# Effects of Physical Activity on Affectivity in College Students: Mediating Role of Self-Esteem

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## Author Note

I have no conflicts of interest to disclose.

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**Abstract**

Archival data from 720 undergraduate students from the University of Washington, Tacoma, concerning level of physical activity, self-esteem, and positive affect (PA) were used to determine if level of exercise predicts affectivity and self-esteem and to explore the mediating effects of self-esteem within the relationship between physical activity and positive affect. In addition, the predictive relationship between self-esteem and positive affect was explored. Results indicated higher levels of physical activity were predictive of positive affect but not of self-esteem and that self-esteem is not a mediating factor between physical activity and affectivity. Results also showed that self-esteem was not predictive of positive affect. Incidental findings showed that self-esteem is predictive of negative affect (NA). The results described suggest PA is influenced by physical activity which is similar to historical findings. However, results did not show that self-esteem acts as a mediator within the relationship of physical activity and affectivity. Results also indicated that self-esteem is predictive of NA, but not predictive of PA. Interpretation of these results, along with limitations, clinical implications, and recommendations for future research, are subsequently discussed.

*Keywords:* physical activity, positive affect, negative affect, self-esteem

# Chapter 1

## Introduction

Attending college or university is often an exciting time for those who set out to pursue higher education. However, stressors that often accompany this endeavor can be significant and may lead to a decrease in psychological well-being. Students who transition from high school to college are often met with a significant change in social environments (e.g., living arrangements, social network), increased responsibilities (e.g., personal health, finances, academic stress), and developmental milestones (e.g., increased independence, identity development). This stage is often marked with increased stressors as students also manage personal and/or familial issues, interpersonal and romantic relationships, and face future uncertainties. Older students who return to college may face difficulties with the balance of academic demands with raising kids, maintaining relationships, work, finances, and other responsibilities.

The demands of college and university life can lead students to give up on their desire for higher education and leave prematurely (Maher et al., 2021). Approximately 60% of students leave before they have completed 2 years of college courses, due to stressors (Farzaneh, 2016; Friedlander, 2007). The benefits of securing a college degree cannot be understated, not only on an individual level, but on a societal level as well. On an individual level, college graduates' benefit from higher pay, more career opportunities, job stability, job satisfaction, medical benefits, and retirement benefits, which can make pursuing a degree highly appealing. In terms of societal implications, the Association of Public and Land-Grant Universities (2021) asserted that college graduates are 24% more likely to gain employment and make at least $30,000 more annually than those who do not obtain a degree. In addition, those with a bachelor's degree are more likely to take participate in voting for elected officials which is an important contribution to

societal issues. They are also less likely to rely on public assistance than those with only a high school degree, which is a positive benefit in terms of economics. Consequently, identifying ways in which psychological components contribute to college completion is important to reap benefits not only on an individual level, but a societal level as well.

## Academic Stressors, Affect, and Adjustment

Academic stressors and affectivity play a significant role in a student's level of adjustment to their college environment (Alsulami et al., 2018; Farzaneh et al., 2016; Maher et al., 2021). Awareness of how these factors contribute to completion and dropout rates are necessary to increase positive student interaction with their college environment and increase rates of college completion (Alsulami et al., 2018; Farzaneh et al., 2016; Maher et al., 2021).

### Academic Stressors

Academic stress (AS) refers to the physiological response to academic-related difficulties that extends beyond a student's ability to adapt (Alsulami et al., 2018). Approximately 10%–30% of students will face some level of AS when attending college (Alsulami et al., 2018). Although some level of academic stress is expected, heightened and unmanaged stress may lead to mental health issues and/or drop out (Agolla & Ongori, 2009). The most reported contributors to AS includes heavy workload, lack of resources for assignment completion, competition among students, student–teacher ratio, and future job uncertainties (Agolla & Ongori, 2009). Considering high rates of college incompletion, college and universities should focus on the source of stressors experienced by students and find practical and creative ways to decrease academic related stress.

**Affect, and Social, Academic, and Psychological Adjustment**

Positive and negative affect are critical components to psychological adjustment, particularly in college students (Rogers et al., 2018). Trait affectivity is a temperamental feature closely linked to an individual's capacity to experience and express positive or negative emotions (Harding et al., 2014). Individual differences in trait affectivity are noticeable beginning in early childhood and remain fairly stable throughout the lifespan (Harding et al., 2012). Trait positive affect (PA) refers to the expression of pleasurable emotions such as joy, pride, enthusiasm, and excitement. On the other hand, trait negative affect (NA) refers to expressed negative emotions such as anger, hate, weariness, shame, fear, and irritability (Civitci, 2015; Harding et al., 2012; Maher et al., 2021). The concept of subjective well-being, which is an indicator of happiness, is made up of positive and negative affectivity (Civitci, 2015). Research has demonstrated that low levels of PA and high levels of NA have been linked to unhappiness and psychological issues such as depression and anxiety (Ahadi et al., 2018; Arger et al., 2012; Harding et al., 2014; Varma, 2017).

Early research has indicated that PA is a cause of success rather than an outcome and is a hallmark of psychological wellbeing (Lybomirsky et al., 2005). Individuals who experience frequent PA are seen as confident, optimistic, and self-sufficient. They tend to view others in a positive light and are social, active, and exhibit a high level of prosocial behaviors (Lybomirsky et al., 2005). They also possess effective coping skills in high stress situations and are flexible in a new environment and when added stressors arise (Farzaneh et al., 2016). All these characteristics taken together promote participation with the social and physical environment and motivation to achieve personal goals which is particularly important for college students as they face various transitions (Lybomirsky et al., 2005). Research has shown that trait affectivity

influences various facets of college adjustment, including social, academic, and psychological domains (Rogers et al., 2018).

Academic adjustment refers to the capacity in which students manage educational demands including drive to complete assignments, effort to be successful academically, ability to meet academic standards, and satisfaction with college environment (Friedlander et al., 2007). Psychological adjustment refers to an individual's capacity to positively interact with their new social and physical environment (Kyalo et al., 2011). In the university setting, college students must learn to adapt to social norms and official and nonofficial rules of the school (Farzaneh et al., 2016). Social adjustment refers to a student's level of participation in social events and activities which facilitate the formation of relationship with others. In the process of adaptation, students learn to both desocialize and socialize. In desocialization, students often alter or set aside personal values and belief systems in which they previously held and are no longer effective in the university environment (Paskarla & Terenzini, 1995). In socialization, students often develop new or transform their values and worldviews to flourish in their new setting (Paskarla & Terenzini, 1995). Student satisfaction with social domains in a university setting suggests positive social adjustment. Students who do not effectively adjust to the social environment report loneliness and perceived low levels of support, opportunities, and interaction with others (Farzaneh et al., 2016). Student satisfaction with social environment is a critical component to facilitating college completion.

Farzaneh et al. (2016) conducted a study to determine if college adjustment could be predicted by affectivity. A total of 6,546 university students were administered the Positive and Negative Affects Scale (PANAS) and the Adjustment to College Questionnaire. Results indicated that PA and NA were predictive of college adjustment. Students with higher levels of

PA were found to have higher levels of success within domains of social and academic adjustment (Farzaneh et al., 2016). Likewise, higher levels of NA played an inhibitive role in student adjustment to college in the social domain (Farzaneh et al., 2016). In other words, the higher their NA, the less students were able to assimilate into the social environment and find satisfaction through interpersonal relationships. In addition, it was found students with higher reported NA had lower academic adjustment. Similarly, Moosavi et al. (2009) revealed educational adjustment and academic success can be predicted by emotional hygiene. Students who functioned well emotionally and maintained positive emotions fared significantly better in terms of academic adjustment and had higher rates of educational success (Moosavi et al., 2009). Considering the impact on college success, it is important for college and university counseling centers to focus on strategies to improve PA and reduce NA in students.

Research has shown that social communication is enhanced by PA, which promotes positive social adjustment as compared to students with high NA who reported much lower levels of positive relationships and social adjustment in college (Farzaneh et al., 2016; Rogers et al., 2018). Additionally, research has demonstrated that an individual's ability to remain positive and optimistic stems from PA which largely contributes to the ability to form friendships, an important component to social adjustment in college (Farzaneh et al., 2016). Rogers et al. (2018) found that the trajectory of affective states among first-year college students varied. Specifically, students began the year with high PA which tapered off across the 1st semester. They also found increased levels of PA and decreased levels of NA when students interacted positively with their family and friends (Rogers et al., 2018). Conversely, it was found that NA significantly increased when students experienced conflict with friends and family (Rogers et al., 2018). These results indicate that positive contact with friends and family may act as a protective measure for

transitioning college students (Rogers et al., 2018). Farzaneh et al. (2016) found that PA played a mediating role between symptoms of distress and psychological adjustment to university life in college students (Farzaneh et al., 2016). This is in line with other studies that found affectivity to be strongly linked to psychological distress. Specifically, Chang et al. (2007) found affectivity to mediate the relationship between resilience and psychological distress. Based on these findings, it is important for college and university counseling centers to implement strategies for those who tend to characteristically be low in PA and high in NA to foster more positive social relationships. In addition, it is important programs mitigate reasons for a decrease in PA in students after the 1-year mark.

**Physical Activity, Affectivity and Mental Health**

Physical activity is defined as the act of moving the body in a manner that expends energy (World Health Organization [WHO], 2020). A plethora of research have demonstrated the positive benefits of physical activity on social, physical, and affective functioning (Fiuza-Luces et al., 2013; Kandola et al., 2016; Maher et al., 2021; Weidner et al., 1996). The ability to change or maintain healthy behavior (e.g., exercise, diet) in times of stress is highly faceted by the influence of PA and NA (Kandola et al., 2016; Maher et al., 2021). Consequently, health behavior changes are frequently accompanied by affective changes, often going from PA into NA (Wunsch et al., 2017). Research has indicated healthy behaviors are positively correlated with higher levels of PA in periods of low stress (Wunsch et al., 2017). Moreover, an individual's tendency toward PA or NA can impact the way in which students respond to the demands of college life, their ability to graduate, and successful transition into the workforce. Those with high levels of PA are more likely to effectively cope with negative experiences that accompany this stage of life (O'Hara et al., 2014). Programs to facilitate healthy affectivity are

not only beneficial for college completion but will also help students to matriculate effectively throughout their careers.

To the contrary, when stress levels are high, NA increases significantly and a decline in PA and health behaviors occur. This indicates a steady PA temperament may be correlated to adaptive health behaviors during times of high AS (Wunsch et al., 2017). A study by Wunsch et al. (2017) examined student participation in physical activity and how this influenced affective states during high AS periods. They found students who participated in physical activity had higher PA and lower NA than student who were sedentary (Wunsch et al., 2017). This is consistent with historical findings in which Weidner et al. (1996) found that affective states were directly related to health behaviors such as physical activity. Stressful periods were marked with significant decreases in physical activity accompanied by decreased positive affectivity (Weidner, 1996). Thus, indicating physical activity can act as a safeguard against negative affect by increasing PA during periods of high academic stress (Wunsch et al., 2017). Steptoe et al. (1995) noted, over the course of 1 year, physical activity is the most easily changeable and time-consuming health behavior that is often decreased during times of high academic stress periods. In addition, Steptoe (1995) asserted routine health behaviors are less likely to be affected by stress than unstable health behaviors. Thus, a regular routine involving physical activity may be a protective factor against stressors.

Low levels of physical activity have been further exacerbated by current restrictions due to the COVID-19 global pandemic as access to campus recreation and social resources have diminished (Maher et al., 2021). Another study by Maher et al. (2021) examined the relationship between physical activity and affectivity in college students in light of the recent COVID-19 global pandemic. Many students are reeling from the effects of limited or nonexistent

recreational resources often provided by college and universities as restrictions have been put in place to reduce viral spread (Maher et al., 2021). Maher et al. examined the relationship between physical activity and affectivity in college students both before and after the COVID-19 global pandemic. Results indicated a drastic decrease in physical activity and PA and a significant increase in NA since stay-at-home orders and other restrictions were put into place (Maher et al., 2021), thus confirming a strong correlation between physical activity and affectivity. Considering this correlation, it is important for college and universities to promote participation in physical activities that can be done in adherence to quarantine or social distancing restrictions.

Gaskins et al. (2014) examined effects of an 8-week vinyasa yoga program on affectivity in college students. Results indicated significantly higher PA and reduced NA among college students immediately following classes. In addition, they found the positive impact on affectivity was sustained longitudinally (Gaskins et al., 2014). Taken together, these studies indicate physical activity may be a vehicle to increase PA in college students, particularly as they face stress related to college life.

Research suggests physical activity (e.g., aerobics, yoga, strength training) can be equally as efficacious in treating various psychiatric disorders such as depression and anxiety (Qureshi & Al-Bedah, 2013). There are several benefits to prescribing exercise as an intervention to treat mental illness (Kandola et al., 2016; Quereshi & AlBehah, 2013). First, the risk of side effects from physical activity is significantly reduced and there are little or no associated costs (Heinzel et al., 2015). Physical activity also helps to combat stigma associated with mental health treatment as physical activity can be easily prescribed by a primary care physician, eliminating the need for patients to specifically seek out a mental health provider. Physical activity has also

been directly correlated to reduced risk of cardiovascular disease and higher overall rates of physiological health (Blumenthal et al., 2007).

Physical activity has been well documented as an effective means to significantly reduce stress and increase positive affectivity and levels of self-esteem (Kavosi et al., 2015). Despite these documented benefits, level of participation in physical activity has been found to be exponentially lower than recommended levels in college students, with approximately only 19% reporting meeting recommendations (American College Health Association, 2013). According to the WHO, adults should participate in a minimum of 2.5 hours of moderate intensity, or 75 minutes of vigorous physical activity per week. Recommendations also state that a combination of cardio and muscle strength training are needed to reap the full benefits of physiological and mental health (Zamani et al., 2016). Several cross-sectional studies have found a connection between physical activity and depression (Jerstad et al., 2010). Physical activity impacts depression by increasing monoamine neurotransmitters serotonin (5-HT), dopamine (DA) and norepinephrine (NE). Monoamines are responsible for various functions in the brain such as mood, attention, and cognition (Hasler, 2010). Increase of these specific neurotransmitters works to increase PA which subsequently reduces the risk of depressive symptoms (Hasler, 2010). The monoamine-deficiency theory states depression is the result of reduction of monoamines neurotransmitters suggesting treatments to correct deficiencies will have an antidepressant effect (Hasler, 2010). Previous studies have indicated an increase in monoamines in both plasma and urine are present in participants directly after exercise (Craft & Perna, 2004).

Physical activity may also operate as a diversion to negative affect which moderates the risk of potential maladaptive coping strategies (Jerstad et al., 2010). Jerstad et al. (2010) examined correlations between physical activity and the future risk of depression in adolescent

girls. Results of the analysis indicated physical activity acts as a protective measure against onset of depression as it often provides more opportunities for social interactions, enjoyment and satisfaction, and self-efficacy (Jerstad et al., 2010). In addition, Jerstad et al. found depression mediates the quantity of physical activities participated in by teenage girls. In a similar meta-analytic study by Heinzel et al. (2015), effects of exercise were found to have an antidepressant effect on a geriatric population of chronically depressed patients as well. Given the documented benefits of physical activity on affectivity and mental health issues in various populations, programs that integrate or promote adequate exercise are worthwhile in terms of promoting college success through positive mental health.

**Self-Esteem and Physical Activity**

The construct of an individual's positive self-esteem is a fundamental mechanism that has a profound impact on an individual's social, emotional, and mental health (Mann, 2004; Zamani Sani et al., 2016). Self-esteem refers to an individual's level of self-confidence, self-worth, and self-respect (Ummet, 2015). In other words, it is the appraisal of one's self-image versus their ideal self. Subjective evaluations of oneself govern their personal thoughts, behaviors, and the concept of who they are as a person (Harris et al., 2020; Mann, 2004). Self-esteem is important as it is a construct that develops consistently over the lifespan (Harris et al., 2020; Mann, 2004). Moreover, research has indicated that happiness is most often determined by levels of self-esteem, which is considered to be its most influential predictor (Mann, 2004; Sato & Yuki, 2014).

The most influential factors that contribute to academic performance are academic and life stressors, depression, and self-esteem, in college students (Alsulami et al., 2018; Maher et al., 2021). Academic performance has important life implications such as whether a student will

graduate and move forward to obtain meaningful and gainful employment. There is a substantial body of literature that demonstrates the impact of self-esteem on academic performance and other life outcomes such as job satisfaction, occupational status, and psychological health (Alsulami et al., 2018; Harris et al., 2021; Jirdehi et al., 2018). Specifically, the positive correlation between self-esteem and academic performance has been found to be strong (Harris et al., 2021). In other words, those with higher levels of self-esteem enjoy greater academic achievement (Jirdehi et al., 2018). Interestingly, researchers found that student grades can be positively impacted through interventions that specifically target enhancement of self-esteem (Alsulami et al., 2018).

Several theories attempt to explain the function of self-esteem. The sociometer theory posits an evolutionary underpinning suggesting that the need for social inclusion has several adaptive benefits, such as the possibility of information sharing (Sowislo & Orth, 2013). The theory posits that the system of self-esteem is an individual's perception of their personal effectiveness in managing interpersonal relationships, and the process of monitoring their status of either being accepted or rejected in a desired social setting (Sowislo & Orth, 2013). Therefore, individual perceptions of low relational value will cause low levels of self-esteem. As a result, individuals will be driven to participate in behaviors that increase social acceptance (Sowislo & Orth, 2013).

Terror management theory suggests that the fundamental motivation for individuals is to identify with cultural values and social groups to manage feelings of terror that come with the realization of death. For example, religious beliefs often promise life after death (i.e., literal immortality) or being a part of something such as family lineage that will continue to exist after an individual dies (i.e., symbolic immortality). When an individual upholds their cultural or

personal values, their self-esteem is often raised and their deeply seeded fear of death is significantly reduced (Sowislo & Orth, 2013). The inferential concept within these theories is that there is a correlation between self-esteem and psychological regulation. The assumption within terror adjustment theory is that self-esteem acts as a protective measure against anxiety (Sowislo & Orth, 2013). In sociometer theory, self-esteem is correlated to psychological regulation through the benefits brought forth through social acceptance (Sowislo & Orth, 2013). The consequence of social exclusion, such as isolation and limited social support, significantly raises the risk of mental health issues (Sowislo & Orth, 2013).

It has been well established that self-esteem plays a role in psychological well-being (Mann et al., 2004; Saleh et al., 2017). Low levels of self-esteem tend to lead to mental instability whereas positive levels of self-esteem are associated with mental well-being (Mann et al., 2004). First-year university students who reported high levels of self-esteem also reported enhanced physical and psychological outcomes (Mann et al., 2004). Han (2005) found a significant relationship between self-esteem and symptoms of stress among 369 university students. Results revealed self-esteem as a significant predictor of stress symptoms among this population. This is in line with a study conducted by Saleh et al. (2017) in which perceived stress and self-esteem were assessed in 483 college students. Results showed students had high levels of stress and anxiety and low levels of self-esteem. Furthermore, results indicated perceived stress was a significant predictor of self-esteem among this population (Saleh et al., 2017).

Meeting and satisfaction of basic psychological needs are important factors in the development of self-esteem. According to self-determination theory, three basic individual needs exist, namely autonomy, competence, and relatedness. Autonomy refers to an individual's consideration of personal inherent processes and their ability to act independently, with

confidence in their decisions (Ummet, 2015). Those who live autonomously make their own choices about how to conduct their life and accept the consequences of their decisions. Competence refers to an individual's ability to manage and organize skill and judgement to achieve a goal, in a self-approving manner (Ummet, 2015). Individual competence is developed by learning to interact appropriately to a given environment. Relatedness refers to the ability of an individual to place confidence in the provision and leadership of others. It is the ability to feel a sense of closeness and belonging with others in a social environment (Ummet, 2015). Psychological well-being and fulfilment of basic psychological needs are highly correlated. Autonomy, competence, and relatedness are important developmental variables that contribute to formation of self-esteem. Ummet (2015) conducted a study on 342 college students to find out if fulfillment of basic psychological needs would predict self-esteem. Results indicated that autonomy and relatedness needs were predictive of self-esteem with autonomy being the highest predictor of self-esteem (Ummet, 2015).

Self-esteem also plays a significant role in level of adjustment to college life (Friedlander et al., 2007; Nordstrom et al., 2014; Pasha & Munaf, 2015). In fact, self-esteem has been found to be a protective factor for overall student adjustment (Friedlander et al., 2007). Two significant areas for adjustment in college students include academic and social domains (Friedlander et al., 2007). Students who have higher levels of self-esteem are more likely to have effective coping mechanisms to manage stress that accompanies the demanding nature of the college experience (Friedlander et al., 2007). When a student feels competent in certain capacity, they are more equipped to handle various stressors. This subsequently leads to their ability to positively adjust to their environment (Friedlander et al., 2007). Conversely, students who perform negatively in the academic environment also view themselves in a negative light (Friedlander et al., 2007).

Students who have high self-esteem report higher levels of physical and psychological health and increased positive affectivity in their freshman year of college (Pasha & Munaf, 2015). Feelings of sadness in college students are also highly influenced by self-esteem and those with higher reported level of self-esteem are more satisfied with their college experience (Pasha & Munaf, 2015). These findings should encourage college and universities to focus on strategies to maintain or improve levels of self-esteem as a means to promote college completion.

According to the literature, physical activity plays an important role in terms of achieving overall positive health (i.e., physical and mental health; Zamani Sani et al., 2016). The literature also supports the notion that PA is correlated to higher self-esteem among children and adults (Alfermann, 2000; Guinn et al., 1997; Sonstroem et al., 1994). In 2004, Ekeland et al. conducted a systematic review, which considered 25 random control trials (RCTs), to understand whether or not physical activity can improve self-esteem in students. Interventions were standard exercise practices such as swimming, running, strength training, and sports lasting anywhere from 30–90 minutes, at least twice per week, up to 20 weeks. Although results did not indicate which exercises and duration of exercises were most effective, overall results indicated self-esteem was significantly improved in exercise group as compared to controls (Ekeland et al., 2004).

In a more recent study, Gilani and Fiezabad (2019) examined effects of aerobic exercise on mental health in 60 male patients who had Type 2 diabetes. Participants were administered the General Health Questionnaire and the Rosenberg Self Esteem measure and subsequently divided into an intervention group and a control group (Gilani & Fiezabad, 2019). The intervention group participated in a 12-week aerobic exercise program for 60 minutes per day and the control group was asked to avoid all forms of exercise (Gilani & Fiezabad, 2019). Corresponding with previous findings, self-esteem was significantly improved among

participants in the exercise group when compared to the control group (Gilani & Fiezabad, 2019).

Garcia et al. (2011) found that physical activity directly impacts levels of self-esteem, specifically in the student population. University students who participated in low and high levels of physical activity reported higher levels of self-esteem than those who were sedentary. This is congruent with previous findings by Wang (2008) who found that low impact exercise programs such as Tai Chi are beneficial to improvement in psychological well-being of university students. Thus, indicating that a high level of physical activity may not be necessary to reap the benefits of physical activity in terms of self-esteem improvement. This is important, particularly for those who may not have the physical ability to participate rigorous exercise.

**Relationship Between Affectivity and Depression**

Depressive symptoms are a significant mental health concern for college students as it is estimated that approximately one out of four people will experience a depressive episode before the age of 25 (Ahadi et al., 2018; Arger et al., 2012). Many college students face functional impairment such as substance use, academic decline, unstable interpersonal relationships, and increased suicidal ideation (Arger et al., 2012). According to statistics derived from the Center for Collegiate Mental Health (CCMH, 2018), students from various college institutions based in the United States reported that one of the top concerns is depression (49.7%) and is one of the most frequently reported issues among this population. The Center for Disease Control and Prevention (n.d.) considers suicide as one of the top causes of death in the college student population. This statistic alone raises the importance of identifying factors that contribute to suicidality and ways to mitigate stressors in a college academic setting.

Research has indicated that negative affectivity and lack of positive affectivity play a significant role in the development of depression (Ahadi et al., 2018; Arger et al., 2012; Varma, 2017). Ahadi et al. (2018) conducted a cross-sectional study to examine the role of rumination between PA and NA and depression in college students. The results indicated a negative correlation between PA and depression and a positive correlation between NA and depression (Ahadi et al., 2018). In addition, results revealed that rumination acts as a mediator between PA and NA and depression (Ahadi et al., 2018).

In a similar study, Arger et al. (2012) found other important mediators between affectivity and depression which includes brooding and cognitive style. This is in line with previous studies which indicate that negative emotions are facilitated by depressive cognitive responses to stressors (Arger et al., 2012). In turn, such recurring negative conclusions are solidified, and the risk for depressive symptoms becomes significantly elevated. Other studies have shown that in undergraduate students, the focus on adverse versus positive cues following negative feedback was correlated with NA (Derryberry & Reed, 1994). Furthermore, separating attention from stressors and negative affective states may be challenging for those who report depressive symptomology. Research has demonstrated that low levels of NA have been linked to depressive disorders (Varma, 2017). According to these findings, it is crucial to address low levels of NA in students to prevent the development of psychological disorders and facilitate college success.

Major depressive disorder (MDD), the most common mood disorder in the United States, is a debilitating psychiatric illness that has a profound impact on those affected (American Psychiatric Association, 2018). Although approximately 60% of patients achieve remission of symptoms with treatment, a significant portion of patients do not benefit from symptom

reduction, and barriers to treatment such as access, affordability, and social stigma, often leave a substantial number of individuals suffering untreated symptoms (Rowan et al., 2013; Sareen et al., 2007). The prevalence of MDD surpasses all other psychiatric illnesses in the United States, affecting 8.1% of adults aged 20 and over, and with a lifetime prevalence of 14.4% (Hillhouse & Porter, 2015; Mata et al., 2012). The disorder is more prominent in females than males affecting 10.4 and 5.5%, respectively (Hillhouse & Porter, 2015). It is characterized by a wide range of symptoms which can include feelings of sadness, disruptions in sleep patterns, fatigue, marked weight loss or weight gain, feelings of worthlessness or inappropriate or extreme guilt, trouble making decisions, inability to focus, loss of interest in regular activities, functional impairment, and suicidal ideation (APA, 2018; Hillhouse & Porter, 2015).

Suicide is the third leading cause of death in young adults and can be a significant issue or college students who face stressors related to the unique college life experience, including newfound independence from caretakers, juggling finances, social and romantic relationships, increased academic workload, and pressures to become successful (Padrelli et al., 2015). In fact, research has indicated that in college students, approximately 6.7% endorse suicidal ideation, 1.6% endorsed a plan to carry out suicide, and 0.5% of students attempted suicide. Among this age group, depression is a significant risk factor for suicide (Padrelli et al., 2015). Unfortunately, the origin of depression is not well understood. However, a biopsychosocial model is often effectively used to understand the development of symptoms, considering patients biological, psychological, and social history, in conceptualizing how depression likely developed (Sowislo & Orth, 2013). Various areas of functioning are often impaired in those with an MDD diagnosis, and if not treated, can have serious implications in occupational, relational, and adaptive, and social domains (Christensen et al., 2020; Mehta & Swami, 2014).

### *Functional Impairment*

Symptoms of MDD are often severe enough to cause significant impairment in daily functioning across settings (i.e., ability to tend to activities of daily living, development and preservation of interpersonal relationships, work productivity, and health domains; Hammer-Helmich et al., 2018; Qureshi & Al-Bedah, 2013; Sowislo & Orth, 2013). Those who report low mood often report high levels of functional impairment ranging from severe to very severe and the effects of impairment can remain even after the individual has achieved remission of mood symptoms (Novick et al., 2017). Currently, the WHO (2020) cites depression as the primary cause for disability and has a high disease burden around the world (Sowislo & Orth, 2013). The most common depressive disorder, MDD contributed to a 36.7% unemployment rate for those who carry a diagnosis, and the estimated economic burden is 210.5 billion per year in the United States (Hillhouse & Porter, 2015; Kessler, 2012). Functionality is also significantly impaired in college students who experience depression. Specifically, research has found depressed students miss a significant number of classes and report a decrease in grades. Alarmingly, students with depression attend less than 50% of their classes when experiencing symptoms.

### *Occupational Impairment*

A study by Mehta and Swami (2014), which analyzed and compared levels of cognitive functioning in nondepressed versus depressed participants, showed those with MDD had significantly higher levels of work interference than nondepressed participants. Quality of work and development and preservation of interpersonal relationships are important factors in terms of maintaining a job (Mehta & Swami, 2014). However, those with depression are often perceived as short-tempered, cynical, and withdrawn, making it difficult to formulate positive relationships (Mehta & Swami, 2014). Additionally, work productivity is often inhibited due to lack of focus,

fatigue, and inadequate decision making (Mehta & Swami, 2014). Park and Jung (2019) also found that significant impairment within occupational domains in those with MDD as there is a significantly higher risk for decreased productivity and job performance.

### *Relational and Adaptive Impairment*

Nezlek et al. (2000) found those with depressive symptoms found much less satisfaction in interpersonal relationships as compared to those without symptoms. Those in the depressed group reported frequent arguments with family members and exhibited difficulties with emotional intimacy (Hammer-Helmich et al., 2018; Mehta & Swami, 2014). In addition, results indicated that those with depressive symptoms neglected important tasks, such as daily chores and paying bills, at much higher rates than those who were not depressed (Nezlek et al., 2000). Park and Jung (2019) found several areas of adaptive functioning, such as activities of daily living and communication and social skills, to be impaired in patients with depression. Symptoms negatively interfered with adaptive functioning in areas such as career, family and interpersonal relations, physiological health, all which contributed to negative quality of life (Park & Jung, 2019). In the communication domain, it was found that participants tended to be preoccupied with their thoughts and emotions which in turn created issues with effective mutual communication as they interacted with others (Park & Jung, 2019).

### *Social Impairment*

Those with depression display various social and interpersonal deficits including decreased need or want to participate in social functions, inability to express emotions nonverbally, and a limited capacity to express pleasure in facial expressions (Park & Myung Hun, 2019). Deficits in social interaction were found to linger for a significant amount of time after resolution of symptoms, in some cases, up to 3 years (Park & Jung, 2019). Those with

MDD were also found to lack interest in leisure activities they once enjoyed which have been shown to be effective in facilitating positive emotions (Park & Jung, 2019). Without opportunities to experience positive emotions, negative mood symptoms are often exasperated (Park & Jung, 2019). Due to high rates of mental health, suicide, and dropout rates of college students, it is essential for college and universities to address affectivity and implement programs and strategies to increase PA and self-esteem. Based on the literature, this can be achieved through promotion of physical activity.

The purpose of this study was to add to existing literature that those who participate in physical activity experience less negative affect. In addition, the purpose was to explore mediating effects of self-esteem on the relationship between physical activity and affectivity. First, and in line with previous research, I hypothesized that more activity would predict an increase in PA. Second, I hypothesized that more activity would predict higher levels of self-esteem. Third, I hypothesized that higher self-esteem would predicted more PA. Lastly, I hypothesized that self-esteem would act as a mediator between activity and affectivity.

# Chapter 2

## Study Design and Methodology

The current study used archival data from a survey design using quantitative methodology. Archival data were collected in a large-scale study that investigated the role of self-care practices on psychological well-being and academic success. This dataset allowed for the following hypotheses to be tested: (a) physical activity is predictive of positive affectivity and self-esteem, (b) level of self-esteem is predictive of positive affectivity, and (c) self-esteem is a mediating factor between activity and mood.

### Participants

Participants in this study included 720 undergraduate students from the University of Washington, Tacoma who were invited to participate for extra credit. Participants included undergraduates recruited from psychology courses at the University of Washington, Tacoma, a 4-year undergraduate, graduate, and post-graduate satellite campus of the University of Washington. Participants were drawn from archival data from a larger study that was conducted at the University of Washington, Tacoma about self-care practices. The ages of participant's ranged between 18–50 years old with a mean age of 22.65 and standard deviation of 5.96. The gender ratio was 76% female and 24% male.

### Materials

Participants were informed that the purpose of the study was to look at how self-care practices impact psychiatric well-being. Participants were administered a demographic's questionnaire, the Positive and Negative Affect Schedule (PANAS), and the Godin Leisure-Time Exercise Questionnaire (GLTEQ).

## Measures

### *Demographics*

Participants were administered a questionnaire regarding their demographics which included queries such as:

- What is your age?
- Are you male or female?
- What is your ethnicity?
- What is your religious affiliation?
- What is your class standing? (see Appendix A)

### *Physical Activity*

Participants were also administered a questionnaire regarding their exercise habits. The Godin Leisure-Time Exercise Questionnaire (GLTEQ) is a four-item self-report measure used to evaluate individual leisure time habits (Godin & Shephard, 1985). Activities are broken down into three subgroups that include “strenuous,” “moderate,” and “light.” The metabolic equivalent (MET; i.e., amount of energy expended by the individual while at rest) by each participant is calculated by multiplying the activities completed for at least 15 minutes in a 1-week period with their coefficients. The MET intensity value is as follows: (a) 9 METs: strenuous/exhausting exercise, (b) 5 METs: moderate exercise, and (c) 3 METs: light exercise (Godin & Shephard, 1985). The first question assessed the intensity of physical activity that occurs for more than 15 minutes within a typical 7-day period. The participants were asked to write down how many times per week they do the following: (a) strenuous exercise (e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long-distance bicycling); (b) moderate exercise (e.g., fast walking, baseball,

tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing); and (c) light exercise (e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking). In the second question, participants were asked to categorize how often they engage in regular activity long enough to work up a sweat, by selecting one of the following: (a) *often*, (b) *sometimes*, or (c) *never/rarely*. Internal consistency for this measure was tested for optimal discriminant functions for maximum oxygen intake and body fat which ranged from 0.83 to 0.85, respectively (Godin & Shephard, 1985; see Appendix A).

***Positive and Negative Affect***

Participants were also administered a questionnaire regarding their recent emotional state. The Positive and Negative Affect Schedule (PANAS) was used to measure individual positive affect (PA) and negative affect (NA; Watson & Clark, 1988). The PANAS is a 20-item assessment. Participants were asked to respond to 10 terms that correlated with positive emotions (e.g., attentive, alert, excited, inspired) and 10 terms that correlated with negative emotions (e.g., hostile, irritable, upset, scared). Response options were on a 5-point Likert scale: 1 - *this concept applies very little or not at all*, 2 - *this concept applies a little to the participant*, 3 - *this concept applies moderately to the participant*, 4 - *this concept applies a lot to the participant*, and 5 - *this concept applies very much to the participant*. The total score of the PANAS scale was calculated by summing the 10 positive terms and the 10 negative terms (Watson & Clark, 1988). Positive affect was calculated by adding the positive terms (1, 3, 5, 9, 10, 12, 14, 16, 17, and 19), which range between 10 and 50 with higher scores indicating higher levels of PA. Negative affect was calculated by adding negative terms (2, 4, 6, 7, 8, 11, 13, 15, 18, and 20), which range between 10 and 50 with lower scored indicating lower levels of NA. Mean scores for NA were 17.4 (*SD* =

6.2). Data collection on the PANAS has indicated both high reliability and validity in the assessment of positive and negative affect. Internal consistency of this measure was tested and ranged from .86 to .90 for PA and .84 to .87 for NA (Watson & Clark, 1988; see Appendix A).

### *Self-Esteem*

Participants were also administered the Rosenberg Self-Esteem Scale to assess for their level of global self-esteem. The questionnaire is a 10-item scale in which participants choose between 4-point scale from *strongly agree* to *strongly disagree* to positively worded questions such as "on the whole, I am satisfied with my life" or negatively worded questions such as "at the time I think I am no good at all." The instrument has demonstrated high reliability with internal consistency ranging from .77 to .88 and test-retest reliability ranging from .82 to .85. It has also demonstrated high validity ratings with criterion validity at .55. All items marked with an R are to be reversed scored. Final scores were determined by summing all items. Higher scores indicate higher levels of self-esteem (Rosenberg, 1965; see Appendix A).

## Procedure

Institutional Review Board (IRB) approval was granted from the University of Washington. Participants were recruited through a participant pool program at the University of Washington, Tacoma. Although student participation was voluntary, many students were expected to choose from a selection of offered studies to fulfill requirements of their introduction to psychology course. Other students received extra credit in a variety of their psychology courses for their participation. Participation in this study was anonymous and, therefore, confidential. Each participant was provided an informed consent preceding the survey and consent was established upon participant proceeding with the assessment. Upon providing consent to participate in the study, students were directed to a Qualtrics link survey which

included multiple surveys assessing self-care practices, psychological well-being, and academic success. Overall, the study took approximately 45 minutes, but completion of these specific surveys was estimated to take approximately 15 minutes. For this archival study, the anonymous dataset was be reviewed to create an SPSS data set including the demographic questionnaire, the Godin-Leisure Questionnaire, Rosenberg Self-Esteem questionnaire, and Positive and Negative Affect Scale (see Appendix A). Permission to use archival data was obtained by original researcher (see Appendix B).

**Analysis**

A hierarchical multiple regression analysis was conducted to test the hypothesis that levels of physical activity are predictive of PA. Similarly, it tested the hypothesis that levels of physical activity are predictive of levels of self-esteem. Finally, the analysis tested the hypothesis that self-esteem mediates the relationships between physical activity and affectivity. Initially, descriptive statistics was analyzed to test for assumptions of normality. In the first step of the regression, physical activity was entered as the predictor variable and PA was added as the criterion variable. In the second step of the regression, physical activity*self-esteem was entered as a predictor variable (mediator) of PA. An independent analysis was subsequently conducted in which self-esteem was added as predictor variable and PA was added as a criterion variable. Lastly, another independent analysis was conducted in which exercise was added as a predictor variable and self-esteem was added as criterion variable.

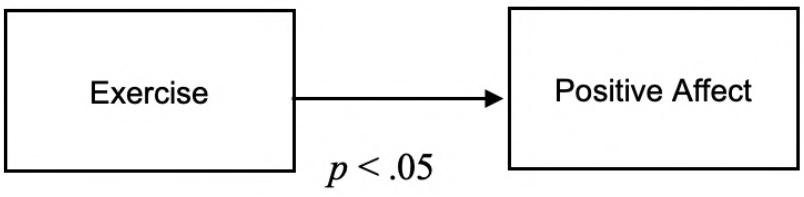
# Chapter 3

## Descriptive Statistics

A hierarchical multiple regression was carried out on archival survey-data collected from 720 undergraduate college students from the University of Washington, Tacoma, to determine whether physical activity and self-esteem could significantly predict trait affective states in college students. In addition, testing was carried out to explore mediating effects of self-esteem between physical activity and trait affected states within this population. Figures 1–4 present a flowchart of analyses. Participants were administered surveys to answer questions about their exercise habits, negative and positive affective states, and level of self-esteem. Participant ages ranged from 18–50 years with an average age of 22.65 (*SD* = 5.96). Participants were made up of 73.7% female, 25.3% male, .3% transgender, and .7% other. The racial makeup of this study included Caucasian (42%), African American (7.4%), Hispanic/Latino (15.1%), Asian (19.5%), American Indian/Alaskan Native (1%), Native Hawaiian/Other Pacific Islander (1.5%), two or more races (10.5%), and other (3%). The religious affiliation of participants included Christians (36.5%), Jewish (6%), Muslim (3.3%), Buddhist (4.5%), Hindu (1.2%), Agnostic (8.5%), Atheist (7.8%), unaffiliated (16.7%), other (6.7%), Catholic (13.2%), and LDS (1%).

**Figure 1**

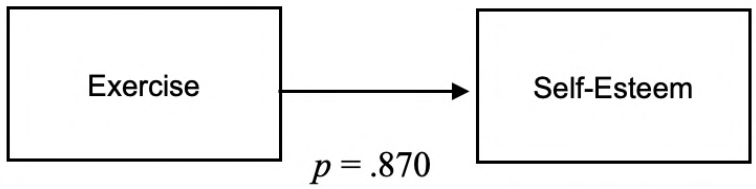
*Exercise Predicts Positive Affect*




*Note.* Hypothesis 1.

**Figure 2**

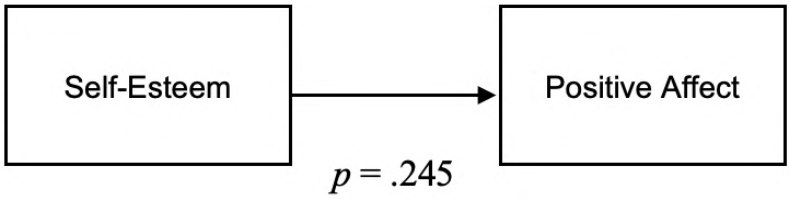
*Exercise Predicts Self-Esteem*




*Note*. Hypothesis 2.

**Figure 3**

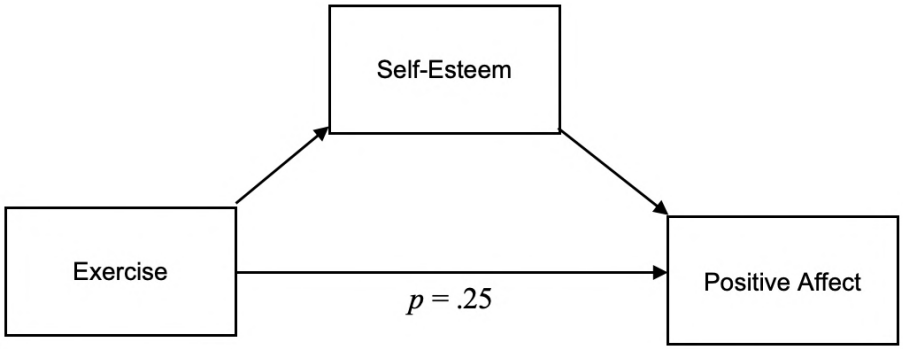
*Self-Esteem Predicts Positive Affect*




*Note.* Hypothesis 3.

**Figure 4**

*Self-Esteem Mediates Relationship Between Exercise and Positive Affect*




*Note.* Hypothesis 4.

Descriptive statistics of each variable are presented in Table 1, which shows average positive affective scores of 31.18 (*SD* = 7.65). Scores for positive and negative affect range from 10–50, with lower scores indicating lower positive or negative affect and vice versa. Average exercise scores were 44.89 (*SD* = 75.18). Assumptions of normality were tested for each variable, which indicated normal distribution for self-esteem and affectivity. However, skewness was identified in the exercise variable which violates normality assumptions for this particular variable. Scores less than 14 indicated insufficient level of exercise, scores between 14–23 indicated moderate level of exercise, and scores above 24 indicated active level of exercise. Average self-esteem scores were 23.39 (*SD* = 2.32) with a score range of 0–30. Scores below 15 indicated low self-esteem whereas scores between 15–25 indicated normal levels of self-esteem.

***Table 1***

*Descriptive Statistics*

| Variable | *M* | *SD* | *n* |
|---|---|---|---|
| Positive Affect | 31.18 | 7.65 | 720 |
| Exercise | 44.89 | 75.18 | 720 |
| Self-esteem | 23.39 | 2.32 | 720 |

A Pearson correlation was calculated to determine the strength and direction of the relationships between variables. Results of the Pearson correlation indicated a positive correlation between positive affect (PA) and exercise ($r = .096$, $p < .05$), and PA and self-esteem ($r = .042$, $p > .001$), and a negative correlation between exercise in self-esteem ($r = .44$, $p > .001$), as presented in Table 2. An alpha level is .05 for all statistical tests in this study.

**Table 2**

*Correlation Matrix*

| Variable | Positive | Exercise | Self-esteem |
|---|---|---|---|
| Positive affect | - | - | - |
| Exercise | .096 | - | - |
| Self-esteem | .042 | -.006 | - |

In Step 1 of the regression, exercise was added as the predictor variable and PA was added as the criterion variable, $R^2$ of .009, $F(1, 718) = 6.66$, $p = .010$, indicating that exercise accounted for 1% of the variance in PA scores, and therefore, confirming the first hypothesis that exercise is predictive of trait affective states (see Table 3). In the second step of the regression, self-esteem was added as a mediator, $F(1, 717) = 1.32$, $p = .25$, and did not appear to mediate the relationship between exercise and PA as expected in the fourth hypothesis (see Table 3). A second analysis was conducted to examine the independent effects of exercise and self-esteem on trait affective states. Results could not support the second hypothesis that exercise would significantly predict level of self-esteem $F(1, 726) = .027$, $p = .870$ (see Table 4). Results also indicated that although self-esteem did not significantly predict PA, $F(1, 741) = 1.36$, $p = .245$, self-esteem predicted negative affect (NA), $R^2 = .07$, $F(1, 741) = 53.49$, $p < .000$. Self-esteem accounted for 7% of the variance in negative affective scores. Moreover, as self-esteem increased, NA decreased, ß = -.259, $t = -7.31$, $p < .001$ (see Table 4). A visual flow chart of variables and their respective significance levels are presented in Figures 1–4.

**Table 3**

*Hierarchical Regression Model of Exercise Predictability of Positive Affect and Self-Esteem as Mediator*

| Step 1 and 2 | *R* | $R^2$ | $\Delta R^2$ | □ | *t* | *p* |
|---|---|---|---|---|---|---|
| Step 1 | .096 | .009 | .008 | | | |
| Exercise | | | | .096 | 2.58 | .010 |
| Step 2 | .105 | .011 | .008 | | | |
| Exercise | | | | .096 | 2.59 | .010 |
| Self-esteem | | | | .043 | 1.15 | .252 |

*Note.* Step 1 and 2, DV = Positive Affect.

**Table 4**

*Independent Analysis Model of Predictability of Exercise on Self-Esteem and Predictability of Self-Esteem on Positive Affect*

| Analysis 1 and 2 | *R* | $R^2$ | $\Delta R^2$ | □ | *t* | *p* |
|---|---|---|---|---|---|---|
| Analysis 1 | .006 | .000 | -.001 | | | |
| Exercise | | | | -.006 | -.164 | .870 |
| Analysis 2 | .043 | .002 | .000 | | | |
| Self-Esteem | | | | .043 | 1.164 | .245 |

*Note.* Analysis 1, DV = Self-Esteem; Analysis 2 DV = Positive Affect. $n$ = 720.

## Summary

The results described suggest PA is influenced by physical activity which is similar to historical findings. However, results did not show that self-esteem acts as a mediator within the relationship of physical activity and affectivity. Results also indicated that self-esteem is predictive of NA, but not predictive of PA. Interpretation of these results, along with limitations, clinical implications, and recommendations for future research, are subsequently discussed.

# Chapter 4

## Discussion

Although attending college or university is an exciting time for individuals who set out to pursue educational goals, stressors that often accompany this transitional period can lead to drop-out (Farzaneh, 2016; Friedlander, 2007; Maher et al., 2021). Research indicated that trait affect and self-esteem are important psychological mechanism that play a role in social, academic, and psychological adjustment in a college or university setting (Civitci, 2015; Harding et al., 2012; Rogers et al., 2018). Exercise has been shown to have a positive influence on various mental health constructs including, but not limited to, trait affect and self-esteem (Gaskins et al., 2014; Kyalo et al., 2011; Maher et al., 2021; Wunsch et al., 2017).

Despite documented research of these benefits, and research documenting the influence of self-esteem and affectivity on college success, rates of college students who meet WHO recommendations for daily exercise are significantly low (American College Health Association, 2013). Understanding underlying psychological constructs that contribute to successful college completion can shed light on appropriate strategies to increase positive affect (PA) and self-esteem and increase rates of college completion. This study sought to add to the existing literature which shows exercise promotes higher levels of PA. In addition, indirect effects of self-esteem in the relationship between physical activity and affectivity were explored.

### Physical Activity and Affect

The results of the regression confirmed the first hypothesis that exercise increases PA as it accounted for 1% of the variance in PA measures. When compared to empirical findings in the literature, the findings in this study are congruent. For example, a significant increase in PA was found in college students after completing a structured exercise program (Craft & Perna, 2004).

Researchers in this study found physical activity creates a physiological response as it increases neurological transmitters (e.g., dopamine and serotonin) responsible for various brain functions that influence affectivity. The increased presence of dopamine, serotonin, and norepinephrine were found in participant blood and urine directly after exercise, as compared to controls (Craft & Perna, 2004). Similar to the current study, Gaskins et al. (2014) relied on self-report measures in which college students reported a significant increase in PA after exercise, and scores were maintained longitudinally as well.

Research has clearly indicated that exercise is an effective behavioral strategy to increase PA. College is marked with inherent stressors, and historical findings suggest periods of high academic stress are met with decreased level of physical activity and therefore decreased level of PA in students (Weidner, 1996; Wunsch et al., 2017). This is important as research also points to the connection between affect and student ability to positively adjust to the college environment (Farzaneh et al., 2016; Rogers et al., 2018). Students with higher PA can more effectively adjust to college on an academic, social, and psychological level; therefore, they are more likely to matriculate through college and go on to graduate (Farzaneh et al., 2016; Rogers et al., 2018).

The clinical implication of this finding is that exercise could be used as a behavioral intervention to increase PA in students at college or university. Schools would need to begin with a standardized process to identify student level of physical activity and trait affectivity in students using measures such as the Godin Leisure-Time Exercise Questionnaire (GLTEQ) and the Positive and Negative Affect Schedule, respectively. These are relatively simple questionnaires that would take less a few minutes for students to complete. Schools could then provide psychoeducation and targeted interventions to increase physical activity and, therefore,

increase positive affectivity which could potentially lead to decreased rates of drop-out and increased rates of college completion

**Physical Activity and Self-Esteem**

This study did not find a significant relationship between physical activity and self-esteem. This is contrary to historical findings which have demonstrated that those who participate in physical activity tend to have higher self-esteem (Alfermann, 2000; Ekeland et al., 2004; Gilani & Feizabad, 2019). For example, Ekeland et al. (2004) found through a systematic review of 25 random control trials that self-esteem was significantly improved in those who exercised regularly. In a more recent study, Gilani and Fiezabad (2019) found self-esteem was significantly improved in patients who participated in a 12-week aerobics exercise program. The discrepancy in the outcome of this study may be explained by methodological variances including a difference in assessment tools used to assess physical activity and self-esteem. Inconsistencies may also be explained by variations in sample populations between studies and potential underlying variables within the study samples that have not yet been assessed.

Despite a discrepancy in findings in the current study as compared to historical findings, addressing low self-esteem through behavioral interventions such as physical activity are worthwhile (Ekeland et al., 2004; Ummet, 2015). College and universities are encouraged to assess level of student self-esteem through measures such as the Rosenberg Self-Esteem Scale (RSES) and create programs that promote physical activity and are accessible for students with low self-esteem scores.

**Self-Esteem and Affect**

The third hypothesis that self-esteem would predict PA was not supported in the current study. There are limited studies that have examined the role of self-esteem on affectivity.

Contrary to the findings of this study, other studies have shown that higher self-esteem is in-fact related to PA (Campbell et al., 1991; Lightsey et al., 2006) An older study conducted by Campbell et al. (1991) showed higher self-esteem was related to higher level of PA, and that those with higher self-esteem reacted less intensely to adversity. However, similar to this study, Krieger et al. (2015) found no correlation between self-esteem and affect after controlling for other variables (e.g., self-compassion).

Incidental findings in this study show self-esteem is predictive of negative affect (NA). One possible explanation for why this study predicted NA but did not predict PA is due to the concept that the absence of a negative does not necessarily prove a positive. In other words, higher self-esteem may minimize NA, but it does not warrant the assumption that self-esteem would automatically increase PA. For example, feeling good about oneself may not necessarily indicate individual happiness or joyfulness. It is possible that there are more significant variables that contribute to PA or pair well with self-esteem when measuring this variable. Thus, the absence of self-esteem does increase NA, but the presence of self-esteem does not necessarily increase PA.

Although results did not show that an increase in self-esteem would lead to higher PA, it could be inferred that bolstering self-esteem may lead to a decrease in NA. School counselors could use measures to identify students with low self-esteem such as the Rosenberg Self-Esteem Scale and implement behavioral interventions such as cognitive behavioral therapy, which has been shown to be a useful strategy to address self-esteem issues by working to identify core beliefs, challenge negative thinking patterns, and cognitive reframing (van der Stouwe et al., 2021). A decrease in NA may be one less barrier to achieving PA.

**Self-Esteem as Mediator**

Considering the impact of affectivity and the significant role self-esteem plays in student success rates in college, this study sought to determine if self-esteem could explain the relationship between exercise and affective states. However, results of the current study indicate self-esteem does not explain the relationship between physical activity and affectivity. In other words, the relationship between physical activity and affectivity remains intact when controlling for self-esteem. This appears to be the first study to test mediating effects of self-esteem in the relationship between physical activity and affectivity. These results point to the powerful influence that exercise has on trait affect despite core levels of self-esteem. In other words, an individual can reap the benefits of exercise regardless of their degree of self-esteem.

Despite insignificant findings for two of the four hypotheses, the results of this study are important. First, this study lends credibility to the notion that physical activity increases PA. This emphasizes this importance of the development of programs that promote increased physical activity in college and university students, considering the role affectivity plays in college success. College completion has both individual and societal implications including higher pay, medical insurance, and decreased reliance of government welfare programs (Association of Public & Land-Grant Universities, 2021). Although this study did not find significant relationship between exercise and self-esteem, empirical findings suggest that exercise may impact level of self-esteem (Ekeland et al., 2004; Gilani & Fiezabad, 2019; Wang, 2008). Self-esteem is a worthy target for intervention in a college or university setting. An unexpected finding in this study showed that high self-esteem does not predict PA, but low self-esteem does predict NA. Although limited, prior studies have indicated self-esteem does predict PA and this construct would be a worthy target for intervention in those with high NA and low on PA

(Campbell et al., 1991; Lightsey et al., 2006). As NA could act as a barrier to PA, a decrease in NA may be one less obstacle to increasing PA. Lastly, the current study did not show indirect effects of self-esteem on the relationship between physical activity and affectivity.

**Limitations and Recommendations for Future Research**

It is important to note the limitations in this current study. Data for all variables were gathered using self-report measures that relied solely on participants to answer as honestly and accurately as possible. This study could not ascertain the level of validity of self-awareness regarding self-esteem and affectivity, which may have made it difficult for participants to provide accurate responses. Also, it is recommended additional studies be conducted to understand longitudinal effects of physical activity on affectivity and the longitudinal effects of self-esteem on affectivity. Future research is recommended to test the direct and indirect effects of self-esteem on PA and NA.

Another limitation of the current study is mirrored in the ethnic makeup of participants, which was predominantly Caucasian. Due to the rapid growth of minority populations in the United States, it will be important to assess the degree to which significant results can be simulated across racial and ethnic groups. There are various strategies that have shown to be effective in increasing PA which can look different across cultures (Miyamoto & Ma, 2011; Tugade & Fredrickson, 2007). Positive emotions may not be readily expressed in cultures in which expression of such emotions may be considered abnormal (Miyamoto & Ma, 2011; Tugade & Fredrickson, 2007). Future research should integrate participants from a wide range of cultural and ethnic groups to understand trait affectivity unique to these groups. Along the same lines, research should examine ways in which physical activity, PA and NA, and self-esteem may look different across genders and religious affiliation. Lastly, although research regarding

decreased rates of exercise and its impact on affectivity during the COVID-19 global pandemic was cited in this study, this data was collected previous to lockdowns due to the pandemic and, therefore, the COVID-19 global pandemic was not a limitation of the results of this study.

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## Appendix A

## Effects of Physical Activity on Affectivity in College Students: Mediating Role of Self-Esteem

Questionnaire 1: Demographics Information
Northwest University – College of Social and Behavioral Sciences
Jennifer Webb

**Demographics Questionnaire**

1.) **Age: _____**
2.) **Gender:** Male ____ Female____
3.) **Ethnicity:**
Caucasian ____ African American ____ Hispanic or Latino____
Native Hawaiian or other Pacific Islander ____ American Indian or Alaska Native ____
4.) **Religious Affiliation: _____**
5.) **Highest degree completed:**
Associates degree____ Bachelor's degree____
Master's degree____ Doctorate Degree____

**Effects of Physical Activity on Affectivity in College Students: Mediating Role of Self-Esteem**

Questionnaire 2: Positive and Negative Affect Scale

Northwest University – College of Social and Behavioral Sciences
Jennifer Webb

**Worksheet 3.1 The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988)**

**PANAS Questionnaire**

This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word. **Indicate to what extent you feel this way right now, that is, at the present moment *OR* indicate the extent you have felt this way over the past week (circle the instructions you followed when taking this measure)**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| A Little | Moderately | Quite a Bit | Extremely | Very Slightly or Not at All |

_____1. Interested

_____2. Distressed

_____ 3. Excited

_____4. Upset

_____5. Strong

_____6. Guilty

_____7. Scared

_____8. Hostile

_____9. Enthusiastic

_____10. Proud

_____11. Irritable

_____12. Alert

_____13. Ashamed

_____14. Inspired

_____15. Nervous

_____16. Determined

_____17. Attentive

_____18. Jittery

_____19. Active

_____20. Afraid

**Effects of Physical Activity on Affectivity in College Students: Mediating Role of Self-Esteem**

Questionnaire 3: Godin Leisure-Time Exercise Scale

Northwest University – College of Social and Behavioral Sciences
Jennifer Webb

**Godin Leisure-Time Exercise Questionnaire**

1. During a typical **7-Day period** (a week), how many times on the average do you do the following kinds of exercise for **more than 15 minutes** during your free time (write on each line the appropriate number).

1. **a) STRENUOUS EXERCISE**
   **(HEART BEATS RAPIDLY)**
   (e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming,

   vigorous long distance bicycling)

2. **b) MODERATE EXERCISE**
   **(NOT EXHAUSTING)**
   (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)

3. **c) MILD EXERCISE**
   **(MINIMAL EFFORT)**
   (e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)

**Times Per Week**

_____

2. During a typical **7-Day period** (a week), in your leisure time, how often do you engage in any regular activity **long enough to work up a sweat** (heart beats rapidly)?

| OFTEN | SOMETIMES | NEVER/RARELY |
|---|---|---|
| 1. | 2. | 3. |

**Effects of Physical Activity on Affectivity in College Students: Mediating Role of Self-Esteem**

Questionnaire 4: The Rosenberg Self-Esteem Scale (RSES)

Northwest University – College of Social and Behavioral Sciences
Jennifer Webb

| | STATEMENT | Strongly Agree | Agree | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| 1. | I feel that I am a person of worth, at least on an equal plane with others. | | | | |
| 2. | I feel that I have a number of good qualities.. | | | | |
| 3. | All in all, I am inclined to feel that I am a failure. | | | | |
| 4. | I am able to do things as well as most other people. | | | | |
| 5. | I feel I do not have much to be proud of. | | | | |
| 6. | I take a positive attitude toward myself. | | | | |
| 7. | On the whole, I am satisfied with myself. | | | | |
| 8. | I wish I could have more respect for myself. | | | | |
| 9. | I certainly feel useless at times. | | | | |
| 10. | At times I think I am no good at all. | | | | |

## Appendix B

## Effects of Physical Activity on Affectivity in College Students: Mediating Role of Self-Esteem

Permission Slip
Northwest University – College of Social and Behavioral Sciences
Jennifer Webb


Northwest University
5520 108th Ave. NE
Kirkland, WA 98033

To the Northwest University IRB:

Jennifer Webb works on my research team and has my permission to use deidentified data that has already been entered into SPSS. Only the variables that are relevant to her study will be made available to her. There is no identifying information associated with the data.

Thank you,

Jennifer Harris

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