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## Self-Connection as a Mediator Between Exercise and Well-Being

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# Walden University

College of Psychology and Community Services

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Lauren Esmay

has been found to be complete and satisfactory in all respects,  
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Walden University

2025

Abstract

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by

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MA, Walden University, 2017

BS, Virginia Tech, 2012

Dissertation Submission for Fulfillment

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## Abstract

Scientists and health professionals have established the connection among physical activity and overall wellbeing. In more recent years, scholars have also researched the correlation among increased self-connection with increased overall well-being. Nevertheless, insignificant data has been gathered to investigate the impact of predictor variables upon the connection between exercise and wellbeing. This research study examined the mediating effect of self-connection among the relationship between exercise and wellbeing. The current study's purpose was to gain better insights on how self-connection predicts a person's physical activity, contributing to comprehensive insights how exercise habits may predict a person's wellbeing by using a cross-sectional correlational survey. The Health Action Process Approach theory was used as a framework to explain how self-connection may mediate the relationship between exercise and wellbeing. The results indicate a significant correlation among the following relationships exercise and wellbeing, self-connection and well-being, and self-connection and exercise; however, no significant results were found in the data to support self-connection as a mediating variable in the relationship between exercise and well-being.

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## Chapter 1: Introduction to the Study

Scientific studies have previously expressed the multiple ways in which exercise can improve various parts of a person's well-being (Alleva et al., 2019; Klaperski et al., 2019; Rollo & Prapavessis, 2020; Smith et al., 2018; Wickham et al., 2020). Increased self-esteem and body-esteem (Alleva et al., 2019), enhanced mood (Ghaderi et al., 2018), increased mental health (Rollo & Prapavessis, 2020), and an increase in overall wellness (Klussman, et al., 2021a; Smith et al., 2018) are a few aspects as to how exercise has been researched to improve a person's well-being. While there is an apparent positive correlation in the association among exercise and well-being (Kim et al., 2017), scarce research has studied variables that may strengthen or weaken this relationship (Klussman et al., 2021a). Due to this phenomenon, it is essential for the scholarly community to continue to research variables that influence the association among exercise and well-being to help health professionals better educate their patients.

Many variables have been studied to further understand the association among exercise and wellbeing. Chronic disease, drinking behaviors, nutrition habits, age, gender, region, education, and income are other variables that have been studied to better understand the association among exercise and well-being (Klaperski et al., 2019; Wickham et al., 2020). Alleva et al. (2019) found young adults describing body functionality in a positive manner resulted in a higher correlation in the relationship of exercise and well-being, whereas young adults engaging in negative self-talk when describing body functionality resulted in a weaker correlation in association among exercise and well-being. Similarly, Smith et al. (2018) suggested self-esteem as being an

additional variable impacting the association among exercise and well-being when discussing potential moderating and mediating variable to further research. While researchers have started to investigate the association among exercise and well-being, a research gap is present in understanding which variables may strengthen or weaken the association among exercise and well-being.

Self-connection is one of many variables to study when attempting to understand the association among exercise and well-being. Health professionals are given new tools and perspectives to help clients and patients as the scholarly community continues to research mediator and moderator variables influencing the association among exercise and well-being. By understanding how variables influence this relationship, health professionals can work with their patients on developing stronger skills to support mediator variables, such as self-connection, to strengthen the association among exercise and well-being, with the main goal of improving one's health along this journey.

Self-connection has been found to improve one's mindfulness (Klussman et al., 2020a) and contribute to a person's life meaning (Klussman et al., 2020c), as the latter is hypothesized to align one's intentions, developed from higher levels of self-connection to one's actions, based upon what an individual views as meaningful. Research-based studies have shown exercise to improve various aspects of an individual's health (Klussman et al., 2021a), and thus, studying how a mediator variable may increase a person's willingness and motivation to exercise may have other effective outcomes, like increased overall well-being, lower stress levels, and serve as preventative measures for other health-related conditions.

This chapter will address the established research on self-connection and its role as a mediating variable to better understand the association among exercise and well-being. Next, the chapter will cover the problem statement, goals of this current study, and the research questions, including the hypotheses. The framework will then be discussed, followed by the nature of the study will be discussed next, as the researcher explains the variables of the study. Definitions, assumptions, and limitations will be provided before closing out this chapter with the significance of the study.

### **Background**

Recent research shows inflated levels of self-connection also increases one's overall well-being (Klussman et al., 2020a). While self-connection is still a novel concept and variable to be studied in academic research, the definition of self-connection can be described as an a person's self-awareness, their self-acceptance established upon one's awareness of self, and the alignment of a person's behavior with this particular awareness. As Klussman et al. (2021a) found a positive association among exercise and well-being, as well as a association among self-connection and well-being (2020a), Klussman et al. (2021a) proposed additional studies to examine how self-connection affects the association among exercise and well-being.

This research focused on self-connection as a plausible mediator variable in the association among exercise and well-being, while the Health Action Process Approach (HAPA) will be used portray the potential relationship (Schwarzer & Luszczynska, 2008). HAPA indicates three behaviors, adoption, initiation, and maintenance, must be clearly understood as a system that entails a motivational phase and a volition phase. A

core principle of HAPA is the emphasis of sensed self-efficacy at various phases of changing the health behavior. Panahi, et al. (2020) defines self-efficacy as a person's belief in their power to execute specific necessary behaviors to enable precise performance markers, whereas self-connection is defined as one's awareness, and acceptance of this awareness, to foster the belief in themselves to carry out specific behaviors. Moreover, this model was accentuated to understand how other variables, such as self-connection, may influence health behavior changes between the motivation and volition phase. Therefore, this study utilized HAPA to further examine the association among exercise and well-being, with self-connection as a possible influencing variable on this relationship. Furthermore, possible mediating impacts of self-connection may provide insight as to whether future health behavior changes may increase levels of exercise and well-being and if these increased levels are continuum-based to provide further guidance for health practitioners.

### **Problem Statement**

Prior research has examined the relationship a person's wellbeing and activity level. For example, there is a reported increased correlation among weekly minutes of activity and a person's overall well-being. However, there is little research to understand how physical activity distinctly relates to specific well-being when involving other variables as mediators and moderators. Klusman et al. (2021a) conducted a comprehensive study to understand the association among various categories of movement in association to the multiple aspects of well-being, which suggested a positive correlation between exercise and well-being. When examining variables

influencing well-being, self-connection mediated the association among mindfulness and well-being, which suggests increased levels of self-connection may increase a person's well-being (Klussman et al., 2020a). As the advantages of exercise continue to be researched, it is significant for the academic community to persist in investigating the variables that may be related to the connection among physical activity and well-being, whether they be variables that strengthen or weaken the relationship.

Recent research has implied a strong correlation concerning exercise and well-being (Kim et al., 2017; Klussman et al., 2021a). Self-connection is a variable with scarce research, though recent research has suggested self-connection has a mediating influence in the association among mindfulness and well-being (Klussman et al. 2020a). As Klussman et al. (2020a) studied self-connection as a moderating variable in the association among exercise and well-being, the research analyzed the strength of the association among exercise and well-being, with self-connection being a predictor variable. Thus, as the research indicated self-connection has a mediating impact on mindfulness and well-being (Klussman et al., 2020a), the academic community yet to research self-connection as a mediating variable in the connection between exercise and well-being, where exercise may affect a person's well-being through the mediator of self-connection. Klussman et al. (2021a) suggested further research to other independent factors of self-connection and the position they may produce in exercise and well-being. Aside from closing the gap in the scholarly community, the current research will be used to further inform the health professional community in a collaborative approach to help individuals reach an increased overall well-being. The research problem of this study

addressed self-connection as a potential mediating variable in the involvement among exercise and wellbeing, as this relationship is currently unknown.

### **Purpose of Study**

This quantitative study analyzed the self-connection as a mediator between physical activity and well-being. Utilizing a survey method of inquiry, the research addressed a person's level of self-connection. This level of self-connection was studied as a mediator in the association among a one's exercise level and well-being. The independent variable, physical activity, was defined as minutes per week in which the participant engages in physical activity via the International Physical Activities Questionnaire (IPAQ; Craig et al., 2003). The dependent variable, well-being, was defined and quantified by the Ryff Scales of Psychological Wellbeing (Horwood & Anglim, 2019). The mediating variable, self-connection, was quantified by utilizing the Self-Connection Scale (SCS; Klussman et al., 2020c). The goal of this research sought to clarify the mediating role of self-connection in the relationship of physical activity on overall wellbeing. This study's purpose was to understand how self-connection may influence an person's exercise levels, which in turn may provide a deeper insight as to how physical activity may influence a person's wellbeing. Furthermore, this study may result in the development of alternate methods to guide a person seeking higher levels of self-connection.

### **Research Questions**

The first research question (RQ) addressed the connection among physical activity and wellbeing. The association among self-connection and wellbeing was

addressed in the second RQ. The third RQ addressed the association among self-connection and physical activity. Lastly, the most crucial RQ of the current study, addressed the association among exercise and wellbeing, where self-connection mediates the association among these two variables.

RQ1: How does exercise, when quantified by the International Physical Activity Questionnaire (IPAQ) associate to well-being, as measured by the Ryff Scales of Psychological Well-Being (PWB)?

$H_01$ : There is no significant association among exercise and well-being.

$H_a1$ : There is a significant association among exercise and well-being.

RQ2: How does self-connection, as measured by the Self-Connection Scale (SCS), correlate to well-being, as quantified by the Ryff Scales of Psychological Well-being (PWB)?

$H_02$ : There is no significant association among self-connection and well-being.

$H_a2$ : There is a significant association among self-connection and well-being.

RQ3: How does self-connection, as measured by the Self-Connection Scale (SCS), relate to exercise, as measured by the International Physical Activity Questionnaire (IPAQ)?

$H_03$ : There is not a significant association among self-connection and physical activity.

*H<sub>a3</sub>*: Significant correlation among self-connection and physical activity is observed.

RQ4: How does exercise, as quantified by the International Physical Activity Questionnaire (IPAQ), associate to well-being, as quantified by the Ryff Scales of Psychological Well-Being (PWB), whereas self-connection, quantified by the Self-Connection Scale (SCS), mediates this relationship?

*H<sub>04</sub>*: There is no significant association among exercise and well-being where self-connection serves as a mediator.

*H<sub>a4</sub>*: There is a significant association among exercise and well-being where self-connection serves as a mediator.

### **Theoretical Framework**

The theoretical basis for this study examined Ralf Schwarzer's (2016) theory of Health Action Process Approach (HAPA). This theory suggests that the adoption, initiation, and maintenance aspects of health behaviors actions must be easily comprehended as a method that contains both motivation and volition stages. HAPA has been used to clarify and anticipate personal changes in specific health habits including smoking cessation, increasing physical activity, dental hygiene behaviors, and wearing seat belts (Panahi et al., 2020; Schwarzer, 2016; Zarski et al., 2018). One principle of HAPA is the emphasis of distinguished self-efficacy at various stages of changing a health behavior. Self-efficacy is one's confidence in their power to carry out particular behaviors necessary to produce certain performance markers, whereas self-connection is

defined as one's awareness to foster the belief of themselves to carry out specific behaviors (Panahi et al., 2020). Additionally, this model can be accentuated to comprehend how other variables, such as self-connection, may impact health behavior changes among the motivation phase and the volition phase. Therefore, this study utilized HAPA to explain self-connection, as it may provide a precursor to comprehending self-efficacy on a deeper level. Further details regarding how HAPA will be used as a theoretical framework to this study will be detailed in the following chapter.

### **Nature of Study**

This study used a cross-sectional, correlational survey study, as all measures will be observed at one point in time. Correlational designs provide a measure of positive statistical correlational or negative statistical correlational association among at least two variables by attempting to determine a pattern among the variables of the study (Creswell, 2014). Self-administered surveys were utilized to ensure a high response rate and minimize the change of social desirability bias (Chung & Monroe, 2003). Data was collected via Survey Monkey and was stored on the researcher's computer that is secured by being double password protected. Descriptive statistics were reported and calculated using SPSS (Version 29), as the data that was gathered from Survey Monkey was transferred to the SPSS (Version 29) program.

### **Outcome (Dependent) Variable**

The study's outcome (dependent variable), wellbeing, was quantified by participants' responses to the short-form survey of the Ryff Scales of Psychological Wellbeing (Horwood & Anglim, 2019). The survey included forty two questions

measuring various aspects of wellbeing, such as independence, personal growth, healthy relationships with others, environmental proficiency, one's life purpose, and self-acceptance. Subjects rated their agreement or disagreement statement by answering a 6-point rating scale (1 = strongly disagree; 6 = strongly agree). Scores of 42 to 84 were marked as "low levels of wellbeing", scores of 85-168 were marked as "moderate levels of wellbeing", and scores above 169 were measured as "high levels of wellbeing".

### **Predictor (Independent) Variable**

Physical activity was the study's predictor (independent variable). Participants will be administered the International Physical Activity Questionnaire (Craig et al., 2013), whereas the minutes of exercise per week were used as the data point to measure exercise. According to the CDC, 150 minutes per week is the suggested guideline of exercise for adults (Craig et al., 2003; Osei-Tutu & Campagna, 2005). Data was marked as "low activity" if participants engage in under 120 minutes of exercise per week, "moderate activity" if participants engage in 120-180 minutes of exercise per week, and "high activity" if participants engage an excess of 180 minutes of weekly activity.

### **Mediator Variable**

The study's mediator variable was self-connection, in which it will attempt to explain the connection among the dependent variable (wellbeing) and the independent variable (physical activity). Self-connection was quantified utilizing the 12-question Self-Connection Scale (Klussman et al., 2020c). As each question was evaluated from a score of one to seven, total scores less than 24 were identified as "low levels of self-

connection”, total scores between 24-72 were identified as “moderate levels of self-connection”, and scores higher than 72 were identified as “high levels of self-connection.

### **Hypotheses**

Prior research has indicated a correlational association among an individual engaging in physical activity and an increase in overall wellbeing (Kim et al., 2017). Self-connection has also been studied as an intervening variable, as it has shown to moderate the association among the exercise type and a person’s presence of meaning (Klussman et al., 2021a; Klussman et al., 2020c), as well as presenting as a mediating variable in the association among mindfulness and well-being. Moreover, studies on disconnection from oneself has been implied that disconnection is associated with a decrease in one’s wellbeing, as disconnection from oneself resulted in various negative affect states such as sadness, fear, stress, confusion, anger, and darkness (Klussman et al., 2020b).

Based upon data from previous research (Kim et al., 2017| Klussman et al., 2021a), one hypothesis for the current study was that a person’s overall wellbeing will be elevated as the amount of physical activity increases. Similarly, it was projected that lower levels of exercise will correlate with lesser levels of wellbeing. As for the mediating variable of self-connection, it was postulated that self-connection will mediate the association among exercise and wellbeing. As higher levels of self-connection were reported, was conjectured that increased levels of exercise were also recorded, which was hypothesized to correlate with higher levels of wellbeing. In a similar fashion, it is

hypothesized that lower levels of reported self-connection will be correlated to lower levels of exercise, which will also indicate lower levels of overall wellbeing.

### **Definitions**

The following definitions were used to develop the rationale, methods, and research questions for this current study:

*Adult:* According to the CDC (Centers for Disease Control, 2018), an adult includes any individual who are aged 18 years or older.

*Exercise:* Activity involving physical effort, carried out to maintain or improve (CDC, 2018) one's health and fitness levels; used interchangeably with *physical activity*.

*Intervening variable:* A factor that occurs during the study that could also potentially affect the dependent variable, including mediating and moderating variables (Burkholder et al., 2016).

*IPAQ:* A questionnaire to measure and evaluate the kinds of exercise, intensity of their daily exercise and sedentary time (Craig et al., 2003).

*Mediator:* A third variable explain how or why the association among a dependent variable and independent variable is present.

*Moderator:* A third variable that affects and explains the correlation of the association among a dependent and independent variable.

*Motivation phase:* The initial stage of the HAPA model; the stage in which one needs and (Schwarzer, 2016) seeks a reason as to how the behavioral change will benefit the individual on a personal basis (Teng & Mak, 2011).

*Physical activity*: Activity involving physical effort, carried out to maintain or improve (CDC, 2018) one's health and fitness levels; used interchangeably with *exercise*.

*Ryff Scales of Psychological Wellbeing*: A 7-point scale to quantify six aspects of wellbeing including independence, personal growth, healthy relationships with peers, capacity to manage life's stressors, one's life purpose, and self-acceptance (Horwood & Anglim, 2019).

*Self-connection*: A subjective experience entailing three factors: (1) a consciousness of oneself, (2) self-acceptance grounded in this awareness, and (3) a person's aligned actions with this established recognition (Klussman et al., 2020a).

*Self-connection scale*: A 12-item questionnaire to assess each participant's self-connection, as each question provides a measurement as to how connected the participant is with oneself, assessing desirable, neutral, and less-desirable traits or behaviors (Klussman et al., 2020c).

*Self-efficacy*: One's perception in their capability to accomplish certain behaviors needed to accomplish particular behaviors required to produce distinct performance markers (Panahi et al., 2020).

*Volition phase*: The second phase of HAPA; the phase in which the individual develops a plan for making and sustaining changes to improve one's wellbeing (Schwarzer & Luszczynska, 2008).

### **Assumptions**

A key assumption was that this present study will align with prior research that has studied the strong connection between exercise and wellbeing (Kim et al., 2017;

Klussman et al., 2021a). This study assumed that indicated increased exercise yields to increased levels of wellbeing, while lower levels of exercise gives way to lesser wellbeing. In certain situations, such as the case for individuals eating disorders, elevated levels of exercise may be correlated with lesser levels of wellbeing (Kolar & Gorrell, 2021). While there was an assumption of a present association among exercise and wellbeing is needed for the study to continue forward, the study needed to study correlation to effectively incorporate and test self-connection as a mediator.

Another critical assumption was that all survey answers will be answered honestly by each participant. The potential for survey answers to be falsified was present (Kolar & Gorrell, 2021), as some participants may experience guilt or shame due to the amount of physical activity incorporated into their schedules (Smith et al., 2018), which could give way to inaccurate responses in the survey. Honest answers were crucial to this current study, as false answers could have provided false results (Zarski et al., 2018) and inaccurate information when discussing the mediation of self-connection on the association among exercise and wellbeing.

### **Delimitations and Scope**

The current study's scope was restricted to measuring the impact of exercise by the number of minutes exercised per week. While other research has studied the type of exercise, anaerobic versus aerobic exercise, and various other aspects of physical exercise, the current study focused on the number of minutes exercised per week with the guidelines of the CDC (Centers for Disease Control, 2018) to measure lower, moderate, and higher levels of exercise. While the idea of researching the type of exercise may have

a stronger influence on wellbeing, or the idea of self-connection being a factor on the chosen form of physical activity, are both interesting scopes to research in the future, this current study highlighted the amount of exercise to as a basis for understanding self-connection's role as a mediating variable.

The HAPA theory used in this study was used to better comprehend and explain the mediating impact self-connection may have on the association among exercise and wellbeing. In using the HAPA (Schwarzer & Luszczynska, 2008) model to explain the association among variables, it also provided insights and pathways to future research to better understand how the motivational phase and volitional phase of HAPA play a part in sustaining an individual's exercise habits to benefit their wellbeing. Other theories and designs of improving health behaviors, like the Transactional Model of Stress and Coping, the Health Belief Model, and the Theory of Planned Behavior were not used in this study as these models poorly reflect the concept of using variables to understand and motivate one to change health behaviors.

For this study, the researcher recruited adults of at least 18 years of age stating they exercise at minimum of three times per week. Due to the CDC's recommendation of adults acquiring a minimum 150 weekly exercise, the current study used this parameter to guide participant selection, as most people aim for at least 30 minutes of exercise per exercise session (Osei-Tutu & Campagna, 2005). Therefore, this study's limitations included sampling the established boundaries and the procedures used to conduct this study and examine its variables.

### **Study Limitations**

A study's results encapsulate content validity, including both face validity and sampling validity, while the quantifying instrument covers all the elements obtained from the results. A thorough foundation of previously existing content validity data safeguards authenticity for the survey proposal and assessment to include every element within the study (Frankfort-Nachmias & Nachmias, 2008). The survey instruments consisted of questions that measure physical activity habits, levels of self-connection, and a person's wellbeing. While these instruments are similar in serving to measure results, they differ in the extraction of the results for statistical assessment and the comprehension of the data.

As participants were recruited via SurveyMonkey, an online survey platform, it created a limitation of only allowing individuals with a computer and the Internet to complete the survey. Moreover, this limited individuals in lower socioeconomic (SES) groups (Kwon et al., 2022), as these individuals were less probable to obtain access to such technology. Another limitation regarding the sample population was the survey was only provided in the English language. This placed limitations on adults not fluent in English (Schouten et al., 2020), despite having the other prerequisites for participation for this study. In both groups, low SES status and a language barrier, limited the diversity the study could potentially have for recruiting participants and understanding how this study could be applied across various SES and cultures.

### **Internal Validity**

The selection of participants could have rendered internal validity to the current study (Creswell, 2014). One requirement of participants was to participate in exercise at a minimum of three times per week. The researcher selected this parameter to ensure enough participants engaged in physical activity to produce measurable results, as if a large selection of participants abstained from exercise when completing the study, the researcher would not have enough data to study the mediation analysis. However, due to this parameter, it was difficult to measure how self-connection may impact the absence of physical activity in one's overall wellbeing (Klaperski et al., 2019).

Additionally, as it is inherent to quantitative cross-section research, it was not concluded that the relationship of the variables exhibits causality. Longitudinal research, not cross-sectional information, was required to state connection in a association among variables. Similarly, due to the cross-sectional research design, data was only obtained at one point, presenting a limitation is to observe how interventions to improve self-connection may affect other variables in the study (Lapalme & Coucet, 2018). A limitation specific to the current study included the limited established research of self-connection. Due to this scarcity, only one self-connection scale has been established for research, which then provides a limitation of choices to select the questionnaire to best align with the current study.

Reliability of objective data provided by participants was also another limitation for the current study. Surveys and questionnaires are unable to capture the participants' emotions, behaviors, and change of emotions throughout the survey (Queiros et al., 2017). Therefore, the research data was contingent upon the participants' responses

provided by the respondents and the structure of the survey. Moreover, the researcher was not able to suggest assumptions based upon the results, as quantitative research must be supported by the objectivity of statistics provided by data collection.

In a similar fashion, Bruce et al. (2018) stated that gathering accurate information, as well as information representative of the general population, are two important barriers to discuss when health behaviors are researched. When conducting surveys as data collection, it is often difficult to obtain accurate information based on survey questions, due to closed-ended questions and how questions may be perceived by the responded. Sampling error occurs when an inadequate sample size is present, which may affect the results to be substantially different from those of the overall population.

Frankfort-Nachmias (2008) stated the fundamentals of validity include content validity, empirical validity, construct validity, and they must be distinctive values under detailed conditions. A study's dependability assesses the quantifying instrument concerning the features used to outline testing procedures in the association among reliability and validity that supplement each other. Instruments used to measure validity are key factors in evaluating the threat to internal validity, even if the identical scale is used for different studies. The Likert scale used in the study may determine the outcome of the gathered scores, and it may alter the reliability and validity with an alternate application used in a different study, as variables may also differ across multiple studies (Köksal et al., 2014). Therefore, it is always crucial to test and reevaluate the consistency for the final sample in each study.

### **External Validity**

The key concern about external validity for this study was the capacity to generalize these results to comparable populations (Frankfort & Nachmias, 2008), as it is important to be able to replicate similar studies to continue to research other variables influencing the association among exercise and wellbeing. Additionally, as self-connection is a novel variable being studied in academic research, it was helpful to observe how self-connection may influence an intervening association among other variables. By no means was the researcher entirely ensured that the study's results would be completely valid to comparable persons outside of secondary research. The sample target was intentionally selected with similar features compared to the overall population. To reach this study's sampling target, Survey Monkey distributed surveys based upon the age standards set by the researcher, as this was prerequisite for any participant to possess before moving on to complete the entire survey. The sampling strategy helped provide external validity, in which the results were generalized to adults aged 18 to 65 who have stated they exercise at minimum of times per week. Additionally, the survey included questions about demographic concerns, which will then used as control variables.

### **Significance of the Study**

The current study highlighted key factors attributed to physical activity, self-connection, and wellbeing as an effort to aid in people to live a healthy, wholesome lifestyle. The current research study provided insight as to how physical activity, self-connection, and well-being are all linked, which may be helpful for health practitioners in various fields highlight specific protocols to help increase self-connection to promote an increase in overall wellness. Continuing to explore self-connection may contribute to the

continuous efforts to help others make positive change in their lives by increasing the awareness of a person's multiple aspects of wellbeing.

Exploring variables, such as self-connection, helps to better understand the association among exercise and wellbeing to better equip healthcare providers with education and resources. On a larger scale, this research may help health providers educate patients on increasing physical activity levels, while also increasing wellbeing to help combat the obesity epidemic the nation has faced over the past several decades (Burns et al., 2018). Moreover, if the preceding factors mentioned were present, Americans may also report an increase in wellbeing due to higher activity levels, higher self-connection levels, and lower obesity rates. Furthermore, the insights from this study may inform interventions to practitioners and may utilize clinicians to help a patient increase self-connection, which may not only affect physical activity and wellbeing levels, but it may also foster stronger communication skills between healthcare providers and their patients (Sinclair et al., 2008).

### **Summary**

For this quantitative study, the researcher analyzed the intervening effects of self-connection on the association among exercise and well-being. It was postulated that elevated self-connection will mediate the association among exercise and wellbeing. As one's self-connection is elevated, their physical activity levels and wellbeing will also be elevated. Similarly, if an individual exhibits low self-connection, it was hypothesized that the person's physical activity levels and wellbeing may also be lowered. The HAPA (Schwartz & Luszczynska, 2008) theory was used to measure and explain self-

connection, as this may provide insight into the stages of motivation and volition that are needed to make changes to increase a person's overall wellbeing.

In Chapter 2, the study's theoretical framework is discussed more in detail, how the HAPA model has been used in prior research when changing health behaviors, and why this model was selected for this specific research study. Additionally, an in-depth review of established research of each variable in the present study will be discussed in greater detail. Preceding research regarding the association among exercise and wellbeing will be examined, as well as the novel, but scarce, research regarding self-connection as an intervening variable. The next chapter finishes with a review of the gaps in the current academic literature and of theory-based perspectives on the significance of ongoing research regarding the association among exercise and well-being, as well as the need for continued research of self-connection as an intervening variable.

## Chapter 2: Literature Review

### **Introduction**

Multiple researchers detailed the importance of exercise to improve various facets of overall well-being. An increase in psychological well-being, prevention and maintenance of several physical illnesses, and an increase in baseline mood are just a few ways in which exercise has been studied to improve a one's overall well-being (Kim et al., 2017). Despite the increasing volume of research indicating the association among adequate amounts of exercise and an increase in well-being, only 23% of American adults reach the 150 minutes of suggested exercise per week as suggested by the Centers for Disease Control (2018).

Similarly, newer research has correlated the increase in self-connection to their overall well-being. Klussman et al. (2020a) reported self-connection helps to explain the association among mindfulness and well-being, as their research implied that the more a person is self-connected with oneself, the greater a person's overall well-being, with a mediating effect of self-connection when noting correlation among mindfulness and well-being. As exercise is often discussed as a factor contributing to well-being (Alleva et al., 2019; Kim et al., 2017; Klussman et al., 2020b; Smith et al., 2018) and self-connection is also attributed to well-being (Klussman et al., 2020b; Klussman et al., 2020c; Klussman et al., 2020d), little research has been performed to understand the association among exercise and self-connection, or moreover, how self-connection may be a factor in how exercise is utilized to manage one's well-being.

This literature review focuses on the impact of self-connection as a mediating variable in the association among exercise and well-being. In this review, an analysis of the latest findings in the research on the reciprocal association among exercise and well-being, the established research in the association among self-connection and well-being, as present studies indicating the need to continue to study other factors, such as self-connection, in the association among exercise and well-being. This chapter encompasses three sections: the literature research strategies, HAPA theory, and an exploration of the current state of the research on three key variables of the current study. Lastly, the literature review ends with a summary and conclusion of the preceding sections.

### **Literature Research Strategy**

The present literature review is compiled of the following separate concentrations: the three variables of the current study, the function of any two of the research variables independent of the third variable, and the related variables of self-connection on exercise and well-being, as self-connection is a novel variable in academic research. The literature search included journal articles and book chapters from 2015 to the present. This researcher utilized Walden University's databases as the leading resource for applicable material and included CINAHL Plus, Medline, ProQuest, PsycARTICLES, PsycINFO, SAGE Journals, ScienceDirect, and Thoreau. Additional academic searches in the CDC virtual library and Public Health Library generated studies used the current review, as the official government websites were utilized to explain definitions and other information related to the research variables. Supplementary contact was made to the researcher and author of several articles discussing self-connection to retrieve additional research articles

pertaining to the association among self-connection and well-being. Lastly, Google Scholar functioned as an additional search engine for articles inaccessible via the databases previously mentioned.

The following key terms were searched to locate each literature source: *exercise and well-being*, *self-connection and exercise*, *physical activity and well-being*, *physical activity and self-connection*, *exercise and mental health*, *Health Action Process Approach and exercise*, *motivation and self-connection*, *motivation and exercise*, and *mindfulness and well-being*. Other key terms within these searches included *body image*, *exercise adherence*, and *health*. Additionally, the references sections in all articles endured thorough review for supplemental articles and authors applicable to the research area.

### **Theoretical Framework**

The central theoretical framework used for this current analysis is HAPA (Schwarzer et al., 2011), as it influenced the analysis of the suggested association among vital variables of this study. HAPA's theory basis and its key intentions are explained and discussed below. Lastly, an overview of empirical support for the HAPA theory is detailed as a justification for the use of HAPA as the directing conceptual framework for the examination of the research questions for this study .

### **Health Action Process Approach**

HAPA, a psychological theory (Schwarzer & Luszczynska, 2008) officially founded in 1992, addresses changes related to health behavior targeting the gap between intentions and behaviors. Prior theories primarily focused behavioral change on predicting intentions rather than behavior variance, prompting Ralf Schwartz to focus his

theory to explain why individuals do not always carry out their behaviors in unity with their goals , a common phenomenon observed in the healthcare field (Lehane, 2014).

Smoking cessation, increasing physical activity levels, seat belt usage, and dental hygiene habits are all behaviors in which HAPA can be used to explain and predict health and wellness behavior changes (Chen et al., 2020; Godinho, et al., 2013; Joveini et al., 2020). HAPA suggests that adoption, initiation, and maintenance factors are all aspects of health behaviors that must be clearly understood as a progression with both a motivation phase and a volition phase. A person's perceived, or self-observed, self-efficacy at various phases of altering the specific health behavior is a primary emphasis of the theory (Teng & Mak, 2011). Self-efficacy is the confidence and belief one has about their capability to accomplish specific actions and behaviors required to generate specific performance indicators, whereas self-connection is defined as one's awareness and acceptance of this awareness to foster the belief of themselves to carry out the targeted behaviors (Panahi et al., 2020).

Moreover, the HAPA enables an understanding of changing health behaviors based upon the predictors of health behavioral intentions, as well as the means or strategies that convert these intentions into their respective behavior (Schwarzer et al., 2011). This theory unequivocally uses both motivational and volitional progressions by defining the mechanisms that occur when a person wants to alter their behavior, when implementing and sustaining a novel health action, and when attempting to challenge old behaviors and recuperate from succumbed obstacles (Schwarzer et al., 2011). The HAPA

model is a unified approach of social-cognitive theory and the Theory of Reasoned Action (Lindsey, 2017), and an incorporation of various volition theories (Lehane, 2014).

### **HAPA Key Concepts**

The HAPA model involves two overarching principles: the motivational phase and the volitional phase (Teng & Mak, 2011). Both phases are crucial to implementing sustained health behavior changes, as one needs a reason as to how the behavioral change will benefit the individual on a personal basis (motivation phase), as well as a plan for making and sustaining these changes (volitional phase). By detailing the given gap between one's intention and behavior, a person is better suited to understand why a change is needed, how to change the behavior, and how to maintain the behavior if, and when, obstacles arise.

**Motivational Phase.** Increasing risk attentiveness, outcome prospects, and action self-efficacy are all factors characterized by HAPA's (Schwarzer & Luszczynska, 2008) motivational phase, which further leads forming new behavioral intentions. Risk perception and awareness contain the assessments of an event in which damage is predicted and a specific reaction is produced. Thus, risk perception and awareness are viewed as a indirect influences of developing intentions. Expectant outcomes and action self-efficacy, often viewed as the confidence one's capabilities to initiate and follow through with a plan of action for a wanted outcome, are viewed as the key contributors to the development of robust behavioral goals as part of the motivation stage of the HAPA (Gaube et al., 2021). Behavior self-efficacy, expectant outcomes, and perceiving risk are all factors of how a person views their intention for the behavior change.

**Volitional Phase.** After the intention has been developed, it is then transformed into the anticipated behavior. The anticipated behavior may be accomplished through two major factors: a strategic plan and one's willingness to follow the strategic plan (Scholz et al., 2009). Planning involves a self-regulatory approach involving the mental stimulus of behavior to be used for multiple types of situations in which the behavior should be executed (Joveini et al., 2020). Planning functions as two key concepts: action planning and coping planning. Action planning postulates when, where, and how an individual will apply the intended behavior, as it provides the person alternate reactions and stimulates conceptual processes that apply conditional prompts for the targeted actions (Gollwitzer, 1999). Coping planning is an obstacle-fixated self-regulation strategy that allows the person to have an alternate plan in place, as the person anticipates complications or barriers when adopting a new, healthier behavior. If the person is unable carry out the targeted new behavior, they have an alternative to turn to instead of completely abandoning the targeted behavior, as they have prepared for potential setbacks and how to handle these barriers. Therefore, it is accepted that individuals who plan on coping with risky encounters are more likely to preserve a freshly embraced behavior when faced with obstacles. The volitional progressions involved in this planning may be persuaded by consciously aware obstacles, resources, and support (Godhini et al, 2013).

### **Analysis of HAPA Theory**

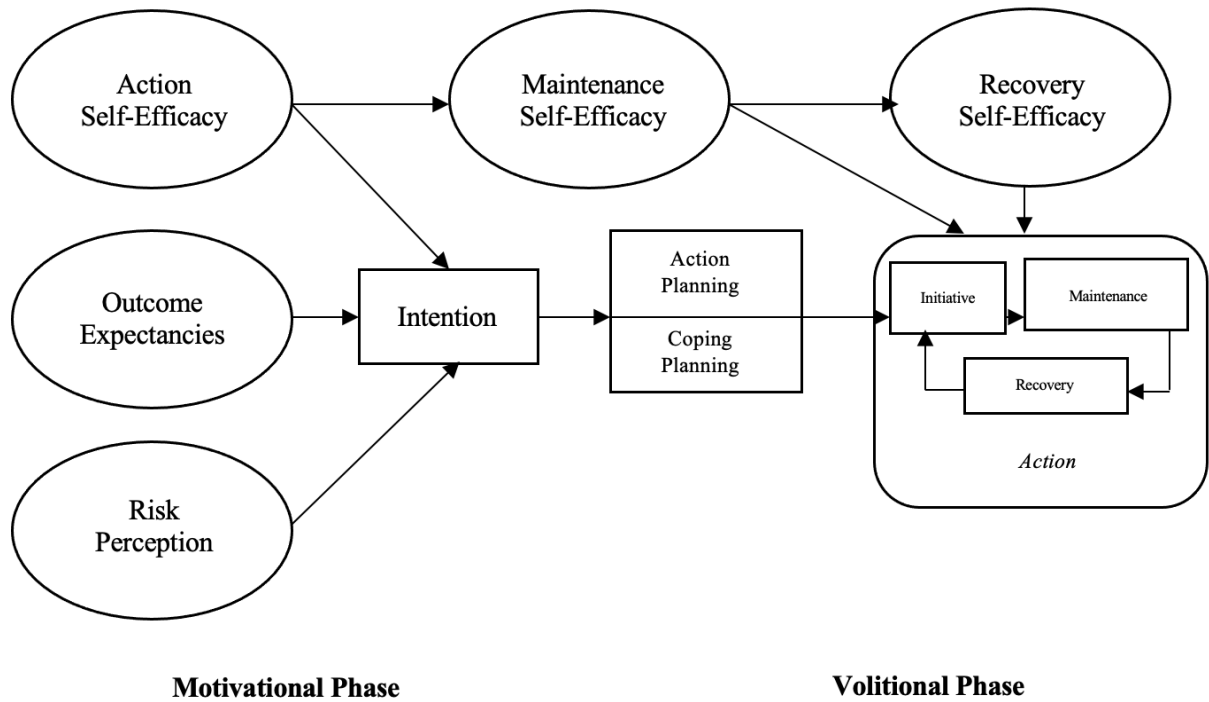
The primary objective of HAPA is to promote health-enhancing behaviors as it hones in on describing, gaining knowledge, and foreseeing health behavior changes. Therefore, it's crucial to use a theory such as the HAPA model (Dillon et al., 2021) when

making changes for increased healthy habits. Also, the HAPA theory provides novel and evoking perspectives into the subjectmatter and furthering the discussion surrounding other health behavior change theories, as it considers both cognitive-motivational and volitional self-regulatory processes when discussing how to best change a person's behavior. Related theories have mainly focused on the motivational piece without consider the cognitive steps on how to change a behavior (Dillon et al., 2021).

The behavior change process may often be viewed as complex, though HAPA explains behavior change in the fewest concepts as possible to simplify the method of changing health behaviors (Ednie. & Stibor, 2017). This can be predominantly observed in the motivation phase of the HAPA (Schwarzer et al., 2011) theory as it uses only three core concepts to explain how a behavioral intention may be made. Higher levels of complexity are observed in the volitional phase of HAPA, (Schwarzer & Luszczynska, 2008) such as when discussing the sub concepts of self-efficacy, relationships, and linking concepts, but these concepts are concisely and clearly explained. The HAPA (Schwarzer et al., 2011) establishes a relatively multifaceted phenomenon regarding health behavior change into an easily comprehensible and accessible form.

Most studies conducted to date have shown how competent the HAPA model has been when attempting the change behavior (Lehane, 2014). However, according to Lehane (2014) and Scholz et al. (2009), most of this data originates from single study findings using similar methodologies and data analysis methods. Therefore, more conclusive data is needed using various data synthesis techniques and a wide array

methodologies to determine HAPA's empirical capability across different data synthesis techniques and methodologies.



*Figure 1.* Health Action Process Approach (HAPA). Adapted from “The Health Action Process Approach Theory,” by E. Lehane, 2014.

### **Empirical Support for Health Action Process Approach**

Scholars have aided in estimating outcomes of lasting health behavior changes via the HAPA model. Health professionals and researchers have utilized HAPA to assist individuals modify various behaviors like smoking cessation (Joveini et al., 2020), seat belt use, condom use (Teng & Mak, 2011), increasing physical activity (Dillon et al., 2021; Teleki et al., 2021), hygiene habits (Chen et al., 2020; Gaube et al., 2021), and eating habits (Godinho et al. 2013; Schwarzer & Luszczynska, 2008). HAPA has gained

empirical support to aid in various health concerns, such as sunscreen use (Panahi et al., 2020), smoking cessation (Joveini et al., 2020), increasing physical exercise (Dillon et al., 2021; Teleki et al., 2021), disease management (Chen et al., 2020; Schwarzer et al. 2011), dietary habits (Godinho et al. 2013; Schwarzer & Luszczynska, 2008), medication compliance (McCleary et al., 2022), and improving hygiene habits (Chen et al., 2020; Gaube et al., 2021). These topics present additional information on the HAPA theory (Schwarzer et al., 2011), representing an extensive range of topics to help inform how the HAPA model may be used to change different types of behaviors, which could lead to understanding the critical importance of the HAPA theory for continuing research.

Chen et al. (2020) performed a cluster-randomized trial for older adults with tuberculosis to study the usefulness of a multicomponent intervention constructed on the HAPA model to increase self-management tactics for tuberculosis. Multicomponent interventions were also provided for the first six months following treatment initiation. The control group only received health education instruction. Foundations of self-management foundations were recorded for a baseline measurement and one full week after each intervention was provided. Among the 262 patients, 244 patients completed the trial. The results suggested the HAPA-based compound interventions considerably helped self-management adeptness of seniors with tuberculosis when compared with the control group of only acquiring health and wellness education. Therefore, the HAPA-based multicomponent intervention might be useful for self-management in routine healthcare in other tuberculosis patients, as well as other patients with chronic illnesses.

Panahi et al. (2020) performed a randomized, controlled, quasi-experimental study of 177 farmers to examine the use of sunscreen, as skin cancer is a common concern in a farming career. The subjects were randomized into one of three groups: motivational, volitional, or control. The motivational group and volitional group obtained a HAPA-inspired, educational intervention. All groups were assessed according to HAPA (Schwarzer et al., 2011) constructs, intention, and behaviors at three intervals: pre-intervention, immediately following the intervention, and one month post-intervention. A chi-square, repeated measure analysis was utilized to interpret and understand the findings. The study's results indicate the paradigms that HAPA's two group utilized were vastly improved when comparing these results to the control group.

Dillon et al. (2021) examined the effectiveness of an intervention using HAPA (Schwarzer et al., 2011) based planning supplemented with text messages to decrease sedentary time in university students and increase certain non-sedentary behaviors. Full-time university students were selected a random into either the group with the HAPA intervention or the control group for this study. The intervention group acquired one individual behavior counseling appointment, an educational booklet, a planning sheet, and daily text messages. HAPA works to close the intention-behavior gap by incorporating volitional elements which were revealed to aid in turning intentions into taking action and better predict if one will carry out the the intended health behavior (Schwarzer & Luszczynska, 2008). Utilizing the education and provided resources, subjects implementd three to four action plans to name when, where, how, and how long they planned lower their school-related sedentary time over the period of the next 6

weeks. Dillon et al. (2021) asked all students to acknowledge possible obstacles that may surface or interrupt their action plans, as well as determine ways the students may be able to conquer these barriers. Participants wrote the formulated action planning and coping planning strategies on their planning sheet after the one-on-one counseling session.

Additionally, sedentary behavior-related mobile alerts were sent to students daily for six weeks at a specific time to emphasize the action plan and coping plan developed by subjects to encourage action control. Results indicated significance in the intervention group for sedentary time, walking time, stretching time, action planning, coping planning, and action control. These findings indicate a HAPA-based planning intervention, combined with mobile text alerts for reminders and encouragement, can reduce student-related sedentary behaviors (Dillon et al., 2021).

As suggested by prior research across multiple health behaviors, the HAPA (Schwarzer et al., 2011) model has indicated support for the effectiveness of incorporating the motivation and volition phases into a plan of action when attempting to improve various health-related behaviors. As Panahi et al. (2020) pointed out, a key factor in the volitional phase is to identify any potential barriers that the person may encounter, as this will allow the subject to plan how they will encounter such obstacles when presented with challenges. Furthermore, Dillon et al. (2021) suggested that involving encouraging reminders, such as behavior-related text messages, help the subjects to reinforce the specific behavior in which they want to improve.

### **Rationale for Selecting Health Action Process Approach to Analyze the Current Study's Research Question**

Vastly investigated and tested across various behaviors, the HAPA model is prominent in changing health actions, like incorporating more exercise. Research has shown significant support for HAPA (Schwarzer et al., 2011) and its impact in helping individuals create healthier habits contributing to an increased overall wellbeing. Moreover, the HAPA model includes self-efficacy as a factor throughout the motivational and volitional phases of implementing health behaviors, whereas self-efficacy and self-connection are closely related when discussing factors of motivation (Kluszman et al., 2021).

Ednie and Stibor (2017) found that a substantial amount of people engage in exercise for more extrinsic goals, rather than for pleasure or for feelings of competence. External motivation, such as enhancing physical appearance, avoiding health-related complications, and managing weight concerns, versus intrinsic motivation, is common in the younger, university student population (Alleva et al., 2019; Ednie & Stibor, 2017). In a related study, Alleva et al. (2019) analyzed factors in which young adults detail their body processes and physical physique. Further investigation indicated six themes were acknowledged from subjects' explanations of their body's processes in order by recurrence: (a) assessing the functionality of the body, (b) positive self-connection with one's body, (c) a body's resilience, (d) evaluations compared to the norm according to societal expectations, (e) body behind the scenes, and (f) satisfaction of body processes. These results suggested an increase in healthy body self-connection was associated with increased bodily processing, as well as some specific types of exercise. A person's

motivations for exercise, how they view their body, and the individual's self-connection are all factors as to how one experiences and executes exercise behaviors.

As the HAPA (Schwarzer & Luszczynska, 2008) has helped explain the contribution of various factors into making significant and lasting changes with health behavior changes (Ednie & Stibor, 2017), it has also probed more questions as to how other aspects associated to motivation, like self-efficacy (Klussman et al., 2022) and self-connection (Klussman et al., 2021b), may play a part into forming sustained health behavior changes (Dillon et al., 2021; Rollo & Prapavessis, 2020; Scholz et al., 2009). Klussman et al. (2020d) a means to better understand what role self-connection, and lack thereof, may play in the association among one's mental wellness and overall health. With more recent research investigating factors of self-connection, exercise, and overall health of a person, it intrigued the researcher of this current dissertation to investigate how self-connection may act as a mediator for the association among exercise and well-being. . As self-connection has related ties with motivation (Klussman et al., 2022), the HAPA model and theory is used for the current study to help explain how the key variables may interact with one another.

The HAPA (Schwarzer et al., 2011) model has been utilized to understand and explain exercise behaviors (Dillon et al., 2021; Ednie & Stibor, 2017; Ghaderi et al., 2018; Hirst & Porter, 2005; Rollo & Prapavessis, 2020; Rutchick et al., 2018; Scholz et al., 2009; Smith et al., 2018; Veselska et al., 2011), while scientific research continues to explore the association among exercise and well-being (Klussman et al., 2021a; Klussman et al., 2020b). The current study inquired to examine the unique influence of

self-connection in the association among exercise and overall health, the HAPA (Schwarzer et al., 2011) model is implemented to facilitate a better comprehension of motivations behind a person's exercise habits, which may help scientists and field experts to better understand the responsibility of self-connection in the motivations to exercise.

### **Key Variable Related to the Literature Review**

This segment provides a summary of the pertinent publications associated to the study's most important variables of self-connection, exercise, and well-being (Klussman et al., 2020d). Specifically addressed are the various ways in which a association among exercise and well-being already exists in the scholarly literature. This section closes with an assessment of the latest literature regarding self-connection, which is a novel variable being studied within the last few years.

### **Exercise and Well-Being**

The American College of Sports Medicine (2017) described physical activity as a recurring movement or activity demanding physical energy, performed to support or increase health and fitness. Recreational sports, gym workouts, walking, biking, and home workouts are just a few avenues in which exercise can take form. Exercise is an important element of physical health and mental wellness, as researchers have acknowledged physical activity as a fundamental tool for developing increased overall well-being (Klussman et al., 2020a). Improved physical health, increased bone density, greater endurance, amplified strength, and increase in balance, improved flexibility, enhanced joint structure, increased muscle mass, reduced blood pressure, and reduced cholesterol are all aspects in which exercise has been researched to improve the physical

well-being of a person (Hirst & Porter, 2015; Ghaderi et al., 2018; Perrier et al., 2015; Peterson & Mahmoudi, 2015; Rutchick et al., 2018; Stanescu, 2014). Additionally, exercise has shown positive psychological benefits, as it may improve stress levels, increase self-esteem, and enhance mood (Ghaderi et al., 2018).

Well-being can be described as a complex concept, frequently separated into two overlapping fields, described as 'hedonic' and 'eudemonic' well-being (Deci & Ryan, 2008). Hedonic well-being describes personalized experiences of a person's emotional states as it incorporates ideas such as feelings of happiness and pleasure. On the other hand, eudemonic well-being relates to ideas such as independency, mastery of one's surroundings, personal growth, healthy relationships, life's purpose, and self-esteem, which may be developed even when positive emotions are not present (Ryff, 1989). Prior research states increased well-being supports pro-social behavior, increases educational accomplishments, and acts as a buffer against potential mental health conditions (Park, 2004). Therefore, it is important to continue to investigate strategies that increase well-being for ongoing research and the healthcare industry. For children and teenagers growing up in an era of social, economic, and technological change and advancements, there is currently little research to understand the psychological consequences of developing in such a period (Patton et al., 2016).

Smith et al. (2018) examined the influence of school-based projects, as both a mediator and moderator, as way to mitigate adolescents' self-esteem and personal well-being concerns. The school-based physical activity intervention took place over 10 weeks with weekly fitness session and extra lunch-time sessions. Smith et al. (2018) used

intervention outcomes and an analysis of moderator variables were used to discover prospective mediators of adjustments in well-being outcomes. The outcomes indicated that intervention results for well-being were not statistically significant, but it was noted that this may be due to the higher self-esteem measures and well-being reported at the initial baseline during the initial phase of the study; however, the authors (Smith et al., 2021) noted other mediator and moderator variables ought to be contemplated in additional research when examining the association among exercise and well-being.

Klussman et al. (2021a) studied the disparity of relationships between multiple forms of physical exercise and different aspects of well-being. The results indicated that physical activity was unpredictably associated to well-being, while the intensity and kind of physical activity were more significant to comprehending the association among exercise and well-being. Vigorous activity was correlated to general self-rated wellness and anxiety, while solely walking showed improvement in anxiety scores, but not overall wellness. Klussman et al. (2021) stated a positive association among weekly exercise and overall well-being when the activity included some form of vigorous activity. These results were expected when compared with previous studies looking into associations between exercise and anxiety, as the autonomous function of self-connection and its contribution in physical activity, health, and overall well-being was noted to be further examined (Klussman et al., 2021).

An apparent association among exercise and well-being has been long noted in research, though many studies suggest moderator or mediator variables may provide a better understanding as to how the association among exercise and well-being exist. As

Klussman et al. (2021) suggested, perhaps the type and/or frequency of activity play an critical position in determining the strength of the association among exercise and well-being. Exercise is a vital component in the overall picture of wellness, and by investigating variables that provide an understanding of one's motivation to exercise, researchers may continue to provide education and insights as to how a person can gain the most from adding exercise into a plan of health and wellness.

### **Self-Connection and Well-Being**

Self-connection can be described as one's understanding of themselves, an acknowledgement and accepting oneself built upon this understanding, and lastly, the person's alignment of actions within the context of this understanding (Klussman et al., 2021). By having this understanding of oneself, taking responsibility as to what an individual discovers, and behaving in accordance with this knowledge, people can gain increased well-being. Self-connection is associated with overall wellness, decreased anxiety, one's affect, one's life satisfaction, and career satisfaction (Klussman, Nichols, & Langer, 2020).

For several decades, mindfulness practices have gained popularity and have become a part of everyday routines for many people (Tart, 1990). Klussman et al. (2020b) reported that generally, mindfulness is a robust precursor and predictor of overall health, and since research pertaining to mindfulness is more established than self-connection research, it is key to also understand the mindfulness effect and its practices. Kabat-Zinn (1999) explained mindfulness as capturing one's focus in a specific manner: on purpose, in the moment, and from a nonjudgmental perspective. Practitioners

specializing in mindfulness-based theories report various enduring positive results, including higher well-being and compassion (Baer, Lykins, & Peters, 2012), improved quality of life, lessened levels of depression, anxiety, chronic pain and physical disabilities, and improved coping skills (Grossman, Niemann, Schmidt, & Walach, 2004). Scientific research also indicates that short practices of mindfulness are helpful in improving many well-being markers, such as improved observations of quality of life, compassion, and lower job burnout (Fortney, Luchterhand, & Zakletskaia, 2013). As increased mindfulness has been correlated to an increase in well-being, and since mindfulness seems to be a precursor to self-connection (Klussman et al., 2020b), the scholarly community is now providing research as to how self-connection may improve well-being, as well as other factors influencing this relationship.

Disconnection, the absence of self-connection, has been shown to result in various negative affect states, including but not limited to sadness, fear, stress, confusion, anger, and darkness. Klussman et al. (2020b) conducted 20 semi-structured interviews to investigate the understanding of self-disconnection in people that previously acknowledged their self-connection, by utilizing a thematic investigation to better understand the collected data. Disconnection was measured by forms of not understanding oneself, not fully trusting oneself, and an inability to exhibit behaviors in alignment with oneself. Klussman et al. (2020b) implied that disconnection is associated with a decrease in well-being, which implies self-connection may be correlated to an increase in well-being.

Klussman et al. (2020d) studied connection and disconnection, across two studies, as predictors of mental well-being, respectively. The results indicated life satisfaction, in both mental well-being, decreased when participants experienced greater self-disconnection. Various limitations were mentioned as a result of the study, but this provided a multitude of implication for future research. The authors stated future studies shall conducted to help better comprehend the connection of self-connection and how it contributes to other areas of overall well-being.

College students experience increased levels of burnout, stress, and mental illness, and it is imperative to understand how educators can promote stress resilience among students. Klussman et al. (2021c) studied the association among perceived stress and self-connection when researching burnout among college students, and one area they examined closely is the connection between self-connection and well-being. The results indicated a substantial suggestion among self-connection and satisfaction of life, implying that as self-connection improved, life satisfaction may increase as well. The researchers suggested that future research may be conducted by examining the association among self-connection and well-being by examining other key factors that may add to this relationship (Klussan et al., 2021a).

The self-connection and well-being association still is a novel avenue in the scholarly community, but as the previous studies have indicated, further research between self-connection and well-being is warranted. Moreover, the association among self-connection and well-being when other variables are also present and being studied may help provide insight as to how these variables work together to improve additional parts

of a person's life. As the scholarly community continues to examine self-connection and well-being on an individual level, it may also help health professionals provide better care plans for their patients when improving overall health and wellness.

### **Exercise and Self-Connection**

As self-connection is a novel variable to various areas of research, the relationship with self-connection and well-being has already shown promising results for future research avenues. Self-connection as a variable has been related with a person's self-efficacy (Klussman et al., 2021), and self-efficacy is a crucial variable throughout all phases of the HAPA (Schwarzer et al., 2011). Due to these correlations, as motivation is a key component to engaging in a regular exercise regimen, it is crucial to investigate and understand what role self-connection has when researching variables of exercise, which will further be investigated by utilizing the HAPA model in this study?.

Klussman et al. (2022) implied that physical exercise may be a reason for increasing one's self-connection, as it may aid in a person be more self-aware of their emotions and sensations. When physical activity becomes a habit, it may promote self-connection, as self-connection builds self-assurance, individuality, and/or a healthier body image. (Hülshager et al., 2014; Pennebaker & Seagal, 2003). Moreover, physical activity may be useful as it may permit a person to practice accepting themselves more, and thus proceeding to follow this by implementing healthier behaviors in a non-competitive environment. Edwards and Loprinzi (2019) further stated that when physical activity is combined with meditation practices, the effects of exercise may be enhanced.

Alleva et al. (2019) produced a qualitative study to observe the factors in which young adults describe their body's processes and physical appearance. Via conceptual investigation, six identified concepts were noted from participants' explanations of their body processes, in order by persistence: (a) assessing the body's processes, (b) healthy body self-connection, (c) resilient body, (d) comparisons to societal norms, (e) body behind the scenes, and (f) contentment of body functions. The results suggested an increase in positive body self-connection was associated with increased body functionality, as well as some specific types of exercise. In general terms, as a person feels more confident about their body and its function, which is a form of self-connection, they may be willing to engage in a wider array of exercise patterns versus a person with less confidence about their body.

In a study exploring various views of self between physically active and inactive youth, Veselska et al. (2011) took worldwide sample of 501 school-aged students and administered various scales to gather data on self-esteem, self-competence, and self-efficacy. Additionally, Veselska et al. (2011) separated respondents into three groups according to their level of activity: (1) no physical activity; (2) infrequent physical activity; (3) every day exercise. A one-way analysis of variance (ANOVA) was utilized to explain the data separately for each gender. Veselska et al. (2011) found that elementary males, with an absence of physical movement, had worse self-acceptance and social self-efficacy in contrast with males who had daily exercise. In comparison, females with an absence of exercise reported lower self-esteem, decreased self-acceptance, depressed self-competence, lower general and social self-efficacy, and an increased

negative self-esteem when compared to males with infrequent and daily exercise. Positive self-esteem, self-acceptance, self-competence, overall self-efficacy, and social self-efficacy were greater and unhealthy self-esteem worsened in adolescents who reported increased regular levels of exercise. Sharper contrasts were significantly more noticeable in females than males. While self-connection wasn't directly assessed, the variables contributing to self-connection, as referenced by Klussman et al. (2020a), were assessed which is important to include due to the novelty of research surrounding self-connection as a variable (Veselska et al., 2011).

As little research has been completed to date regarding the association among exercise and self-connection, the established research has provided data for the scholarly community to continue to research the association between these two variables, as well as additional variables that may influence or hinder this relationship (Grossman et al., 2004). Additionally, as research evolves regarding exercise and self-connection, it is imperative to continue to research how these variables contribute to overall well-being, especially when investigating other variables as moderators or mediators within this relationship. As Klussman et al. (2020a) pointed out, the established research between self-connection and overall well-being suggests a research gap indicating a association among self-connection and exercise. As the academic community continues to research these relationships, it will guide health professionals from to better understand their patients, as well as provide more individualized plans to achieve optimal wellness.

The current study used established research to continue to build upon the exploration of the mediating impact that self-connection (Klussman et al., 2022;

Klussman et al., 2020a; Klussman et al., 2021b; Klussman et al., 2021c; Klussman et al., 2020b; Klussman et al., 2020d) may have on the association among exercise (Alleva et al., 2019; Ednie & Stibor, 2017; Perrier et al., 2015; Rollo & Prapavessis, 2020; Smith et al., 2018) and well-being (Klussman et al., 2021a; Klussman et al., 2020b). Previous research has often highlighted the connection between exercise and well-being, as well as how physical activity is a key in preventing several health concerns (Teleki et al., 2021), but little research has investigated reasons why people engage in exercise and what motivations may strengthen the association among exercise and well-being. By examining these factors and relationships, the goal was to gain more knowledge as how self-connection corresponds to exercise and well-being (Klussman et al., 2020b). Another priority was to study the association among the variables to better implement plans of action for individuals that may benefit from exercise and providing education as to how they may be able to strengthen factors to increase intrinsic motivations to care for their own well-being.

### **Summary and Conclusion**

The Centers for Disease Control (CDC) recommends 150 minutes of weekly exercise for adults (Centers for Disease Control, 2018). Many adults do not meet the recommendations for the activity guidelines, and research has indicated this statistic may be related to poorer health conditions, such as increased blood pressure, various heart conditions, and obesity, to name a few (CDC, 2018). As the health complications increase, an overall goal of wellness decreases, providing a better lens to investigate the association between exercise and overall well-being.

As prior research has examined the association among exercise and individual well-being, more recent studies have implied the need to better comprehend how self-connection influences this relationship. Klussman et al. (2021a) reported a positive correlation between weekly minutes of exercise and a person's overall well-being. There is currently little research to comprehend how exercise distinctively conveys to specific health aspect and well-being when including other variables as mediators and moderators. Klussman et al. (2021) carried out a comprehensive analysis to understand the association among various kinds of exercise in relation to the multiple aspects of well-being, in which the results suggested a substantial positive correlation between physical activity and well-being. When examining variables influencing well-being, self-connection was found to mediate the association among mindfulness and well-being, which may suggest higher levels of self-connection increase a person's overall health (Klussman et al., 2020b). Moreover, Klussman et al. (2020b) proposed further research to determine if the participation of self-connection in the association among exercise and well-being.

As the HAPA (Schwarzer et al., 2011) model has been researched in the last few decades to help individuals create and change health behaviors to improve oneself, one of the key components to successful execution of this model is self-efficacy throughout the stages. As self-efficacy has been compared to self-connection in prior research (Klussman et al., 2022; Klussman et al., 2020b;), the HAPA theory will be utilized to help understand and explain the mediating impact self-connection may have on the association among exercise and well-being. Moreover, by using the HAPA (Schwarzer & Luszczynska, 2008) model to explain the association among variables, it provides

insights and pathways to future research investigating how the motivational and volitional phases play a part in sustaining exercise to better benefit one's well-being. The current research used the literature discussed throughout this section to develop the procedures examined in the next section.

## Chapter 3: Research Method

### **Introduction**

This study's goal was to interpret the mediating impact of self-connection in the association among exercise and well-being. As prior research has analyzed the relationship of exercise and a person's well-being (Klussman et al., 2021a), scarce research has investigated the moderating or mediating factors that may impact the association among exercise and well-being. In an attempt to clarify the mediating function of self-connection in the correlation among exercise and overall well-being, a deeper insight was sought after to better understand how physical activity affects well-being, as well as how the health industry may be able to utilize this information in helping others create treatment plans.

A cross-sectional survey, comprised of three short-form established surveys measuring their three respective variables was used for this quantitative study to provide an analysis of the mediating impact of self-connection in the correlation among exercise and well-being by sampling a cross-section of the population at one point in time, in contrast to sampling the population over a longer time period. The current chapter starts by detailing the research plan and the justification defending why this specific research procedure was selected. The methodology section will look at the population, sampling protocols, sampling procedures, recruitment procedures, data collection, and instrumentation that will be used for this study. The author reviewed the plan for data analysis to properly align the research questions conducted for the research. Next, the

data tools' reliability and validity are discussed. Lastly, validity threats and an overview of ethical practices for this study are discussed to close out the chapter.

### **Research Design and Rationale**

A cross-sectional, quantitative method research design was used to examine a possible mediating association among variables via a survey. Quantitative studies are often used to test mindsets, attitudes, views, and actions to interpret findings from more voluminous sample sizes (Burkholder et al., 2016). Surveys are more cost-efficient and time-efficient, as the researcher can send out multiple surveys in a short amount of time and receive results quickly. In a quantitative study, variables can be measured by the data produced using various instruments and statistical analyses. Quantitative research addresses hypotheses and predictions, thus a quantitative research method was selected for the current study. The quantitative methodology was not selected for this research, as a different approach would not have allowed for the assessment of the hypotheses to sufficiently investigate and quantify the current study's research questions (Creswell, 2009).

**Theoretical Basis and Framework.** The theoretical basis for the current study was Ralf Schwarzer's (2016) theory of Health Action Process Approach (HAPA). The HAPA theory proposes the adoption, initiation, and maintenance aspects of health practices need to be clearly comprehended as a progression that entails a motivation phase and a volition phase. Both phases are critical to making long-lasting health behavior changes, as a person needs to reason how the behavioral change will benefit them on a personal basis (motivational phase), as well as a plan for making and

sustaining these changes (volitional phase). The motivational phase is characterized by increasing a person's risk attentiveness, outcome prospects, and action self-efficacy (Schwarzer & Luszczynska, 2008). After a person's intention for change has been established in the motivational phase, strategic planning and volitional self-efficacy transform the intention into the anticipated behavior, as the person is now in the volitional phase of HAPA. When the individual has transformed their behavior into the wanted outcome, it is crucial for the individual to learn when this behavior is to be implemented, as well as how to deal with obstacles to continuation of the behavior if they arise. Action planning postulates when, where, and how the individual will execute the intended behavior, as this helps the person prepare alternate reactions and it stimulates the cognitive tasks that apply circumstantial prompts for the intended actions (Gollwitzer, 1999). Coping planning helps the person plan for a backup plan, as the individual anticipates barriers when adopting a new, healthier behavior into a lifestyle change (Gaube et al., 2021).

HAPA has been used to describe and anticipate individual changes in specific health behaviors including smoking cessation, increasing exercise levels, and use of seat belts, just to name a few behaviors (Panahi et al., 2020; Schwarzer, 2016; Zarski et al., 2018). One principle of HAPA is the emphasis of discerned self-efficacy at various phases of changing the health behavior. Self-efficacy can be defined as the confidence a person feels they have in their power to implement particular steps necessary in generating certain behavior markers, whereas self-connection is defined as one's awareness, and acceptance of this awareness, to foster the belief of themselves to carry

out specific behavior (Panahi et al., 2020). Additionally, the HAPA model can be accentuated to better understand how other variables, such as self-connection, may influence health behavior changes among the motivation phase and volition phase. Therefore, this study utilized HAPA to measure self-connection, as it provides a precursor into understanding self-efficacy on a deeper level. The current quantitative study also used HAPA to further examine the association among exercise and well-being, and the impact of self-connection provided insights for future health behavior changes to increase levels of well-being.

The framework of the current study was based upon prior research conducted detailing the association among exercise and well-being. Prior studies have researched the association among exercise and well-being adopted a holistic view of well-being (Klussman et al., 2021a), investigated various aspects of psychological well-being (Kim et al., 2017), and examined various types of exercise as to how it impacts well-being (Smith, et al., 2018). These studies also looked at other predictor variables, such as motivation (Gomes et al., 2018) and self-efficacy (Gardiner et al., 2021), as moderators or mediators as to how they may influence the association among exercise and well-being. Frameworks for related research influenced the framework for the present study. This study examined the correlation among exercise and well-being, where self-connection was researched as a mediating variable of this relationship. HAPA was used to help explore self-connection as a variable, whereas in previous research HAPA has aided in understanding how self-connection and motivation for change are related (Schwarzer, 2016).

The outcome (DV) variable for this study was well-being. It was evaluated by the condensed version of the Ryff Scales of Psychological Well-being (Horwood & Anglim, 2019). The shorter scale evaluates six overarching themes of overall well-being including independence, personal growth, healthy relationships with others, mastery of the subjects' environmental surrounding, their life purpose, and acceptance of oneself. Participants rated their accordance or discordance using a 7-point rating scale (1 = strongly agree; 7 = strongly disagree).

The key predictor variable (IV) of this study is physical activity. This variable was measured by answering the shorter version of the International Physical Activity Questionnaire (Craig et al., 2003). The IPAQ quantifies and measures the types of intensity of exercise and sedentary activity that people engage in as a part of their daily lives. It was hypothesized that amount of physical activity will have a correlational relationship with respondents' level of well-being.

The mediating variable of this study was self-connection. Self-connection was measured by Self-Connection Scales (Klussman et al., 2020c), a 12-item questionnaire to assess each participant's self-connection. A seven-point rating scale (*1 = I rarely or never feel self-connected; 7 = I always or often feel self-connected*) will be used to measure each question, where higher scores indicate greater self-connection.

## **Methodology**

### **Target Population and Sample**

The researcher utilized convenience sampling strategy to gather participants from the Survey Monkey Audience, an online platform with a diverse target population of

more than 30 million individuals volunteering to complete research survey studies via [www.surveymonkey.com](http://www.surveymonkey.com). The inclusion standards to participate in this study were age (18-65) and amount of exercise (at least two times per week.) The age criterion was set for a range of 18-65 based upon the recommended minutes of exercise by the CDC, recommending adults aged 18-65 should receive 150 minutes of weekly physical activity (United States. Dept. of Health and Human Services, 2008). Recommendations for exercise change for adults above the age of 65. Participants were required to participate in exercise a minimum of two times per week to ensure they have a baseline measurement for exercise to produce sufficient data for this study, as exercising less frequently than twice per week may not provide enough data to effectively study the variables.

Survey Monkey permits for particular standards to be selected before surveying, which means that only participants meeting the standardized criteria for this specific study will be asked to participate. The specific criteria chosen before surveying allows for the most comprehensive sample to be used for this research. Using this sampling protocol meant the research metrics don't need to be confirmed during recruitment, as the demographic funneling ensured all participants will meet the necessary metrics for the current study. Subjects in this study will enter the demographic information in their preliminary profile, as profiles included age, gender, and exercise frequency to ensure participants have met the inclusion criteria.

This study followed ethical guidelines set by Walden University's Institutional Review Board (IRB) and was permitted for the researcher to carry out the study.

Additionally, Survey Monkey was used to select participants for this study. Survey Monkey's Audience purpose will distribute the surveys established on age and inclusion criteria, which is a feature Survey Monkey has for each prospective sample. During the first step of seeking participants meeting the criteria, respondents answered a question detailing their frequency of physical exercise (a minimum of three times weekly) and a question regarding the timespan of exercise habits. If they meet the inclusion criteria based upon these questions, participants were prompted to continue. If prospective participants did not meet the required criteria, they were not allowed to continue. Participants meeting the inclusion criteria were guided to complete the authorization agreement form to guarantee each participant has a thorough acknowledgement of the study. The consent form included study information, study procedures, participants rights, and researcher contact information if participants had further questions. Upon selecting the volunteer consent option, volunteers consented to move forward with the study, where they will be granted to move to the next section. Each participant marked a box stating they read and comprehended the consent form and wish to proceed to engage in the study to allow the participant to move forward. If any participant meeting the inclusion criteria did not wish to continue the study after reviewing the permission form, they were able to cease participating. If subjects wanted to stop their participation before finishing the study, they presented with the choice to finish the survey later. Participants were not be forced in any way to participate. The survey questionnaire, which consisted of a more concise variation of the IPAQ, PWB, and the SCS, was administered to those participants consenting to move forward with the study. Participants completed the study

on electronic equipment that supports the Survey Monkey website. Participants completed the survey anonymously, as the researcher selected to disable the IP address tracking via the options setting on Survey Monkey's website.

### **Sampling and Sampling Procedures**

The current investigation utilized purposive sampling, a method involving surveys that has become popular in the last decade (Baratt et al., 2015). Purposive sampling helps to match the representative group to the study's objectives, which helps improve the study's thoroughness and reliability of the data and results. Purposive sampling was utilized to collect a dense amount of information out of the data collected in a time and cost-efficient way (Campbell et al., 2020). Subjects were selected based upon their pertinence to the study, as the demographics were accounted for when selecting the criteria for participants when submitting the surveys to Survey Monkey. Due to a distinctive set of conditions required to complete the survey, purposive sampling was used in recruiting participants matching the required demographics and criteria. According to the Centers for Disease control, 150 minutes per week is the suggested guideline for exercise for adults (Craig et al., 2003). As most people attempt to aim for at least 30 minutes of exercise per exercise session, the criteria for participants to exercise at two times per week, at minimum, was established for this study (Osei-Tutu & Campagna, 2005).

Scholars that have used mediation analyses in prior research decide sample sizes for their models based on previous studies or follow popular rules-of-thumb. The former approach may be problematic, as estimates for sample sizes may differ depending on the

number of variables being studied in a mediation analysis (Bentler & Chou, 1987). Popular rules-of-thumb methods may also be problematic, as this method doesn't consider the specific method being used for the research design (Bollen, 1989). Sim et al. (2021) reported that sample size should be reflective of findings this study applicable to the research scope and the sample population requirements for the surveys being used to conduct the research.

As the present study utilized a multiple regression analysis conducting a mediation analysis, the researcher determined a minimum sample size of 100 participants. In similar mediation and moderation studies focusing on the areas of exercise, well-being and self-connection, sample sizes have been between 100 (Klussman et al., 2020a) and 154 (Klussman et al., 2021b), 0.017 as the alpha level, and a power level consisting of .80. Based on this prior data, this researcher will obtain a sample size between 115 and 135 participants.

### **Recruitment, Participation, and Data Collection Procedures**

When guidelines and confirmation by Walden University's Institutional Review Board (IRB) were met, Survey Monkey was utilized to enlist participants for this study. Survey Monkey's Audience option distributed the surveys based on the participant's age and criteria for completing the study, a feature Survey Monkey has for each prospective participant. During the first step of seeking participants meeting the criteria, respondents answered a question detailing their frequency of physical activity (base level of three times per week) and a question regarding the duration of exercise habits. If they meet the inclusion criteria, participants were prompted to continue. If prospective participants did

not meet the required criteria, they were not allowed to continue. Participants satisfying the pre-vetted questions were guided to sign informed consent waiver to establish each subject has a thorough comprehension of this study and its procedures. The informed consent form included information on the study, study methods, participants rights, and researcher contact information if participants have further questions. By selecting the consent option, participants indicated their agreement to partake in this study, where they to moved to the next section of the survey. Next, each participant stated they have read and comprehended the survey's informed consent portion, as well as wanting and to proceed and participate in the study. If a participant met the eligibility requirements but did not wish to move forward with the study after reading the consent form, they were able to cease participation. If a participant wanted to leave the survey prematurely, they were not forced to finish the questionnaire. The questionnaire, which consisted of the condensed versions of the IPAQ, PWB, and the SCS, was administered to those participants consenting to move forward with the study. Participants completed the study on any electronic device that supports Survey Monkey's website. Participants completed the survey completely anonymously, as the researcher will select to disable to IP address tracking via the options setting on Survey Monkey's website.

### **Instrumentation and Operationalization of Constructs**

Demographic information, such as participant age, participant gender, participant ethnicity, participant level of education, participant socioeconomic status, and participant exercise frequency, was gathered at the beginning of the survey. Age and exercise frequency were the only demographics needed to ensure participant met inclusion criteria

to continue with the study. Exercise frequency was gathered using the condensed survey for the IPAQ, created by the International Consensus Group in 1998 (Craig et al., 2003), is an open-ended, 7-item, questionnaire relying on self-report to measure a participants' exercise habits. The IPAQ is open for public use, and therefore did not need permission to employ the questionnaire in this study. The main goal from the IPAQ was to gather time exercised per week from each participant, as the sum was calculated of the following questions from the IPAQ: (a) How many minutes per week were spent doing vigorous (heavy breathing, increased heart rate) physical activities?; (b) How many minutes per week were spent doing moderate (physical activities?; and (c) How many minutes did you spend walking (at least 10 minutes or more per walk)?

As each participant provided the number of minutes exercised weekly, this data was categorized into one of three groups. The CDC (Craig et al., 2003) states 150 minutes weekly is the advised guideline of exercise for adults. Data from the IPAQ was marked as “low activity” if participants engaged in under 120 minutes of exercise per week, “moderate activity” if participants engage in 120-180 minutes of exercise per week, and “high activity” if participants engage in an excess of 180 minutes of exercise per week. Descriptive statistics provided a thorough summary of data of physical activity in this mediation analysis.

The PWB, created by Carol Ryff in 1989 (Horwood & Anglim, 2019), is a questionnaire in which 54 questions will be answered from a scale of one to seven, was administered to measure wellbeing. The PWB's questionnaire is open for public use and therefore, this researcher did not need permission to be used for this study. The Ryff

Scales of Psychological Wellbeing contains of a sequence of expressions portraying six various parts of psychological well-being such as independence, environmental mastery, personal growth (questions inquiring how they have improved upon and handle setbacks and obstacles in life), healthy relationships with other people, a life purpose, and self-acceptance. Subjects rated the expressions on a scale of 1 to 6, as 1 indicates strong disagreement with the statement and 6 indicates strong agreement with the statement. This researcher gained authorization to use the Ryff Scales of Psychological Well-Being. See Appendix A for permission letter.

Lastly, self-connection was assessed by administering the 12-item SCS developed by Kristine Klussman (SCS; Klussman, et al., 2020c). Participants rated their answers in accordance to how each item depicts them on a 7-point rating scale, with 1 indicating the participant's strongest disagreement and 6 indicating the participant's strongest agreement. Each question provided a measurement as to how connected the participant is with oneself, assessing desirable, neutral, and less-desirable traits or behaviors. The researcher of this current study contacted Klussman et al. (2020c) to obtain the Self-Connection Scale for use, as the researcher explained her need for the scale for this research project. Permission letter is located in Appendix A.

### **Data Analysis Plan**

A cross-sectional, correlational method was used to gather data for the current study, as all encompassing data was acquired at once, in contrast to a longitudinal study, in which data are taken various times over a specific timeframe. Correlational designs provide a degree of positive or negative statistical correlational association among more

than two variables by attempting to determine a trend among the study variables (Creswell, 2014). Self-administered surveys were utilized to ensure a high response rate and minimize the change of social desirability bias (Chung & Monroe, 2003). Two major advantages to using a cross-sectional, correlational survey proposal was to decrease the length of time to conduct the research, as it also lowered costs associated when conducting the research. A mediation investigation was used to test the hypothesis.

Survey Monkey was used to collect data and was stored on the researcher's individual computer which will be double password protected. SPSS (Version 29) was the software used to analyze the descriptive statistics, as the data taken from Survey Monkey was exported to the SPSS (Version 29) program. Careful examination and organization of the data is crucial when planning for data analysis (Howell, 2008). The researcher used ample precaution when entering data into SPSS (Version 29) and rechecked their work to safeguard the precision of data entry, as the slightest error could lead to calculation errors when analyzing the data.

Survey Monkey Audience was utilized to confirm participants are adequately vetted and meet all eligibility requirements to continue. Participants who were recognized as meeting the criteria for the study were asked additional questions to confirm the inclusion criteria for the survey. Participants failing to answer any of the questions on either of the three questionnaires for this survey were eliminated based on the inability to measure scores for the respective variable.

Listed below are the study's research questions and hypotheses:

RQ1: How does exercise, as quantified by the IPAQ, associate to well-being, as measured by the Ryff Scales of Psychological Well-Being (PWB)?

*H<sub>01</sub>*: There is no significant association among exercise and well-being.

*H<sub>a1</sub>*: There is a significant association among exercise and well-being.

RQ2: How does self-connection, as measured by the Self-Connection Scale (SCS), influence well-being, as measured by the Ryff Scales of Psychological Well-being (PWB)?

*H<sub>02</sub>*: There is no significant association among self-connection and well-being.

*H<sub>a2</sub>*: There is a significant association among self-connection and well-being.

RQ3: To what extent does self-connection, as quantified by the Self-Connection Scale (SCS), impact exercise, as measured by the International Physical Activity Questionnaire (IPAQ)?

*H<sub>03</sub>*: There is no significant association among self-connection and exercise.

*H<sub>a3</sub>*: There is a significant association among self-connection and exercise.

RQ4: How does exercise, as quantified by the IPAQ, correlate to well-being, when measured by the PWB, where self-connection, as quantified by the SCS, mediates this relationship?

*H<sub>04</sub>*: There is no significant association among exercise and well-being where self-connection serves as a mediator.

$H_{a4}$ : There is a significant association among exercise and well-being where self-connection serves as a mediator.

A linear regression design was employed to research and demonstrate the correlational effects between two variables, as demonstrated in the first three research questions. To understand and explain the mediation effect of self-connection on the correlation among exercise and well-being, a mediation analysis was performed (Field, 2013). Due to convenience factors, this study used multiple regression analysis to interpret the data, instead of alternative methods to display mediation analysis, such as logistic regression or polynomial regression (MacKinnon, 2008).

Descriptive statistics were based on the demographic information, as it includes age ranges and gender. Howell (2008) stated descriptive statistics are typically used when attempting to define a data set. Descriptive statistics were examined to gain knowledge and comprehend the generalizability of this study, but it also provided an insight for the perplexing effects of the demographic variables. For example, age and geographic location may affect the total amount of minutes exercised. In controlling these potential influences, the association among any of the two variables is prone to be statistically acceptable, and it may also be less likely accredited to sample bias impact (Stevens, 2016).

Field (2013) explained the required circumstances for findings to be statistical mediated. By using Pearson's simple bivariate correlation coefficient ( $r$ ): 1) the predictor variable ( $X$ ; physical activity in the current example) must show significant correlation with the outcome variable ( $Y$ ; well-being); and 2) the predictor variable must be

significantly associated with the mediator variable (M, self-connection). Then, using Multiple Regression Analysis (MRA), where X and M are the predictor variables and Y is the outcome; 3) after controlling for the association among the mediator (M) and the dependent variable (Y), the association among X and Y is substantially minimized (partial mediation) or is reduced to a non-significant (full mediation level); and 4) finally, in the MRS, the association among M and Y remains statistically significant.

In the current model proposal, the association among X (physical activity) and M (self-connection) is the simple unstandardized regression coefficient. However, some scientists may select to state the standardized regression coefficient. The association among M (self-connection) and Y (well-being) is the unstandardized regression coefficient gathered from a multiple regression model in which Y (well-being) is regressed on X (physical activity) and M (self-connection). In a true meditational model, the effect of X on Y must be reduced substantially (partial mediation) or reduced to a non-significant level (full mediation) (Field, 2013).

The mediated impact of X on Y may be conveyed as an unstandardized regression coefficient (b). Moreover, the significance of the indirect effect of X on Y will continue to be tested by employing Sobel's test (Field, 2013).

### **Threats to Validity**

A study's results hold content validity, including both face validity and sampling validity, as the instrument measuring data includes all the characteristics obtained from the results. Thorough formation of already existing content validity data warrants content validity for the survey strategy and assessment to encapsulate all components under the

findings (Frankfort-Nachmias & Nachmias, 2008). The survey's data tools entailed items that quantify exercise habits, levels of self-connection, and a person's well-being. These instruments are comparable in meaning as a measuring tool, but they differ when obtaining of the information for statistical assessment and the explanation of the data.

As Frankfort-Nachmias and Nachmias (2008) reported, the foundations of validity include content validity, empirical validity, construct validity, and they are exclusive values under certain circumstances. Reliability gauges the study's tools concerning the characteristics used to describe the study's among reliability and validity when supplementing each other. Instruments used to measure validity are important factors in evaluating the threat to internal validity, even when using the same measuring scale in various studies. Varying based upon the Likert scale used in the study, the obtained scores may alter the reliability and validity with an alternate application used in a different study, as variables may also differ across multiple studies (Köksal et al., 2014). Therefore, it is always essential to test and reconsider the reliability for the concluding sample in each study. The Pearson correlation test will be used to test reliability.

The chief obstacle regarding external validity for the current study was the capacity to generalize these results to similar populations (Frankfort & Nachmias, 2008), as it is important to be able to replicate similar studies to continue to research other variables influencing the association among exercise and well-being. Additionally, as self-connection is a novel variable being studied in academic research, it was helpful to observe how self-connection may influence a mediating or moderating association among other variables. By no means can the researcher entirely guarantee that the study's

findings will be completely related to comparable populations outside of secondary research, the targeted sample was intentionally selected with similar features compared to the overall population. To reach the sample target, Survey Monkey distributed surveys based on the age limitations set by the researcher, as this is a prerequisite for any participant to possess before moving on to complete the actual survey. The specific sampling strategy helped to provide to the external validity, so the outcomes were appropriate to adults aged 18 to 65 who have stated they exercise a minimum of three times per week. Aside from the descriptive features, the survey included items asking about demographic features, which were then used as control variables.

### **Ethical Considerations**

Ethical concerns are always considered when conducting any type of research. It is crucial to use guidelines to ensure participant safety when conducting research. Walden University's Institutional Review Board (IRB) was used to certify all ethical considerations and concerns were handled properly before the initiation of a study to deal with any complications that may arise (Connelly, 2014). It is essential that researchers anticipate issues that may arise throughout the study, as well as being equipped and prepared to address these issues in an ethical and timely manner. Informed consent is required by the IRB for anyone participating in a research study.

As stated in the the Ethical Principles of Psychologist's Code of Conduct (American Psychological Association, 2017), researchers must inform participants about (a) the research's purpose, expected duration and procedures; (b) the participant's right opt out of participation and to retract from the findings once the study has begun; (c) the

known concerns of withdrawing from the study; (d) reasonably predictable aspects that may be estimated to impact their readiness to become involved in any potential risks, discomfort, or consequences; (e) any potential benefits to the research; (f) confidentiality restrictions; (g) participation perks; and lastly, (h) whom to communicate with for additional questions and concerns regarding the research and volunteers' rights. The researcher instructed subjects that participation is completely voluntary and anonymous. Subjects who acquired recruitment supplies were already be part of a larger group who have decided to accept Survey Monkey requests when a study fits their inclusion criteria, though the participants were not expected or coerced to be a part of this study. As detailed in the consent form, subjects were not obligated to complete each question, and they were free to cease the questionnaire at any point. Additionally, other detailing aspects, such as an IP address, name, and contact information, were not obtained by the research to support the data collection being anonymous. In line with standard procedures, all data from this study will be held for 7 years after the study's ending, in which it will then be demolished by deletion of the data permanently. As this study was conducted via an online platform, this researcher cannot guarantee that the computer or device the participant used to complete the survey will be completely safe. Therefore, the researcher encouraged all participants to use a private device when answering the survey for this study.

### **General Study Precautions**

The safety of participants must always be vigilantly taken into consideration when conducting any type of research. Applications were submitted to Walden's IRB to

confirm that all safeguards were secured before beginning to collect data and for the entirety of the study. All data was obtained through Survey Monkey's website. Secure Socket Layer (SSL), was used by Survey Monkey to secure data. SSL produces a secure connection between the subject and the server, as it encrypts sensitive and identifying information that is communication through the webpage. All subjects were completely anonymous as their IP address tracking will be disabled. Additionally, there was no way to link the subject with the collected data, ensuring complete anonymity of the data accumulation procedure and preventing security breaches. The researcher retained the information on their own computer that must be double password protected for at least 7 years, as this is the standard required protocol by Walden University. Before beginning the study, research subjects were provided a consent form to read and understand. They were required to indicate their agreement by checking a box before proceeding with the study. The researcher has determined that there are no expected danger to participants completing this study.

### **Summary**

The key research question for this analysis asked to what extent physical activity relates to well-being, where self-connection mediates the relationship. The null hypothesis was there was no meaningful relationship among exercise and well-being where self-connection served as a mediator. The researcher predicted self-connection serves as a mediator in the association among physical exercise and well-being. This prediction was made based upon prior research of the current study's variables. Kim et al. (2017) noted that higher psychological well-being was found to be correlated with

increased levels of exercise in linear regression models. Self-connection was found to positively impact health, well-being, and exercise in a study designed by Klussman et al. (2021a). To test this hypothesis, the researcher conducted a non-experimental quantitative, cross-sectional research design to provide an analysis of self-connection in the association among exercise and well-being by sampling a cross-section of the population during one point in time, as opposed to sampling over time .

Other research questions comprised the relationship of two variables within the study, instead of all three being presented in the main research question. The second research question inquired to what degree does exercise associate to well-being. The third research question asked to what extent does self-connection associate to well-being. Lastly, the fourth research question examined to what extent does self-connection relate to physical activity. Regression analysis was used to examine these subsequent research questions and to determine the association among variables.

## Chapter 4: Results

This quantitative study's purpose examined self-connection's influences in the association among physical activity and wellbeing. Prior research has indicated exercise to have a positive correlation with wellbeing, while self-connection has also been researched to have a positive correlation with wellbeing. Wellbeing (DV) was measured by the Ryff Scales of Psychological Wellbeing to provide participants with a score of their wellbeing levels. Physical activity (IV) was assessed based on the minutes of exercise per week, while self-connection, another predictor variable, was measured via the Self-Connection Scale.

Data collection was administered and collected as expected without any unexpected challenges. Listed below are the study's research questions and hypotheses:

RQ1: How does exercise, as measured by IPAQ correlate to one's well-being, as measured by the PWB?

$H_01$ : There is no significant association among exercise and well-being.

$H_a1$ : There is a significant association among exercise and well-being.

RQ2: How does self-connection, as quantified by the SCS, relate to well-being, as quantified by the PWB?

$H_02$ : There is no significant association among self-connection and well-being.

$H_a2$ : There is a significant association among self-connection and well-being.

RQ3: How does self-connection, as measured by the SCS, associate to exercise, as measured by the IPAQ

$H_03$ : There is no significant association among self-connection and exercise.

$H_{a3}$ : There is a significant association among self-connection and exercise.

RQ4: To what extent does exercise, as measured by the IPAQ correlate to well-being, as measured by the PWB, where self-connection, as quantified by the SCS, mediates this relationship?

$H_{04}$ : There is no significant association among exercise and well-being where self-connection serves as a mediator.

$H_{a4}$ : There is a significant association among exercise and well-being where self-connection serves as a mediator.

### **Data Collection and Processing**

After obtaining Walden University's IRB permission to begin the current study, SurveyMonkey was used to obtain research data in April 2024. Data was obtained from April 7, 2024 to May 7, 2024. The survey was closed after 135 participants completed the survey. Eight participants were not included due to not fully completing the survey. After these exclusions, 127 participants remained to use data for the current survey.

### **Demographics**

Data was collected from 127 participants. Out of 127 participants, 71 participants reported their gender as female and 56 participants reported their gender as male. The volunteers' age ranged from 19 to 65, where the mean age was 41. Subjects were asked to provide their highest education level, which rendered these statistics: Some High School, 2; Graduated High School, 7; Some Undergraduate, 28; Graduated Undergraduate, 68; Some Graduate Education, 8; Graduated Higher Education, 14. Participants were asked to self-report their ethnicity. Eighty-seven subjects responded as White, 23 subjects

responded as African American, 11 subjects responded as Hispanic/Latino, and 6 subjects responded as Other.

Table 1. *Gender Demographics (n=127)*

Variables	Frequency	Percentage
Gender		
Female	71	55.9%
Male	56	44.1%
Other	0	0

Table 2. *Education Demographics (n=127)*

Variables	Frequency	Percentage
Education		
Some High School	2	1.6%
Graduated HS	7	5.51%
Some Undergraduate	28	22.0%
Graduated Undergraduate	68	53.5%
Some Higher Ed	8	6.3%
Graduated Higher Ed	14	11.0%

Table 3. *Ethnicity Demographics (n=127)*

Variables	Frequency	Percentage
Ethnicity		
White	87	68.5%
African American	23	18.1%
Hispanic/Latino	11	8.7%
Other	6	4.7%

### Descriptives

The current study required participants to be between the ages of 18-65. See Table 4 for a breakdown of age ranges.

Table 4. *Age Demographics (n=127)*

Variables	Frequency	Percentage
Age Group		
18-24	3	2.4%
25-34	31	24.4%
35-44	43	33.9%
45-54	22	17.3%
55-65	28	22.0%

The IPAQ was administered with 7 open-ended questions asking participants to report the number per minutes they spent each week on exercise levels and their intensity

scores, as well as how many days per week they spent engaging in these varying levels of movement and exercise. Physical exercise was this study's independent variable. To obtain a general sense of physical activity, this study will measure the total number of minutes across varying levels of weekly physical activity to score as participants' physical activity measure. The lowest physical activity reported was 90 weekly minutes, and the highest amount of physical activity reported was 1200 minutes per week, with an average of 252 minutes of weekly exercise.

Well-being, the dependent variable in the study, was quantified by Ryff's Psychological Well-Being scale, where participants completed a 42-item questionnaire measuring well-being levels on a rating scale from 1 to 6 (1 = strongly disagree; 6 = strongly agree). Scores of 42 to 84 were marked as "low levels of wellbeing", scores of 85-168 were marked as "moderate levels of wellbeing", and scores above 169 were measured as "high levels of wellbeing". Out of 127 participants, 42 participants reported moderate levels of wellbeing and 85 participants reported high levels of wellbeing. No participant reported having a low level of wellbeing. The minimum level of wellbeing was reported at 101, and the highest level of wellbeing was reported at 250, where the mean was 183.93 and the standard deviation was 32.07.

Self-connection, the mediating variable, was quantified by utilizing the 12-question Self-Connection Scale (Klussman et al., 2020c). As each question is evaluated from a score of one to seven, total scores less than 24 were identified as "low levels of self-connection", total scores between 25-72 were identified as "moderate levels of self-connection", and scores higher than 72 were identified as "high levels of self-connection.

Out of 127 participants, 109 participants reported high moderate levels of self-connection and 18 participants reported moderate levels of self-connection. No participant scored as having a low level of self-connection. The minimum level of self-connection was reported at 33 and the highest level of self-connection was reported at 84, with an average of 60.06 and a standard deviation of 11.13.

Table 5. *Descriptive Statistics on Key Variables (n=127)*

Variables	Min	Max	Mean	Std. Deviation
Physical Activity	45	1200	251.52	213.60
Self-Connection	33	84	60.06	11.13
Wellbeing	101	250	183.93	32.07

### Assumptions

This study used a multiple linear regression model to interpret and examine the hypotheses of this study. Five assumptions – linear relationship, no multicollinearity, independence, homoscedasticity, and multivariate – are all required for a multiple linear regression (Darlington & Hayes, 2016). A linear relationship observes the correlation among the predictor variables and the response variable in a multiple regression model. In this study, the predictor variables include self-connection and wellbeing, whereas the predictor variable is physical activity. Multicollinearity determined if the two predictor variables were strongly correlated. Independence studied if the data set observations are

independent. Homoscedasticity determined if the residuals had consistent points of variance in this linear model. Lastly, multivariate normality was interpreted to determine if the residuals were normally distributed.

### Linearity

Linearity was observed in scatterplots produced by SPSS. Please see the scatterplots below in Figure 1 and Figure 2.

*Figure 1.* Self-Connection and Wellbeing Scatter Plot

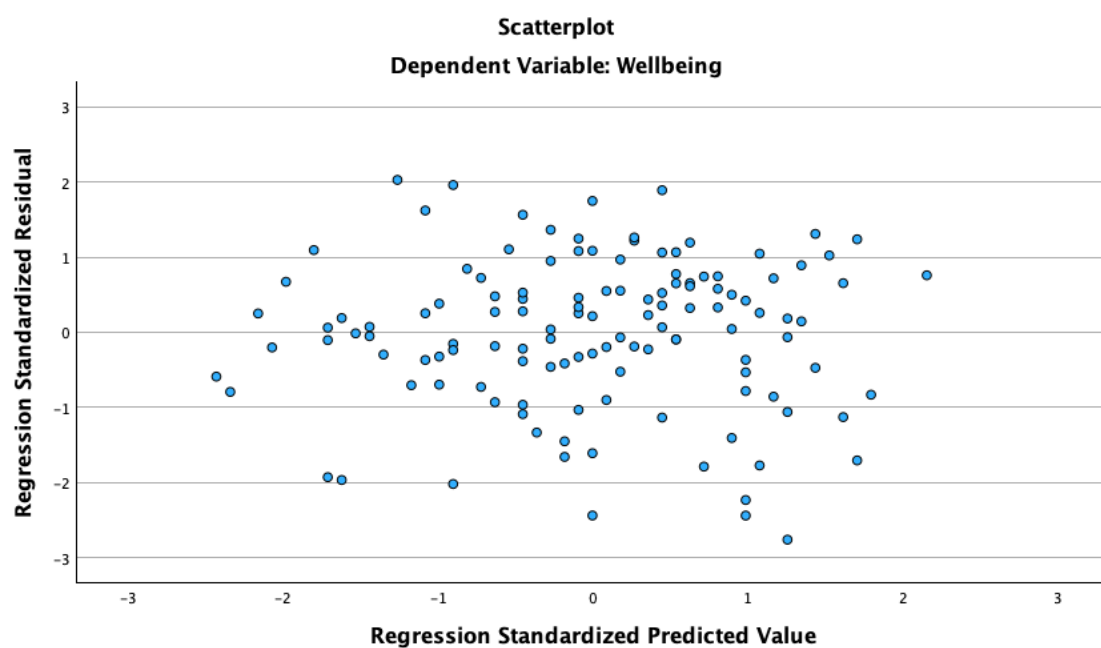


Figure 2. Physical Activity and Wellbeing Scatter Plot

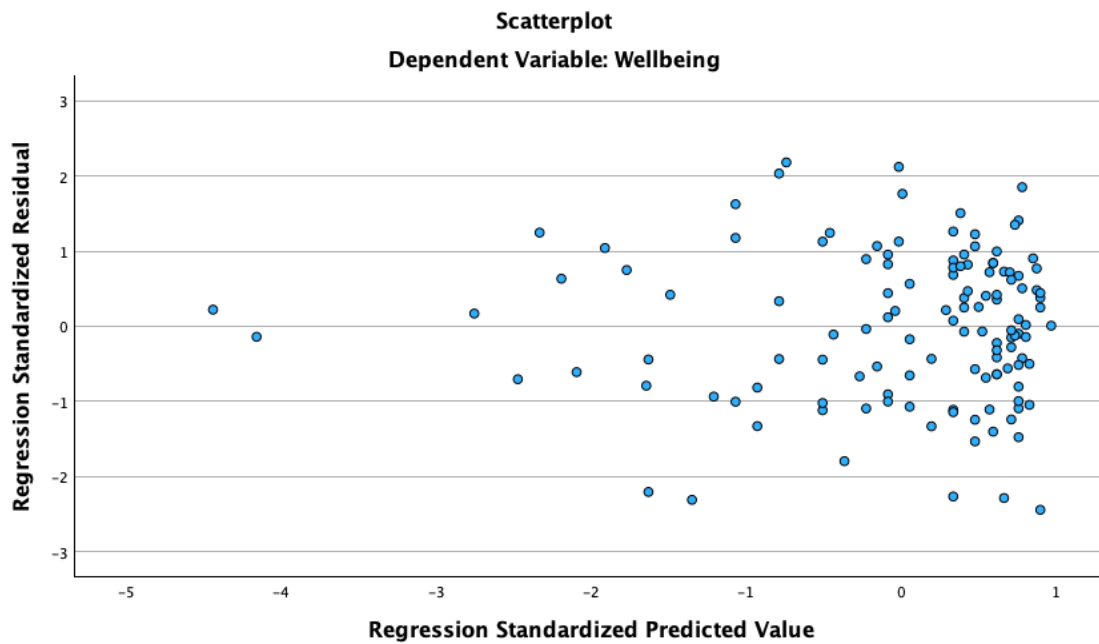


Table 4 shows that wellbeing has a significant linear relationship with physical activity of  $r = -.221, p < .001$  when measured against wellbeing. However, self-connection does not have a significant linear relationship with wellbeing with values of  $r = .653, p < .604$ .

Table 6. *Correlations of Variables for Hypothesis Test*

Variables	Wellbeing	Self-Connection	Physical Activity
Wellbeing	Pearson Correlation 1	.663**	-.252**
	Sig. (2-tailed)	<.001	.004

	N	127		
Self-Connection	Pearson Correlation	.663**	1	-.047
	Sig. (2-tailed)	<.001		.604
	N	127		
Physical Activity	Pearson Correlation	-.252	-.047	1
	Sig. (2-tailed)	.004	.604	
	N	127		

\*\*Correlation is significant at the 0.01 level (2-tailed)

\*Correlation is significant at the 0.05 level (2-tailed)

### **Multicollinearity**

The correlation of predictor variables, such as physical activity and self-connection, were investigated for multicollinearity. This examination determined that multicollinearity does not exist in this relationship. Tolerance and Variance Inflation Factor (VIF) were researched to test for multicollinearity. A tolerance value of at least .10 is needed to ensure multicollinearity isn't present in either variable. Physical activity and self-connection had a tolerance of 0.998. The VIF was analyzed at a value of 1.002 as shown in Table 13.

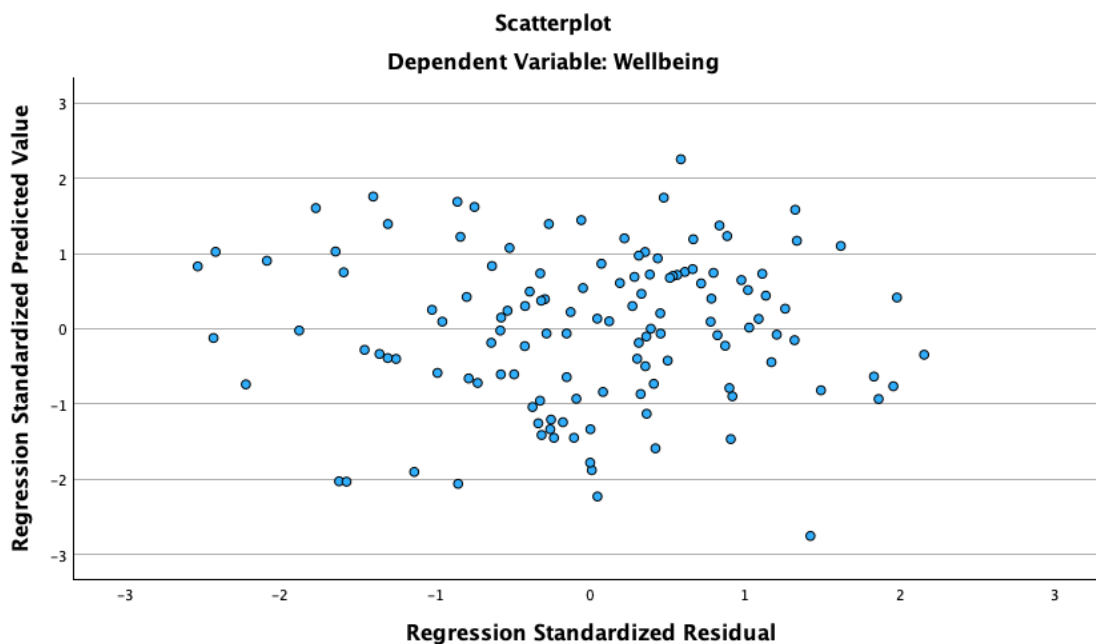
## Independence

Independence was determined via a Durbin-Watson. The Durbin-Watson test showed a value of 1.430 which indicates that each dataset point was not independent of each other.

## Homoscedasticity

Figure 3 portrays a constant variance and trending in the same direction. Therefore, the collected data points met the homoscedasticity requirements.

*Figure 3. Physical Activity and Self-Connection as Predictor Variables in Wellbeing*

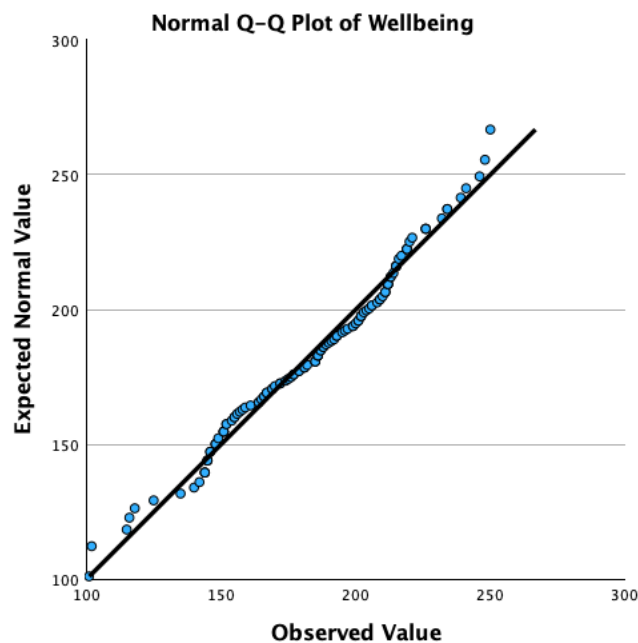


## Multivariate Normality

This study used a Q-Q plot to examine the residual normality. Figure 4 shows the residual and the predictor Y-value are distributed in a sufficient manner. Most of the

variation for the predictor value were normally distributed, though there were a few cases of outliers displayed.

*Figure 4.* Normal Q-Q Plot of Regression Residuals for Wellbeing (Dependent Variable)



### Testing the Hypothesis

This section displays the current study's mediation model to examine and interpret data analysis and research questions. Research questions will be analyzed using tables to present the coefficient measures with statistics representing predictor and dependent variables in relation to the mediation model.

Research Question: How does exercise, as measured by the IPAQ correlate to well-being, as measured by the PWB, whereas self-connection, quantified by the SCS, mediates this relationship?

$H_{04}$ : There is no significant association among exercise and well-being where self-connection serves as a mediator.

$H_{a4}$ : There is a significant association among exercise and well-being where self-connection serves as a mediating variable.

### Findings

Four regression analyses were conducted to determine whether self-connection mediates the correlation among exercise and wellbeing. The initial regression analysis indicated significance in the relationship between physical activity and wellbeing. Results in Table 5 show significance between increased physical activity and increased wellbeing ( $F(1,125) = 8.46, p = .004$ ). See Table 6 for reference.

Table 7. Regression of Physical Activity and Wellbeing

Model	Sum of squares	df	Mean squares	F	Sig
Regression	8215.891	1	8215.891	8.462	.004
Residual	121364.471	125	970.916		
Total	129580	126			

Dependent Variables: Wellbeing

Predictor: Physical Activity

Table 8. Coefficients of Physical Activity and Wellbeing

	Unstandardized coefficients	Standardized coefficients
--	-----------------------------	---------------------------

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Model	B	Std. Error	Beta	T	Sig.
Constant	193.438	4.281		45.182	<.001
Physical Activity	-.038	.013	-.252	-2.909	.004

---

Dependent Variable: Wellbeing

---

The second regression analysis examined whether the self-connection influences a person's physical activity level. See Table 7 for results. No significant relationship was indicated among self-connection and well-being in the regression analysis ( $F(1,125) = .27, p = .604$ ).

Table 9. *Regression of Self-Connection and Physical Activity*

---

Model	Sum of squares	df	Mean squares	F	Sig
Regression	12439.459	1	12439.459	.271	.604
Residual	5736212.242	125	45889.698		
Total	5748651.701	126			

---

Dependent Variable: Physical Activity

Predictor: Self-Connection

---

Table 10. *Coefficients of Self-Connection and Physical Activity*

Model	Unstandardized coefficients		Standardized coefficients		
	B	Std. Error	Beta	T	Sig.
Constant	305.155	104.756		2.913	.004
Self-Connection	-.893	1.715	-.047	-.521	.604

Dependent Variable: Physical Activity

The third regression analysis determined if the relationship between self-connection and wellbeing was significant. See Table 9 for the results. The regression analysis between self-connection and physical activity showed a significant relationship between these two variables ( $F(1,125) = 98.09$ ,  $p = <.001$ ).

Table 11. *Regression of Self-Connection and Wellbeing*

Model	Sum of squares	df	Mean squares	F	Sig.
Regression	56975.504	1	56975.504	98.092	<.001
Residual	72604.858	125	580.839		
Total	129580.362	126			

Dependent Variable: Wellbeing

Predictor: Self-Connection

Table 12. *Coefficients Self-Connection vs Physical Activity*

Model	Unstandardized coefficients		Standardized coefficients		
	B	Std. Error	Beta	T	Sig.
Constant	69.141	11.786		5.867	<.001
Self-Connection	1.911	.193	.663	9.904	<.001

Dependent Variable: Wellbeing

A final regression analysis evaluated the mediating effect of self-connection in the association among physical activity and wellbeing. Table 11 displays overall significance from the ANOVA analysis results:  $F(2,124) = 59.24, p = <.001$ . Table 12 displays that the mediation variable (self-connection) creates a significant relationship among physical activity and wellbeing ( $B=1.881, p = <.001$ ).

Table 13. *Regression of Physical Activity and Self-Connection on Wellbeing*

Model	Sum of squares	df	Mean squares	F	Sig.
Regression	63315.517	2	31657.758	59.240	<.001
Residual	66264.845	124	534.394		

Total 129580.362 126

---

Dependent Variables: Physical Activity, Self\_Connection

Predictor: Wellbeing

---

Table 14. *Coefficients of Wellbeing*

Model	Unstandardized coefficients		Standardized coefficients		
	B	Std. Error	Beta	T	Sig.
Constant	79.286	11.682		6.787	<.001
Physical Activity	-.033	.010	-.221	-3.444	<.001
Self-connection	1.881	.185	.653	10.154	<.001

---

Dependent Variable: Wellbeing

---

Table 15. *Collinearity Statistics*

Model	Collinearity Statistics	
	Tolerance	VIF
Self-Connection	.998	1.002
Physical Activity	.998	1.002

---

Dependent Variable: Wellbeing

### Summary

This study utilized a mediation regression procedure to determine if self-connection mediates the relationship among physical activity and wellbeing. After data was inspected and incomplete surveys were thrown out, 127 participant surveys were used in analyzing this data. The IPAQ measured weekly physical activity among participants. Self-connection was measured via the Self-Connection Scale. The Ryff Scale of Personal Wellbeing was used to measure overall wellbeing.

A multiple linear regression analysis analyzed the mediation effects of this current study. A linear relationship, exhibiting no multicollinearity, independence, homoscedasticity, and multivariate normality were all examined as the five assumptions that must be met for this multiple regression analysis. Significance was shown in the conducted analysis among physical activity and wellbeing, as well as significance between self-connection and wellbeing; however, when analyzing the mediation of self-connection in the correlation between physical activity and wellbeing, the relationship became insignificant. While the overall coefficient data showed significance between these three variables, a more in-depth analysis was insignificant in the mediation model. Chapter 5 will review the current study's results, implications from the results, and future academic research recommendation based upon these results.

## Chapter 5: Discussion, Conclusion, and Recommendations

### Introduction

To help people obtain an increased quality of life, satisfaction, and wellbeing, it's crucial to continue investigate the factors that affect these goals. Without understanding how to promote the wellbeing of individuals of various populations, healthcare providers cannot adequately help build treatment plans with strategic health behaviors when helping patients improve their life satisfaction. The purpose of this study involved understanding the mediating effect of self-connection in the relationship among physical activity and wellbeing. Recent research has reported a positive correlation among exercise and wellbeing, as obtaining the recommended amounts of exercise set forth from the Centers for Disease Control has increased a person's overall being (CDC, 2018).

Exercise has been found to decrease various physical complaints and health concerns, such as diabetes, heart disease, and cancer. Mental health concerns, like anxiety and depression, have also been studied to be controlled by exercise (Gardiner & Bryan, 2021). Klussman, Nichols, Langer, and Curtin (2020d) researched self-connection as a predictor of mental well-being, in which they concluded that individuals who presented with increased self-connection have lower rates of mental health concerns and can manage their symptoms when presented with mental health woes.

As physical activity has been correlated with higher reports of wellbeing and self-connection also has been shown to have a positive effect on wellbeing, prior studies had discussed a research gap in understanding influencing variables in the relationship between exercise and wellbeing. This researcher measured self-connection as a mediator

variable using the Self-Connection Scale (SCS), physical activity as the independent variable using the International Physical Activity Questionnaire (IPAQ), and wellbeing as the dependent variable using the Ryff Scales of Psychological Wellbeing (PWB). This study was created to research how self-connection may strengthen or weaken the relationship among exercise and wellbeing.

While this study's key findings did not support each of the four research question hypotheses, the study did provide results to point the researcher to ideas for future academic directions when studying self-connection, physical activity, and wellbeing. This study found that as physical exercise increases, well-being and self-connection also increase. Moreover, when self-connection increases, so does a person's wellbeing. However, the current study did not suggest that self-connection serves as a predictor variable in the association between exercise and well-being.

In this chapter, the contributions and limitations are examined and discussed the, as well as implications for health psychology research theories incorporating human motivation and social change. Next, an individual's personal motivations will be considered and discussed by using HAPA to better explain the results and implications when examining the results. Lastly, the results of the current study, based on the HAPA model, will be used to explain implications for future research incorporating self-connection, wellbeing, and physical activity.

### **Key Findings and Interpretations**

The current study's findings provided limited support for the research-based hypothesis of increased self-connection would mediate the relationship between exercise and wellbeing.

As discussed in Chapter 2, recent research has correlated the increase in self-connection to overall well-being. Klussman et al. (2020a) found self-connection helps to explain the relationship among mindfulness and well-being, as their research implied that the more a person is self-connected with oneself, the higher they reported experiencing overall well-being, with self-connection presenting as a mediator in the relation among mindfulness and well-being. As exercise is often discussed as a variable contributing to well-being (Alleva et al., 2019; Kim et al., 2017; Klussman et al., 2020b; Smith et al., 2018) and self-connection is also attributed to well-being (Klussman et al., 2020b; Klussman et al., 2020c; Klussman et al., 2020d), little research has been performed to understand the association between exercise and self-connection, or moreover, how self-connection may be a factor in how exercise is utilized to manage one's well-being. Based on this literature gap, the current study set out to better understand this gap and study how self-connection influences the relationship between exercise and wellbeing.

The RQ1 hypothesis of an associated among increased exercise and higher levels of wellbeing was correct, as the data showed significance between these variables. Data also supported the RQ3 hypothesis as it indicated significance between self-connection and physical activity. Despite previous academic research, the current study did not support the RQ2 hypothesis of a significant relationship between self-connection and

wellbeing. The overall coefficient data showed significance when self-connection serves as a predictor variable in the relationship among physical activity and wellbeing to support RQ4, but a more in-depth analysis was unable to indicate significance of these findings.

For this study, the researcher used the total minutes of exercise per week to assign a data point for physical activity. One of the questions of the IPAQ asked participants how many minutes of walking they participated in each week. While not displayed in Chapter 4, the researcher did find that when isolating the minutes of walked per week, self-connection did serve as a mediating variable in the relationship between exercise and wellbeing.

### **RQ1: Physical Activity and Wellbeing**

The present study's findings suggested an association between an increase in exercise and increased wellbeing. The findings are consistent with previous research implicating a person's overall wellness is correlated with their exercise habits (Dillon et al., 2021; Edwards & Loprinzi, 2019; Klaperski et al., 2019; Klussman et al., 2021a; Poon & Fung, 2008). A regression analysis indicated that the more a person exercised, they were more likely to report increased wellbeing. Kim et al. (2017) reported similar findings when they examined the long-term effects of exercise. They reported that a person maintained high levels of wellbeing if they continued to exercise for over a decade, but ceasing to exercise – despite a previous regular exercise regimen – resulted in lower levels of wellbeing. Lower levels of wellbeing may also result in a person's declined interest in exercising.

Prior academic research has differed from the current study by measuring physical activity in various ways: number of workouts per month (Kim et al., 2017), vigorous versus leisure physical activity (Klaperski et al., 2019), short- versus long-bout exercise activities (Osei-Tutu & Campagna, 2005), and how many calories were burned during exercise (Poon & Fung, 2008). All the research utilized to form hypotheses for the current study noted that an alternate scale to measure physical activity may have altered the results. Therefore, it is crucial to be able to replicate these studies with various physical activity scales to obtain a well-rounded measure of how various types of exercise measurements may impact identical variables differently.

The current study examined exercise by weekly minutes exercised across these categories: vigorous activity, moderate activity, and walking. However, neither the type of exercise nor the number of days exercised in a week were recorded. These factors may have provided a more in-depth analysis as how exercise affects well-being, as well as which exercises may have a greater impact on wellbeing. In this section, I consider how the HAPA theory may help explain how a person's motivation and determination can help a person reach their goal of increased well-being by incorporating adequate physical activity (Schwarzer, 2016).

**Effects of using Health Action Process Approach theory.** Based on the HAPA theory, if a person is attempting to increase their wellbeing (to feel better, improve certain health markers, decrease their chances of developing a chronic illness, or a variety of other sound reasons), their outcome of achieving wellbeing may prompt a person to first form a behavioral intention, such as increase their exercise. However, risk perception and

awareness are viewed as distal antecedents of forming intentions because by itself, intention is not enough to allow a person to develop a behavior change. Expectant outcomes and a person's self-efficacy, which can be described as one's confidence in their capacity to initiate and execute an action plan for a specific outcome, are viewed as the key factors to the development of robust behavioral goals as part of the motivation stage of the HAPA (Gaupe et al., 2021). Actions of self-efficacy, results expectancies, and a person's perception of risk are all factors of how a person views their intention for the behavior change.

After the intention has been developed, it is then transformed into the anticipated behavior, or the volitional phase. Anticipated behavior is accomplished via two key factors: strategic planning and volitional self-efficacy (Scholz et al., 2009). When a person has moved into the volitional phase, they develop their exercise regimen, plan for perceived situational obstacles, and move forward with the behavior. The HAPA theory aims to close the intention-behavior gap by incorporating volitional factors which have been researched to aid in turning intentions into action and predict the intended health behavior commitment (Schwarzer & Luszczynska, 2008). Therefore, when an individual wants to achieve an outcome, such as improve one's wellbeing, motivation and determination will help them achieve this goal via increasing their physical activity.

### **RQ2: Self-Connection and Physical Activity**

This study found a significant relationship when undergoing a regression analysis between self-connection and physical activity. When a person reported higher self-connection scores, they were more likely to state they had higher physical activity levels.

The Self-Connection Scales were used to measure self-connection, and the short version of IPAQ was used to quantify a person's exercise. A similar study, Klussman et al. (2021a), looked into the connection between exercise, health and wellbeing, where self-connection and exercise were used as moderators. Results showed physical activity is not always associated with well-being, and moreover, the type of exercise and intensity of exercise should be investigated further to observe different aspects of these relationships. Despite these results, the previous research study found self-connection to be reliably related to health and wellbeing, while moderating the relationship among the type of exercise and the presence of meaning.

As self-connection – explained by self-awareness, self-acceptance, and self-alignment – is a novel variable being researched in academia, more research needs to be conducted to effectively learn how self-connection influences other variables and relationships. However, based on the research that self-connection tends to improve healthy habits, the HAPA model was used to help explain the findings of the current research. As self-efficacy is a related concept explained by self-connection's definition (Klussman et al., 2021), it helps explain why a person with higher levels of self-connection may experience better success rates at engaging in the motivation phase and carrying a behavior out through the final steps of the volition phase when compared to their counterparts with lower levels of self-connection. Individuals with higher self-efficacy levels have a higher belief they can achieve their goals, thus when applying the same ideology with self-connection, it is hypothesized they would possess the motivation to follow through with behaviors leading to increased wellbeing.

Much like RQ1, future studies should incorporate the type of exercise performed and how many days per week a person engages in physical activity. Osei-Tutu and Campagna (2005) discussed the differences of short and long-bout exercise regarding physiological measures and mood disturbances. Replicating this study with an emphasis on type of exercise may help the academic and health communities better understand which types of exercise may increase self-connection. Also important is whether level of self-connection is related to type of exercise.

**Internal validity in prior research.** Previous studies correlating research on self-connection with an improved quality of life have often included socioeconomic and demographic factors, for example, a middle-aged white female with an undergraduate degree or higher, living in an urban area with at least a \$75,000 household income level (Klussman et al., 2021a; Klussman et al., 2020d; Klussman et al., 2020c). When researching relationships between exercise and self-connection, the same demographic profile was the most represented (Klussman et al., 2021a). Results from the current study reflected a similar demographic of a middle-aged white women with an undergraduate degree or some other higher education degree. Living environments and socioeconomic statuses were not reported in the current study.

While it is crucial to incorporate diversity into demographics across various studies, the similarities of the demographic samples from prior research and the current research helps to control internal validity (Kwon et al., 2022; Poon & Fung, 2008). Since the same demographic was represented in prior research and the current research, this provides further information and guidance on how physical activity and self-connection

can be utilized in the healthcare, fitness, and wellness industries. Furthermore, by controlling internal validity, the academic community can better compare this study against prior research studies since the results represent the same population used in previous self-connection and exercise studies.

### **RQ3: Self-Connection and Wellbeing**

A third regression analysis showed a significant relationship among self-connection and wellbeing. As self-connection rose, so did well-being. The Self-Connection Scale measured self-connection, and Ryff's Psychological Wellbeing Scale was utilized to measure wellbeing. As prior research has stated, self-connection mediates the relationship among mindfulness and wellbeing (Klussman et al., 2020a). In a similar study, self-connection was observed to be one of two significant moderators between exercise and wellbeing (Klussman et al., 2021a).

Much like RQ2, using HAPA to explain the significance between self-connection and wellbeing relies on the assumption that a person with higher self-connection will most likely have increased self-efficacy. As HAPA explains the process of behaviors moving from the motivation phase through the volition phase, a person with higher self-connection levels will probably follow through with behaviors related to wellbeing at higher success rates than those individuals with lower self-connection levels (Chen et al., 2020). Moreover, increased levels of self-connection may give way to a person finding it easier to implement HAPA's approach of planning for setbacks when executing a new health behavior (Schwarzer, 2016). Understanding your strengths, as well as your weaknesses, is a critical part in deeper self-connection as one's self-acceptance is a factor

of self-connection. Therefore, if one understands a behavior change may be challenging, they may be more open to accepting setbacks are part of progress and plan accordingly.

**Self-connection as a novel variable.** Self-connection is a novel variable in the academic research field. Klussman et al. (2022) developed, examined, and approved the 12-item SCS to further propel empirical academic studies of self-connection and its impact on well-being. This is the first scale of its kind to measure self-connection in a broader sense for the academic community. While aspects of self-connection, such as self-esteem and self-efficacy, have been studied in previous research, self-connection is a new variable to examine in conjunction with a new scale to measure this variable.

Unlike the PWB and IPAQ with various forms and quantity of measurement questions, the SCS currently only has one form to administer. As more self-connection research is conducted with various results, it is to be expected that the SCS may take on various forms also, such as including scales for measuring self-connection in specific circumstances or environments (Klussman et al., 2022). This will help future research be more accurate and precise when understanding how self-connection relates to other variables.

Future research should incorporate various measures of wellbeing to examine if self-connection correlates with higher overall levels of wellbeing, or if there are specific components of wellbeing in which self-connection has a greater effect. A similar study could be conducted as the current study, however using multiple scales to measure wellbeing instead of only one scale. More research should be conducted to have a better-detailed and comprehensive understanding of the connection between self-connection and

wellbeing. Just as multiple scales exist to measure physical activity and well-being depending on which aspect of the variable one is seeking to study, the Self-Connection Scale as the only measure currently, may serve as a barrier in interpreting its full effect on a broader level (Klussman et al., 2022). As the research community continues to study self-connection, academics will be able to further critique this novel scale to add questions to the SCS or formulate new scales to better represent and understand how self-connection influences a person's daily routine, wellbeing, and life satisfaction (Klussman et al., 2020b).

#### **RQ4: Self-Connection as a Mediator in the Relationship Among Physical Activity and Wellbeing**

A final multiple regression analysis detailed the significance of self-connection among the relationship among exercise and wellbeing. As previously studied, self-connection, along with type of exercise, moderated the relationship among exercise and wellbeing (Klussman et al., 2021a). A linear relationship, which exhibited no multicollinearity, independence, homoscedasticity, and multivariate normality were all observed as the five assumptions that must be met for this multiple regression analysis. The overall analysis indicated a significance among physical activity and wellbeing, as well as significance between self-connection and wellbeing. However, when using self-connection as a predictor variable in the relationship among physical activity and wellbeing, the relationship became insignificant. The overall coefficient data indicated significance between self-connection, wellbeing, and physical wellbeing; however, when

self-connection was examined as the mediator in the relationship among exercise and wellbeing, the results concluded this relationship as insignificant.

In a previous study examining the moderating effect of self-connection in physical activity and a person's health status, increased physical movement was not consistently associated with improved personal health and wellbeing (Klussman et al., 2021a). However, self-connection was consistently associated to overall health and wellbeing as it moderated the relationship among exercise type and one's well-being. A similar study by Klussman et al. (2020a) studied how mindfulness impacts well-being using self-connection as a mediator. In this study, mindfulness significantly predicted self-connection and well-being. Self-connection was also shown to predict well-being and somewhat mediated the connection among mindfulness and wellbeing. The results from that study indicated that mindfulness improves self-connection, and therefore may positively impact a person's wellbeing.

**Prior research on relevant use.** Established research has suggested some forms of exercise may have a greater impact on wellbeing than others, such as the differences between short- and long-bout exercise impacts on physiological measures and mood disturbances (Osei-Tutu & Campagna, 2005). From researching social factors of exercise (Teleki et al., 2021) to better understanding how age impacts the effects of physical activity in wellbeing (Poon & Fung, 2008), established research has taught the academic community how various factors impact the relationship between exercise and wellbeing. Therefore, researching other variables associated with exercise and wellbeing is an academic and research landscape in the path of helping individuals obtain better

wellbeing and quality of life. Increased mental health (Rollo & Prapavessis (2020), better nutrition choices (Sinclair et al., 2008), and community cohesion (Stanescu, 2014) are a few ways in which prior research has shown to be effective in improving a person's overall wellness scores.

Based on established self-connection research, it is suggested that self-connection mediates the relationship among mindfulness and wellbeing (Klussman et al., 2020), as well create resilience in stressful environments (Klussman et al., 2021b), and co-exist with type of exercise as a moderator in the connection among exercise and well-being. This study proposed further research to investigate self-connection as a predictor variable in the relationship among exercise and well-being, where exercise was measured in the scope of how many minutes per week a person engaged in physical activity. While the current study did not suggest self-connection serves as a mediator for the relationship among exercise and well-being, it still suggested a positive correlation when only measuring self-connection and well-being, as well as measuring self-connection and physical exercise. The previous research and current study suggest that self-connection serves as a variable to continue studying in the relationship between exercise and well-being, but scholars must be strategic in how they study self-connection. While the null hypothesis was accepted in the final research question but rejected in prior research questions, this research suggests that well-being should be studied as a mediator in the relationship among exercise and self-connection and/or exercise should be studied as a mediator in the relationship among well-being and self-connection.

When investigating these findings within context of HAPA and prior research, a key takeaway is to review the research examining the types of exercise rather than solely focusing on the duration of activity when investigating the effect of self-connection on wellbeing (Godinho et al., 2013; Grossman et al., 2004; Klussman et al., 2020a). If certain forms of exercise begin to produce the desired effect over time, a person may feel more compelled to participate in an activity as a regular habit and lifestyle change. Self-connection may also increase as one's motivation increases to take part in physical activity, particularly if a person's wellbeing is also increasing (Klussman et al., 2020b).

### **Limitations of the Study**

A study's limitations are important to examine, as these limitations may have unintentionally impacted the outcome of the study. These constraints were anticipated but should still be addressed.

### **Online Platform**

Participants were recruited via SurveyMonkey, an online tool to recruit participants for various academic research studies. Using SurveyMonkey limited the study to only allow individuals with a computer and the Internet to complete the survey, so therefore individuals without these tools were unable to participate. Furthermore, individuals in lower socioeconomic groups were limited, as this population is affected by the restricted access to the Internet and computers (Kwon et al., 2022). The study was also only provided in English, limiting adults not fluent in English (Schouten et al., 2020). In both groups low SES and a language barrier, the lack of diversity could have

impacted understanding how these results could be applied across various SES and cultures.

### **Internal Validity**

Bruce et al. (2018) stated that obtaining accurate information, as well as information representative of the overall general population, are two important barriers to discuss when health behaviors are researched. When conducting surveys like data collection, it is often difficult to obtain accurate information from survey questions, due to closed-ended questions and how questions may be perceived by the responded. The current study used the Likert scale to collect data points, which may contribute to altering the reliability and validity, as variables may differ across multiple studies (Köksa et al., 2024). The current study included 127 participants, which is in the range the researcher needed to carry out this study to limit sampling error.

Due to the anonymity of the participant surveys and proper randomization via SurveyMonkey, experimenter bias was a non-issue for the research. The data points were entered into SPSS 28 (IBM, 2020) and rechecked twice for accuracy of data to ensure experimenter bias was not an issue. All analyses were read objectively by the researcher and another university professor to ensure objectivity of the results.

### **External Validity**

The main concern in this study for external validity was the capacity to generalize the results to comparable populations (Frankfort & Nachmias, 2008), as it is imperative to be able to replicate similar studies to continue to research other variables influencing the association among these variables (self-connection, wellbeing, and physical activity).

The sample target was intentionally selected with similar features compared to the overall population (age and activity levels). SurveyMonkey distributed surveys based upon the age standards set by the researcher, as this was prerequisite for any participant to possess before moving on to complete the entire survey. The sampling strategy provided external validity, in which the results were generalized to a group of adults aged 18 to 65 who have stated they exercise at minimum of three times per week. Additionally, the survey included questions about demographic concerns, which were then used as control variables.

### **Scope and Delimitations**

This study's scope was restrained to measuring the effects of exercise by the number of minutes exercised per week. While previous research has studied the type of exercise, anaerobic versus aerobic exercise, and various other aspects of physical exercise, this study focused on the number of minutes exercised per week with the guidelines of the CDC's (Centers for Disease Control, 2018) to measure little, moderate, and increased levels of exercise. While the idea of researching the type of exercise may have a stronger influence on wellbeing, or the idea of self-connection being a factor on the variation of exercise chosen, both variables are interesting topics to research in the future, this current study highlighted the amount of exercise as a basis for understanding self-connection's role as a mediating variable.

HAPA helped to better understand and explain the mediating impact self-connection may have on the association between exercise and wellbeing. Use of the HAPA (Schwarzer & Luszczynska, 2008) model to explain the association among

variables also provided insights and pathways to future research designed to better understand how both HAPA phases play a part in sustaining an individual's exercise habits to benefit their wellbeing. Other theories and designs of improving health behaviors, like the Transactional Model of Stress and Coping, the Health Belief Model, and the Theory of Planned Behavior were not executed in this study as these models poorly reflected the concept of using variables to understand and motivate one to change health behaviors.

For this study, the researcher recruited adults, aged 18 to 65, stating they exercise at minimum of three times per week. Due to the CDC's recommendation of adults obtaining at least 150 minutes of weekly exercise, the current study used this parameter to guide participant selection, as most people aim for at least 30 minutes of exercise per exercise session (Osei-Tutu & Campagna, 2005). Therefore, the current research's findings were limited to sampling the established boundaries and the procedures used to fully test and understand this study's variables.

### **Recommendations for Future Research**

While self-connection failed to demonstrate the role of a significant mediator in the relationship among exercise and wellbeing, this study still provides key insights on how to move forward in researching these variables and their relationships with each other. It is crucial to understand that there are various ways to measure physical activity, and calculating the total minutes of exercise per week for each participant is only one way to measure this variable (Gomes et al., 2018; Klussman et al, 2021a; Stanescu, 2014). It is also important to recognize that self-connection is still a novel variable within

the academic community, and there are only a couple of scales to measure self-connection. As self-connection continues to be researched, there will be various ways to measure self-connection, and researchers will be able to choose a scale most appropriate for their study and other variables being studied.

### **Self-Connection**

As a novel research variable, self-connection should continue to be researched to examine its effects on other variables. Self-connection has previously been researched in relation to mindfulness (Klussman et al., 2020b), health (Klussman et al., 2020d), and some aspects of exercise (Klussman et al., 2021a). As mental health becomes a topic with increasing awareness in society, self-connection could be explored to learn which therapeutic modalities may be most helpful for those with lower self-connection, as well as those with increased self-connection. Moreover, self-connection is a great variable to test against other variables testing habits and motivation. As HAPA has been used to study various behaviors, like smoking cessation (Joveini et al., 2020), dental hygiene, and seat belt use (Zarski et al., 2018), HAPA can also continue to be used to study how motivation and self-determination works with self-connection (Schwarzer, 2016). If academia can learn more about how self-connection improves other areas of one's life, it provides a catalyst for learning how to increase self-connection pertaining to various areas of health, wellbeing, and overall life satisfaction.

### **Physical Activity**

Physical activity has been studied for decades in areas such as mental health (Smith et al., 2018), well-being (Kim et al., 2017; Klussman et al., 2020a), and levels of

stress (Klussman et al., Klaperski et al., 2019), but as more research occurs with novel variables, such as self-connection, the more physical activity needs to be researched to observe its association with other variables. When discussing future research related to the current study, it is recommended that various aspects of physical activity be researched when investigating variables such as health, motivation, wellbeing, life satisfaction, and self-connection. In particular, more research regarding types of exercise performed (Edwards & Loprinzi, 2019), intensity of exercise (Osei-Tutu & Campagna, 2005), and exercising solo or with a group (Poon & Fung, 2008) may provide further specific insights on how physical activity affects these variables. Specific to explaining HAPA, a study examining motivation and physical activity may further allow HAPA to be a preferred model when explaining exercise habits, such as Godinho et al. (2013) conducted on nutrition habits, when evaluating other variables.

### **Wellbeing**

Wellbeing comes in various forms and research should continue to focus efforts in studying how to improve all aspects of wellbeing. Moreover, there are various scales to measure wellbeing such as PWB (the scale used for this study), Warwick-Edinburgh Mental Well-Being Scale (Tennant et al., 2020), Satisfaction With Life Scale (Valenti & Faraci, 2024), and the WHO-5 Well-Being Index (Lara-Cabrera et al., 2022) to name a few. Continuing to study wellbeing in relation to various factors related to health habits, physical health, and mental wellbeing, professionals in the health psychology and medical fields can better help their patients achieve higher levels of overall wellbeing, improved health scores, and life satisfaction.

## Age and Health

Based on the findings of this research, it is recommended for future research studies to study smaller age gaps, such as early adulthood, middle-aged adults, and adults aged 50 and older. The relationship between age and self-connection is current academic literature gap, as scarce studies take into account a person's age being connected to self-connection. Younger adults may not have encountered health concerns where physical activity may be prescribed as a remedy. Moreover, younger adults are more likely to exercised based on vanity and appearance factors (Alleva et al., 2019). Older adults may be more likely to have encountered health concerns requiring a need for exercise to alleviate health symptoms, but self-connection may be more difficult for them to achieve. The middle-aged adult population may benefit the most from a study investigating how self-connection influences the relationship between exercise and wellbeing based upon their current physical abilities and an understanding of how exercise may increase wellbeing. Additionally, studies examining how a person's wellbeing may influence how likely they are to exercise would also be appropriate to further investigate.

## Implications

If this research is replicated and confirmed, this study's finding may be helping in future designs and evaluations when learning how physical activity affects wellbeing. The findings of this study reveal a complex interplay between exercise, self-connection, and wellbeing. While significant direct relationships were established between all paired variables (physical activity-wellbeing, physical activity-self-connection, and self-connection-wellbeing), the absence of a mediating effect through self-connection

suggests that these relationships may operate through distinct psychological mechanisms. More specifically, further research may help practitioners create detailed improvement plans for patients experiencing difficulties such as body image issues (Alleva et al., 2019); obesity (Burns et al., 2018); diet-related concerns (Gardiner & Bryan, 2021), and various mental health disorders (Kim et al., 2017). Additional research will need to be conducted to study these variables (Fortney et al., 2013).

These results contribute to existing literature by highlighting that although physical activity and self-connection independently influence wellbeing, they likely do so based on the type of exercise conducted (Klussman et al., 2021a). This challenges initial assumptions about self-connection serving as an explanatory mechanism for how exercise enhances wellbeing. Instead, the findings suggest that physical activity may affect wellbeing through other means.

### **Health Professionals**

For health practitioners and mental health professionals, these findings have significant implications for intervention design and implementation. First and foremost, practitioners should recognize that physical activity and self-connection interventions can be viewed as complementary rather than interdependent approaches (Klussman et al., 2020b; Lapalme & Doucet, 2018). Programs do not need to explicitly link exercise to self-connection to be beneficial, and clients may benefit from either type of intervention, regardless of their engagement with the other. Intervention options may be based on an individual's preference and circumstances.

When designing physical activity interventions, practitioners should focus on establishing sustainable exercise routines without overemphasizing psychological connections, such as self-connection or self-efficacy. The emphasis should be on immediate physical and mental health benefits, starting with small, achievable exercise goals to build confidence. Programs should incorporate variety in exercise types to maintain engagement while addressing practical barriers to exercise participation. The HAPA model can help practitioners better understand their patient's motivation for a health behavior change, as well as help practitioners build better individualized plans to incorporate potential barriers to achieving the behavior change and how to overcome them (Schwarzer, 2016; Schwarzer & Luszczynska, 2008).

Self-connection interventions can be pursued independently of exercise programs and may include mindfulness practices, journaling, or reflection exercises. These interventions should focus on identity exploration and personal value alignment, potentially incorporating body awareness practices without requiring physical exercise (Alleva et al., 20219). It's crucial that these approaches be tailored to the individual client's cultural and personal background.

When implementing combined approaches, practitioners should recognize that clients may progress at different rates in different areas. Programs should allow flexibility in participation rather than requiring concurrent progress, with separate support structures for physical activity and self-connection goals (Rutchick et al., 2018). Regular assessment and monitoring are essential, with separate metrics for tracking progress in

each domain and multidimensional wellbeing assessments to capture various benefits (Scholz et al., 2009).

### **Individuals**

Learning how these variables are connected and correlate with each other can help empower individuals when making decisions about their own life (Veselska et al., 2011). As mental health awareness become increasingly discussed in daily dialogues, many people are taking their wellbeing into their own hands. From self-help books to downloading the newest and top-rated apps to improve overall wellbeing, people are looking for more traditional ways to improve their lives (Tart, 1990).

As more people begin to seek happiness and worth from internal validation rather than external validation, learning how to increase wellbeing and self-connection has become an increasingly popular topic. Educating the public to better understanding how to increase self-connection and wellbeing empowers people to take actions accordingly with the intention of increasing overall life satisfaction. As people begin to be more self-connected with higher levels of wellbeing, this may help people to reduce stress, have lesser incidents of chronic illnesses, and most importantly, have more capacity to help others around them (Klussman et al., 2020c).

### **Conclusion**

In summary, while this study did not yield all the results the researcher hypothesized, it provided information that the academic community to continue to build upon. As previous research has detailed, physical activity increases wellbeing, mindfulness, and helps us make healthier choices daily (Kim et al., 2017). Researching

other variables, such as self-connection, is crucial to continue to learn the vast number of ways in which exercise enriches one's life. This researcher recommends researching specific exercise types when researching how self-connection may predict the relationship among exercise and wellbeing. Just as certain activities are better for different outcomes (relaxation, endurance, building muscle), some activities may show significance when replicating this study.

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## Appendix A: Permission Letters

## E-mail to Use Self-Connection Scale

Hi Lauren,

Kristine forwarded me your email about our research. I am the senior research associate at the Connection Lab. It is great you are interested in self-connection! Our paper including the self-connection measure is currently a pre-print, to be officially published in 2022. I have attached the paper (which includes the scale) to this email. You can also find it at <https://psyarxiv.com/2cxb8/>

Please don't hesitate to contact me if you have any other questions. I am happy to discuss self-connection and the future development of this field of research.

Julia

--

Julia Langer, MHS  
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Connection Lab  
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[www.connectionlab.com](http://www.connectionlab.com)

## Appendix A: Permission Letters

## Email to Use Ryff Scales of Personal Wellbeing

Greetings,

Thanks for your interest in the well-being scales.  
I am responding to your request on behalf of Carol Ryff.  
She has asked me to send you the following:

You have her permission to use the scales for research or other non-commercial purposes.

They are attached in the following files:

"Ryff PWB Scales" includes:

- psychometric properties
- scoring instructions
- how to use different lengths of the scales  
(see note about the 18-item scale,  
which is NOT recommended. It does a bad job  
measuring the six dimensions.)

"Ryff PWB Reference Lists" includes:

- a list of the main publications about the scales
- a list of published studies using the scales

There is no charge to use the scales and no need to send us the results of your study.

We do ask that you please send us copies  
of any journal articles you may publish using the scales to:  
[berrie@wisc.edu](mailto:berrie@wisc.edu) and [cryff@wisc.edu](mailto:cryff@wisc.edu).

Best wishes for your research,

--

Theresa Berrie  
Communications Specialist  
UW-Madison Institute on Aging  
[berrie@wisc.edu](mailto:berrie@wisc.edu)

## Appendix B: Scales

## Self-Connection Scale (SCS)

Please select the response below that best describes you:

Strongly Disagree = 1

Disagree Somewhat = 2

Disagree = 3

Neither Agree nor Disagree = 4

Somewhat Agree = 5

Agree = 6

Strongly Agree = 7

1. I have a deep understanding of myself.
2. It is easy for me to identify and understand how I am feeling in any given moment.
3. I know myself well.
4. I am often surprised by how little I understand myself.
5. I try not to judge myself.
6. When I find out things about myself that I don't necessarily like, I try to accept those things.
7. Even when I don't like a feeling or belief that I have, I try to accept it as a part of myself.
8. I can easily forgive myself for mistakes I have made.

9. I find small ways to ensure that my life truly reflects the things that are important to me.
10. I spend time making sure that I am acting in a way that is a reflection of my true self.
11. I try to make sure that my actions are consistent with my values.
12. I try to make sure that my relationships with other people reflect my values.

Question #4 should be reverse-scored

Awareness = 1-4; Acceptance = 5-8; Alignment = 9-12

## Appendix B: Scales

## International Physical Activity Questionnaire

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the vigorous activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

1. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?

\_\_\_\_\_ days per week

2. How much time did you usually spend doing vigorous physical activities on one of those days?

\_\_\_\_\_ hours per day

\_\_\_\_\_ minutes per day

Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

\_\_\_\_\_ days per week

4. How much time did you usually spend doing moderate physical activities on one of those days?

\_\_\_\_\_ hours per day

\_\_\_\_\_ minutes per day

Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

\_\_\_\_\_ days per week

6. How much time did you usually spend walking on one of those days?

\_\_\_\_\_ hours per day

\_\_\_\_\_ minutes per day

The last question is about the time you spent sitting on weekdays during the last 7 days.

Include time spent at work, at home, while doing course work and during leisure time.

This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the last 7 days, how much time did you spend sitting on a week day

\_\_\_\_\_ hours per day

\_\_\_\_\_ minutes per day

## Appendix B: Scales

### Ryff Scales of Psychological Wellbeing (PWB)

**Answer Format:** 1 = strongly agree; 2 = somewhat agree; 3 = a little agree; 4 = neither agree or disagree; 5 = a little disagree; 6 = somewhat disagree; 7 = strongly disagree.

#### Scoring:

The Autonomy subscale items are Q1, Q13, Q24, Q35, Q41, Q10, and Q21. The Environmental Mastery subscale items are Q3, Q15, Q26, Q36, Q42, Q12, and Q23. The Personal Growth subscale items are Q5, Q17, Q28, Q37, Q2, Q14, and Q25. The Positive Relations with Others subscale items are Q7<sup>[SEP]</sup>, Q18, Q30, Q38, Q4<sup>[SEP]</sup>, Q16, and Q27. The Purpose in Life subscale items are Q9, Q20, Q32, Q39, Q6, Q29, and Q33. The Self-Acceptance subscale items are Q11, Q22, Q34, Q40, Q8, Q19, and Q31.

Q1, Q2, Q3, Q4, Q6, Q7, Q11, Q13, Q17, Q20, Q21, Q22, Q23, Q27, Q29, Q31, Q35, Q36, Q37, Q38, and Q40 should be reverse-scored. Reverse-scored items are worded in the opposite direction of what the scale is measuring. The formula for reverse-scoring an item is:

$$((\text{Number of scale points}) + 1) - (\text{Respondent's answer})$$

For example, Q7 is a 7-point scale. If a respondent answered 3 on Q7, you would re-code their answer as:  $(7 + 1) - 3 = 5$ .

In other words, you would enter a 5 for this respondents' answer to Q7.

To calculate subscale scores for each participant, sum respondents' answers to each subscale's items.

**Instructions:** Circle one response below each statement to indicate how much you agree or disagree.

1. "I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

2. "For me, life has been a continuous process of learning, changing, and growth."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

3. "In general, I feel I am in charge of the situation in which I live."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

4. "People would describe me as a giving person, willing to share my time with others."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

5. "I am not interested in activities that will expand my horizons."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

6. "I enjoy making plans for the future and working to make them a reality."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

7. "Most people see me as loving and affectionate."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

8. "In many ways I feel disappointed about my achievements in life."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

9. "I live life one day at a time and don't really think about the future."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

10. "I tend to worry about what other people think of me."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

11. "When I look at the story of my life, I am pleased with how things have turned out."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

12. "I have difficulty arranging my life in a way that is satisfying to me."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

13. "My decisions are not usually influenced by what everyone else is doing."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

14. "I gave up trying to make big improvements or changes in my life a long time ago."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

15. "The demands of everyday life often get me down."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

16. "I have not experienced many warm and trusting relationships with others."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

17. “I think it is important to have new experiences that challenge how you think about yourself and the world.”

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

18. “Maintaining close relationships has been difficult and frustrating for me.”

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

19. “My attitude about myself is probably not as positive as most people feel about themselves.”<sup>[1]</sup><sub>[SEP]</sub>

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

20. “I have a sense of direction and purpose in life.”

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

21. “I judge myself by what I think is important, not by the values of what others think is important.”

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

22. “In general, I feel confident and positive about myself.”

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

23. “I have been able to build a living environment and a lifestyle for myself that is much to my liking.”

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

24. “I tend to be influenced by people with strong opinions.”

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

25. “I do not enjoy being in new situations that require me to change my old familiar ways of doing things.”

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

26. "I do not fit very well with the people and the community around me."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

27. "I know that I can trust my friends, and they know they can trust me."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

28. "When I think about it, I haven't really improved much as a person over the years."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

29. "Some people wander aimlessly through life, but I am not one of them."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

30. "I often feel lonely because I have few close friends with whom to share my concerns."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

31. “When I compare myself to friends and acquaintances, it makes me feel good about who I am.”

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree
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32. “I don’t have a good sense of what it is I’m trying to accomplish in life.”

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree
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33. “I sometimes feel as if I've done all there is to do in life.”

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree
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34. “I feel like many of the people I know have gotten more out of life than I have.”

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

35. "I have confidence in my opinions, even if they are contrary to the general consensus."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

36. "I am quite good at managing the many responsibilities of my daily life."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

37. "I have the sense that I have developed a lot as a person over time."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

38. "I enjoy personal and mutual conversations with family members and friends."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

39. "My daily activities often seem trivial and unimportant to me."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

40. "I like most parts of my personality."

Strongly	Somewhat	A little	Neither	A little	Somewhat	Strongly
agree	agree	agree	agree nor	disagree	disagree	disagree
			disagree			

41. "It's difficult for me to voice my own opinions on controversial matters."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree
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42. "I often feel overwhelmed by my responsibilities."

Strongly agree	Somewhat agree	A little agree	Neither agree nor disagree	A little disagree	Somewhat disagree	Strongly disagree
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