and anxiety, which could be relevant considering the unique and novel barrier that COVID-19 has presented to PA (Weinstein, Koehmstedt, & Kop, 2017). Not to mention, the high transmission rates, the reluctant adoption of the new social distancing norms, and the uncertainty surrounding the future has likely compounded the impact of physical inactivity withdrawal or decline in the population. One study documented the adverse mental health issues, such as significantly higher depression and anxiety rates of the quarantined population, during the COVID-19 shutdown (Tang et al., 2020); another study reported moderate to high levels of perceived stress in Chinese adults, which was negatively linked to their health-related quality of life and lower levels of moderate to vigorous physical activities (Qi et al., 2020).

With the addition of new social distancing guidelines at colleges and universities, such as closures of campus recreational facilities, college students, specifically, may have struggled to maintain their physical and mental health during the COVID-19 shutdown. Coughenour et al. (2020) found that there were significantly higher self-reported minutes of PA and lower depression scores among college survey participants prior to the stay-at-home order compared to after the stay-at-home order, which may be presumed given the sudden shift from normal life to the unexpected circumstances surrounding the virus (Coughenour et al., 2020). Another study on

the college population revealed an increase in negative affect and significant decreases in PA, positive affect, and sleep quality during COVID-19 stay-at-home orders (Maher et al., 2021). Each of these studies reported decreases in PA and changes in mental health, which suggests that more research should be conducted on the differences in PA beliefs and behaviors of college students before and during the COVID-19 shutdown.

Significance of the Study

While there are relatively few studies that have examined the impact of the COVID-19 pandemic on the PA beliefs and behaviors of college students, to our knowledge, no published studies have examined the differences in social support and exercise, self-efficacy to exercise, g self-esteem, and perceptions of body weight prior to and during the COVID-19 pandemic among the college demographic. Thus, the purpose of this study was to evaluate the specified PA behaviors and beliefs of college students at a four-year, comprehensive, southeastern university prior to and during the COVID-19 shutdown. The PA routines of college students before the stay-at-home order (determined to be March 15, 2020) will serve as a baseline, so that researchers can gather information on the impact of this virus on PA and factors related to PA. The results of this study would help to understand the short-term impact that COVID-19 has had on the PA behaviors and beliefs of college students. Researchers hypothesized that participants would report significantly lower PA levels and psychometric factors related to PA after the COVID-19 pandemic as compared to before. The null hypothesis was that the COVID-19 pandemic would have no difference on the variables in the present study.

Definition of Terms

For the purpose of this study, the following terms are operationally defined:

1. **Exercise.** A form of PA that is planned, structured, and repetitive and results in improvement or maintenance of physical fitness (Casperson, Powell, & Christensen, 1985).

2. **Physical Activity (PA).** Any full body movement produced by skeletal muscles that result in energy expenditure (Casperson, Powell, & Christensen, 1985).

3. **Self-efficacy.** One's belief in their ability to perform a specific task successfully (Bandura, 1977).

4. **Self-esteem.** One's positive or negative attitude toward oneself and one's evaluation of their own overall thoughts and feelings in relation to oneself (Rosenberg, 1965a).

5. **Self-efficacy for PA.** The extent to which an individual believes that they can successfully engage in PA or complete a workout (Strecher et al., 1996).

6. **Social support.** Perceived or received emotional (love, affection), informational (guidance), or instrumental (tangible outcome) support (Sagrestano et al., 1999).

7. **Social support for PA.** Perceived, informational, or instrumental support to engage in PA.

Chapter 2: Literature Review

PA Behaviors of College Students

The benefits of regular PA are well documented for both mental and physical well-being across the lifespan. Physically active people tend to live longer and are at a lower risk for serious health problems like heart disease, type 2 diabetes, and some cancers (CDC, 2021). According to the USDHHS (2018), it is recommended that adults get at least 150 to 300 minutes of moderate intensity, or 75 to 150 minutes of vigorous intensity aerobic PA, or an equivalent combination of both spread throughout the week (USDHHS, 2018).

The review by Pate et al. (1995) is widely considered one of the most influential papers in establishing PA guidelines for Americans. They revealed strong evidence supporting the association between physically active individuals and a reduced risk of chronic diseases related to cardiovascular disease, type 2 diabetes, osteoporosis, colon cancer, and anxiety and depression; further, several risk factors for chronic diseases: blood lipid profile, resting blood pressures, body composition, glucose tolerance and insulin sensitivity, bone density, immune function, and mental capacity were improved with regular PA (Pate et al., 1995). In addition to these benefits, new evidence has surfaced since the 2008 guidelines were published; these health outcomes include: improved bone health and weight status for children ages 3-5 years, reduced risk of cancer at a greater number of sites, improved brain function for youth ages 6 through 13 years, mental health benefits, such as possible improved cognitive function, reduced anxiety and depression risk, and improved sleep and quality of life, improved pregnancy outcomes, lower risk of falls for older adults, and decreased risk of all-cause and disease-specific mortality, as well as increased physical function and overall wellbeing, adding to the benchmark guidelines provided by Pate et al. (1995) (USDHHS, 2018).

Along with the physical benefits associated with an active lifestyle, there is also strong evidence for the benefits of PA on mental well-being. Generally, several findings have indicated that PA is linked with less anxiety and stress among adult (Bhui, 2002; Byrne & Byrne, 1993; Dunn, Trivedi, & O'Neal, 2001; Salmon, 2000) and college populations (Brown, 1991; Nguyen-Michel et al., 2006). When compared to a social support group and a wait-list control group in men and women, Craft and Perna (2004) found that an exercise group walking an average of 30 minutes, 3 times per week, for 6 weeks was the most effective intervention in reducing overall symptoms of depression (Craft & Perna, 2004). These findings support the notion that light-to-moderate PA, such as walking, can lessen depression symptoms in adults. Similarly, among healthy adults with various weights, Conn (2010) revealed that PA was effective in reducing symptoms associated with depression in a review of 70 PA interventions on depressive symptoms in the general population (Conn, 2010). Furthermore, in another review of 90 studies with over 10,000 participants diagnosed with a chronic illness: cardiovascular disease, multiple sclerosis, cancer, and chronic obstructive pulmonary disease, exercise therapy was shown to mediate depressive symptoms (Herring et al., 2012), suggesting that exercise and PA have significant psychological benefits even for individuals that have chronic illnesses.

Young adults, specifically, have also exhibited protective mental outcomes from PA. One study by Simon et al. (2004) indicated a protective correlation between an active lifestyle and suicide attempts in individuals between the ages of 13 and 34 (Simon et al., 2004), and a similar study by Taliaferro et al. (2009) showed that aerobic exercise was protective against suicide risk in a college student population (Taliaferro et al., 2009). Additionally, findings from another study found that individuals who reported the highest activity levels perceived higher psychological satisfaction (Ferron et al., 1999), which generally supports the notion that higher

frequencies of PA are associated with greater health outcomes overall. Thus, the literature on the psychological benefits of PA is significant in the college population because it may promote positive emotional wellness in college students or young adults.

Due to the unforeseen impact that the COVID-19 pandemic has had on many aspects of daily life, it may be important to note PA behaviors of college students prior to and during 2020, specifically, the date of March 15, 2020. Thus, the Fall 2019 ACHA-NCHA may be the last full representation of college students' health behaviors prior to the COVID-19 shutdown; 38,679 students from 58 schools were included in the aforementioned reference group. In this sample, 67.6% of students reported meeting the USDHHS (2018) guidelines for moderate to vigorous activity, and 40.3% met the recommendations for both strength training and cardiovascular activity (ACHA, 2019). Similarly, according to data from the Spring 2020 ACHA-NCHA, approximately two-thirds (69.8%) of the 50,307 students surveyed reported that they met the USDHHS (2018) guidelines for moderate to vigorous PA (ACHA, 2020), while less than half (44.0%) reported that they met the guidelines for strength training and aerobic activity. It is important to note that schools that began data collection after March 16, 2020 were not included in the reference group due to the COVID-19 pandemic. Meanwhile, only 13,373 students from 22 schools were included in the data set from the Fall 2020 ACHA-NCHA; of the students surveyed, 64.3% reported that they met the USDHHS (2018) aerobic guidelines for PA, and 38.5% met the guidelines for weight training and aerobic activity. While this is a slight decline in self-reported PA of college students from the Spring 2020 data set, it may be due to the significantly less students that were surveyed in the latter reference group. However, it will be interesting to see if the COVID-19 pandemic has significantly impacted PA among the college population in the present study.

Social Support for PA

Several research studies have been published supporting the positive associations between social support and PA or exercise. A systematic review by Trost et al. (2002) found a positive correlation in every study that included a measure for social support and PA (Trost et al., 2002). In contrast, a recent review involving healthy adults between 18-65 years of age reported inconsistent findings regarding the strength and direction of the association between social support and PA; however, the article observed that there was a small positive correlation between support for PA from friends and future PA among the population (Scarapicchia et al., 2017). The varying findings suggest that future longitudinal studies should be conducted to gain a more concrete understanding of the associations between social support and PA in healthy adults. Additionally, multiple studies have supported the notion that college students who reported higher levels of support for PA engage in more PA behaviors than college students who reported lower levels of support (Bauman et al., 2012; Belanger & Patrick, 2017; Cotter & Lachman, 2010; King et al., 2014).

In a graduate thesis that examined the relationship between social support for exercise and PA in undergraduate fraternity and sorority members, Minton (2008) observed that low to moderate PA groups perceived lower levels of support for exercise, while highly active fraternity and sorority members perceived higher amounts of social support for exercise from family and friends (Minton, 2008). However, it was reported that low to moderate intensity was likely related to PA or walking, whereas moderate and vigorous activity was likely associated with exercise, which was a limitation of the study. Essentially, it was difficult for researchers to define the relationship between social support for exercise and PA, since the Social Support for Exercise Survey measures perceived social support for "exercise", but not all intensities of PA.

Another study revealed that women who stopped regularly exercising displayed a decline in social support for exercise over time, while women that went from non-regular exercisers to exercisers showed an increase in exercise social support from baseline (Colangelo & Weissbrod, 2019).

The Relationship between PA, Self-Esteem, and Body Image

There is evidence that PA or exercise may be positively linked to mental well-being (Salmon, 2000); one study associated PA with improvements in self-esteem and body image (Fox, 2000). Another study found that an 8-week aerobic exercise intervention appeared to significantly increase the mean self-esteem score of medical students (Mousavi Gilani & Dashipour, 2016); the results of the study correspond with those of other studies (as cited in Gilani & Dashipour, 2016). Another study revealed that undergraduates ages 18 to 25 years old who engaged in regular PA were more likely to report higher self-esteem, optimism, and happiness as compared to their sedentary peers (Cekin, 2015). Cekin proposed 3 reasons for this outcome: 1) there is a direct relationship between self-esteem and interpersonal relationships; young adults may meet new friends during exercise, which may promote feelings of acceptance, 2) improved self-esteem from regular PA may mediate the impact of stressful events and feelings of low self-worth, and 3) physically active students or young adults may have an increased perception of body image compared to those that are physically inactive (Cekin, 2015). After taking part in a 12-week exercise intervention that consisted of 60 minutes of exercise per day, three days a week, Yìğìter (2014) reported that female university students displayed an improved level of self-esteem and a reduced level of hopelessness, while there were no significant improvements in the control group who merely continued their normal daily activities without participating in an exercise program similar to the experimental group (Yìğìter, 2014).

Self-Efficacy for PA

Self-efficacy may influence one's ability to accomplish a task. Bandura (1994) defined self-efficacy as the self-confidence to execute a certain task or situation (Bandura, 1994). Our experiences usually shape our self-efficacy, as well as the way we think and behave. PA self-efficacy is the extent to which an individual believes that they can successfully engage in PA or complete a workout (Strecher et al., 1996; Woodard & Berry, 2001). In a recent meta-analysis including 26 original studies, Szczuka et al. 2021 revealed that higher levels of self-efficacy were associated with lower levels of sedentary behavior (SB); meanwhile, analyses showed no statistically significant effects of one of the moderators (SB reduction self-efficacy vs. PA self-efficacy) on the self-efficacy—SB relationship (Szczuka et al., 2021), suggesting that the associations are of similar strength. Although SB and PA may be weakly related according to Pearson et al. (2014), the relationship suggests that SB may limit PA, and that lower levels of self-efficacy may be related to SB, which in turn, may result in decreased PA levels (Pearson et al., 2014). Based on previous literature, one could presume that a lower self-efficacy to engage in PA is negatively associated with physical inactivity, which is why the present study seeks to examine levels of self-efficacy to engage in PA before and after the COVID-19 shutdown.

Colangelo and Weissbrod (2019) reported that women who eventually stopped exercising regularly displayed lower self-efficacy scores at baseline, and that there was a linear relationship between increases in PA and self-efficacy related to exercise, which was consistent with previous studies (Colangelo & Weissbrod, 2019; Marquez & McAuley, 2006). Pauline (2013) found that female college students were less physically active than male college students and that males engaged in more vigorous and moderate minutes of PA per workout, although females did engage in significantly more light exercise sessions per week. Additionally, males reported both

higher self-efficacies to engage in PA under challenging conditions and higher self-confidence to plan for PA regardless of obstacles compared to their female counterparts (Pauline, 2013). This research suggests that overall self-efficacy to engage in PA is linked to higher PA levels and more moderate to vigorous minutes of PA per session, which is typically recommended for greater health benefits. It will be interesting to see how the COVID-19 pandemic has impacted exercise self-efficacy in the present study.

Summary

As the literature has shown, PA is an important part of living a healthy lifestyle. Specifically, PA is essential to improve the mental and physical well-being of young adults and college students. While the research indicates that a relatively high percentage of college students meet the guidelines for aerobic PA, the short-term impact of the COVID-19 pandemic on PA beliefs and behaviors of this population is unknown, suggesting that research is warranted in this area. Not only will this research provide a baseline understanding of the impact of the pandemic on the PA beliefs and behaviors of college students, but it will also provide insight on how the physical and psychological health of the population has been impacted by the newly enacted social distancing guidelines.

Chapter 3: Methods

The purpose of this study was to compare PA behaviors and related psychometric factors before and after the COVID-19 shutdown (dated as March 15, 2020) among college students at a four-year, comprehensive, southeastern university. Volunteers consisted of college students at a four-year, comprehensive, southeastern university in the United States who were recruited via email and daily student announcements to take surveys regarding their PA behaviors prior to and during the COVID-19 shutdown. Surveys were conducted via Qualtrics and consisted of approximately 60 items, including demographic information, PA behaviors, social support and PA, self-esteem, self-efficacy and PA, and perceptions of body weight and self-image. Additionally, the questionnaires included pre-screening questions related to age and enrollment at a southeastern university. Questions also included confirmation of a positive COVID-19 test or exposure to a positive COVID-19 case that required quarantine since March 15, 2020.

Purpose

The purpose of this research was to examine PA behaviors and related psychometric beliefs of college students before and after the COVID-19 shutdown, and to evaluate the impact of the COVID-19 pandemic on the aforementioned behaviors and beliefs of the population. The study was approved by the Institutional Review Board for the use of human subjects prior to data collection.

Research Questions

To examine the impact of the COVID-19 shutdown on PA behaviors and beliefs of college students, the following research questions were addressed:

1. Within the college population, how has the COVID-19 pandemic impacted the PA behaviors?

2. How has the COVID-19 pandemic impacted related psychometric variables of social support and self-efficacy for PA, self-esteem and body image of college students?

Participants

Data were collected from 311 students at a four-year, comprehensive, southeastern university in the United States from December 1, 2020 to March 5, 2021 via an electronic survey. The questionnaire specifically assessed demographic information, PA behaviors, social support to exercise, self-esteem, self-efficacy to exercise, and perceptions of body weight and self-image prior to the COVID-19 shutdown (before March 15, 2020) and during the COVID-19 pandemic (after March 15, 2020).

Inclusionary and exclusionary criteria for this study are listed next.

Inclusion criteria:

1. College students who attended Winthrop University during the 2020-2021 academic year.

2. College students who were at least 18 years of age.

3. College students who agreed to complete the survey.

Exclusion criteria:

1. College students who did not attend Winthrop University during the 2020-2021 academic year.

2. College students who were not at least 18 years of age.

3. College students who did not agree to take the survey.

Instrumentation

Assessments for this study were conducted through a popular online survey and assessment tool, Qualtrics (Provo, UT). Qualtrics allows researchers to create questions based on type and customize the survey to meet the needs of the project. Qualtrics also allows the

researchers to define the rules for skip logic patterns, which is a feature that changes what question or page a respondent sees next based on how a previous question was answered. Participants were taken to the end of the survey if they were not at least 18 years of age and a current student at the university. The survey also included questions related to a positive test for COVID-19 in the past year or the need to quarantine for 14 days due to exposure to a positive COVID-19 test. Time to complete the survey was approximately 10 minutes.

Demographic information was assessed with questions from the ACHA-NCHA II, a national survey of college students' current health behaviors and perceptions (ACHA, 2012). The ACHA-NCHA II is a public domain scale that is widely used among 40 colleges and universities and collected health related information from over 26,000 U.S. college students in 2008, which is the largest health information data set on college students. This study used nine self-report items from the ACHA-NCHA II including: age, gender, height and weight, year in school, enrollment status, ethnicity, marital status, and on/off campus residence. The ACHA-NCHA II is a public domain scale (ACHA, 2012).

PA was measured using the International Physical Activity Questionnaire (IPAQ) developed by Craig, Marshall, and Siostrom, 2003. The present study used a modified version of the IPAQ. Respondents included the frequency (times per week), intensity (low, medium, and high), duration (minutes per session), and type of exercises or sports that were completed within the last seven days. This information was used to calculate metabolic equivalent (METmin/week) by the following formula (IPAQ, 2004): Total METmin/week = (Walk METs*min*days) + (Mod METs*min*days) + (VigMETs*min*days). MET values were calculated using the following values: walking = 3.3 METs; moderate intensity = 4.0 METs; and

vigorous intensity = 8.0 METs. Nigg, Maddock, Barnett, and Yamauchi reported the IPAQ as a valid and reliable PA assessment scale in 2003, and Craig et al. demonstrated criterion validity of the IPAQ (rho = 0.30) in 2003. The IPAQ is in the public domain (IPAQ, 2004).

PA social support was assessed with the nine-item abbreviated version of a scale developed by Sallis, Grossman, Pinksi, Patterson, and Nader (1987) to assess PA social support from family and friends. The scale is composed of statements such as: My family or friends… "Gave me encouragement to stick with my exercise program," "Changed their schedule so we could exercise together," or "Talked about how much they like to exercise." A five-point Likert scale was used to rate items, ranging from never/rarely (1) to very often (5). Total scores for perceived social support were calculated by summing all items. Scores range from 9 to 45, with higher scores indicating greater social support. Internal consistency for the measure was high in this study (α = .93) for this scale. Previous research reported similar reliability (Kegler et al., 2012), and the scale has been validated in adult populations (Sallis et al., 1987; Treiber, et al., 1991).

PA self-efficacy was assessed using a five-item scale by Marcus, Selby, Niaura, and Rossi (1992). This instrument is used to measure an individual's ability to overcome common barriers to exercise by using internal resources, such as self-efficacy and self-confidence. The scale is composed of statements such as: "I am confident I can participate in regular exercise when…. "I am in a bad mood," "It is raining or snowing," "I feel I don't have the time." Responses to each item are answered on a Likert scale, and range from a 1 (not at all confident) to 7 (very confident). Responses of items were summed for a total score, which can range from 5 to 35, with higher scores representing greater self-efficacy to participate in PA. Internal

consistency for the measure was high in this study ($\alpha = 0.89$), which is comparable to previous reliability reports (McAuley and Mihalko, 1998).

Self-Esteem was measured with the Rosenberg Self-Esteem Scale developed by Dr. Morris Rosenberg (1965). There are 10 items, and possible responses range from strongly agree to strongly disagree. Example questions include "I am able to do things as well as most other people" and "I certainly feel useless at times." Scoring for questions 1,3,4,7,10 is as follows: strongly agree is 3, agree is 2, disagree is 1, and strongly disagree is 0. Scoring for questions 2, 5, 6, 8, 9 is in the reverse. The value for each question is summed together; a higher number represents a higher self-esteem. The reliability of this survey ranges from 0.82 to 0.88 and the internal consistency ranges from 0.77 to 0.88 (Rosenberg, 1965).

Body Image was measured with the Perceptions of Body Weight & Self-Image scale. Only one item from the scale was used in the survey: "Which of the following categories would you classify yourself?" Possible responses for this question range from very underweight to very overweight (very underweight=1, slightly underweight=2, normal weight=3, slightly overweight=4, very overweight=5). Lower scores indicate a perception of being very underweight, while higher scores indicate a perception of being very overweight.

 Procedures

Institutional Review Board approval was obtained before recruiting any participants for this study. Instructors from the Physical Education, Sport and Human Performance Department and the Basic Instruction Program were asked to send out the recruitment email that consisted of the informed consent and the link to the Qualtrics survey to their classes at a comprehensive,

southeastern university. Additionally, the recruitment email was posted in the daily student announcements weekly. Data collection was from December 1, 2020 until March 5, 2021. The survey took approximately 10 minutes to complete.

Statistical Analysis

Upon data collection, the data set was numerically exported to Excel to clean or get rid of entries that either contained unnecessary information or were missing too much information. The clean data set was imported into Statistical Packages for Social Sciences (SPSS) where frequencies were calculated for the demographic information. Next, the scales were scored according to the instrumentation mentioned earlier. Paired sample t-tests were used to compare vigorous, moderate, and walking PA behaviors, social support for PA (SSPA), self-efficacy for PA (SEPA), Rosenberg self-esteem, and body image (BI) prior to the COVID-19 shutdown and after the COVID-19 shutdown. The sums for vigorous, moderate, and walking PA were then calculated to find the totals for each variable. P-values from all variables were then evaluated to determine significance.

Chapter 4: Results

While 390 college students initiated the survey, a total of 311 participants (Table 1) were included in the data analysis, with varying responses for each scale; 79 students were excluded altogether due to large amounts of missing information. As indicated in Table 2, a total of 297 participants completed the modified IPAQ for pre-COVID and post-COVID data, 304 completed the PA for social support scale, 307 completed the scale for PA self-efficacy, 292 completed enough information for Rosenberg self-esteem, and 309 completed enough information for body image. Female participants made up 70% of the sample. More than half of the population (59%) were classified as upperclassmen or above. According to the demographics of the school population, there was a high representation of African American and Other students (45%) in the study, while Caucasian students made up the rest of the sample. Moreover, full-time students made up the majority of the sample (92%).

PA Totals for Vigorous, Moderate, and Walking-Only

Pre-COVID-19 PA totals: vigorous (M=2.57), moderate (M=3.29), and walking-only (M=4.64). Post-COVID-19 PA totals: vigorous (M=2.00), moderate (M=2.68), and walking-only (M=4.17) Thus, according to Table 2, paired samples t-tests showed significantly higher PA totals for vigorous, moderate, and walking-only PA levels before the COVID-19 shutdown (prior to March 15, 2020) than after (after March 15, 2020): vigorous (M=2.57; M=2.00; p=<.001), moderate (M=3.29; M=2.68; p=<.001), walking-only (M=4.64; M=4.17; p=<.001). M represents the average number of days per week that participants reported engaging in vigorous and moderate activities for at least 10 minutes at a time, as well as the average number of days per

week participating in walking-only activities. P represents the p-value or significance according to t-tests. Table 2 displays the PA totals for vigorous, moderate, and walking-only scales.

Psychometric Factors Related to PA

According to data presented in Table 2, dependent t-tests for psychometric factors related to PA displayed significantly higher findings before the COVID-19 shutdown occurred (prior to March 15, 2020) than after (after March 15, 2020): social support for PA (M=22.47; M=21.06; p=.007), self-efficacy for PA (M=15.16; M=13.96; p=<.001), self-esteem (M=24.05; M=24.88; p=.002), and body image (M=8.72; M=9.11; p =.002). M represents the average scores of the participants for each scale. P represents the p-value or significance according to t-tests. Table 2 demonstrates the values for each psychometric variable.

Chapter 5: Discussion

The purpose of this study was to compare physical activity (PA) behaviors and related psychometric factors before and after the COVID-19 shutdown (dated as March 15, 2020) among college students at a four-year, comprehensive, southeastern university. Paired samples t-tests suggested that PA levels, social support for PA, self-efficacy for PA, self-esteem, and body image were significantly higher before the COVID-19 shutdown occurred (prior to March 15, 2020) than after. These results suggest that the physical activity levels significantly decreased upon the COVID-19 shutdown, as well as several psychometric factors that could be related to physical and mental well-being, supporting the hypothesis that all variables would be significantly lower following the COVID-19 shutdown.

There are relatively few studies that have examined the impact of the COVID-19 pandemic on PA levels and related psychometric variables among college students. However, the significant decreases in PA in the present study are consistent with the findings of Coughenour et al. (2020) that found significantly higher self-reported minutes of PA scores among college survey participants prior to the stay-at-home order compared to after the stay-at-home order. Additionally, the results in the present study are also consistent with the significantly reduced PA levels reported during COVID-19 stay-at-home orders in Maher et al., (2021). With the decrease in self-reported PA scores following the COVID-19 shutdown, one could predict that related psychometric variables in the present study would also decline based on findings of previous research.

Overall, the pattern of results in the present study are consistent with previous literature. Among the college population, multiple studies have supported the notion that college students

who reported higher levels of support for PA engage in more PA behaviors than college students who reported lower levels of support (Bauman et al., 2012; Belanger & Patrick, 2017; Cotter & Lachman, 2010; King et al., 2014). Furthermore, one study associated PA with improvements in self-esteem and body image, suggesting that a decrease in PA would be associated with reductions in self-esteem and body image, which reflects the significantly lower self-esteem and body image scores in the present study following the decline in PA levels after the COVID-19 shutdown as compared to before (Fox, 2000). Not to mention, the present results are consistent with the claim that college students 18-25 years old who engage in regular PA are more likely to report higher self-esteem, optimism, and happiness as compared to their sedentary peers (Cekin, 2015).

Previous studies have also found a linear relationship between increases in PA and self-efficacy related to PA in women (Colangelo & Weissbrod, 2019; Marquez & McAuley, 2006). Additionally, in a study of college students, males reported both higher self-efficacies to engage in PA under challenging conditions compared to females, and males were not only more physically active than their female counterparts, but they also engaged in more vigorous and moderate minutes of PA per workout (Pauline, 2013). However, while researchers did not compare gender differences for totals of PA in the present study, the findings indicate that overall, PA and self-efficacy to engage in PA declined after the COVID-19 shutdown.

According to previous and recent literature on PA in college students, the significant decline in PA does not bode well for the mental well-being of the population. Among individuals between the ages of 13 and 34, Simon et al. (2004) found a protective correlation between an active lifestyle and suicide attempts (Simon et al., 2004); a similar study by Taliaferro et al.

(2009) indicated that cardiovascular exercise was protective against suicide risk among the college population (Taliaferro et al., 2009). Further, high amounts of self-reported PA were associated with greater psychological well-being in adolescents (15-20 years of age) (Ferron et al., 1999).

Additionally, in a systematic review that included 15 eligible articles, three involving college or university students, one with young adults, Violant-Holz et al. (2020) reported an association between lower PA levels and mental health distress, including stress, anxiety, depressive symptoms, social isolation, and psychological distress, suggesting that increased sedentary time and reduced PA levels during the COVID-19 pandemic have led to negative psychological effects in the adult and college populations (Violant-Holz et al., 2020). Another study by Wilson et al. (2021) examined the impact of the COVID-19 pandemic on college students' PA, perceived stress, and depressive symptoms, and observed that there was a significant decline in PA and an increase in perceived stress and depressive symptoms under COVID-19, but not under normal circumstances in a sample of primarily women and non-Hispanic white participants (Wilson et al., 2021); Guintella et al. (2021) documented similar findings in disruption of PA behaviors and increases in depression rates among the population (Guintella et al., 2021). These studies indicate that lower PA levels and increased sedentary time during the pandemic have negatively impacted the psychological health of college students, which may have compounded the stressors that college students already face during college. In a survey of 195 university students, Son et al. (2021) highlighted significant increases in stress and anxiety during the COVID-19 pandemic, and identified several stressors that contributed to the elevated levels of stress, anxiety, and depressive thoughts of the population, including fear and

worry about their own health and of their loved ones, difficulty in concentrating on school work, disruptions to sleeping patterns, reduced social interactions due to social distancing guidelines, and increased concerns about academic performance (Son et al., 2021).

Strengths and Limitations

Due to the spontaneous nature of the COVID-19 shutdown, there were relatively few studies that have examined the impact of the pandemic on PA behaviors and related factors among college students. However, to our knowledge, no published studies have compared PA behaviors and related psychometric variables, such as social support for and self-efficacy for PA, self-esteem, and perceptions of body image before and after the COVID-19 shutdown in the population. Thus, the findings in this study help to understand the short-term impact that the COVID-19 shutdown (after March 15, 2020) has had on the various measures in the population, and how the decline in these variables may have impacted their physical and mental well-being. Further, since 311 college students from a four-year, southeastern, comprehensive university participated in the study, the results are more generalizable to students at various universities across the U.S. Not to mention, there was a strong representation of African American and Other ethnicities (45%) according to demographics of the school population in the study (Winthrop University, 2019).

Limitations of the study may include self-reported PA levels and the reality that pre-COVID-19 and post-COVD-19 scores were recorded at the same time approximately nine months to a year following the COVID-19 shutdown (March 15, 2020), suggesting that the results could be subjective. Nevertheless, dependent t-tests showed that the scores for all variables were significantly higher before the stay-at-home orders than after. Furthermore,

researchers did not calculate metabolic equivalent (METmin/week) by the formula indicated in the IPAQ measure for PA; they also did not include time for walking-only PA. However, researchers did calculate the sums for vigorous, moderate, and walking PA days per week, and analyzed results via t-tests to determine significance. Additionally, this study is an exploratory cross-sectional study; researchers did not seek to find causation or determine specifically why levels were lower for all scales, which could be an area for a future research.

Future studies may also examine how the variables in the present study are impacted post-COVID-19 as compared to after stay-at home orders were issued (after March 15, 2020). From the present study, the post-COVID-19 shutdown results could be used as a baseline to compare data post-pandemic, or the findings from the pre-COVID-19 scores in the present study could be used as a guideline to compare variables post-COVID-19. Either way, a correlation of physical activity levels with overall mental health is of special value within the college population. Moreover, additional studies may consider evaluating the variables in the present study in various diverse or high-risk populations, such as Hispanics or older adults to examine the impact of the COVID-19 pandemic on their mental well-being. Lastly, future research could consider measuring variables, such as BMI or VO2max, to gain an understanding of how the pandemic has impacted physiological health of various populations, as well as the psychological impact of variables in the present study following a decline in PA.

Practical Application

According to the results from the dependent t-tests, the COVID-19 pandemic has negatively impacted the mental and physical health of college students. More specifically, it has impacted PA levels, social support and self-efficacy for PA, general self-esteem, and body

image. This is concerning due to the uncertainty and worry caused by the pandemic that has likely compounded these issues and may have added other stressors beyond the typical stressors of college students, such as difficulty in concentrating on schoolwork and disruptions to sleeping patterns (Son et al., 2021). One study comprised of mostly female undergraduates reported a significant rise in depressive symptoms and a reduction in overall well-being under lockdown conditions (April/May 2020) as compared to pre-pandemic (fall 2019), suggesting that the mental health of female college students has worsened during the stay-at-home orders, and that their mental well-being may have continued to decline or remained at lower levels throughout the pandemic (Evans et al., 2021). Although participants in this study included female college students, the study may also be generalizable to college students as a whole.

Among college students, findings from this study emphasize the need for PA as a protective factor against adverse mental health outcomes, especially during challenging situations, such as a pandemic. Additionally, campuses should educate students on the importance of PA for their overall health, and they should amplify these efforts in times of crisis. Several published studies have observed positive associations between PA and overall well-being in the population. Based on this information, colleges and universities should continue to offer safe and effective recreational activities and activity courses, as well as health services to combat poor mental health conditions, even when facing challenges; these services should continue whether students are on or off campus. Services may include in-person or virtual health visits and group fitness classes that are accessible to all students regardless of their living arrangements. Furthermore, colleges and universities could offer webinars, wellness days, and campus health checks to address these issues on a semester-by-semester basis.

Moreover, inclusion of activities that promote social support, self-efficacy, and self-esteem would also help to address the issues related to the mental health concerns that may be associated with reduction of physical activity within the college student population. A study of college-aged women who participated in a 12-week yoga intervention twice weekly found a significant increase in body-image satisfaction, which is associated with self-esteem, suggesting that yoga programs may be an effective way to improve the self-esteem of female college students (Ariel-Donges et al., 2019). Not to mention, multiple published studies have reported improved psychological well-being, including reduced stress and anxiety levels, following yoga interventions (Ensari et al., 2016; Smith et al., 2007), which were significantly elevated in college students during the COVID-19 shutdown according to recent literature (Son et al., 2021; Violant-Holz et al., 2020; Wilson et al., 2021).

Furthermore, a study consisting of 94 first-year college students found relationships between higher levels of self-reported social support and self-efficacy, lower levels of perceived stress, and higher levels of life satisfaction. Thus, researchers proposed several ways that colleges could establish social support networks, such as first-year orientation programs that include social opportunities and introductions to academic requirements, as well as a continuation of support programming throughout the academic year (Coffman & Gilligan, 2002). This research suggests that there are various activities that campuses can implement to improve the social support, self-efficacy, and life satisfaction of college students. While this particular advice may be more suited for traditional circumstances on college campuses, it can and should be implemented in times of crisis, whether through in-person or virtual formats, to aid in reducing mental health concerns that may be related to decreased PA. Nonetheless, previous

literature indicates that increasing PA in college students may be the most effective way to improve the related psychometric variables in the present study. Thus, colleges and universities should encourage and educate students on the importance of PA, and they should offer various social activities to improve the overall well-being of students, especially when facing challenges.

Conclusion

Information from the present study highlight the importance of PA as a protective factor against adverse mental health outcomes, especially during challenging situations, within the college population. Because of this, campuses should provide education on the positive associations between PA and overall health. Colleges and campus recreation centers should continue to offer safe and effective recreational activities and health services to combat negative psychological well-being, whether students are on or off campus; they should amplify their efforts when facing challenges, such as a global pandemic. Furthermore, in addition to PA promotion, inclusion of activities that promote social support, self-efficacy, and self-esteem may aid in the improvement of mental health among college students.

Table 1

CHARACTERISTICS

	N	%
GENDER	310	
Male	94	30.3
Female	216	69.7
YEAR IN SCHOOL	311	
Freshman	69	22.2
Sophomore	58	18.6
Junior	50	16.1
Senior or above	134	43.1
RACE/ETHNICITY	311	
African American	103	33.1
Caucasian	172	55.3
Other	36	11.6
ENROLLMENT STATUS	310	
Full-time	285	91.9
Part-time	25	8.03

Note: n= number of participants, %= percent of participants

Table 2

T-test Results Comparing Participants' Pre-COVID-19 and Post-COVID-19 PA Levels, Social

Support and Self-Efficacy for PA, Self-Esteem, and Body Image

Sample Values of Variables	N	Pre-COVID* Mean	Post-COVID* Mean	P-Value
Vigorous PA	297	2.57	2.00	<.001
Moderate PA	297	3.29	2.68	<.001
Walking PA	297	4.64	4.17	<.001
Social Support for PA	304	22.47	21.06	.007
Self-Efficacy for PA	307	15.16	13.96	<.001
Rosenberg Self-Esteem	292	24.88	24.05	.002
Body Image	309	8.72	9.11	.002

Note: n= number of participants, Pre-COVID* Mean= mean scores prior to COVID-19
shutdown (before March 15, 2020), Post-COVID* Mean= mean scores after COVID-19
shutdown (after March 15, 2020), P-Value= significance of paired samples t-tests

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Appendix A

Dear Winthrop Student,

You are invited to take part in a research study whose purpose is to examine physical activity behaviors and beliefs of college students prior to and during the COVID-19 event.

This study is open to adults over the age of 18. Your decision to take part in this study is voluntary. You are free to choose whether or not you will take part in the study. Even if you decide to participate now, you may change your mind and stop at any time.

Your participation will last about 5-10 minutes and you will be completing an anonymous online survey. Researchers will make no attempt to link your survey responses to you. We may publish the results of this study but will not include any information that would identify you.

If you have questions about this research study, you may contact me, James White, via email at whitej40@winthrop.edu or my faculty advisor, Dr. Joni Boyd, at boydj@winthrop.edu or 803-323-4936.

If you choose to participate in the survey, please click the link to access it.
https://winthropstudents.qualtrics.com/jfe/form/SV_0lblqUmeIMCevDn

Thank you very much for your time and participation!

James White

Appendix B

Q28 You are invited to take part in a research study whose purpose is to examine physical activity behaviors of college students prior to and during the COVID-19 event. Specifically, the study will evaluate physical activity, social support to exercise, self-efficacy to exercise, self-esteem, and perceptions of body weight and self-image. This study is open to adults over the age of 18. Your decision to take part in this study is voluntary. You are free to choose whether or not you will take part in the study. Even if you decide to participate now, you may change your mind and stop at any time. You may choose not to answer an individual question, or you may skip any section of the survey. Simply click "Next" at the bottom of the survey page to move to the next question. Your participation will last about 5-10 minutes and you will be completing an anonymous online survey. This project is deemed as no more than minimal risk. The research team does not foresee or anticipate any risk greater than that encountered in your routine daily activities.

While you may not receive any direct benefit for participating, we hope that you gain satisfaction from contributing to this study, and we hope that this research will lead to a better understanding of the effects of COVID-19 on physical activity behaviors in young adults. If you are interested in learning the results of the study, you may contact the researchers after 4/30/2021. Your cost to participate in the study is the time that you will dedicate to this activity. Researchers will make no attempt to link your survey responses to you. We may publish the results of this study but will not include any information that would identify you. If you have questions about this research study, you may contact me, James White, via email at whitej40@winthrop.edu. You may also contact me through my faculty advisor, Dr. Joni Boyd, at boydj@winthrop.edu or 803-323-4936. You may also contact:Grants and Sponsored Research DevelopmentWinthrop UniversityRock Hill, SC 29733Telephone: 803-323-2460 The Winthrop University Institutional Review Board has determined that this study is exempt from IRB oversight. By clicking on "Yes, I agree to participate," you agree that you have read this informed consent agreement, you understand what is involved, and you are consenting to participate in this research study. If you do not wish to participate, select "No, I do not wish to participate" to exit the survey.

Q2 Choose your age range

○ 17 or younger (1)

○ 18 or older (2)

Skip To: End of Survey If Q2 = 17 or younger

Q3 Are you currently enrolled at Winthrop University (Fall 2020 or Spring 2021)?

○ yes (1)

○ no (2)

Skip To: End of Survey If Q3 = no

Q4 Have you tested positive for COVID-19 within the past year?

○ yes (1)

○ no (2)

Q5 Have you been in quarantine for 14 days due to contact tracing in the past year?

○ yes (1)

○ no (2)

End of Block: Screening Questions

Start of Block: Demographics

✱

Q6 How old are you in years? (type the number out) ex: twenty-three years old

_____

Q7 What is your gender?

○ Male (1)

○ Female (2)

Q8 What is your height?

○ 5'1 (1)

○ 5'2 (2)

○ 5'3 (3)

○ 5'4 (4)

○ 5'5 (5)

○ 5'6 (6)

○ 5'7 (7)

○ 5'8 (8)

○ 5'9 (9)

○ 5'10 (10)

○ 5'11 (11)

○ 6'0 (12)

○ 6'1 (13)

○ 6'2 (14)

○ 6'3 (15)

○ 6'4 (16)

○ 6'5 (17)

○ 6'6 (18)

○ 6'7 (19)

○ Other (20) _____

Q9 What is your weight in pounds?

_____

Q10 What is your year in school?

○ 1st year undergraduate (1)

○ 2nd year undergraduate (2)

○ 3rd year undergraduate (3)

○ 4th year undergraduate (4)

○ 5th or more year undergraduate (5)

○ Graduate or professional (6)

○ Not seeking a degree (7)

○ other (8) _____

Q11 What is your enrollment status at this time? (Choose One)

○ Full-time (1)

○ Part-time (2)

Q12 How do you usually describe yourself? (Choose One)

○ White (1)

○ Black or African American (2)

○ Hispanic or Latino/a (3)

○ Asian or Pacific Islander (4)

○ American Indian, Alaskan Native, or Native Hawaiian (5)

○ Biracial or Multiracial (6)

○ Other (7) _____

Q13 Were you enrolled in a physical activity course for the spring, summer, or fall 2020 semesters? Check all that apply.

☐ Spring 2020 (1)

☐ Summer 2020 (2)

☐ Fall 2020 (3)

End of Block: Demographics

Start of Block: International Physical Activity Questionnaire Short Form

Q14 This question will ask you to report your physical activity habits before and during the COVID-19 pandemic. Please think about a typical 7-day period before COVID-19 (before March 15, 2020) and during the COVID-19 pandemic (since March 15, 2020). We will ask you to report the number of days you performed vigorous, moderate, or walking-only activities during a typical 7-day period.   **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal.   **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.   **Walking-only** activities refer to activities where the only movement was walking.   Please respond to the question in the left column by thinking about a typical

seven-day period before COVID-19 (on or around March 15).   Then respond to the question in the right column by thinking about a typical seven-day period since COVID-19 began (since March 15).

	Within a typical 7-day period before COVID-19 (before March 15, 2020)?	Within a typical 7-day period during COVID-19 (since March 15, 2020)?
	Please enter a whole number 0 to 7. (1)	Please enter a whole number 0 to 7. (1)

Please enter the number of days per week you participated in **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling for at least 10 minutes at a time. (1)		
Please enter the number of days per week you participated in **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis for at least 10 minutes at a time. (4)		
Please enter the number of days per week you participated in **walking-only** activities. This could include walking at work or home, from place to place, or for recreation or leisure. (5)		

Q15 This part of the survey asks you about your family or friends support of your exercise and physical activity habits before and during COVID-19. There are no right or wrong answers. You can choose any number from 1 to 5, with the numbers denoting the following:

1 = none or does not apply

2 = rarely
3 = a few times
4 = often
5 = very often

Using the following scale, rank how many times have your family (or members of your household) or your friends have provided support of your exercise and physical activity habits before COVID-19 and during the COVID-19 pandemic.

	Prior to COVID-19 (before March 15, 2020), how often did your friends and/or family members.....					During the COVID-19 pandemic (since March 15, 2020), how often did your friends and/or family members....				
	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)

Exercised with me. (1)	○	○	○	○	○	○	○	○	○	○
Offered to exercise with me. (2)	○	○	○	○	○	○	○	○	○	○
Gave me helpful reminders to be active ("Are you going to exercise tonight?") (3)	○	○	○	○	○	○	○	○	○	○
Gave me encouragement to stick with my exercise program. (4)	○	○	○	○	○	○	○	○	○	○
Changed their schedule so we could exercise together. (5)	○	○	○	○	○	○	○	○	○	○
Discussed exercise with me. (6)	○	○	○	○	○	○	○	○	○	○
Planned for exercise on recreational outings. (7)	○	○	○	○	○	○	○	○	○	○
Helped plan activities around my exercise. (8)	○	○	○	○	○	○	○	○	○	○
Talked about how much they like to exercise. (9)	○	○	○	○	○	○	○	○	○	○

End of Block: Social Support and Exercise

Q16 This part of the survey asks you about your confidence to participate in exercise in different situations, specifically before and after the COVID-19 pandemic. Please rate your confidence from 1 to 5, with 1 being "not at all confident" and 5 being "very confident." You can choose any number from 1 to 5.

Not at all confident = 1
Very confident = 5

Rate your confidence to exercise before COVID-19 (prior to March 15, 2020) in the left answer column, and your confidence to exercise since COVID-19 (since March 15, 2020) in the right answer column.

	Answer the statements regarding your confidence to participate in exercise in different situations on or prior to March 15, 2020 (before COVID-19)					Answer the statements regarding your confidence to participate in exercise in different situations after March 15, 2020 (during COVID-19)				
	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)

I am confident I can exercise when I am tired. (1)	○	○	○	○	○	○	○	○	○	○
I am confident I can exercise when I am in a bad mood. (2)	○	○	○	○	○	○	○	○	○	○
I am confident I can exercise when I don't have the time. (3)	○	○	○	○	○	○	○	○	○	○
I am confident I can exercise when I am on vacation or traveling. (4)	○	○	○	○	○	○	○	○	○	○

| I am confident I can exercise when it is raining, snowing, or too hot, or the weather is bad. (5) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Q17 This section asks you to rate how much you agree or disagree with statements dealing with general feelings about yourself.

SA = Strongly Agree
A = Agree
N = Neutral
D = Disagree
SD = Strongly Disagree

Rate your self-esteem to before COVID-19 (prior to March 15, 2020) in the left answer column, and your self-esteem since COVID-19 (after March 15, 2020) in the right answer column.

	Answer the statements dealing with your general feelings about yourself on or prior to March 15, 2020 (before COVID-19).					Answer the statements dealing with your general feelings about yourself since March 15, 2020 (during COVID-19).				
	SA (1)	A (2)	N (3)	D (4)	SD (5)	SA (1)	A (2)	N (3)	D (4)	SD (5)

On the whole, I am satisfied with myself (1)	○	○	○	○	○	○	○	○	○	○
At times, I think I am no good at all (2)	○	○	○	○	○	○	○	○	○	○
I feel that I have a number of good qualities (3)	○	○	○	○	○	○	○	○	○	○
I am able to do things as well as most people (4)	○	○	○	○	○	○	○	○	○	○
I feel I do not have much to be proud of. (5)	○	○	○	○	○	○	○	○	○	○
I certainly feel useless at times. (6)	○	○	○	○	○	○	○	○	○	○

I feel that I am a person of worth, at least on an equal plan with others. (7)	○	○	○	○	○	○	○	○	○	○
I wish I would have more respect for myself. (8)	○	○	○	○	○	○	○	○	○	○
All in all, I am inclined to feel that I am a failure. (9)	○	○	○	○	○	○	○	○	○	○
I take a positive attitude toward myself. (10)	○	○	○	○	○	○	○	○	○	○

End of Block: Rosenberg Self-Esteem

Start of Block: Perceptions of Body Weight and Self-Image

Q18 Which of the following categories would you classify yourself?

	Very Underweight (1)	Slightly Underweight (2)	Normal Weight (9)	Slightly Overweight (10)	Very Overweight (11)
How would you classify yourself on or prior to March 15, 2020 (before COVID-19)? (6)	○	○	○	○	○
How would you classify yourself since March 15, 2020 (during COVID-19)? (7)	○	○	○	○	○

End of Block: Perceptions of Body Weight and Self-Image