Walden University

College of Psychology and Community Services

This is to certify that the doctoral dissertation by

Catherine Shirreffs

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the review committee have been made.

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Walden University
2023

Abstract

Intergenerational Contact as a Moderator Between

Perceptions of Aging and Sedentary Behaviors

by

Catherine Shirreffs

MPhil, Walden University, 2020

MA, Adams State University, 2016

BS, Metropolitan State University of Denver, 2014

BS, Newberry College, 1992

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Human and Social Services

Gerontology

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November 2023

Abstract

Engaging in high levels of sedentary behavior leads to increased health problems and a decreased quality of life in adults aged 75 and older. Negative perceptions of aging are shown to increase sedentary behavior time. Simultaneously reducing negative perceptions of aging and sedentary behavior time aligns with the need to improve the quality of life in old to oldest–old adults and reduce the projected burden of healthcare to come with population aging. Despite the significant role intergenerational contact has in reducing negative perceptions of aging, little research has examined the moderating role of intergenerational contact between negative perceptions of aging and sedentary behavior time. Allport's contact theory was the theoretical framework for this study, in which the relationship between intergenerational contact, negative perceptions of aging, and sedentary behaviors in adults aged 75 and over were investigated. Quantitative data were collected from a sample size of 70 using a cross–sectional web–based, mail–in, and in–person survey. The findings showed a positive and significant influence of intergenerational contact in moderating the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and over. Future research stemming from this study should include the mediating role of intergenerational contact in the relationship between negative perceptions of aging and sedentary behavior. Addressing sedentary behavior through lifespan interventions may support positive social change by decreasing implicit and explicit attitudes toward aging, therefore improving health and quality of life in older adults.

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Dedication

I am dedicated to my best friend, "Little" Sonny, who has curled up faithfully beside me throughout this journey, and also to my parents, who would have been delighted.

Acknowledgments

I want to thank Dr. Hickman and Dr. Hamilton for their ongoing support and Dr. Stadtlander for taking the time to assist me. Special thanks to Dr. Lawson for being my rock and to Dr. Kramer for being my level head. Also, thank you to Alanna, Suzy, and Vince for sticking by my side. I would never have accomplished this without all of you!

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Chapter 1: Introduction to the Study

Sedentary behaviors have been a growing public health concern compounded by population aging projections (Dohrn et al., 2020). The United Nations Department of Economic and Social Affairs Population Division Prospects (DESA; 2019) projected the global population of individuals aged 65 and over to double by 2050. Likewise, DESA anticipated the population of individuals aged 80 and over to grow at an even greater rate. Projections for the oldest–old population were to triple globally from 143 million in 2019 to 426 million by 2050 to 881 million by 2100, placing an enormous systemic burden on healthcare services in terms of fiscal pressure and services over the next 30 years and longer (Kojima et al., 2019). The percentage of older adults provided an educative perspective of how the population growth will affect healthcare systems throughout this shift: 2019 9%; projected 2030= 12%; projected 2050= 16%; projected 2100= 21% (DESA, 2019). The healthcare systems currently in place will not withstand the influx of complex medical conditions accompanying older adults (Kojima et al., 2019).

Epidemiologists identified that sedentary behaviors play an active and recursive role in many chronic diseases and health conditions facing older adults (Leitzmann et al., 2018). Sedentary behaviors were defined as waking behaviors where an individual expended between 1.0 to 1.5 metabolic equivalents (METs) while sitting or reclining (Copeland et al., 2017; McEwan et al., 2017; Owen et al., 2011; Tremblay et al., 2017). Examples of sedentary behaviors in older adults included television watching, public transportation, riding as a passenger in a car, driving a car, sitting for leisure, sitting to eat, using the computer, talking on the phone, sitting to complete chores, sitting to rest,

reading, conversing (Gardiner, 2011; Van Cauwenberg et al., 2014). Current behavioral interventions were focused on reducing the impact of population aging on healthcare systems. These interventions targeted the addition of leisure time fitness activities and physical fitness programs intended to reverse adverse health conditions (Kojima et al., 2019; Massie & Meisner, 2019). Similarly, sedentary behavior–reducing interventions increased the frequency and duration of value–based interruptions throughout the day (Leitzmann et al., 2018; Stockwell et al., 2019).

While these reactive interventions showed promise, researchers expressed a need to investigate proactive measures to address sedentary behaviors' causal influences (Diaz et al., 2016; O'Brien & Sharifian, 2020). Such findings could improve the quality of life in adults aged 75 and older by decreasing chronic disease and adverse health conditions that contribute to public health problems (Massie & Meisner, 2019). By simultaneously reducing the burden on the healthcare system and improving the quality of life for older adults, there would be more opportunities for the aging population, specifically those 80 years of age and over, to contribute to society and remain active in their lives.

The Guidelines for Psychological Practice with Older Adults (American Psychological Association, 2014) endorsed the term "older adult" for use in referencing those aged 65 and over (p. 34, para 1). In this paper, I further classify older adults and focus on the beliefs and behaviors of those over the age of 75, specifically, middle–old (aged 75–84) and oldest–old (aged 85 and older) adults, as acknowledged by the National Institute of Health and the National Institute on Aging (Lee et al., 2018). Gerontological researchers expressed a need to study older adults' subgroups concerning sedentary

behaviors (Van Cauwenberg et al., 2015). This research focus reflected the identified rise in health problems and sedentariness reported by adults aged 75 and over (Lee et al., 2018; Van Cauwenberg et al., 2015). Hereafter, the targeted population, aged 75 and older, may occasionally be referred to collectively as middle–old and oldest–old adults or as adults aged 75 and over.

While searching for causal and contributory influences on sedentary behaviors, Wurm et al. (2017) identified that aging perceptions play a crucial role in life satisfaction as individuals age. Likewise, sedentary behavior was considered a modifiable influence on many adverse health conditions (Wolff et al., 20014). Perceptions of aging refer to how individuals perceive their own positive and negative expectations for aging based on personal and cultural experiences (Robertson et al., 2016). Individuals with more positive views on aging had a longer life span, up to 7 years longer, than those with more negative views (Levy et al., 2002; Wurm et al., 2017). Similarly, Weiss and Kornadt (2018) found that negative perceptions of aging could result in stereotype internalization, negatively influencing life span, health, and quality of life. Likewise, Robertson et al. (2016) found that negative perceptions of aging were related to cognitive decline in addition to physical health decline. Levy, Ferrucci, et al. (2016) identified a potential connection to Alzheimer's disease through biomarkers. Wolff et al. (2014) identified the relationship between negative views of aging and sedentary behaviors and recognized this connection as modifiable. These findings suggested that individuals with positive perceptions of aging were less likely to engage in behaviors, such as long bouts of sedentariness, contributing to adverse health conditions. According to Weiss and Kornadt (2018), these

beliefs begin to mature and internalize during childhood. For this reason, interventions must address individuals throughout their lifespan as they develop perceptions that determine their fate.

Internalized negative beliefs about aging were also referred to as ageism towards oneself (Ayalon & Tesch–Römer, 2017). One evidence–based method of creating positive beliefs toward aging was Intergenerational (IG) contact (Drury et al., 2016). IG contact refers to contact between generations where a difference of 15 years or more exists (O'Dare et al., 2019). In the context of IG contact as an influential factor in perceptions of aging, using Allport's contact theory (1954) as a foundation, I focused this study on the relationship between older adults and children as they mature through adolescence. Researchers studying groups that joined intergenerational programs found that participants had low ageist attitudes, understood more about the process of aging, and experienced low anxiety about growing older (Cooney et al., 2020). These findings suggested that IG contact could change the strength of the relationship between perceptions of aging and sedentary behaviors, thereby serving as a moderator (Karazsia & Berlin, 2018).

While there was a documented link between IG contact, perceptions of aging, and sedentary behavior, I found no research investigating the role of IG contact as a moderator of the relationship between perceptions of aging and sedentary behaviors in adults who were age 75 and older. I examined the gap in the literature to establish a foundation for further research into social programs and interventions targeting positive aging perceptions, specifically implicit ageism. Implications for further research could

include generating positive beliefs about aging through intergenerational programs, decreasing implicit and explicit ageism through community partnerships, and longitudinal studies to improve the quality of life in adults aged 75 and older over the next 30 years.

In this chapter, I include the background of the problem of sedentary behaviors in adults aged 75 and older. I describe how aging perceptions influence physical and psychological health and the priming and internalization of aging perceptions. I explain IG contact's role related to aging perceptions and the development of implicit attitudes towards aging. I introduced the theoretical framework of contact theory (Allport, 1954), which I used as the study's foundation. The nature of the study includes a discussion of my choice of methodology, the target population, and the sampling procedure, and explained terminology relevant to the study. I address the study's assumptions, the scope and delimitations, the limitations, the study's significance, and end the chapter with a summary.

Background

Older adults with negative perceptions of aging were more likely to engage in a sedentary lifestyle (Levy et al., 2002). Healthcare costs in the United States were $33.7 billion a year related to negative perceptions of aging (Levy et al., 2020). Levy (2009) hypothesized that aging perceptions developed due to stereotypes that the general population was exposed to throughout their lifespan and internalized as older adults. Stereotype–embodiment theory (SET; Levy, 2009) was used by researchers to study ways of modifying perceptions of aging to improve the quality of life in older adults (Brothers & Diehl, 2017; Klusmann et al., 2019; Menkin et al., 2017; Weiss & Kornadt, 2018).

Based on this theory, Wolff et al. (2014) directed their research to understand the differences in how interventions affected older adults when their health problems arose through modifiable conditions, such as sedentary lifestyles, compared to inherited biological factors. Their findings suggested that negative views on aging may be counter–intuitive to health behavior interventions that target older adults' sedentary lifestyles. Additionally, the researchers suggested that societal and individual factors contributing to aging perceptions should be addressed throughout the lifespan for change to be sustainable (Wolff et al., 2014).

Common negative aging stereotypes included being frail, frugal, grumpy, forgetful, and in poor health (Leedahl et al., 2020; Levy, 2009; Wurm et al., 2017). Stereotypical beliefs were internalized across the lifespan, leading to decreased physical activity and a lack of preventative medical measures (Brothers & Diehl, 2017; Cuddy et al., 2007; Levy et al., 2002). Similarly, negative perceptions of aging were associated with increased loneliness, social isolation, depression, and anxiety (Weiss & Kornadt, 2018). According to Menkin et al. (2020), these negative perceptions contributed to a sedentary lifestyle. Correspondingly, Wurm et al. (2017) identified negative aging perceptions as an underlying influence on sedentary behavior.

While substantial research attempts to understand the harmful effect negative perceptions of aging have on health and quality of life, there was growing research investigating how positive views of aging had the opposite effect. Positive beliefs about aging include having wisdom, empathy, and independence (Blawert & Wurm, 2020; Cuddy et al., 2007; Levy et al., 2002). These views created a buffering effect against

stress, cognitive decline, Alzheimer's disease, and dementia (Levy, 2017; Levy, Ferrucci, et al., 2016; Levy, Moffat et al., 2016; Robertson et al., 2016). Likewise, individuals with positive perceptions of aging were less likely to be sedentary, more likely to be social, have longer lifespans, and more positive health outcomes (Brothers & Diehl, 2017; Levy et al., 2002; Menkin et al., 2017; Wettstein et al., 2020; Wurm et al., 2017). Additionally, Levy (2017) found that both emotional and physical wellness experienced significant improvement when negative transformed into positive beliefs through interventions.

Learning that a positive perception of aging could improve the quality of older adults' lives inspired researchers to explore multiple ways to modify perceptions of aging. Research on interventions ranged from targeting older adults to targeting young adults through a lifespan approach. Targeting younger generations through priming was one proactive way of creating positive perceptions of aging. Explicit priming, such as having children write about the positive aspects they see in older adults, was one approach that has shown encouraging results (Menkin et al., 2020). However, researchers have recently focused on IG contact's implicit priming potential (Leedahl et al., 2020; Levy & Macdonald, 2016). IG contact provides an opportunity for children to experience first–hand relationships with older adults (Leedahl et al., 2020).

IG contact is the interaction between two or more generations of individuals (Kennedy & Boland, 2019). Contact between family members and nonfamilial interactions can positively influence all generations' well–being. McAlister et al. (2019) describe an essential function of IG contact as being "mutually beneficial" (p. 511). Consistent with Allport's contact theory (1954), IG contact reduced negative age

stereotypes (Zhong et al., 2020). Reducing negative stereotypes was accomplished by increasing the respect between the different generations (McAlister et al., 2019). According to Levy (2017), even a limited amount of time spent between younger and older generations has shown a significant decrease in prejudice.

Intergenerational communities were encouraged and supported by aging–in–place initiatives that promote physical activity and social connection and decrease explicit ageism (Zhong et al., 2020). According to the Administration for Community Living (2019), 44% of women over age 75 were aging in place. Additionally, over a third of adults over age 75 were considered sedentary (Stockwell et al., 2019). The addition of IG contact to an older adult's life improved several aspects of wellness, which led to an enhanced quality of life (Teater, 2016). Promoting light physical activity in intergenerational programs led to physiological, social, and emotional health benefits (World Health Organization, 2017). Moreover, IG contact reduces social isolation and depression (McAlister et al., 2019). Together, these benefits positively influenced how older adults viewed their aging (McAlister et al., 2019; Teater, 2016; Zhong et al., 2020).

Considerable research confirmed the link between IG contact and the reduction of negative perceptions of aging. Even greater research exists connecting perceptions of aging to health outcomes. There was little research on the health benefits of IG contact, specifically related to the relationship between the interaction effect of IG contact and perceptions of aging on sedentary lifestyles. What was known was that IG contact positively affected older adults' quality of life (Teater, 2016). Older adults who participated in intergenerational programs were less sedentary, experienced less adverse

health, less depression, and felt less isolated (McAlister et al., 2019; World Health Organization, 2017). Children who participated in these programs experienced relationships with older adults who were active, independent, healthy, social, lively, and cooperative (Kornadt et al., 2016; Levy & Macdonald, 2016). These first–hand experiences challenged age stereotypes (Allport, 1954; Drury et al., 2016).

Because ageism is the only form of bigotry where individuals eventually belong to the group against which they have bias, challenging aging stereotypes creates an opportunity for an individual's aging perceptions to be altered (Levy, 2009; Nelson, 2005). Positive IG contact serves as a form of implicit priming in which attitudes and beliefs are internalized and manifest throughout the lifespan (Fawsitt & Setti, 2017). In this study, I explored how IG contact served as a moderator for decreasing implicit ageism by modifying negative perceptions of aging, leading to reduced sedentary behaviors later in life. This study's findings may contribute to gerontology and potentially enhance the quality of life for adults aged 75 and older who are aging in place.

Problem Statement

Sedentary behaviors have been a public health problem common among aging adults, specifically adults over the age of 75, accounting for 35.3% of adults who never or rarely engage in physical activity (Stockwell et al., 2019). Sedentary behaviors were related to cardiovascular disease, obesity, depression, increased mortality, and disability, which could be delayed or prevented with some activity (Diaz et al., 2016). The combination of population aging and the increase in life expectancy brought attention to sedentary behaviors and adverse health conditions that were explicitly interconnected

because sedentary behaviors were modifiable behaviors that often contributed to adverse health conditions (Wolff et al., 2014).

Researchers have focused on developing interruption–based interventions targeting sedentary behaviors (Stockwell et al., 2019). Epidemiologists argued that there was a need for proactive interventions that investigated the contributing factors to sedentary behaviors (Diaz et al., 2016; O'Brien & Sharifian, 2020). Sedentary behaviors differentiated from a lack of physical activity by measuring significant episodes of sitting or reclining time compared to engaging in too little amount of exercise (Leitzmann et al., 2018).

Interpersonal experiences throughout the lifespan contribute to how we cope with stress as we age (O'Brien & Sharifian, 2020). According to these researchers, adaptive coping strategies were shaped by early childhood relationships, including perceptions of aging's gains and losses. Wurm et al. (2017) found that positive perceptions of aging developed throughout the lifespan had a statistically significant relationship with decreased depression and lower adverse health outcomes in adults aged 75 and older. These findings were consistent with Kornadt et al.'s (2016) conclusion that implicit and explicit age stereotypes developed through early childhood experiences. Drury et al. (2016) suggested that positive IG contact throughout the lifespan creates positive attitudes toward aging and increases the observation of aging gains. IG contact occurs through a blend of interpersonal, intrapersonal, organizational, and community experiences (Drury et al., 2016).

Although the aforementioned research regarding sedentary behaviors illuminated important findings, I found no research that examined the moderating effect of IG contact on the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older. Further research was warranted to examine the relationship between IG contact and implicit views on aging to address the documented health problem of sedentary behaviors in adults aged 75 and older.

Purpose of the Study

The purpose of this quantitative cross–sectional design study was to investigate whether there was a statistically significant relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older. I also examined whether intergenerational contact moderated the relationship between negative perceptions of aging and sedentary behaviors. My goal was to understand lifespan approaches geared to influence public health strategies in reducing sedentary behaviors in adults aged 75 and older.

Research Questions and Hypotheses

Research Question 1 (RQ1): What was the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older?

Null Hypothesis ($H_0$1): There was no statistically significant relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older.

Alternative Hypothesis (H_a1): There was a statistically significant relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older.

Research Question 2 (RQ2): What was the relationship between IG contact and sedentary behaviors in adults aged 75 and older?

Null Hypothesis ($H_0$2): There was no statistically significant relationship between IG contact and sedentary behaviors in adults aged 75 and older.

Alternative Hypothesis (H_a2): There was a statistically significant relationship between IG contact and sedentary behaviors in adults aged 75 and older.

Research Question 3 (RQ3): Did IG contact moderate the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older?

Null Hypothesis ($H_0$3): IG contact did not moderate the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older.

Alternative Hypothesis (H_a3): IG contact moderated the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older.

Theoretical/Conceptual Framework

Using contact theory, Allport (1954) posited that negative attitudes and stereotypes toward individuals belonging to groups of people stem from a lack of contact with that group. Gordon W. Allport hypothesized that prejudice was a learned attitude based on preconceived judgment rather than facts (Allport, 1954). There are four tenets to Allport's theory: support from social and institutional authorities, having a common goal, cooperation, and sharing equal group status (Allport, 1954). Initially developed as a response to racism, researchers have found that contact theory effectively reduced sexist stereotypes and negative attitudes toward individuals with disabilities, gender minorities, and ageism (Lytle, 2018). Contact theory works at a direct and indirect level (Lytle,

2018). As Lytle (2018) explained, individuals can directly spend time together and gain

knowledge about each other as individuals, reducing stereotypes and improving positive

attitudes about the stigmatized group. Indirectly, the social network of individuals who

experience contact with a stigmatized group often reduces their prejudices through new

information learned secondhand.

Concerning this research study, I used contact theory (Allport, 1954) to explain

how sedentary behavior related to implicit ageism, as ageism is developed through a lack

of contact with older adults during the formative years (Nelson, 2005). Butler (1969)

defined ageism as negative attitudes and stereotypes toward older people due to their age.

Implicit ageism refers to internalized ageist views that are complicated by the prejudice

an individual may hold against their stereotyped future self (Levy & Macdonald, 2016;

Nelson, 2005). Unlike other prejudices, ageism is unique because individuals age into the

group they are biased. According to Allport (1954), individuals express prejudice through

negative verbal remarks, avoidance, discrimination, physical attacks, and extermination.

In the context of ageism, when one grows older, having negative perceptions of aging,

these behaviors are directed toward the self and lead to adverse health behaviors such as

sedentary behaviors (Nelson, 2005). Through contact theory (Allport, 1954), I

hypothesize that individuals with positive contact experiences with aging adults from a

young age that continued throughout their lifespan lead to positive aging expectations

based on real–life experiences. I examined if IG contact moderated how perceptions of

aging influence the behaviors they see in their old age. Positive perceptions of aging were

positively correlated with preventative health measures (Levy, 2009). I discuss contact

theory in depth in Chapter 2.

Nature of the Study

I conducted a quantitative, cross–sectional, correlational survey study. The survey

design was appropriate because this was exploratory research. I used the survey approach

to test the association among variables within a specific population, as suggested by

Queirós et al. (2017). I tested the relationship between perceptions of aging and IG

contact on sedentary behaviors in adults aged 75 and older. I collected data at one point

in time, making the data cross–sectional.

I used nonprobability convenience sampling to target adults aged 75 and older in

the community, per Taherdoost (2016). I used online recruitment through independent

living facilities, retirement communities, churches, local hair salons, barbershops, and

social media to recruit adults aged 75 and older to participate in the research. I used G

Power to determine the sample size (Faul et al., 2009). The test for an a priori: fixed

model, R^2 increase, multiple regression with three predictor variables, 80% CI, resulted in

a sample size of 77 participants (see Appendix A for sample size calculation).

I used a three–predictor multiple regression model in the study, per Hoyt et al.

(2006). The model included three continuous independent variables (IVs), one of which

was the moderating variable (MV) and one continuous dependent variable (DV).

Specifically, there was one continuous IV, negative perceptions of aging; one continuous

MV, IG contact; one continuous interaction variable (IV x MV); and one continuous DV,

sedentary behavior (see figure 2). The MV, IG contact, was measured using The Contact

with Elderly People measure (Knox et al., 1986). The measurement tool was grounded in Allport's contact theory (1954), which suggested that contact with members of a group one holds a bias against leads to recognizing shared values.

Knox et al. (1986) found that contact quality was the strongest predictor of a positive shift in aging perceptions. Quality was measured on a Likert scale from 1–7, with one being the lowest and seven being the highest quality (Knox et al., 1986). In this context, quality represented the participant's subjective experience in relatedness, intimacy, cooperation vs. competition, and equal status (Jarrott et al., 2018; Knox et al., 1986); additionally, the quality component differentiated between familial and nonfamilial contact (Knox et al., 1986). Quantity was also measured using a seven–point Likert scale. According to Jarrott et al. (2018), the quantity of contact was a measure of building friendships. The components described by the quality and quantity of the measure reflect the principles of contact theory: equal status, community support, cooperation in pursuit of common goals, and meaningful interactions (Allport, 1954; Jarrott et al., 2018). The 57–question tool consisted of 52 seven–point Likert–scale questions and five multiple–choice questions, which, when added together, provided a total where higher scores indicate a more significant subjective measure of quality and quantity of contact (Jarrott et al., 2018). The scale has a Cronbach's alpha of 0.96 (Jarrott & Savla, 2014).

The IV is perceptions of aging, measured using the Image of Aging Scale (Levy et al., 2004). The Image of Aging Scale was grounded in Stereotype Embodiment Theory (SET) (Levy, 2009), which posited that negative age stereotypes' internalization begins

during childhood through various environmental exposures. The scale measured negative images of aging among nine domains: wrinkled, grumpy, dying, senile, given up, slow, sick, helpless, and alone (Levy et al., 2004). There were nine Likert–type items on the measurement tool. The respondent was provided a phrase or a word and asked to rate it from 0–6, where 0 represented how the word/phrase reflects "older" people. Six closely described what the participant thought illustrated an older person, with total summed scores ranging from 0–54, where higher scores represented more substantial negative images of aging. The negative age–stereotype component had a Cronbach alpha of .82 for the measure and resulted in .56 in this study.

The continuous DV, self–reported daily sedentary time, was measured using the Belgian Environmental Physical Activity Study (BEPAS Seniors) Questionnaire, Section 5: Time Spent Sitting Scale (Van Cauwenberg et al., 2014; Van Holle et al., 2014). This 12–item inventory was grounded in the social–ecological model of health behavior and focused on behaviors specific to older adults (Owen et al., 2011; Van Cauwenberg et al., 2014). Each of the 12 items consisted of two open–ended questions targeting the total hours and minutes the individual spent involved in specific behaviors while in a sitting or reclining position during the past seven days (Van Cauwenberg et al., 2014). I calculated self–reported daily sedentary time by multiplying the number of days the individual participated in the behavior by the average daily time spent engaged, divided by seven (Van Cauwenberg et al., 2014). For example, the first part of a question asks, "On how many days did you use a computer?" If the participant responded "0", they were directed to skip the second portion of the question. If the participant had a response, they were

directed to the second portion of the question, "How much time do you usually spend on one of those days using a computer? Hours/minutes" For our example, suppose the participant responded that they used the computer five days per week for 1 hour per day, totaling 5 hours for the week. When divided by seven days for the entire week, the week's average computer use was 43 minutes per day. The data collected from the 12 questions were compositional, meaning the 12 separate times collected combined to form one total average sedentary time. Reliability for this measure is good–excellent (Perinetti, 2018). The instrument had an intraclass correlation coefficient (ICC) in total sitting time of 0.77 (95%CI) (Van Cauwenberg et al., 2014). The reliability of the instrument during this study was .40.

The research consisted of a moderation analysis using a three–predictor multiple regression model (see Figure 1) (Hoyt et al., 2006). The third variable was the interaction variable, which combined the IV and the MV. This combination showed the interaction effect of the two predictor variables, negative perceptions of aging and IG contact, therefore showing if a moderating effect from IG contact was present (Kraemer et al., 2008). The moderated multiple regression model (MMR) determined if IG contact moderated the relationship between perceptions of aging and sedentary behaviors (McClelland et al., 2017). The MMR utilized a stepwise process based on Baron and Kenny's approach to moderation (Baron & Kenny, 1986; Memon et al., 2019). I first entered the predictor variable, then the MV, and introduced the interaction. This approach provided information about the independent and combined predictive statistical power (see Figure 2) (Baron & Kenny, 1986; Hoyt et al., 2006). This information was valuable

in this study regarding implicit attitudes developed through those relationships and how they have influenced sedentary behaviors in late life. Consistent with a cross–sectional design, this data collection may benefit the development of new research hypotheses for future studies (Cataldo et al., 2019; Jacoby & Sassenberg, 2011).

Figure 1

Conceptual Moderation Model
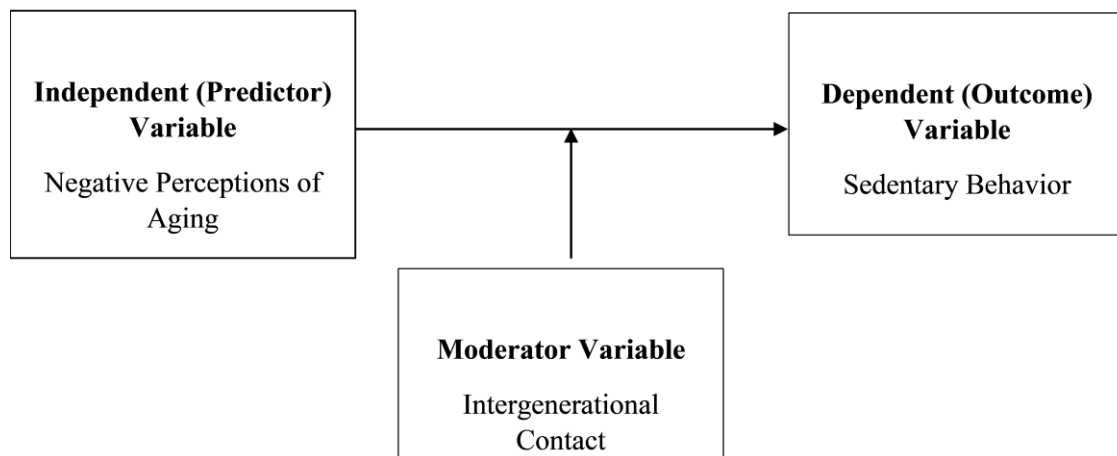
Figure 2

Statistical Moderation Model
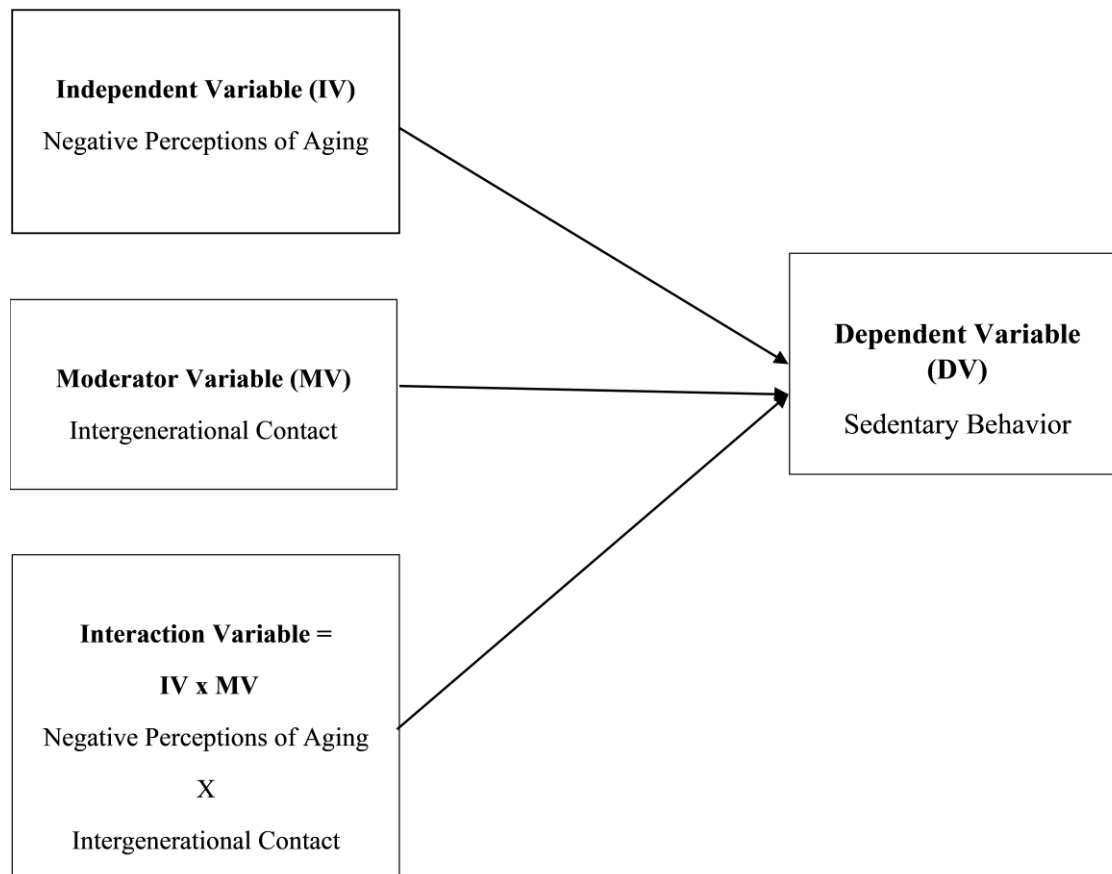
This project required Institutional Review Board (IRB) approval due to the aging adult population vulnerability (Sedlakova & Souralova, 2019). Walden University's approval number for this study is 03–23–22–0987095, and it expires on March 23, 2023. As guided by the Gerontological Association of America (GSA) (2014), the participants in the study voluntarily agreed to participate in the study through informed consent before engaging in research. When working with aging adults, this included the use of a

proxy or gatekeeper. I disclosed the risks and benefits of the research as well as the limits of confidentiality. Additionally, the GSA (2014) recommended that the results of any research study involving this populace be shared among the gerontological field and study participants to enhance the understanding of the aging population.

Definitions

Ageism: Negative attitudes and stereotypes towards older people due to their age (Butler, 1969).

Implicit ageism: Ageist views are internalized and complicated by the prejudice an individual may hold against their stereotyped future self (Levy & Macdonald, 2016; Nelson, 2005).

Intergenerational contact: A purposeful resource exchange between generations with a minimum difference of 15 years of age between them was mutually beneficial (McAlister et al., 2019; O'Dare et al., 2019).

Middle–old adults: The term "middle–old" was used when referencing individuals between ages 75 and 85, according to the National Institute of Health and the National Institute on Aging (Lee et al., 2018).

MVPA– Moderate to vigorous physical activity

Older adults: The term "older adults" was used when referencing individuals over 65, according to The Guidelines for Psychological Practice with Older Adults (American Psychological Association, 2014).

Oldest–old adults: The term "oldest–old" was used when referencing individuals over the age of 85, according to the National Institute of Health and the National Institute on Aging (Lee et al., 2018).

Perceptions of aging: The positive and negative expectations individuals have about aging (Klusmann et al., 2019; Levy, 2009).

Sedentary behaviors: Activities that are expended at or less than 1.5 metabolic equivalents (≤1.5 METS) while in a sitting or reclining position for a span of greater than eight hours, excluding sleeping time (Leitzmann et al., 2018; Stubbs et al., 2018).

Assumptions

There were expectations for this research that I accepted were true. First, I assumed that adults aged 75 participating in the research study recollected childhood IG contact experiences. According to Luchetti and Sutin (2018), adults over the age of 70 were more likely to remember events from their adolescence and young adult years than from other periods in their lives. Researchers attributed this recollection to the occurrence of imprinted first–time experiences in the form of a "reminiscence bump" (Luchetti & Sutin, 2018, p. 119). Second, the research assumed that Western culture negatively views aging as contributing to sedentary behaviors in adults aged 75 and older. Negative stereotypes of aging portray a population dependent on others for support (Berger, 2017). This stereotype contrasted with Western individualistic values that promoted productivity and independence. However, Farida (2020) pointed out that individualist societies were also aware of the need to balance autonomy and relatedness in terms of social responsibility.

Scope and Delimitations

This study investigated approaches to reducing sedentary behaviors in adults aged 75 adults and older. Prompted by the degree of sedentariness in this population and the anticipated population growth, I narrowed the scope to adults aged 75 and older based on the literature gap. As life expectancy and population aging simultaneously increase, DESA anticipated that the cost of sedentariness in adults aged 75 and older will place a costly and systemic burden on healthcare systems (Kojima et al., 2019). Additionally, sedentary behaviors interfere with an individual's quality of life (Massie & Meisner, 2019).

Contact theory was appropriate because of its focus on prejudice and stereotypes (Allport, 1954). Prejudice and stereotypes were related to sedentary behavior through negative perceptions of aging in the form of implicit ageism (Wolff et al., 2014). Within the context of ageism, contact theory (Allport, 1954) is often applied to studies on IG contact (Levy, 2017). This study examined how IG contact moderated the relationship between perceptions of aging and sedentary behaviors by modifying implicit ageist stereotypes. Rather than conducting longitudinal research, which would involve studying one or more sample cohorts over an extended period, this study retrospectively questioned adults aged 75 and older on their childhood intergenerational relationships, perceptions of aging, and current sedentary behaviors.

Delimitations to the study include the omission of positive perceptions of aging from the study and potential generalizability. Positive perceptions of aging were excluded from the analysis because the research question can be answered best by focusing

specifically on how IG contact moderated the relationship between negative perceptions of aging and sedentary behaviors. By eliminating the positive responses, the data analysis becomes more efficient. Additional delimitations include that the study participants recruited through convenience sampling aged 75 and older may not represent a national sample.

<div align="center">**Limitations**</div>

Quantitative research limited the social world's complexity by transforming it into data (Thorleif, 2005). Many theorists believe quantitative analysis does not honor the human aspect of research by remaining within scientific parameters (Thorleif, 2005). Additionally, the nature of cross–sectional design disallowed for identifying the causal relationship between variables (Cataldo et al., 2019). Sedgwick (2014) found that limitations to cross–sectional designs include having a high non–response bias. This limitation could interfere with potential stratification efforts and result in a non–generalized sample, threatening external validity (Sedgwick, 2014). To mitigate this threat, collecting data in person was the recommended best practice for older adults (Sedlakova & Souralova, 2019). Another limitation to the reliability of survey designs was the accuracy of the responses given by the survey respondents (Queirós et al., 2017).

Furthermore, when conducting survey research, it was essential to understand that the outcomes were population estimates, leading to limitations in generalizing the study (Thorleif, 2005). Challenges to gerontology research with adults aged 75 and older can be power imbalances felt by the research participant in vitality and cognitive ability (Sedlakova & Souralova, 2019). These authors suggested mitigating this by addressing

age asymmetries directly. Conducting shorter interviews and speaking clearly and distinctly were specific measures that compensated for hearing and stamina concerns. While providing informed consent to this population, I paid special attention to the roles of caregiver and gatekeeper (Ries et al., 2020).

Significance

The results of this study provide insight for policymakers and organizations in developing age–friendly and healthy communities. These organizations could build programs that target positive beliefs about aging during different stages of life, such as intergenerational community programs. The program agenda would focus on community members of all ages to decrease implicit ageism through contact with aging adults. The benefits from such programs could extend to lessen the burden on healthcare systems as preventative healthcare measures improve and adverse health outcomes decrease. In addition to the policy, organizational, and community levels, stakeholders include individuals of all ages, although this study explicitly targets adults aged 75 and older. Because sedentariness affects many adults aged 75 and older, adopting a lifespan approach to behavior change may significantly change the quality of life for adults aged 75 and older.

Summary

Sedentary behaviors have been a public health problem that increases as the aging population expands. The consequences of sedentary behavior impact the individual from limiting their health to limiting their quality of life. Additionally, sedentary behaviors' contribution to adverse health conditions has significantly burdened healthcare systems,

which will continue over the next 20–40 years. Targeted studies that address sedentary behaviors' contributing factors may improve the aging population's lives. There was an identified link between negative perceptions of aging and sedentary behaviors, which provided insight into modifiable behaviors.

Multiple studies showed that IG contact positively influenced older adults' physical activity levels and reduced their total sedentary time (Brothers & Diehl, 2017; Diaz et al., 2016; Levy, 2017). Another positive result of IG contact was that researchers found them successful in modifying aging perceptions (Blawert & Wurm, 2020; Drury et al., 2016). Based on this combination of findings, this study explored the role of IG contact throughout the lifespan as a moderator of the relationship between negative perceptions of aging and sedentary behavior time.

This chapter presented the introduction to the study, the background, and the problem statement. I then described the research questions, the study's significance, the theoretical framework that serves as the foundation for the study, and a brief description of the methodology used to analyze the data. Additionally, Chapter 1 included a discussion of the study's scope, assumptions, limitations, and delimitations. Further discussion on the methodology and data collection process continues in Chapter 3.

Chapter 2: Literature Review

In Chapter 2, I describe the search strategy used to conduct the literature review, the historical explanation, the rationale for the study, and the appropriateness of contact theory as the theoretical framework for this study. I then described sedentary behavior, perceptions of aging, and IG contact. For each variable, I included a brief history of the construct, a review of current studies, and seminal research related to the variable. I also included theories and methods that were consistent with the scope of the study. Additionally, I provided a synthesis of what was controversial and what remains unknown concerning the variable. The following section expanded on the relationship between negative perceptions of aging and sedentary behavior in adults aged 75 and over, the relationship between IG contact and negative perceptions of aging, and the role of IG contact as a moderator between negative perceptions of aging and sedentary behaviors in adults aged 75 and over. The chapter ended with a summary and a discussion of the significance of the literature.

Literature Search Strategy

I examined the study's main concepts and supports using the three variables chosen for the study: sedentary behavior among adults aged 75 and older, negative perceptions of aging, and IG contact. I found additional searches that supported the problem statement and the study's significance, helped establish the research gap, and reinforced the chosen methodology and design rationale. I searched for current 2015 to 2021 peer–reviewed articles, beginning with the Walden University online library. This database included Thoreau, EBSCO, SAGE Journals, ProQuest Central, CINAHL &

MEDLINE combined search, ProQuest Health & Medical Collection, Pub Med, Psych

Net, SOC Index with Full Text, and Taylor and Francis. I employed Web of Science and

Scopus for open–access articles. I applied the following search terms: *contact theory,*

contact hypothesis, intergroup contact, equal status, common goals, intergroup

cooperation, tenets of contact theory, prejudice, stereotypes, sedentary behaviors in older

adults, adults aged 75 adults, oldest–old adults, elderly, aging, adverse health conditions

and sedentary behaviors, sedentary behaviors and depression, sedentary behaviors and

physical health, and mental health, perceptions of aging, attitudes on aging, aging gains

and losses, subjective age, self–perception of aging, self–fulfilling prophecy, aging

stereotypes, aging beliefs, ageism, views on aging, IG contact, intergenerational

programs, intergenerational studies, intergenerational solidarity, and *intergenerational*

effects.

Theoretical Foundation

I chose contact theory (Allport, 1954) as the theoretical foundation for the study.

Allport conducted pivotal research on prejudice in 1954, which he shared in his book,

The Nature of Prejudice (Dovidio et al., 2005). The foundation of contact theory (Allport,

1954) was that negative stereotypes were developed and exaggerated through a lack of

contact (Dovidio et al., 2005; Lytle, 2018). Allport (1954) claimed that prejudice was a

belief about an individual based on factors relating to their group membership: lacking

evidence, unchanging when presented with contradicting facts, and placing the recipient

in an unnecessary power struggle. Initially, Allport (1954) intended to explain the

underpinnings of racism. However, Alport identified other forms of prejudice, including ageism (Lytle, 2018).

Allport (1954) found that contact with a common goal, cooperation, sharing equal status, and support from social and institutional authorities was ideal for preventing and disrupting prejudice. These four characteristics became known as the four tenets of contact theory. Pettigrew and Tropp developed intergroup contact theory (1998), which built upon the work of Gordon Allport (1954), adding the development of friendship as an essential quality of contact. The researchers found that the four tenets of contact theory worked to reduce prejudice; however, they also found that when one member of the in–group changed their perspective of the outgroup, there was a shift in stereotyping among their social circle, including those who had not been in contact with the outgroup (Paluck et al., 2019). This shift was called extended contact.

The application of contact theory (Allport, 1954) was ideal for this study due to implicit and explicit ageism involving a lack of contact between the in–group (younger generation) and the outgroup (older generation). According to Allport (1954), "One must first overestimate the things one loves before one can underestimate their contraries" (p. 25). Concerning ageism, Allport's statement reflected society's fascination with youth and the aversion to growing old (Berger, 2017). This love–hate prejudice created a perceived in–group and an outgroup, resulting in the automatic categorization of individuals. Quinn and Rosenthal (2012) found that this automatic categorization process was the first step in identifying an individual, whether familiar or a stranger. The aversion toward aging leads many individuals to distance themselves from aging adults (Berger, 2017).

Additionally, with the desire not to be associated with the outgroup, individuals who do not want to identify as old may also develop a sense of implicit ageism (Fawsitt & Setti, 2017; Levy, 2009).

Pettigrew and Tropp (2006) conducted a meta–analysis inclusive of 515 research studies spanning over 60 years. While most of the studies they analyzed focused on racism, older adults also constituted a marginalized group (Paluck et al., 2019). In contrast to racism and sexism, ageist stereotypes were rooted in functional changes related to disease and decline (Raposo & Carstensen, 2015). While individuals witnessed age–related changes occurring in others, they also experienced age–related changes occurring within themselves throughout the lifespan, leading to multifaceted views of aging, the self, and other older adults (Bodner, 2009).

I examined the use of contact theory (Allport, 1954) as applied by researchers meeting the theory's optimal conditions through the four tenets applied to ageism. Whiteland (2016) conducted an art therapy intervention combining contact therapy (Allport, 1954) and IG contact. Although the pretest/posttest design did not reveal significant attitude changes between the younger generation and the older generation, the younger group discussed new understandings that they developed about older adults from their experience (Whiteland, 2016). Likewise, Hewson et al. (2015) studied IG contact using contact theory programs as a comparison group. Hewson found that programs using contact theory tenets had more significant intergenerational interaction and less solitude. Isaki and Harmon (2015) found that the tenets were practical for older adults with mild cognitive decline. In a reading intervention at an adult daycare, both younger and older

groups achieved significant outcomes, including improved perceptions of older adults, improved reading skills, and enhanced quality of life.

While both older adults and children experienced immediate and short–term benefits from IG contact, the long–term benefits to children were undervaluated (Gualano et al., 2018). Two studies included 5–year follow–up surveys on the younger participants. Aday et al. (1996) found that fourth graders who participated in the Intergenerational Partners Project maintained more positive views of older adults than the control group at the 5–year follow–up. Thompson and Weaver (2016) also found that students in the Bridges Growing Together project continued to hold favorable views of older adults at the 5–year follow–up; however, the participants had increased negative aging expectations. Women participants held significantly more positive views of older adults than men participants in the original and the follow–up studies.

In their broad analysis, Pettigrew and Tropp (2006) found that participants could meet positive outcomes without Allport's four optimal conditions; however, they agreed that outcomes were much more successful when the conditions were present. Paluck et al. (2019) analyzed 27 research studies, breaking the contact interventions down using Allport's optimal conditions. What Paluck and colleagues found was that most interventions did not use all four of the tenets simultaneously. Their findings showed that Allport's conditions need to be intentional; otherwise, they might be assumed and lead to negative contact experiences (Paluck et al., 2019).

Brinol and Petty (2020) described the common goal tenet's function as challenging the differences felt by the in–group members. In contrast, Dovidio et al.

(2018) referred to the common goal as affirming in–group approval–seeking. Pettigrew and Tropp (1998) provided an example of optimizing the condition of a common goal within a group experience as an interracial team having the common goal of winning. Sharing the common goal compels team members to work together (Pettigrew & Tropp, 1998). Working as a team was also an example of how two conditions, having a common goal and cooperation, could overlap during an intervention (Gaertner, Dovidio et al., 2016).

Intergroup cooperation is an essential tenet of contact theory because it links the in–group and the outgroup (Gaertner, Dovidio et al., 2016). As a result, relationships develop, and shared identity forms (Dovidio et al., 2017). Pettigrew and Tropp (1998) discussed schools as an ideal setting to use cooperation as an optimal condition for group contact, providing the environment was intentionally created to discourage intergroup competition.

Dovidio et al. (2017) discussed how groups that intentionally create an environment of equal status encourage personal interactions between group members, often leading to the realization that stereotypes are not valid. Pettigrew and Tropp (1998) point out that both the in–group and the outgroup members must feel equal status for the intervention to succeed. MacInnis and Hodson (2019) added that when group members begin to view each other as equals, group inequality becomes challenged, and social change efforts may occur outside the group setting. Much of the indirect level change occurred through secondhand learning, such as observing positive interactions and hearing about positive experiences (Lytle, 2018). According to Lytle (2018), this

vicarious increase in knowledge reduces prejudices that can evolve. With social and institutional authorities' support, a shift in the norms and stereotypes connected to the outgroup is likely (Pettigrew & Tropp, 1998).

Dovidio et al. (2017) found that positive contact experiences played a role in changing implicit attitudes and explicit attitudes. According to their research, implicit attitude was connected to contact quantity, while explicit attitude was connected to contact quality. Additionally, the more frequent positive past contact experiences one had, the more likely the individual was to have less implicit bias toward that group (van Ryn et al., 2015). Moreover, Tredoux and Finchilescu (2010) found that positive group contact benefits groups vulnerable to stereotype threat by clarifying their perception of how others view them. These characteristics of contact theory (Allport, 1954) confirmed it as an ideal choice to apply to IG contact interventions.

Literature Review

Variables

Sedentary Behavior

Researchers defined sedentary behaviors as awake behaviors where an individual expends between 1.0 and 1.5 metabolic equivalents (METs) while sitting or reclining (see: Copeland et al., 2017; McEwan et al., 2017; Owen et al., 2011; Tremblay et al., 2017). Active sitting, on the other hand, included light physical activity exerted between 1.6 and 2.9 METs. Researchers first began connecting sedentary behavior to health in 1965 with a study on railroad workers, sedentary behavior, and blood pressure (Fang et al., 2021; Taylor et al., 1965). Whitsett and Naughton (1971) followed with a study

comparing sedentary and active heart disease patients. Biswas et al. (2015) were the first to quantify the relationship between sedentary behavior and mortality, hospitalizations, cancer, and diabetes. Research articles on sedentary behavior grew from 32 articles in 2010 to 537 in 2020, showing the importance of the topic (Fang et al., 2021). While only 6% of these address older adults, researchers agree that addressing sedentary behavior in this population is essential for public health (Lin et al., 2020; McGowan et al., 2020).

Older adults were the most sedentary population, increasing sedentary time by up to 80% with age (Chastin et al., 2015; Copeland et al., 2017; Leask et al., 2015; Lin et al., 2020; McEwan et al., 2017; McGowan et al., 2020; Vermote et al., 2021). The average daily sedentary time for adults (aged 18 to 65) in 20 countries was 5.8 hours compared to older adults, with an average of 8.5 hours per day in the United States, 7.5 hours per day in Spain, and over 6 hours per day in England (Kim & Lee, 2019). Researchers estimated that up to 93.6% of older adults spend over 8 hours per day in sedentary behaviors (Copeland et al., 2017; McEwan et al., 2017). Similarly, 70% of older adults spend up to 8.5 hours per day sedentary (Chastin et al., 2015; Leask et al., 2015). Kim and Lee (2019) found that for every year after age 65, sedentary time increased by 5%, showing how sedentary time increased with age. Additionally, as sedentary time increased in older adults, health–related quality of life decreased, regardless of physical activity (Dogra & Stathokostas, 2012; Kim & Lee, 2019; Ku et al., 2019; Leask et al., 2015).

Sedentary behaviors specific to older adults included television watching, public transportation, a passenger in a car, driving a car, sitting for leisure, sitting to eat, using the computer, talking on the phone, sitting to complete chores, sitting to rest, reading,

conversing, among others (Gardiner, 2011; Van Cauwenberg et al., 2014). Leask et al. (2015) found that older adults accumulate most of their sedentary time (49.2%) at home in leisure time behaviors while alone (56.9%). Specific to older adults' sedentary behavior research, certain seated activities expending between 1.0 to 1.5 METs offered a positive cognitive benefit to older adults that the risk, such as crafting, reading, and some computer use (Copeland et al., 2017; McEwan et al., 2017).

Controversial in sedentary behavior research was the relationship between physical activity and sedentary behavior (Das & Horton, 2016; McGowan et al., 2020; Vermote et al., 2021). Multiple studies indicated that there is an independent relationship between sedentary behavior and physical activity, suggesting that counteracting the risk from sedentary behavior could be achieved through reduction of sedentary behavior rather than increasing physical activity (Figueiro et al., 2019; Kandola et al., 2020; Owen et al., 2011; Wanigatunga et al., 2018). In contrast, Ekelund et al. (2016) found that 60 to 75 minutes of moderate–vigorous physical activity (MVPA) is needed to offset 6 hours of sedentary time. Similarly, Stamatakis et al. (2019) found that 60 to 75 minutes MVPA per 6 hours of sitting time effectively reduced mortality risk. Ekelund et al. (2020) advised that individuals with high amounts of sedentary time per week (> 10 hours) should exceed 150–300 minutes of MVPA per week to offset the risk of premature mortality. This study included a cohort of older adults aged 65–80, no adults over 80 years of age. Rillamas–Sun et al. (2018) studied two groups of women aged 76 and older. The 13–year follow–up study revealed that higher sedentary behavior time led to an increased risk of morbidity after adjusting for physical activity. Owen et al. (2011) found

that the energy expenditure difference was likely due to the engagement of the lower leg muscles, offset by standing and sit–cycling. A common finding in these studies is that television viewing increases mortality regardless of physical activity (Ekelund et al., 2016; Vermote et al., 2021). Researchers blamed the debate over whether sedentary time and physical activity were independent of each other on the validity of measurement accuracy (Das & Horton, 2016; Ekelund et al., 2016; McGowan et al., 2020; Vermote et al., 202). Ku et al. (2019) estimated a possible 40–60% measurement error due to the lack of accuracy of self–report instruments used in sedentary behavior research.

While researchers agreed that sedentary behaviors interfered with the quality of an older adult's life, another area of debate in sedentary behavior research was the question of sedentary time thresholds (Leitzmann et al., 2018). About older adults, Madden et al. (2021) suggest that 9 –10.5 hours per day increases mortality risk. Ku et al. (2019) found that 8 – 9.5 hours per day increased mortality risk. Stamatakis et al. (2019) referred to over six hours of sedentary time per day as high, while Ekelund et al. (2020) described sedentary behavior as a mean of over six hours per day. Kim and Lee (2019) suggested that less than two hours per day of sedentary time for older adults do not negatively impact life quality. Additionally, researchers debated whether the total sedentary time is less harmful when broken up by standing breaks (Vermote et al., 2021).

Sedentary behavior researchers focused primarily on reducing and classifying sedentary time rather than the determinants of the behavior (see Chastin et al., 2015; Copeland et al., 2017; Leitzmann et al., 2018). Longitudinal studies could support researchers in identifying causal factors and help in understanding the complexity of

sedentary behavior. Van Der Berg et al. (2014) studied the determinants of sedentary older adults with a mean age of 80. Van Der Berg and colleagues found that demographic, biological, and socioeconomic factors during midlife significantly contributed to sedentary time in late life. Barnett et al. (2014) followed older adults' sedentary behavior as they transitioned into retirement, explicitly focusing on television watching, transportation, and leisure time. While more recent longitudinal studies investigated the role sedentary behavior has on cardiovascular health (Bellettiere et al., 2019; Diaz et al., 2016), Kandola et al. (2020) found that older individuals having a history of stroke or cirrhosis also had high levels of sedentary time. Qualitative research showed that sedentary older adults had negative beliefs regarding their ability to be more active (Lachman et al., 2018). Researchers and epidemiologists stated that understanding the determinants of sedentary behaviors could lead to proactive interventions (Copeland et al., 2017; Diaz et al., 2016; O'Brien et al., 2020). Correspondingly, Owen et al. (2011) believed an ecological model was the best way to address the complexity of sedentary behavior, thus developing the ecological model of sedentary behavior.

There was a lack of evidence–based data to support interventions reducing sedentary time in older adults (Copeland et al., 2017; Martin et al., 2015; McGowan et al., 2020). Interventions for older adults included breaking up sedentary time with frequent interruptions, self–regulation, and goal setting (Lachman et al., 2018; Leitzmann et al., 2018; Stockwell et al., 2019). Current recommendations were to stand up every hour, which many older adults stated they struggled to do (McEwan et al., 2017; Tremblay et al., 2017). McGowan et al. (2020) found that interventions focused on

physical activity and sedentary behavior were less effective than those addressing sedentary behavior alone. Promising interventions involved psychological pathways and cognitive restructuring (Gardner et al., 2016; Lachman et al., 2018). Gardner et al. (2016) suggested future research work toward decreasing sedentary behavior through education and information. Lachman et al. (2018) found that cognitive interventions aimed at improving self–efficacy and increasing a sense of perceived control and ability were most effective for older adults.

The Relationship Between Sedentary Behaviors and Adverse Health Outcomes in Adults aged 75 and Older. Sedentary behaviors have been related to many chronic and debilitating diseases that can be prevented or delayed with some activity (Stockwell et al., 2019). Diaz et al. (2016) found that adults over age 75 were four times more likely to experience adverse health outcomes due to sedentary behaviors. The consequences of sedentary behaviors in older adults consist of an increased chance of chronic physical disease and adverse mental health and cognitive processing (Leitzmann et al., 2018). Stubbs et al. (2018) added that depression, diabetes, heart disease, and obesity were the most common conditions related to older adults' sedentary behaviors. Kandola et al. (2020) found that for every additional co–occurring chronic condition, sedentary time increased.

With the anticipated population expansion of older adults, cognitive impairment may place an enormous financial and resource burden on global healthcare systems (Vancampfort, 2019). Wanigatunga et al. (2018) researched if sedentary behaviors had a statistically significant negative influence on cognitive processing. The results indicated a

negative correlation between sedentary behaviors and executive function with a small effect size and a positive correlation between physical activity and executive function with a large effect size, suggesting a need for continued longitudinal research (Wanigatunga et al., 2018). Vancampfort (2019) studied aging adults diagnosed with mild cognitive impairment. They found that sedentary behaviors that included a social aspect were less likely to exacerbate their symptoms, mainly if other physical or emotional conditions were.

Hallgren et al. (2018) conducted a 13–year longitudinal study on mentally active and mentally passive sedentary behaviors. The researchers learned that participants who engaged in active sedentary behaviors, such as reading, were less susceptible to major depression than participants who engaged in passive sedentary behaviors, such as television watching (Hallgren et al., 2018). Specifically, TV viewing was associated with higher rates of depression in older adults (Andrade–Gómez et al., 2018). Additionally, Ku and Fox (2016) found that leisure–time sedentary behaviors (LTSB), such as reading, social conversation, and gardening, were positively correlated with subjective well–being (SWB). These findings were significant, considering the contributing factors to sedentary behaviors in older adults were limited mobility, disability, and chronic pain (Stubbs et al., 2018).

Obesity is a statistically significant consequence of sedentary behaviors in older adults (Zhu et al., 2020). Chang et al. (2018) found that older adults living alone spend more time watching TV than using the computer, reading, or another form of LTSB. According to Chang, the increase in TV viewing contributes to obesity. Adults aged 75

adults in Japan spend 45.5% of 8.8 daily sedentary hours watching TV (Shibata et al., 2019). They found this correlated with decreased SWB and lower ability to perform daily living activities. Manas et al. (2019) recognized the tendency of the sedentary behavior of TV watching to correspond to an individual's waist–hip ratio, widely regarded as a measure of overall health. TV watching has also had a substantial relationship with cardiovascular health, metabolic syndrome, and diabetes (An & Yang, 2016; Lemes et al., 2019). Lin et al. (2020) also found an association between decreased cardiorespiratory functioning and muscle deterioration resulting from insufficient oxygen circulation to the muscles.

Metabolic syndrome (MetS) occurs in tandem with leisure–time sedentary behaviors due to the reduced energy disbursed through the body (Lemes et al., 2019). Researchers have found that MetS sedentary individuals who were more inactive and less mobile were positively correlated. Similarly, Figueiro et al. (2019) found in their research on diabetes in the elderly population that an increase in sedentary behaviors and a decrease in high–density lipoprotein (HDL) cholesterol were negatively correlated. These findings suggested that interventions aimed at decreasing sedentary behaviors in adults aged 75 and older would benefit their health, mainly because other health conditions were yet to be discussed.

Sarcopenia is an inflammatory marker that is considered the leading contributor to frailty (Sanchez–Sanchez et al., 2019). Although sarcopenia typically occurs during advanced age, Smith et al. (2020) found that every additional hour of sedentary time was related to increased odds of developing sarcopenia, while Rodriguez–Gomez et al. (2020)

identified a relationship between sedentary behaviors and frailty. Chronic inflammation is common among older adults who suffer from more than one medical condition (Kandola et al., 2020). Sedentary behaviors played a significant role in the development of several inflammatory markers. Manas et al. (2019) found that MVPA served as a moderator amid sedentary time and frailty.

Similarly, individuals diagnosed with chronic obstructive pulmonary disorder (COPD) also showed improvements in their symptoms with moderate to vigorous physical activity (MVPA). These individuals showed a statistically significant decline in their symptoms when engaged in extended bouts of sedentary behaviors (Schneider et al., 2018). This improvement was consistent with the findings of Diaz et al. (2016) from the REGARDS study. Diaz found that adults aged 75 and older benefited from at least two 60–minute breaks a day from sedentary time. These breaks offset frailty and provide cardiovascular benefits (Diaz et al., 2016).

The 2018 Physical Activity Guidelines Activity Committee (PAGA) reported a link between sedentary behaviors and colon cancer, breast cancer, endometrial cancer, and lung cancer (Friedenreich et al., 2021; Jochem et al., 2019). Ongoing research suggested that risk factors for cancer, such as chronic inflammation, metabolic dysfunction, and hormonal imbalances, were heightened through prolonged sedentary behavior time. As a result, the American Institute for Cancer Research (AICR) created a campaign geared towards taking breaks from sedentary behaviors, complete with an infographic (American Institute for Cancer Research, 2020).

Perceptions of Aging

Research on aging stereotypes began in the United States in 1953 with the Attitudes Toward Old People Questionnaire (Hu et al., 2021; Tuckman & Lorge, 1953). Tuckman and Lorge (1953) found that stereotypes about older adults were lonely, in poor health, resistant to change, financially insecure, and in a state of physical and mental decline. Comparatively, by the 1990s, Hummert et al. (1994) identified eight stereotypes commonly used to represent older adults: five negatives, "severely impaired, shrew/curmudgeon, recluse, despondent, and vulnerable," and three positives, "John Wayne Conservative, liberal matriarch/patriarch, and perfect grandparent" (p. 240). In addition to exploring the perceptions that young and middle–aged adults had of older adults, Hummert et al. (1994) first investigated how older adults' self–perceptions aligned with societal stereotypes (Hu et al., 2021; Pikhartova et al., 2016). This seminal research informs researchers on how stereotype self–relevance can become a self–fulfilling prophecy (Jarrott et al., 2018; Kornadt et al., 2016; Levy, 2009; Weiss & Kornadt, 2018; Wolff et al., 2014; Wurm et al., 2017).

The Stereotype Content Model (Cuddy et al., 2007) led the next shift in research on older adult stereotypes. Cuddy et al. (2007) described stereotypes as two–dimensional: warmth and competence, older adults being high in warmth and low in competence (Chasteen & Cary, 2015; Marquet et al., 2019). Because older adults were considered less capable, younger generations did not see them as a threat to resources. As members of these younger generations who held these beliefs began to age, they started to apply these views to their own aging, leading to the internalization of negative stereotypes (Chasteen

& Cary, 2015; Fawsitt & Setti, 2017; Levy, 2009; Marquet et al., 2019). Currently, researchers are investigating how these beliefs become self–relevant during old age.

Negative perceptions of aging led to stereotype internalization, which negatively influenced life span, health, and quality of life (Chasteen & Cary, 2015; Fawsitt & Setti, 2017; Levy, 2009; Marquet et al., 2019; Weiss & Kornadt, 2018; Wurm et al., 2017). Chasteen and Cary (2015) added that older adults were more likely to embody stereotypes related to limitations due to paternalistic views reinforcing messages of low competence. Additionally, Weiss and Kornadt (2018) found that older adults began to self–stereotype and conform to the perceptions of aging that they believed were true. In contrast, some older adults dissociated from their peers who display the behaviors of the stereotypes (Weiss & Kornadt, 2018).

Children exposed to positive and negative stereotypes about older adults were reinforced throughout their lifespan (Barber et al., 2020; Kornadt et al., 2019; Levy, 2009). According to Weiss and Kornadt (2018), these beliefs matured and internalized during childhood. Likewise, Chasteen and Cary (2015) found that children believed stereotypes were accurate from a young age. According to Barber et al. (2020), children did not challenge these stereotypes as they did not apply to their development. As these children matured, negative stereotypes became more robust when they witnessed negative representations of older adults based on stereotypes (Barber et al., 2020; Chasteen & Cary, 2015; Fawsitt & Setti, 2017; Levy, 2009; Marquet et al., 2019). As individuals age and begin to witness their health and functioning decline, stereotypes become self–relevant. Levy (2009) posited that the negative perceptions of aging due to

exposure to negative stereotypes about older adults during childhood influenced an individual's self–concept, behaviors, and belief system. The unknown remains to what degree stereotype internalization affects an individual based on their lifetime exposure (Chasteen & Cary, 2015).

Multiple studies found that those with negative self–perceptions of aging associated with health and functioning were less likely to participate in positive health behaviors (Barber et al., 2020; Hu et al., 2021; Levy et al., 2004, 2020; Pikhartova et al., 2016; Robertson et al., 2016; Warmoth et al., 2016; Wolff et al., 2014; Wurm et al., 2017). On the contrary, persons with positive perceptions of aging and those who take part in interventions targeting positive perceptions of aging were more likely to experience better health (Barber et al., 2020; Blawert & Wurm, 2020; Hu et al., 2021; Levy et al., 2002, 2017; Warmoth et al., 2016; Wolff et al., 2014; Wurm et al., 2017). Levy et al. (2002) found that those with greater positive perceptions of aging had greater longevity than those with negative perceptions, living an average of 7.5 years longer over 22 years.

Wurm et al. (2017) identified that in addition to improved health, those with positive perceptions of aging felt more perceived control over their life and experienced an overall greater sense of well–being. Similarly, Kornadt et al. (2019) found that negative self–perceptions of aging correlated with low cognitive performance, decreased longevity, declining health and functioning, and low quality of life. Robertson et al. (2016) found that negative perceptions of aging were related to cognitive decline in addition to physical health decline. Levy, Ferrucci, et al. (2016) identified a potential

connection between negative perceptions of aging and Alzheimer's disease through biomarkers. Barber et al. (2020) recognized a link between negative perceptions of aging and gait speed in older adults that improved following an intervention. Furthermore, Pikhartova et al. (2016) identified a link between loneliness and negative perceptions of aging.

Intergenerational contact

IG contact was considered a mutually beneficial exchange of resources between members of generations with at least 15 years between them (McAlister et al., 2019; O'Dare et al., 2019). Canedo–Garcia et al. (2017) found the most IG interventions had a mean age of 50–59 years between cohorts. Intergenerational (IG) contact can be formal in the form of a program, shared site, intervention, or informal through day–to–day interactions and volunteer activities (Generations United, 2021; Gualano et al., 2018; Jarrott & Smith, 2011; Lee et al., 2020; Santini et al., 2018; Thompson & Weaver, 2016). According to Santini et al. (2018), informal IG contact relies on chance opportunities between members of different age cohorts, while programs designed with intention offer an environment conducive to quality contact. The documented benefits of quality IG contact included positive changes in stereotypes between children and older adults, reduction of ageist views, promotion of active aging, and fulfillment of generativity (Canedo–Garcia et al., 2017; Drury, Abrams et al., 2017; Jarrott, 2019; Lee et al., 2020; Martins et al., 2019; Thompson & Weaver, 2016). Formal IG programs also had a positive impact at a community level (Canedo–Garcia et al., 2017; Santini et al., 2018).

There were two types of IG contact identified: direct contact and indirect contact (Constantin & Cuadrado, 2021; Dovidio et al., 2017; Drury, Abrams, et al., 2017; Lytle, 2018; Officer et al., 2020; Wolfer et al., 2016; Zhou et al., 2019). According to Drury, Abrams et al. (2017), IG friendships developed through direct contact were the most substantial influences in changing negative perceptions of aging. When direct contact was not possible, extended contact and imagined contact worked to reduce prejudice and aging anxiety vicariously (Drury, Abrams et al., 2017; Isopahkala–Bouret, 2015; Zhou et al., 2019). Extended contact described a situation where a young person had a peer with an IG friendship, and imagined contact described a situation where a young person imagined a scenario between themself and an older adult (Drury, Abrams, et al., 2017).

The first United States federally funded IG program, Foster Grandparents, began in 1965 with the Older Americans Act (OAA) (Generations United, 2021; Lee et al., 2020). The first shared space, Messiah Village, opened in 1978, where it shared a preschool and child–care center at a residential care facility (Jarrott & Smith, 2011). Both IG programs still thrive today, while Foster Grandparents are now part of the Senior Corps (Generations United, 2021). Similarly, Experience Corps was an IG program started in 1996 where older adults volunteer in United States public schools to help with reading and literacy (Pool et al., 2017; Sakurai et al., 2016; Wagner & Luger, 2021). Significant functional and quality of life outcomes were reported for older adults, while improved educational outcomes occurred in the youth. No long–term outcomes were evaluated for the program. Lee et al. (2020) suggested that Experience Corps conduct ongoing, repeated measures on a national sample of program participants.

Additionally, IG programs supported by social policy resulted in effective health outcomes for older adults from various ethnicities (Generations United, 2021; Pool et al., 2017). Building on the Experience Corps program, Sakurai et al. (2016) developed an IG picture–book reading program for older adults and elementary school children called the REPRINTS (Research of Productivity by Intergenerational Sympathy) study. The REPRINTS study included a 7–year follow–up of the older adults regarding their social, intellectual, and physical functioning. Social and intellectual functioning were significantly higher at the follow–up, while there was no change in physical functioning. There were no follow–up surveys on the child participants.

Wagner and Luger (2021) evaluated attitude changes in young adults and older adults participating in Generation to Generation, an intergenerational service–learning course offered at the University of San Francisco. Participants met for 65 minutes a week for nine weeks and again for planned activities outside the classroom. In contrast to similar IG evaluations, Wagner and Luger (2021) measured changes in allophilia rather than changes in attitudes toward older adults. There were significant improvements in young adults' attitudes towards older adults, while older adults' attitudes towards the younger adults remained the same. Wagner and Luger (2021) noted that the program used contact theory (Allport, 1954) and focused on utilizing each of the tenets, including building friendships, which they attributed to the program's success.

Dance for Health was a community–based participatory research IG program that provided the underserved urban community access to physical activity (Schroeder et al., 2017). Dance for Health spanned over five years in Philadelphia, PA. Participants (n =

521) ranged from age 2–79 years old and were all African American. The program resulted in high levels of enjoyment for the community; however, participants did not achieve the desired physical fitness goals. The program's sustainability was evidenced by the community continuing the IG Dance for Health program after completing the study. There were no perceptions of aging measured during the program evaluation.

Verhage et al. (2021) conducted qualitative research evaluating the Zomervisite IG program. The program was explicitly aimed at improving adolescents' attitudes towards aging by having young adults spend 25 hours with long–term care facility residents over two months. The young adults all reported improved perceptions of aging following the intervention. Verhage et al. (2021) noted that many participants had positive IG contact experiences with grandparents before the intervention and felt this may have been a limitation of the study. Canedo–Garcia et al. (2017) echoed this sentiment, stating that harmful IG contact with grandparents could influence formal IG contact opportunities.

Kim and Lee (2018) paired nursing home residents with high school students for a six–week IG contact study in Korea. The intervention consisted of planned activities framed around symbolic interactionism (Blummer, 1969). The program outcomes for high school students were significant increases in perceptions of aging, improved ego identity, and heightened positive emotions. Nursing home participants experienced greater ego identity and generativity and demonstrated an easier adaptation to the nursing home environment (Kim & Lee, 2018). Similarly, a nursing home in Australia began an IG program aiming to improve the quality of life for their dementia residents (Low et al.,

2015). In the Grandfriends program, residents paired with preschool children enrolled in a daycare center for structured activity days over 12 weeks. Active and passive engagement increased for the residents during the 12 weeks, and enjoyment improved, although there were no benefits noted outside of the sessions. There was no data collected on the children.

An intergenerational reminiscence intervention conducted by Gaggioli et al. (2015) showed positive outcomes for both age cohorts of participants (mean ages of 10 and 67). The intervention resulted in significant positive changes in children's perceptions of older adults, and older adults improved their quality of life and decreased loneliness. McConnell and Naylor (2016) studied the relationship between IG contact and physical activity, including sedentary behavior, using the Life Cycle Theory (Erikson, 1960). The mean ages of the participants were nine and 71. Both older adults and younger participants showed positive improvements in physical activity levels. The researchers stated they noticed attitudinal changes; however, their instruments did not measure this outcome.

Chung and Kim (2021) conducted an IG contact study grounded in contact theory and contextualized learning theory where university students and older adults in Seoul, Korea, worked together to discuss improvements to the Seoul Welfare Foundation Program. The students' perceptions of older adults were significantly more positive following the intervention, and the older adults felt "more appreciated." Drury, Bobrowicz, et al. (2017) had mixed results from an IG contact study on digital technology. University students (mean age 20) and older adults (mean age 71)

participated in conversations discussing their experiences and frustrations with technology. Student perceptions were then measured and compared to a control group. The students' perceptions of the older adults were significantly higher in warmth but also lower in competence. Drury, Bobrowicz, et al. (2017) found this was due to the activation of Stereotype threat (Steele & Aronson, 1995), where the IG contact highlighted an area where they felt less competent.

In contrast, the cyber–seniors reverse mentoring model is often used in IG service learning (Leedahl et al., 2019; Rusnack & Cassaday, 2014). In one program, Leedahl et al. (2019) paired older adult participants with human service student mentors based on their technology needs and expertise. Twenty–eight students from different majors also volunteered for the mixed–methods study. Statistically significant outcomes include positive changes in students' attitudes towards aging, positive feelings about working with older adults in the field of gerontology, feelings of comfort for older adults engaging in various forms of technology, and appreciation of the value of IG programs by both age cohorts.

Despite the documented positive outcomes of IG programs globally, the U.S. has less than 150 IG programs currently operating compared to tens of thousands of age–segregated programs (Butts & Jarrott, 2021). Contrary to the number of programs in the U.S., Generations United (2021) found that most Americans agree that IG programs are beneficial and support the implementation of shared sites. Aligning with the tenets of the contact theory (Allport, 1954), IG programs were also efficient in that younger and older participants shared resources rather than competing for them (Bratt et al., 2018).

Competing for resources reinforced ageism, while sharing resources reduced ageism (Allport, 1954; Butler, 1969).

The success of IG contact in changing perspectives of aging was measured by the quality and quantity of the experience (Dovidio et al., 2017; Drury, Abrams et al., 2017; Drury, Hutchinson et al., 2016; Knox et al., 1986; Sun et al., 2019). Open to discussion is whether the contact quality or contact quantity yields greater results. Isopahkala–Bouret (2015) defined IG contact quality as the emotional connectedness between the age cohorts, evidenced by how the groups get along. Pettigrew and Tropp (1998) supported this perspective, adding friendship as a necessary tenet of Contact theory. According to Glass and Trent's (1981) typology for changing children's attitudes toward older adults, quality contact consisted of IG conversations about aging, direct contact, and gaining knowledge about aging from older adults. Before Trent et al. (1979), researchers focused on quantity over quality time. According to Dovidio et al. (2017), quantity is related to implicit attitudes, and quality is related to explicit attitudes. In contrast, Drury, Abrams, et al. (2017) found that IG programs focusing on quality consistently showed more significant attitudinal outcomes. They found that programs designed for quantity had higher levels of benevolent ageism at the end of the program. Verhage et al. (2021) added the importance of noting the child's previous contact experiences, whether positive or negative, and how they compared to the current contact experience.

The debate over whether contact quality or contact quantity is more compelling is due to the lack of a robust IG contact measurement instrument. Part of the challenge in designing a rigorous tool is due to the dynamic nature of IG contact (Jarrott, 2019; Lee et

al., 2020). According to Canedo–Garcia et al. (2017), another challenge in developing an effective IG contact evaluation tool is that IG programs are quite diverse and rarely consist of a comparison group. Additionally, data collection consisted of several forms: interviews, observation, questionnaires, biofeedback, and more (Lee et al., 2020). According to Cordella et al. (2012), researchers frequently developed their own IG contact scale with no psychometric properties to report. I identified reliable measures specific to IG contact, including The Contact with Elderly People Questionnaire (CEQ) (Knox et al., 1986) and The Intergenerational Observation Scale (Jarrott, 2008), both of which were grounded in Contact Theory (Allport, 1954). Other measures used in IG evaluations met the targets of the interventions, ranging from depression measures and quality of life measures to attitudes about aging questionnaires (Lee et al., 2020).

The lifelong influence of childhood contact remains to be studied in the field of IG contact (Jarrott, 2019; Lee et al., 2020). The majority of IG research was limited to the immediate outcomes of the interventions (Drury et al., 2016; Lee et al., 2020). The goal of current interventions was to create sustainable change in aging perceptions and active aging. Ongoing follow–up studies were needed to understand if these interventions were working and, if so, what worked and why (Dovidio et al., 2017; Drury et al., 2016; Lee et al., 2020). Researchers agreed that there was a need for more longitudinal studies measuring the changes in the developmental pathways following IG contact during adolescence (Levy, 2017; Wolfer et al., 2016).

Research Questions

The Relationship Between Negative Perceptions of Aging and Sedentary Behaviors in Adults Aged 75 and Older.

Older adults with negative perceptions of aging were at a higher risk of engaging in sedentary behaviors than those with positive perceptions of aging (Levy et al., 2002). In addition, Yamashita et al. (2019) found that older adults who engaged in the sedentary behaviors of television viewing and passive leisure were statistically significantly lower in happiness and meaningful experiences and higher in sadness than those who engaged in active leisure. Research on sedentary behaviors has focused on sustaining behavior change following interventions (Wolff et al., 2014). Wolff et al. (2014) identified that when working with modifiable antecedents to sedentariness compared to biological factors, negative perceptions of aging had a significant influence on sedentary behavior and the lack of the participant's ability to maintain behavior change. This influence of negative perceptions of aging was due to stereotype internalization (Chasteen & Cary, 2015; Fawsitt & Setti, 2017; Weiss & Kornadt, 2018).

These stereotypical beliefs become internalized throughout life and decrease physical activity and a lack of preventative medical measures (Brothers & Diehl, 2017; Chasteen & Cary, 2015; Fawsitt & Setti, 2017; Levy, 2009; Wurm et al., 2017). Similarly, negative perceptions of aging were associated with increased loneliness, social isolation, depression, and anxiety (Marquet et al., 2019; Weiss & Kornadt, 2018). According to Menkin et al. (2020), these negative perceptions of aging contribute to a sedentary lifestyle. Correspondingly, Wurm et al. (2017) identified aging perceptions as

an underlying influence on sedentary behavior. McEwan et al. (2017) found that older adults perceived the word sedentary as a negative stereotype despite participating in sedentary behaviors. Study participants clarified that the terminology feels negative, and the behavior does not.

Sarkisian et al. (2005) first identified a relationship between sedentary behavior and negative perceptions of aging. The link between sedentariness and negative perceptions of aging was vague due to the complexity of sedentary behavior (Barber et al., 2020; Stockwell et al., 2019). As Barber et al. (2020) describe, those who internalize negative views of aging as less likely to exercise, take medication, and follow through with medical advice, resulting in sedentariness. Garcia Meneguci et al. (2021) added that sedentary behavior characteristics reflected a decline in physical function and a self–assessed decline in health. Correspondingly, Wolff et al. (2014) established a connection between negative perceptions of aging and sedentary behavior and posited that beliefs and behavior could be modified. This idea suggested that those with positive perceptions of aging were less likely to have lengthy bouts of sedentariness.

Lachman et al. (2018) found that identifying and reframing negative beliefs older adults have about physical activity reduced sedentary time, reinforcing the concept that negative beliefs were related to sedentary behavior. Conversely, O'Brien et al. (2020) found that older adults with a higher awareness of their losses had less physical activity time but not more sedentary time. Despite their hypothesis, Wolff et al. (2014) found that interventions with older adults promoting physical activity rather than changing beliefs had a more significant effect. Marquet et al. (2019) believe that programs that directly

targeted negative perceptions of aging were appropriate. Warmoth et al. (2016) suggested that more research clarifying the causal pathways would provide insight into the most effective interventions.

Stereotype Embodiment Theory, Levy (2009) posited that various causal pathways activate as negative age stereotypes become self–relevant; these include psychological, behavioral, and physiological pathways. Psychological pathways lead to confirmation of a false expectation, known as a self–fulfilling prophecy. The behavioral pathways were responsible for a lack of preventative healthcare and a decrease in self–efficacy due to a false belief that growing older means being unhealthy, regardless of whether one takes care of oneself (Levy & Myers, 2004). Studies on the physiological pathway, which included the autonomic nervous system, found that individuals who held negative stereotypes of aging throughout their lives had a higher risk of cardiovascular disease and took longer to recover from a cardiovascular event (Levy, 2009; Levy et al., 2002).

The Relationship Between Intergenerational Contact and Sedentary Behaviors in Adults Aged 75 and Older.

IG contact was linked to studies relating to older adults' physical functioning (Kim & Lee, 2018; Leedahl et al., 2019; Low et al., 2015; McConnell & Naylor, 2016; Schroeder et al., 2017) or related to ageism (Chung & Kim, 2021; Drury, Abrams, et al., 2017; Gaggioli et al., 2015; Kim & Lee, 2018; Verhage et al., 2021; Wagner & Luger, 2021). A limited number of studies concerning IG contact were specific to sedentary behavior (Ruiz–Montero et al., 2020; Vermote et al., 2021; Wolff et al., 2014). However,

there was interest in gerontology and public health, as evidenced by Scholarly Journals. According to Ruiz–Montero et al. (2020), the advancement of intergenerational programs targeting older adults' physical and mental health may lead to a decrease in sedentary behavior. In a like manner, Vermote et al. (2021) were conducting groundbreaking longitudinal research on the roles of physical activity and sedentary behavior through an intergenerational program called The Healthy Grandparenting Project. Vermote et al. (2021) hypothesized that non–residential familial and non–familial grandparenting tasks provided indirect health benefits that increased physical activity time and decreased sedentary behavior in older adults. Likewise, Ruiz–Montero et al. (2020) conducted the Physical Education Teacher Education students (PETEs) study, an intergenerational service–learning program aimed at identifying different qualities occurring during IG contact. Focus groups identified social interaction, improved physical activity, challenging negative stereotypes, and satisfaction as outcomes for the older adults and the PETEs.

Lee et al. (2020) added that an effective intergenerational program benefited older and younger participants. For example, Hsiao et al. (2020) conducted an intergenerational program where older adults with type 2 diabetes paired with college students as tutors for mobile technology. The 8–week Intergenerational Mobile Technology Opportunity Program (IMTOP) results showed that the students gained information from the older adults on preventing type 2 diabetes, including avoiding sedentary behaviors. Older adults learned new technology and gained generativity through sharing their experiences. In comparison, Scharlach (2017) describes Age–friendly communities as a Process

Model of Constructive Aging, which combines a lifespan approach to aging with IG contact. The focus of the Constructive Aging Process promotes active aging, decreasing sedentary behavior, and providing an environment that supports having more adaptive control in one's life.

The Role of Intergenerational Contact as a Moderator of the Relationship Between Negative Perceptions of Aging and Sedentary Behaviors in Adults Aged 75 and Older.

Though I have found no research on IG contact's moderating effect on the relationship between negative perceptions of aging and sedentary behavior in adults aged 75 and over, the literature provided evidence–based elements in deducing this hypothesis. The literature demonstrated the use of contact theory (Allport, 1954) as appropriate by showing how the theory connects ageism to the variables in the study and how decreasing ageism through the use of the interaction variable may reduce sedentary behavior.

Ageism consists of three constructs: stereotypes, self–perceptions, and discrimination (Hu et al., 2021; Isopahkala–Bouret, 2015). These constructs began to overlap as individuals age into the outgroup of old age that they may have held a stereotype against during their younger years (Levy, 2009; Weiss & Kornadt, 2018; Wurm et al., 2017). Old age stereotypes were generalizations about older adults' traits, behaviors, and qualities, while self–perceptions referred to how individuals perceived their own aging experience (Robertson et al., 2016; Weiss & Kornadt, 2018). In the same sense, negative self–perceptions of aging developed when individuals negatively viewed aging and felt they had no control over their deteriorating mental and physical health (Fawsitt & Setti, 2017; Levy, 2009). Weiss and Kornadt (2018) found that older adults

with negative perceptions of aging believed they had no control over age–related losses than their peers who held neutral or positive perceptions of aging. These negative self–perceptions of aging were internalized ageism (Fawsitt & Setti, 2017). Moreover, negative self–perceptions of aging were positively correlated with adverse health outcomes (Leedahl et al., 2020; Levy & Myers, 2004; Levy et al., 2020). Levy et al. (2020) found that negative perceptions of aging account for $33.7 billion a year in United States healthcare costs, surpassing the costs of stereotypes and discrimination.

Self–perceptions of aging that were developed during childhood were strengthened throughout the lifespan and activated in old age (Levy, 2009; Turner & Hooker, 2020; Weiss & Kornadt, 2018). Levy and Myers (2004) hypothesized that addressing age stereotypes beginning in childhood would effectively combat ageism. Once negative stereotypes were formed, positive perceptions of aging struggled to exist (Ingrand et al., 2018). In contrast, positive perceptions of aging acted as a buffer against ageism (Levy, Moffat, et al., 2016; Turner & Hooker, 2020). Similarly, using accelerated growth curve models, Wolfer et al. (2016) found that IG contact predicted positive aging perceptions in adolescence, which increased contact with older adults throughout adulthood. Similarly, Dovidio et al. (2017) found that contact quality was a significant predictor in preventing implicit ageist attitudes. For this reason, a lifespan approach was ideal for developing and challenging negative age stereotypes (Wolff et al., 2014).

IG programs and interventions focus on interactions between older adults, preschoolers, adolescents, and young adults (Canedo–Garcia et al., 2017; Drury et al., 2016; Lee et al., 2020). Specifically, positive non–familial IG contact helps create a new

understanding of what aging means (Martins et al., 2019). Jarrott and Smith (2011) conducted extensive research on the benefits of IG contact and found that the use of contact theory (Allport, 1954) facilitated an environment where new meanings of aging developed. Despite a lack of follow–up studies on IG contact, Thompson and Weaver (2016) found that a 5–year follow–up of 944 high school students from a fourth–grade IG program had a significant, positive effect on the students, evidenced by scores on the Images of Aging Scale (Levy, 2009).

Abrams et al. (2006) first recognized the role of IG contact as a moderator of stereotype threat theory (Steele & Aronson, 1995). The data showed that participants with more frequent IG contact experiences throughout their lives were less vulnerable to stereotypical behavior. Building on their research, Abrams et al. (2008) conducted a similar study using both real and imagined IG contact as a moderator between stereotype threat, performance, and intergroup bias, both having significant results. Additionally, intergroup anxiety had a mediating effect between the independent and DVs. Febriani and Sanitioso (2021) investigated why IG contact can be mediated by anxiety, influencing its strength as a moderator. The data showed that intergroup anxiety and performance anxiety related to performance differed between individualist and collectivist societies within the context of stereotype threat (Steele & Aronson, 1995). Despite the noted anxiety, participants in the study with a history of IG contact scored higher on performance than those in the control group (Febriani & Sanitioso, 2021).

From a developmental perspective, contact theory (Allport, 1954) remains the most effective intervention for improving attitudes toward the outgroup (Dovidio et al.,

2017). The application of contact theory (Allport, 1954) to IG contact appears to be consistent with its application to other forms of prejudice (Dovidio et al., 2017; Pettigrew & Tropp, 1998). While ageism negatively influences the health of older adults, quality IG contact leads to positive perceptions of aging, improved health, and active aging (Burnes et al., 2019; Jarrott & Savla, 2014; Officer et al., 2020). Likewise, a landmark study by Levy (2009) confirmed that the internalization of negative age stereotypes placed individuals at higher risk for cardiovascular disease than those with positive perceptions of aging. For every point increase in positive perceptions, the risk of cardiovascular disease decreases by 80%, while every increase in negative perception increases the risk by 11%.

Similarly, researchers have used longitudinal studies to understand how sedentary behaviors influence cardiovascular disease (Diaz et al., 2016). Findings indicate that prolonged sedentary time in adults age 75 and older had the most significant influence on cardiovascular disease even when participants met physical activity recommendations. These findings were similar to those of Bellettiere et al. (2019), who researched older women and cardiovascular disease. In their study, both long bouts of sedentary time and total sedentary time per day significantly influenced cardiovascular disease in participants with no history of stroke or prior heart disease. Ballin et al. (2021) found that stroke, myocardial infarction, and mortality increased in sedentary adults over 70 years old. Similarly, Kandola et al. (2020) found that older individuals having a history of stroke or cirrhosis also had high levels of sedentary time.

IG contact was a proven intervention against ageism, specifically when paired with the tenets of contact theory (Allport, 1954) (Aday et al., 1996; Brinol & Petty, 2020; Dovidio et al., 2017; Hewson et al., 2015; Isaki & Harmon, 2015; Jarrott & Savla, 2014; Jarrott et al., 2018; Thompson & Weaver, 2016; Wagner & Luger, 2021; Whiteland, 2016). Wurm et al. (2017) identified that in addition to improved health, those with positive perceptions of aging felt more perceived control over their life and experienced an overall greater sense of well–being. Similarly, Lachman et al. (2018) found that interventions that promoted a sense of control were most effective in reducing sedentary behavior time. Formal IG contact supporting beliefs of active aging and autonomy is necessary for future generations to experience less sedentary time and improved quality of life.

Summary and Conclusions

IG contact was a logical moderator of the relationship between negative perceptions of aging and sedentary behaviors because children were psychologically vulnerable to stereotypical messages about aging (Bodner, 2009). A life–course approach addressing causal factors to sedentary behavior, which included negative perceptions of aging, was plausible in the form of IG contact (Raposo & Carstensen, 2015; Turner & Hooker, 2020). The application of contact theory (Allport, 1954) to the IG contact intervention was appropriate as the intentional implementation of the four tenets has proven to reduce ageism (Dovidio et al., 2018; Paluck et al., 2019; Pettigrew & Tropp, 1998). Such an approach could potentially prevent changes in developmental pathways that lead to decreased control beliefs related to sedentary behavior (Lachman et al., 2018;

Levy et al., 2002; Wurm et al., 2017). These changes in perceptions lead to an improved

quality of life for adults aged 75 and older, which, in turn, may lead to improved health

and less stress on healthcare systems as population aging continues (Levy et al., 2020).

In this chapter, I reviewed and synthesized the literature related to the construct of

ageism, contact theory (Allport, 1954), sedentary behavior in adults aged 75 and over,

negative perceptions of aging, and IG contact. Additionally, I justified using a

moderation analysis by providing empirical evidence of the relationship between the

variables, described by Baron and Kenny (1986) as an essential antecedent to moderation.

I exposed the top–down reasoning process, leading to the cross–sectional, quantitative

research design (Coccia, 2018). In Chapter 3, I provide a further rationale for choosing a

multiple regression analysis to explain this study. I also describe and justify the chosen

sample population, sample methods, research question and hypotheses, and chosen

survey design.

Chapter 3: Research Method

Introduction

The purpose of this quantitative cross–sectional design study was to investigate whether there was a statistically significant relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older. I also examined whether intergenerational contact moderated the relationship between negative perceptions of aging and sedentary behaviors. My goal was to understand lifespan approaches geared to influence public health strategies in reducing sedentary behaviors in adults aged 75 and older. In this chapter, I reviewed the research design, methodology, plan for data analysis, threats to validity, and ethical concerns specific to this study.

Research Design and Rationale

I used a quantitative, cross–sectional, correlational research design in conducting this study. Specifically, I used a moderating multiple regression analysis (MMR) to evaluate whether IG contact throughout the lifespan moderated the established relationship between negative perceptions of aging and sedentary behavior. The variables in the study were negative perceptions of aging (X) as the independent/predictor variable, IG contact (M) as the independent/moderating variable, the combined effect of negative perceptions of aging and IG contact (Z) as the independent/interaction variable, and sedentary behavior (Y) as the dependent/outcome variable. I administered the surveys electronically and in person, based on the participant's preference, and analyzed them using three–predictor MMR.

I aimed to determine if IG contact moderated the relationship between perceptions of aging and sedentary behavior. Specifically, as the quality and quantity of IG contact increases throughout the lifespan, does the established relationship between negative perceptions of aging and daily reported sedentary time weaken?

A cross–sectional, correlational research design was appropriate for this study because I described the study's variables and examined their statistical relationships without manipulation (Dannels, 2019). In addition, through nonexperimental correlational research, I collected data from all participants at one single point in time.

In this study, I sought to link events in the past (i.e., IG contact throughout the lifespan) to events happening in the present (i.e., self–reported daily sedentary time). This realist ontology was well–suited for cross–sectional research, per the guidance of Spector (2019). According to Cook and Campbell (1979), as cited by Dannels (2019), survey questions can be either realist or instrumentalist. Questions related to "feelings, attitudes, and values that cannot be directly observed" were considered realist (Dannels, 2019; p. 362). I used a post–positive epistemology in conducting this study, intending it to serve as a springboard for future research (see Dannels, 2019; Spector, 2019; and Valverde, 2020). The recognition that an unobservable relationship exists between the variables may inform future hypotheses and observable research. Such future research can improve the quality of life in adults aged 75 and over and reduce the pressure population growth places on the healthcare industry.

Methodology

Population

The target population for this study was the combined subgroups of healthy middle–old (ages 75 to 85) and oldest–old (aged 85 and over) adults, as defined by the National Institute of Health and the National Institute on Aging (Lee et al., 2018). This focus reflected the recognized rise in health problems and sedentariness reported by adults aged 75 and over and the need stated by researchers to focus on these specific subgroups (see Lee et al., 2018; Van Cauwenberg et al., 2015).

Sampling and Sampling Procedures

I used nonprobability, homogeneous convenience sampling, and purposeful snowball sampling to recruit the target population for this research study. I chose nonprobability, homogeneous convenience sampling to allow potential participants exposure to the study's description and enrollment criteria based on the recommendation of Elfil and Negida (2017). Nonprobability, homogeneous convenience sampling is ideal for a study focused on a subpopulation (Heckemann et al., 2021; Jager et al., 2017). According to Jager et al. (2017), homogeneous convenience sampling strengthens the generalizability of conventional convenience sampling by delimiting the target population to two to four sociodemographic factors (Jager et al., 2017). The homogeneous sociodemographic factors related to this study were *age* (75 and over) and *type of residence* (one that supports independent living). While nonrandom convenience sampling was often discouraged due to biased results, decreased validity, and lack of generalizability, Estabrook (2019) found that nonprobability, homogeneous convenience

sampling was ideal for gerontological research. Researchers gain deeper insight into healthy aging by highlighting sociodemographic differences within older adult subpopulations (Estabrook, 2019; Heckemann et al., 2021). Additional benefits of convenience sampling are the efficiency, the low cost, and the simplicity of the sampling method (Jager et al., 2017).

In addition to gaining interested and qualified participants through convenience sampling methods, I also used nonprobability, purposeful snowball sampling. Snowball sampling was ideal for gerontological research because they were considered a difficult–to–reach population. Kammerer et al. (2019) found that older adults who volunteered for research studies tended to have higher socioeconomic status, higher education levels, and fewer rural locations. Snowball sampling was one way of mitigating this potential sample limitation (Sharma, 2017). According to Sharma (2017), a drawback of snowball sampling is that participants are not chosen based on inclusion criteria. Therefore, I employed the Katz ADL Scale to assess autonomy in the six activities of daily living, whether recruited by convenience or snowball sampling methods (Edemekong et al., 2021; Fuentes–Garcia, 2014; see Appendix G). ADL scores ranged from 4 to 18, with lower scores reflecting higher levels of independence. Interested candidates with scores of 4 on the Katz ADL Scale were eligible to participate in the research study.

I determined the sample size using G Power (Faul et al., 2009). The statistical test for an a priori: fixed model, R^2 increase, multiple regression with three predictor

variables, 80% CI, .15 effect size, and .05 alpha resulted in a sample size of 77

participants (see Appendix A).

Procedures for Recruitment, Participation, and Data Collection

I placed recruitment flyers at local churches, hair salons, barbershops,

independent living facilities, and retirement communities, describing the research

study and the parameters of the participant sample that I am pursuing (see Appendix

B). I also posted online recruitment flyers using social media.

For respondents, participation depends on meeting the inclusion and exclusion

criteria of the research study (Kammerer et al., 2019). The Inclusion criteria for this study

consisted of adults aged 75 or older who can communicate effectively, live

independently, and complete daily living activities (i.e., hygiene, continence, dressing,

feeding, ambulating, toileting). The exclusion criteria included being frail, living in

nursing homes or assisted living facilities, and having advanced cognitive

impairment.

Because middle–old and oldest–old adults may not be savvy with or have

access to a computer, I provided three options for respondents to participate in the

research study: a web–based survey, mail–in surveys, and in–person surveys.

According to Kammerer et al. (2019), an essential aspect of recruitment in

gerontological research is to break down the obstacles to potential participants. For

in–person surveys, I used local churches and senior centers as a venue where

participants could come to complete their questionnaires. I was available to answer

questions, and they were allowed to bring along a third party to assist them as needed (Kammerer et al., 2019).

Using the template provided by the Institutional Review Board, I created an informed consent form available to participants should they choose to participate in the research online, by mail, or in person. In addition, I collected data in the form of questionnaires, specifically three questionnaires consisting of a total of 77 questions (Knox et al., 1986; Levy et al., 2004; Van Cauwenberg et al., 2014). Online respondents received an email invitation that included a link to the survey, the purpose of the research study, and the projected completion time for the questionnaires. In addition, online respondents receive an on–screen appreciation message after the survey. For those who choose mail–in or in–person surveys, I created two packets: the first containing information about the study and the researcher and informed consent, the second containing demographic questions, and the three questionnaires. Mail–in respondents were required to return an acknowledgment of informed consent by mail to proceed with the research study.

Instrumentation and Operationalization of Constructs

Demographics

Although the respondents' demographics did not operate as study variables, I used the demographic data for the sample's descriptive statistics. The demographic data consisted of age, ethnicity, gender, marital status, socioeconomic status, and education level. In addition to descriptive statistics, following the guidance of Jager et al. (2017),

demographic data aided in justifying the homogeneity of the sample, decreasing researcher bias, and increasing the study's validity.

Negative Perceptions of Aging

The IV, negative perceptions of aging, was measured using the Image of Aging Scale developed by Levy et al. (2004). The Image of Aging Scale was grounded in stereotype embodiment theory (SET; Levy, 2009), positing that negative age stereotypes' internalization begins during childhood through various environmental exposures. The scale measures negative images of aging among nine domains: wrinkled, grumpy, dying, senile, given up, slow, sick, helpless, and alone (Levy et al., 2004). There were nine Likert–type items on the measurement tool. The respondent was provided a phrase or a word and asked to rate it from 0 to 6, with 0 representing how the word/phrase represents older people and six as closely describing what the participant thinks illustrates an older person, with total summed scores ranging from 0 to 54 with higher scores representing more negative perceptions of aging. The estimated time to complete this section of the instrument was five minutes. The negative age–stereotype component has a Cronbach alpha of .82. Dr. Becca Levy granted me permission to use and reproduce the Image of Aging Scale (Levy et al., 2004) via email (see Appendix D).

IG contact

The MV, IG contact, was continuous, measured using The Contact with Elderly People measure (see Appendix I: Knox et al., 1986). IG contact measures the combined quantity and quality of time spent between adults over 65 and under 20 years old (Knox et al., 1986). The measurement tool was grounded in Allport's contact theory (1954).

Allport (1954) suggested that members of a group hold a bias against recognized shared values. The constructs of contact theory (Allport, 1954) were sharing a common goal, cooperation, having equal status, and experiencing support from social and institutional authorities. The 57 questions of this instrument reflect the constructs of contact theory. I this study, I utilized 52 Likert–scale questions and five multiple–choice questions specific to the research questions. The Likert questions were on a 7–point scale measuring the quality and quantity of these constructs in alignment with contact theory (see Allport, 1954; Jarrott et al., 2018; Knox et al., 1986). Higher scores on the quality scale indicated more significant levels of relatedness, intimacy, cooperation, and equal status, supporting the constructs of contact theory (see Allport, 1954; Knox et al., 1986). Higher scores on the quantity scale indicated building friendships (see Allport, 1954; Jarrott et al., 2018; Knox et al., 1986). Additionally, the measure differentiates between familial and nonfamilial contact (Knox et al., 1986). The estimated time to complete the measure was 20 minutes. The scale has a Cronbach's alpha of 0.96 (Jarrott & Savla, 2014). Dr. Jane Knox permitted me to use the CEQ (Knox et al., 1986) via email, contingent upon ethical approval of the research study (see Appendix E).

Sedentary Behavior

The continuous DV, self–reported daily sedentary time, was measured using the Belgian Environmental Physical Activity Study (BEPAS Seniors) Questionnaire, Section 5: Time Spent Sitting Scale and was developed by Van Cauwenberg et al. (2014). This 12–item inventory is grounded in the social–ecological model of health behavior and centers around behaviors specific to older adults (Owen et al., 2011; Van Cauwenberg et

al., 2014). Each of the 12 items consisted of two open–ended questions targeting the total hours and minutes the individual spent in specific behaviors while in a sitting or reclining position during the past 7 days (Van Cauwenberg et al., 2014). I calculated self–reported daily sedentary time by multiplying the number of days the individual participated in the behavior by the average daily time spent engaged, divided by seven. For example, the first part of a question is, "On how many days did you use a computer?" If the participant responded 0, they were directed to skip the second portion of the question. If the participant had a response, they were directed to the second portion of the question, "How much time did you usually spend on one of those days using a computer? Hours/minutes" For our example, suppose the participant responds they used the 5 five days per week for 1 hour per day, totaling 5 hours for the week. When divided by 7 days for the entire week, the week's average computer use was 43 minutes per day.

The data collected from the 12 questions were compositional, meaning the 12 separate times collected combined to form one total average sedentary time. The estimated time for completion of this instrument was 20 minutes. Reliability for this measure was good to excellent (Perinetti, 2018), with an intraclass correlation coefficient (ICC) for the total sitting time of 0.77 (95%CI; Van Cauwenberg et al., 2014). Dr. Jelle Van Cauwenberg granted permission to use the Time Spent Sitting Scale (Van Cauwenberg et al., 2014) via email (see Appendix F).

Data Analysis Plan

Pre–Analysis

Once all survey responses were collected, I conducted a pre–analysis by entering the data into a spreadsheet using the Statistical Package for the Social Sciences (SPSS) software program, version 27. I cleaned the data to identify and eliminate outliers, duplicate instances, abnormalities, conflicting responses, and missing data (Corrales et al., 2018). Data cleaning enhanced the study's rigor by minimizing the influence dirty data can have on the study's results (Allen, 2017). Because many surveys for this research were completed in an in–person format, the data entry was manual. Manual data entry increased the chance of error introduction. The in–person format, however, reduced the chances of missing data. While Corrales et al. (2018) and Zhang and Wang (2017) agreed that imputation through mean substitution and deletion of missing data were acceptable methods, proactively reducing missing data was optimal. George and Mallery (2020) suggested a guideline where imputing up to 15% of missing data would not negatively affect the findings, while over 15% should result in deletion.

Before running the regression, I checked the assumptions and requirements of the MMR model, which were the same as those for bivariate regression and multiple linear regression, with the addition of homogeneity of regression and causality (Field, 2017; Judd & Kenny, 2010; Warner, 2013). The seven assumptions were linearity, homoscedasticity, normal distribution of variables, normal distribution of residuals, independence of observations, no multicollinearity, and homogeneity of regression (Field, 2017; Lund Research LTD, 2020). Additionally, Judd and Kenny (2010) discuss

causality as an assumption to moderation, defining this as the "causal direction" from *X*

to *Y* and from *M* to *Y* (p. 121–122). This assumption was described by Hayes (2018) as a

requirement for moderation, as his model references *X* as the focal antecedent and states

that the predictor, the moderator, and the interaction variable must be antecedent

variables for moderation to occur. This requirement was already met as the IVs in the

study rely on reflection while the DV focuses on current data. Additional pre–met

assumptions were the requirement for the outcome variable to be continuous, the

requirement for there to be at least two predictor variables, and the requirement of the

bivariate regression that all variables were continuous (Field, 2017; Warner, 2013). The

variables met these requirements as three continuous variables were measured on an

interval scale, consisting of two IVs and one DV.

The relationship between *X* and *Y* was assumed to be linear. Linearity was

necessary for the effect of *X* to *Y* to change by a constant amount as M increases or

decreases (Judd & Kenny, 2010). I tested linearity by plotting a scatterplot (Warner,

2013). A scatterplot also showed any significant outliers or unusual data points missed

while cleaning the data. Homoscedasticity of residuals assumed the residuals were equal

for all values of the predicted outcome variable (Field, 2017; Hayes, 2018). Violation of

this assumption results in decreased validity and loss of statistical power. I tested for

homoscedasticity simultaneously, as I tested for linearity visually, using a scatterplot.

The bivariate regression assumed a normal distribution among the variables

(George & Mallery, 2020). I tested normality using the Shapiro–Wilk test and assessed

skewness and kurtosis. Normal distribution of residuals allowed the researcher to infer

the data based on the difference between predicted and observed (Hayes, 2018). A violation of this assumption can lead to errors in statistical significance testing. I tested the normal distribution of residuals using the Shapiro–Wilk test, the Kolmogorov–Smirnov test, a Q–Q plot, and a histogram with a normal curve (Field, 2017; Lund Research LTD, 2020).

A correlation between residuals would violate the independence of observations assumption (Field, 2017). I tested for independence of observations assumption using the Durbin–Watson test. Multicollinearity occurs when two or more predictor variables are strongly correlated (Field, 2017). I conducted a multicollinearity test using Pearson Correlation and checked the tolerance and VIF values of the coefficients table listed under correlation statistics (Field, 2017; Lund Research LTD, 2020). Homogeneity of regression assumed no interaction between X and M as predictors of Y (Warner, 2013). I tested this assumption visually by plotting a scatterplot and checking that the slopes were similar and parallel (Field, 2017).

Data Analysis

In setting up the data for analysis, I used the Baron and Kenny Process (1986) to center the mean of X (negative perceptions of aging) and M (quality and quantity of IG contact. Then, I multiplied the centered variables X by $M,$ creating the interaction variable Z (negative perceptions of aging * IG contact) (Baron & Kenny, 1986; Field, 2017; George & Mallery, 2020; Hayes, 2018). Centering the mean of the three antecedents aided in interpreting the data, specifically in identifying the simple effects (Baron & Kenny, 1986).

Bivariate regression analyses and a stepwise, two–tailed, three–predictor, multiple regression model addressed the research questions and tested the hypotheses of this research study. I tested the first research hypothesis using bivariate regression analysis. A review of the literature showed that there was a positive relationship between negative views of aging *(X)* and sedentary behaviors *(Y)* (Brothers & Diehl, 2017; Levy et al., 2002; Weiss & Kornadt, 2018; Wolff et al., 2014; Wurm et al., 2017). The bivariate regression first tested the $H_0 1$ to see if there was a non–statistically significant relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and over, followed by testing *Ha*1 for statistical significance.

I continued to use bivariate regression to test the second hypothesis. Specifically, does the model support the literature that there was a negative relationship between IG contact *(M)* and sedentary behavior *(Y)* in adults over age 75 (Christian et al., 2014; Lytle, 2018; Reimer et al., 2017)? The analysis tested $H_0 2$ first for statistical significance, testing if there was no statistically significant relationship between IG contact and sedentary behaviors in adults aged 75 and over, followed by testing $H_a 2$.

I tested $H_0 3$ using a stepwise, two–tailed, three–predictor, multiple regression. The third predictor for the model consisted of the interaction variable (*Z*) created during the mean centering process described above. The stepwise process took place in the following order: Step 1: I entered the predictor variable (*X)*, negative perceptions of aging; Step 2: I entered the moderator variable (*M*), quality and quantity of IG contact; Step 3: I entered the interaction variable (*Z*), negative perceptions of aging* IG contact. In the regression analysis, I tested $H_0 3$ to determine if IG contact does not statistically

significantly moderate the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and over.

Research Questions and Hypotheses

RQ1: What was the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and over?

$H_0$1: There was no statistically significant relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and over.

H_a1: There was a statistically significant relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and over.

RQ2: What was the relationship between IG contact and sedentary behaviors in adults aged 75 and over?

$H_0$2: There was no statistically significant relationship between IG contact and sedentary behaviors in adults aged 75 and over.

H_a2: There was a statistically significant relationship between IG contact and sedentary behaviors in adults aged 75 and over.

RQ3: Did IG contact moderate the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and over?

$H_0$3: IG contact did not moderate the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and over.

H_a3: IG contact moderated the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and over.

Threats to Validity

External Validity

A threat to the external validity of cross–sectional designs was having a high non–response rate, exceptionally high in adults over 80 (Gaertner, Seitz, et al., 2016; Sedgwick, 2014). A high non–response rate could lead to low sample generalizability, which was also a potential risk of non–probability convenience sampling (Estabrook, 2019; Jager et al., 2017; Sedgwick, 2014). Expanding the recruitment of potential sample participants by placing recruitment flyers in rural churches and salons and being available to collect data in person helped to mitigate this threat (Kammerer et al., 2019; Sedlakova & Souralova, 2019). The homogeneity of the sample increased by narrowing the sociodemographic factors, thus improving the generalizability of the sample (Heckemann et al., 2021; Jager et al., 2017).

Internal Validity

The CEQ was specific to young adults, leading to a threat to internal validity (Jarrott et al., 2018; Knox et al., 1986). Instrumentation is a threat to internal validity when a researcher uses a questionnaire differently than its intended purpose (Burkholder et al., 2016; Flannelly et al., 2018). I applied the questionnaire to older adults to reflect on their lives between the ages of 5 and 20. Additionally, administering the questionnaire in person helped mitigate the threat as it provided an opportunity to answer questions participants had related to the survey (Sedlakova & Souralova, 2019).

Maturation was considered a universal threat in research consisting of IVs and gerontological research (Flannelly et al., 2018). Regarding this study, maturation was a

threat due to the potential for participants to become fatigued while completing the questionnaires. Administering the surveys in person mitigated this threat because it enabled the participants to take a break while completing the questionnaire (Sedlakova & Souralova, 2019).

Construct Validity

Threats to construct validity included convergent–discriminant validity, confounding constructs, and vague definitions of constructs (Dannels, 2019; Knapp & Mueller, 2019; Westen & Rosenthal, 2003). Campbell and Fiske (1959), as cited by Knapp and Mueller (2019), endorsed the use of a convergent–discriminant approach to identify whether the variables and the measure correlate as expected. Jarrott et al. (2018) and Knox et al. (1986) each identified significant intercorrelations among subgroups in The CEQ, suggesting the instrument contains too many questions (Knapp & Mueller, 2019). Westen and Rosenthal (2003) added that construct validation is a recursive process. Jarrott et al. (2018) noted a need for an improved measure of IG contact with fewer items.

Inexact definitions of constructs and construct confounding were threats, given that most constructs were broad and subject to interpretation through the reader's lens (Knapp & Mueller, 2019; Westen & Rosenthal, 2003). Identifying the constructs and providing an operational definition with clear boundaries helped to mitigate this threat. Operationalization of the constructs decreased the chance for ambiguity and reduced the threat to construct validity.

Ethical Considerations

Walden University's approval number for this study is 03–23–22–0987095, and it expires on March 23, 2023. The population under study was a subgroup of older adults. According to the Center for Research Quality (Walden University, 2021), because this subgroup was independent instead of being in a nursing home, they were not considered a "Red Flag" issue. Participants remain anonymous. Participant names or contact information did not need to be recorded for the research. Participant age and sociodemographic were recorded, which was, however, non–identifiable. The structure of the web survey, mail survey, and in–person surveys required the participant to acknowledge informed consent, including potential risks and hazards, before beginning the surveys. There were no partnership organizations, eliminating the need for confidentiality agreements or masking procedures. There was no incentive for participation in this research project. Per Walden's best practices guide, all data were stored in a password–protected external drive located in a locked safe for five years. I will remove the data after the five years is complete through the process of data wiping.

Summary

I used a quantitative cross–sectional research design to assess whether IG contact moderated the relationship between perceptions of aging and sedentary behavior among adults over 75 years old. Convenience and snowball sampling attracted a homogeneous participant pool of independent older adults willing to reflect on their childhood intergenerational relationships. Respondents remain anonymous and unincentivized throughout the research project. To achieve the highest participation rate, access to

surveys was available online, through postal mail, and in person. I answered the research questions using MMR and stored the data for five years, per Walden's policy. In Chapter 4, I discussed the study's data collection, analysis, and results.

Chapter 4: Results

Introduction

The purpose of this quantitative cross–sectional design study was to investigate

whether there was a statistically significant relationship between negative perceptions of

aging and sedentary behavior time in adults aged 75 and older. For the research questions

and hypotheses, I addressed whether or not there was a statistically significant

relationship between the predictor variable, negative perceptions of aging, and the

outcome variable, sedentary behavior. In this study, I also examined whether IG contact

moderated the relationship between negative perceptions of aging and sedentary

behavior. In this chapter, I share the results of the study and discuss the procedures for

data collection and analysis. Descriptive statistics of the final sample included

frequencies, representation percentiles, and reliability statistics. I further divided the

chapter into subcategories: data preparation, statistical assumption testing, and my

analysis of the results as related to the research questions. I found that the results of the

study substantiated the literature, given that statistically significant relationships did exist

between levels of IG contact, negative perceptions of aging, and sedentary behavior.

Data Collection

Walden University IRB approval number for this study is 03–23–22–0987095,

valid from March 23, 2022, through March 23, 2023. The cross–sectional survey was

available as a web–based survey, a mail–in survey, and an in–person survey on March

24, 2022. I posted the study flyer (Appendix B) on social media and shared it with several

private social media groups, who requested to share the information amongst their social

circles. I placed paper flyers at three senior centers, two local churches, the local food bank, a local barbershop/hair salon, and at community center boards in two neighborhood community golf courses. I used churches in Texas and North Carolina and a retirement center in California as meeting spaces for older adults to gather to complete the paper survey. Twenty–four participants were recruited online, and the remaining participants resulted from snowball sampling and utilized mail–in or requested a local pick–up for their survey. I took a leave of absence from Walden University from August 2022 until February 2023 and did no data collection during this time. At the time of my leave of absence, I had 61 participants. I resumed data collection in February 2023, and I met the target sample size ($n = 77$) on March 22, 2023.

Data Cleaning

I transferred the data by hand from the paper surveys and Google Sheets into SPSS Version 27. I routinely checked for accuracy during data entry, and I reviewed each case after completing the initial data entry. Next, I ran frequencies for each of the multiple response sets I developed for each questionnaire. I identified two cases with missing data. I reviewed the surveys, located the data by case number, and added it to the dataset. After re–running the frequency analysis, six cases remained with problematic data. Question nine of the CEQ provided two choices of Likert scales for the participant to answer. Six respondents chose to answer both Likert scales, leaving an extra response to record. I discussed setting a rule with my committee chair and decided to use the first of the two responses to the scales in CEQ–9.

I then set up the variables for the regression analysis. The DV, sedentary behavior, was measured using two open–ended scale questions. To set up the DV for the analysis, I first transformed the two–answer responses into one–answer responses by multiplying TSSS(1–12)a (days per week spent [completing identified task] during the past week), by TSSS(1–12)b (hours: minutes per day spent sitting [completing identified task] during the past week) to achieve TSSS(1–12) (hours: minutes per week spent sitting [completing identified task] during the past week).

Next, I created the DV, the IV, and the MV. TSSSdaily, the DV, was created by calculating the sum of TSSS1– TSSS12 divided by seven. In other words, I transformed the variable, sedentary behavior, from hours: minutes per day spent sitting while completing identified tasks into total minutes per day spent sitting.

I continued with the same process to transform the IV, negative perceptions of aging. The new variable, NegIOAS, consists of the mean statistics of the negative traits portion of the IOAS responses. The variable CEQ resulted from the mean scores on the Contact with Elderly People Questionnaire, which created the MV. Baron and Kenny (1986) suggested centering the IV and MV to mitigate multicollinearity when there was no true–zero value to the scale associated with the variable. I centered the mean of the IV and MV by subtracting each of the variable's mean statistics from their original variable.

Results

Descriptive Statistics

The targeted population for this study was delimited to the combined subgroups of healthy middle–old (ages 75 to 84) and oldest–old (aged 85 and over) adults who lived independently, were autonomous, and were at least 75 years old. Autonomy was determined through the use of the Katz ADL Scale as a prescreening survey. Respondents scoring 4 to 6 on the Katz ADL Scale were eligible to participate in the survey.

Demographic information is presented in Table 1. The sample population included 54 women (77.1%) and 16 men (22.9%); 37 African Americans (52.9%), 30 Caucasian (42.9%), two American Indian/ Native Alaskan (2.9%), and one Native Hawaiian or Other Pacific Islander (1.4%). The participant's ages ranged from 75 to 89, with ages 78, 81, and 82 receiving the most responses at nine responses each (11.4%). Ages 75, 76, and 77 each had seven responses (10%), 79 had six responses (8.3%), 83 and 87 each had four responses (5.7%), 80 had three responses (4.3%), 84, 86, and 89 each had two responses (2.9%), and 85 and 88 received one response (1.4%). Twenty–five (37.5%) of the participants were widowed, 21 (30.0%) had some college experience but no degree, and 31 (44.3%) made between $20,000–34,999 USD income per year.

Table 1

Demographic Characteristics of Study Participants

Characteristic	*N*	Percent
Gender		
Men	16	22.9
Women	54	77.1
Race/Ethnicity		
American Indian/ Alaskan Native	2	2.9
Native Hawaiian or Other Pacific Islander	1	1.4
White	30	42.9
African American	37	52.9
Marital Status		
Single	11	15.7
Married or in a domestic partnership	22	31.4
Divorced	10	14.3
Widowed	25	35.7
Separated	2	2.9
Education Level		
Less than a high school diploma	2	2.9
High school degree or equivalent	13	18.6
College with no Degree	21	30.0
Associate's Degree	15	21.4
Bachelor's Degree	10	14.3
Master's Degree	7	10.0
Professional Degree	1	1.4
Doctorate	1	1.4
Income		

Characteristic	N	Percent
Less than $20,000	13	18.6
$20,000–34,999	31	44.3
$35,000–49,999	12	17.1
$50,000–74,999	7	10.0
$75,000–99,999	5	7.1
$Over $100,000	2	2.9
Age		
75	7	10.0
76	7	10.0
77	7	10.0
78	8	11.4
79	6	8.3
80	3	4.3
81	8	11.4
82	8	11.4
83	4	5.7
84	2	2.9
85	1	1.4
86	2	2.9
87	4	5.7
88	1	1.4
89	2	2.9

Note. n = 70

I analyzed reliability statistics using descriptive statistics, frequency calculations, and Cronbach's alpha (Table 2).

Table 2

Descriptive Statistics and Reliability Analysis of Sedentary Behavior, Perceptions of Aging, and IG contact

	Sedentary Behavior	Negative Perceptions of Aging	IG contact
Possible Range	0–24:60	0–6	1–7
Mean	1:60	2.85	4.91
Std. Error	.066	.079	.071
SD	.55	.661	.591
Minimum	.73	1.22	3.65
Range	2.42	3.44	2.87
Maximum	3.15	4.67	6.52
Skewness	.476	.100	.147
Kurtosis	–.062	.228	.133
Cronbach's Alpha/ICC	.40	.56	.78

Note. n = 70 Percent values were rounded

Skewness and kurtosis statistics were in the acceptable range between –1 and +1 for each variable (Table 2). Skewness and kurtosis statistics were: (α_3 = .476) and (α_4 = –.062) for Sedentary behavior; (α_3 = .100) and (α_4 = .228) for Negative Perceptions of Aging; and (α_3 = .148) and (α_4 .130) for IG contact. Though in the acceptable range, the skewness statistics were outside of the =.05 to –.05 boundary that signifies symmetry. The positive statistics between .05 and .1 indicated a moderate right skew to the data, which reflected the mean statistic being larger than the median.

Subscale reliability was assessed for each of the three variables using Cronbach's Alpha. The reliability statistic for the CEQ was acceptable (α = .79). The Image of Aging

Scale (IOAS) includes two Cronbach alpha values due to measuring positive and negative

perceptions of aging. The IOAS had acceptable values of positive perceptions of aging (α

= .72) and negative perceptions of aging (α = .56). The Time Spent Sitting Scale

produced an unacceptable Interclass Correlation Coefficient value (ICC = .40). A statistic

in this range is potentially caused by a lack of correlation between questions, too few

questions, or heterogeneous constructs. I ran a factor analysis to identify problems with

the survey (Table 3). The initial eigenvalues show that five of the 12 components account

for 70% of the variance in responses. This difference in variance indicated that the scale

items may be one–dimensional. The Time Spent Sitting Survey was discussed further in

Chapter 5.

Table 3

Total Variance Explained for Sedentary Behavior as the Dependent Variable

Component	Total	Initial Eigenvalues % of Variance	Cumulative %
1	2.630	21.915	21.915
2	2.001	16.665	38.589
3	1.602	13.350	51.940
4	1.102	9.183	61.123
5	1.016	8.470	69.592
6	.785	6.542	76.134
7	.724	6.037	82.171
8	.564	4.702	86.873
9	.526	4.380	91.253
10	.423	3.528	94.781
11	.385	3.209	97.990
12	.241	2.010	100.000

Note. Extraction method: Principle Component Analysis

I measured the outcome variable, sedentary behaviors, with the Belgian

Environmental Physical Activity Study (BEPAS Seniors) Questionnaire, Section 5: Time

Spent Sitting Scale (Van Cauwenberg et al., 2014; Van Holle et al., 2014). I calculated

the responses based on the 12 items that contained two open–ended questions. Each of

the 12 questions related to a specific sedentary behavior. The two questions related to the

behavior referenced within the past week: How many days were spent doing this

behavior and how many hours and minutes were spent doing this behavior on those days?

Van Cauwenberg and Van Holle (2014) presented the instrument reliability as (ICC, $p <$

.05), whereas this study produced a poor Interclass Correlation Coefficient of (ICC = .40,

$p = .002$) for the scale. Individual item ICC statistics ranged from (ICC = .179 – .587, $p <$ .001), suggesting that individual items on the scale accounted for significant portions of the variance in reliability.

The predictor variable, negative perceptions of aging, was measured using the Image of Aging scale (Levy). The 18–item scale was divided into nine positive and nine negative stereotypes associated with aging. Responses were collected based on a 7–point Likert scale (0 = does not match my image to 6 = completely matches my image). Lower scores (0–2) indicated lesser negative perceptions of aging, a neutral score (3) meant neither negative nor positive perceptions of aging, and higher scores suggested greater negative perceptions of aging.

The second predictor variable, IG, was measured using the CEQ (Knox). The 56–item scale included two subscales measuring the quantity and quality of IG contact throughout one's lifespan. Responses were collected based on two 7–point Likert scales. For measures of quantity (1 = very little IG contact to 7 = very much IG contact), Lower scores (1–3) indicated low levels of IG contact, a mid–score (4) meant there was some level of IG contact, and higher scores (5–7) suggested higher levels of IG contact. For quality, (1 = lower levels of quality to 7 = higher levels of quality contact), Lower scores (1–3) indicated little to no quality during IG contact, a mid–score (4) meant there was neutral quality during IG contact, and higher scores (5–7) suggested high levels of quality during IG contact.

Mean scores for measures of sedentary behavior were ($\bar{x}$ = 1.60, SD = .55) total hours: minutes per day spent sitting, which indicated low levels of sedentary behavior for

this age group as older adults average 8.5 hours of sedentary time per day (Kim & Lee, 2019). The mean statistic for IG contact ($\bar{x} = 4.91$, SD = .59) indicated that the quantity of IG contact throughout the lifespan was slightly greater than 50%, with an overall quality that was slightly above average. Mean measures of negative perceptions of aging ($\bar{x} = 2.89$, SD = .66) which suggested that participants felt between *neutral* and *somewhat does not match my image* of the negative perceptions of aging. The small standard deviations of the variables ($\sigma = .55 - .66$), indicated that the study sample accurately reflected the population (Saunders, 2006).

Frequency values (Table 4) were calculated using the combined sums of scale responses for each scale. To arrive at the three frequency levels, I used the mean score as the middle level plus one standard deviation to equate the high–level mean and minus one standard deviation to achieve the lower–level mean, as suggested by Aiken and West (1991). The frequency values indicated that the majority of the participants' responses were in the range of having low levels of sedentary behavior time ($n = 26$, 37.1%) as well as high levels ($n = 24$, 34.3%). Levels at or near the mean were slightly less ($n = 20$, 28.6%). For negative perceptions of aging, the majority of responses fell within the medium range to indicate neither negative nor positive perceptions of aging ($n = 51$, 72.9%), followed by lower levels (n = 10, 14.3%) and higher levels (n = 9, 12.9%), suggesting a close percentage of participants felt that the negative perceptions of aging matched their image as did not. The majority of the responses to statements related to levels of IG contact fell within the medium range ($n = 50$, 71.4%), indicating medium levels of quality and quantity of contact throughout the lifespan.

Table 4

Calculated Frequency Values of Participants' Responses

Variable level and score range	*N*	Percent*
Sedentary Behavior Time (DV)		
Low levels (up to 1.39)	26	37.1
Medium levels (1.40–1.81)	20	28.6
High levels (1.82 & up)	24	34.3
Negative Perceptions of Aging (IV)		
Low levels (up to 2.19)	10	14.3
Medium levels (2.19–3.51)	51	72.9
High levels (3.52 & up)	9	12.9
IG contact (MV)		
Low levels (up to 4.32)	13	18.6
Medium levels (4.33– 5.49)	50	71.4
High levels (5.50 & up)	7	10.0

Note. n = 70. *Percentages were rounded.

Statistical Assumptions

The first two assumptions of the moderation analysis were met during the research design portion of the study. The first assumption was having one continuous DV, and the second assumption was having two or more IVs. This study included one continuous DV, Sedentary Behavior, and two continuous IVs, Negative Perceptions of Aging and IG contact.

I checked for outliers by analyzing the standardized residuals. I removed five outliers from four cases after identifying z–scores outside of the acceptable range of –3 to +3. The next step I took was to produce studentized deleted residuals and identify cases

that were outside of the –3 to +3 acceptable value. I identified two cases with values over 3.0 and removed those cases from the model. Additionally, I found one risky Leverage point of .25520. Leverage values between .2 and .5 were considered risky, while those below .2 were acceptable, and above .5 were problematic. This leverage point was removed from the model. The final step was using Cook's distance to identify any remaining influential data points. There were no values above 1.0, indicating no further outliers or unusual data points. At this point, I reran the regression with a total of 70 cases and continued with the assumption testing. Table 5 provides a comparison of the mean statistic of each variable before and after the removal of the outliers and unusual data points. The minimal difference between means indicated how the removal of the outliers did not significantly alter the mean values.

Table 5

Data Set Comparison of Means

	Sedentary Behavior	Negative Perceptions of Aging	IG contact
Complete survey data	1.63	2.82	4.89
Survey data excluding outliers	1.60	2.86	4.91

*Note. n = 77, 70 Percent values were rounded to .00.

The assumption of normality was assessed through visual inspection of the Q–plot and P–plot (Figures 1 & 2). In addition to the visual inspection, Table 6 showed that normality was statistically confirmed by the Kolmogolrov–Smirnov value (KS= .064, *p*= .200).

Table 6

Tests of Normality

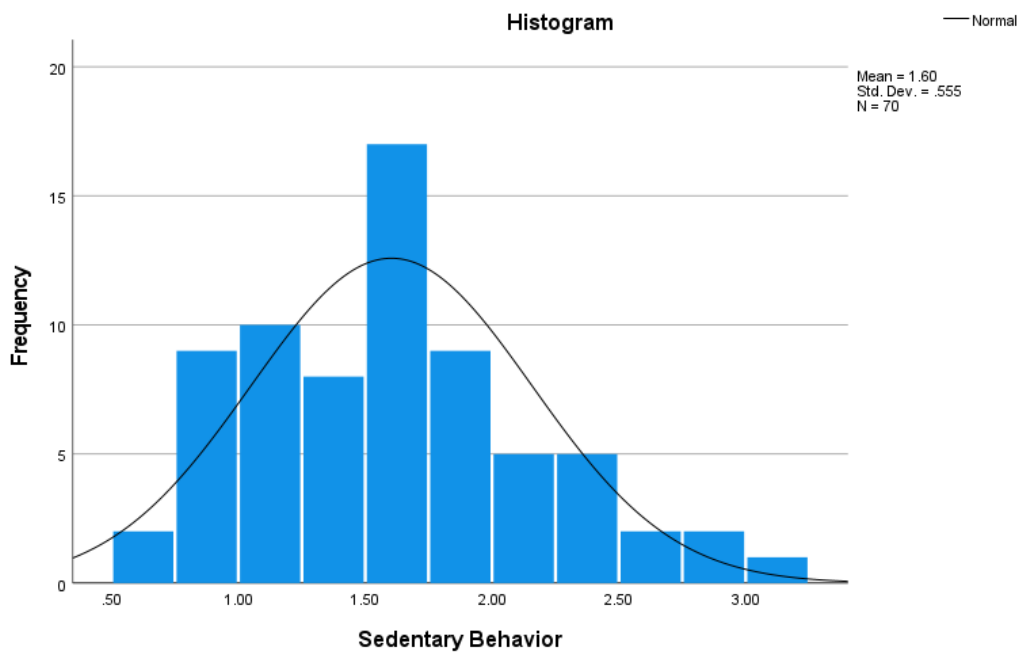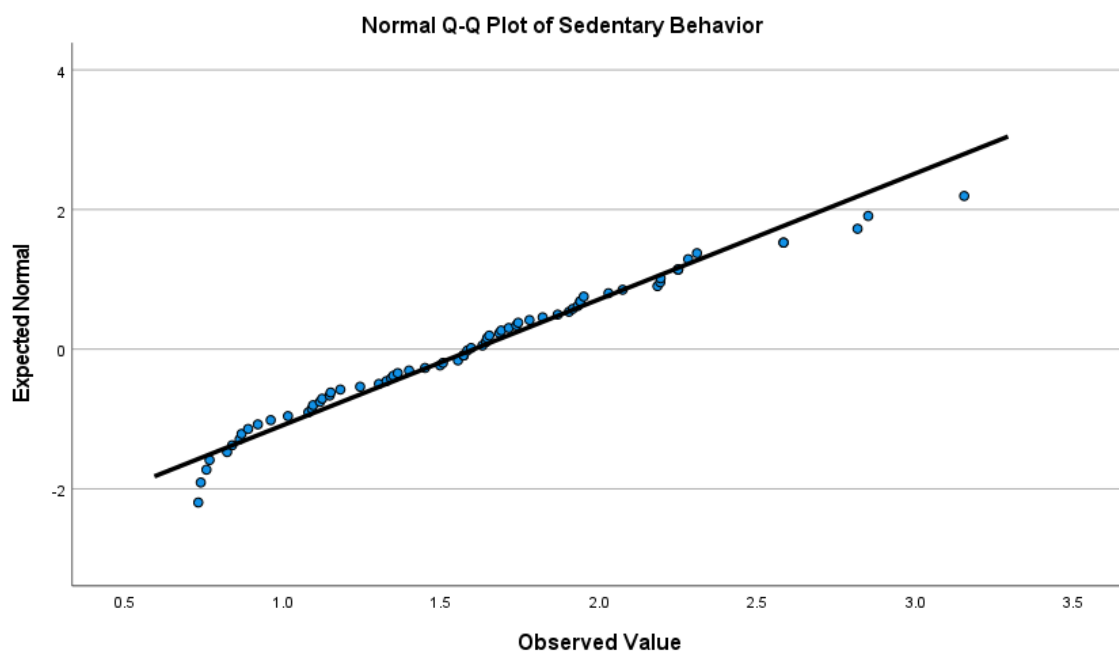|	Kolmogolrov–Smirnov			Shapiro–Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Sedentary Behavior	.064	70	.200	.969	70	.082

Note. ($p < .05$)

Figure 3

Q – Q Plot with Tests of Normality

Figure 4

P – P Plot with Tests of Normality

Table 7

*Model Summary Illustrating Independence of Observations Assumption Test*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin–Watson
1	.370	.137	.098	.52697	1.825

Note. ($p < .05$)

Through visual inspection of the scatterplot, I determined that a linear relationship existed between the DV and the IVs (Figure 5). The quantile points of the regression standardized residuals on the y–axis and the standardized predicted values on the x–axis all fell between –3 and +3 on either axis.

Figure 5

Q–Q Plot with Tests of Linearity
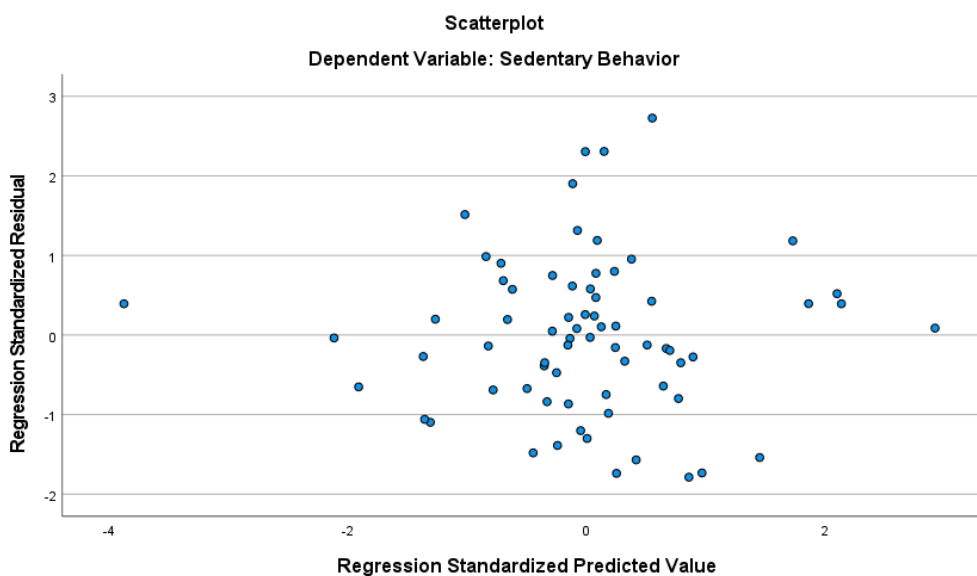
Homoscedasticity was demonstrated as assessed by the scatterplot (Figure 6). There was no pattern to the studentized residuals as they spread across unstandardized predicted

values of the data. Heteroscedasticity, in contrast, occurs if a funnel or peak is formed among the residuals. The scatterplot revealed that homoscedasticity was present.

Figure 6

Scatterplot with Tests of Homoscedasticity

Scatter Plot of Studentized Deleted Residual by Unstandardized Predicted Value
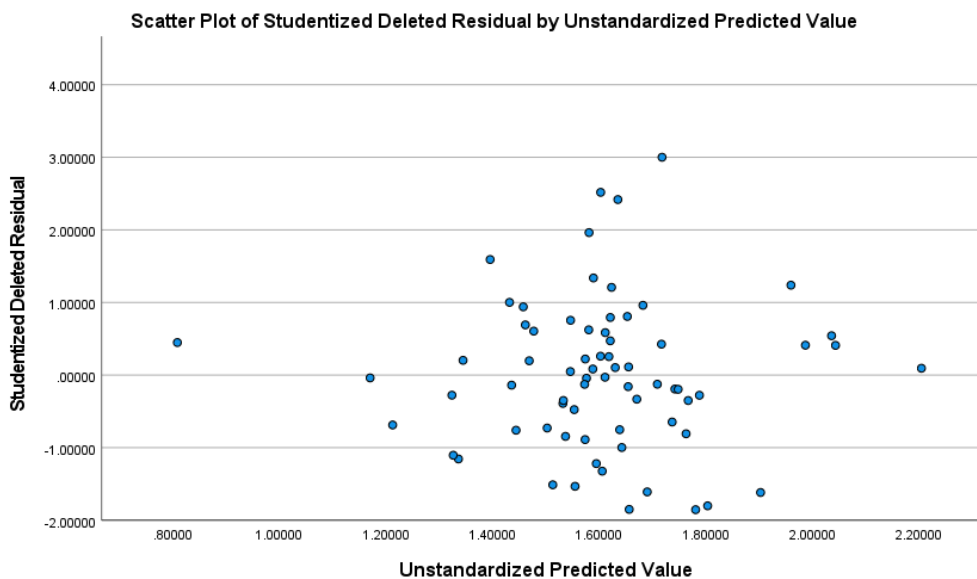
Multicollinearity was determined using a Pearson Correlation (Table 7). The model showed no correlations above .70, and the assumption of multicollinearity was met.

Table 8

Correlation Matrix with Centered Negative Perceptions of Aging as Predictor, Centered

IG contact as Moderator, and Sedentary Behavior as Outcome Variable

	M	SD	1	2	3
1. TSSS	1.6035	.55477	1		
2. CIOAS	−.0391	.66191	.052	1	
3. CCEQ	−.0067	.59115	−.287*	−.229	1

*Correlation is significant at $p < .05$, $n = 70$

Hypothesis Testing

I utilized stepwise multiple regression to test the research hypotheses. Step by step, I entered the IV, the MV, and the interaction variable to determine their relationship with the DV. I observed the main effects of each variable, including variance, correlation, and statistical significance. Finally, I conducted a multiple regression to determine the overall statistical significance of the model.

Table 9

Stepwise Regression with Centered Negative Perceptions of Aging as Predictor, Centered

IG contact as Moderator, and Sedentary Behavior as Outcome Variable

Model	R	R^2	Adjusted R^2	R^2 Change	Sig. F Change
1	.052	.003	−.012	.003	.667
2	.287	.082	.055	.080	.019
3	.370	.137	.098	.055	.045

($p \le .05$)

Research Question 1

RQ1: What was the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older?

$H_0$1: There was no statistically significant relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older.

H_a1: There was a statistically significant relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older.

I tested $H_0$1 to see if there was a non–statistically significant relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and over, followed by testing H_a1. I observed a non–significant relationship ($r^2 = .003$, $p = .667$, Table 8, Model 1), and I failed to reject $H_0$1. A non–statistically significant relationship existed between negative perceptions of aging and sedentary behaviors in adults aged 75 and over.

Figure 7

Q – Q Plot with Sedentary Behavior Time as Outcome Variable and Centered Negative Perceptions of Aging as Predictor Variable
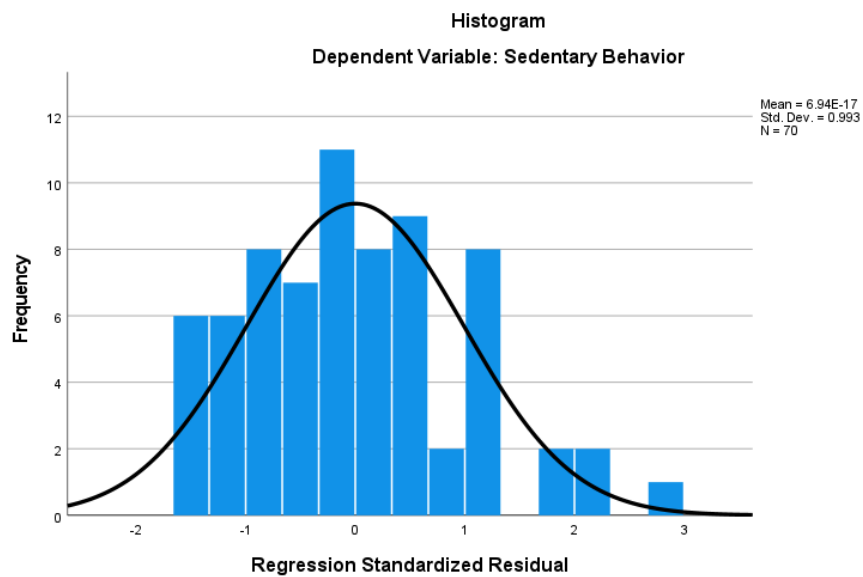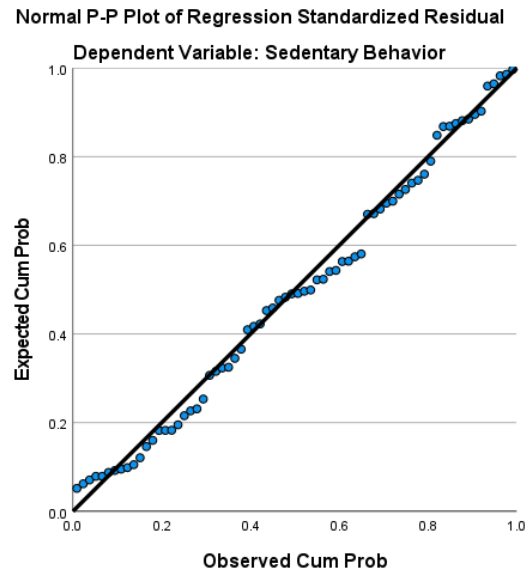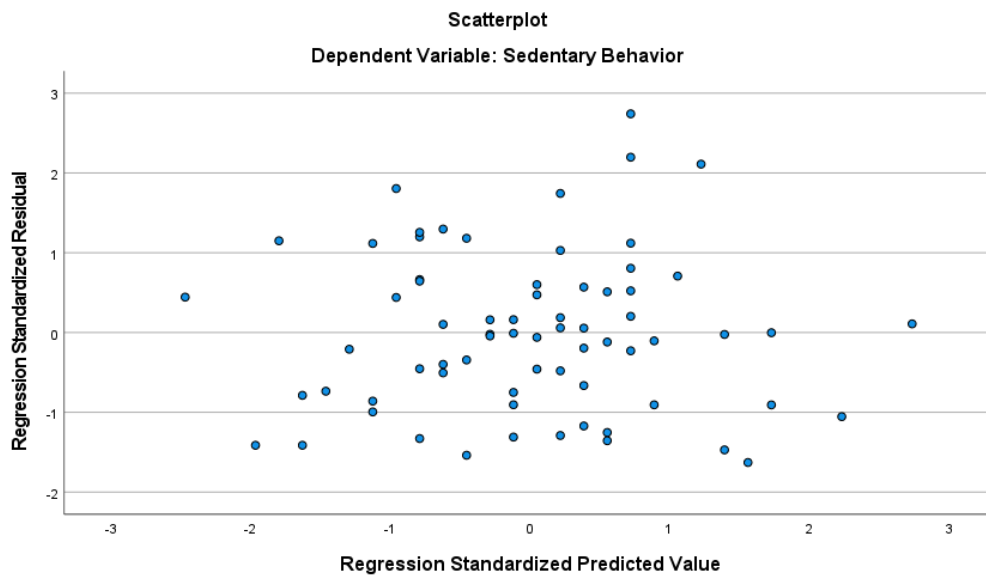
Figure 8

P – P Plot with Sedentary Behavior Time as Outcome Variable and Centered Negative Perceptions of Aging as Predictor Variable

Figure 9

Scatterplot with Sedentary Behavior Time as Outcome Variable and Centered Negative Perceptions of Aging as Predictor Variable

Research Question 2

(RQ2): What was the relationship between IG contact and sedentary behaviors in adults aged 75 and older?

($H_0$2): There was no statistically significant relationship between IG contact and sedentary behaviors in adults aged 75 and older.

(H_a2): There was a statistically significant relationship between IG contact and sedentary behaviors in adults aged 75 and older.

I tested $H_0$2 to check if there was a non–statistically significant relationship between IG contact and sedentary behaviors in adults aged 75 and over, followed by testing H_a2 for statistical significance. The stepwise linear regression established that IG contact was a statistically significant predictor of sedentary behavior time (r^2 = .082, p = .019, Table 8, Model 2). I rejected $H_0$2; there was a statistically significant relationship between IG contact and sedentary behavior.

Figure 10

Q – Q Plot with Sedentary Behavior Time as Outcome Variable and Centered IG contact as Independent Variable

Figure 11

P – P Plot with Sedentary Behavior Time as Outcome Variable and Centered IG contact as Independent Variable

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Sedentary Behavior

Figure 12

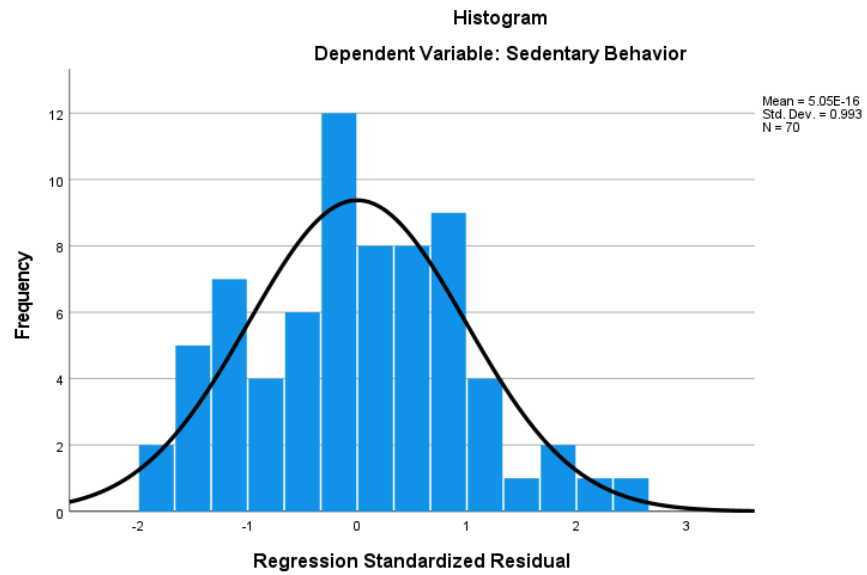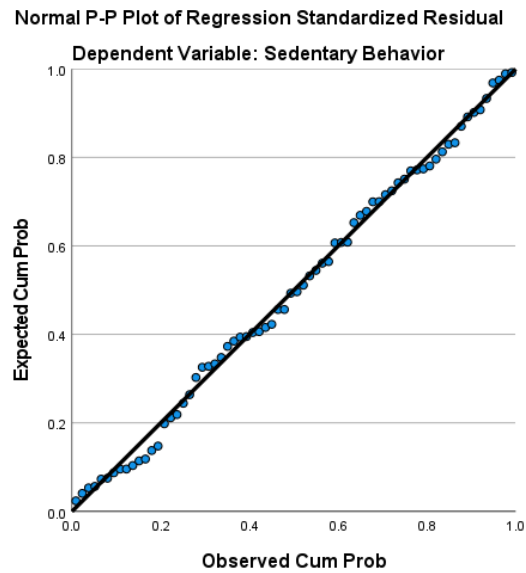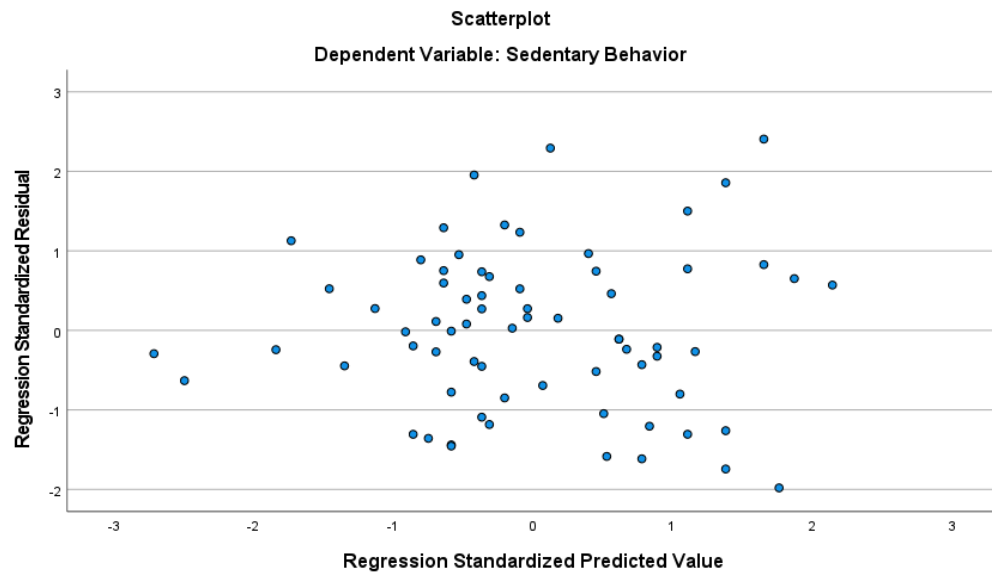*Scatterplot with Sedentary Behavior Time as Outcome Variable and Centered IG contact as Independent Variable*

Scatterplot
Dependent Variable: Sedentary Behavior

Research Question 3

(RQ3): Did IG contact moderate the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older?

($H_0$3): IG contact did not moderate the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older.

(H_a3): IG contact did moderate the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older.

A moderation analysis was tested to see whether M modified the strength of the relationship between X and Y (Figure 13). In this study, I tested to see if IG contact altered the relationship between negative perceptions of aging and sedentary behavior. Specifically, the hypothesis tested whether levels of time spent sedentary were or were not related to levels of negative perceptions of aging and IG contact. The tests included whether IG contact moderated that relationship and if the moderation took place at lower or higher levels of the interaction.

Figure 13

Conceptual Moderation Model
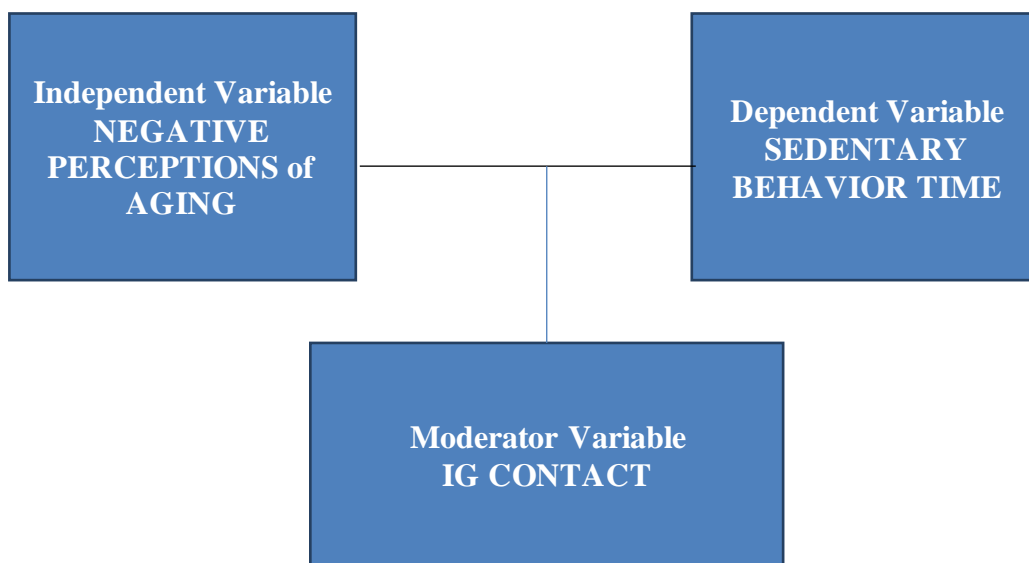
In preparation for the Baron and Kenny moderation analysis, I centered X (negative perceptions of aging) and M (IG contact) by subtracting their mean statistics. I created an interaction variable by multiplying the centered IV by the centered MV. Finally, I centered the interaction variable by subtracting the mean, creating the centered interaction variable.

According to Baron and Kenny (1986), moderation can only take place if an existing relationship exists between X and Y. A non–significant relationship existed between negative perceptions of aging and sedentary behavior time in this study ($r^2 =$ .003, $p = .667$, Table 8, Model 1), which indicated that the regression would be non–significant; however, a regression was conducted to identify if there would be a conditional effect of X on Y with the introduction of M.

Results of Moderation Analysis. I tested the hypotheses to determine whether the relationship between the levels of negative perceptions of aging and levels of sedentary behavior time was moderated by IG contact. Predictor variables (NIOAS and CEQ) were centered by subtracting the mean. An interaction variable was created from the product of the centered MV and IV (Baron & Kenny, 1986).

The initial two steps involved testing the assumption that a statistically significant relationship exists between the DV and each IV. Using additional tests, I evaluated the relationships and effects of each centered variable and the interaction term. Table 8 introduced the values associated with the centered variables, centered negative perceptions of aging (CIOAS), centered IG contact (CCEQ), and the centered interaction term (Cen_int). No change in variance was noted between the original variables and centered variables, and the value of the residuals was zero ($E = 0$).

Table 10

Multiple Regression with Centered Negative Perceptions of Aging as Predictor, Centered IG contact as Moderator, and Sedentary Behavior as Outcome Variable

Model	R	R Square	Adjusted R Square	R Square Change	F Change	Sig. F Change
1	.370	.137	.098	.137	3.491	.020

Table 11

Residual Statistics with Centered Negative Perceptions of Aging as Predictor, Centered

IG contact as Moderator, and Sedentary Behavior as Outcome Variable

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	.8086	2.2040	1.6035	.20529	70
Residual	–94126	1.43723	.00000	.51538	70
Std. Predicted Value	–3.872	2.925	.000	1.000	70
Std. Residual	–1.786	2.727	.000	.978	70

Table 12

Anova with Centered Negative Perceptions of Aging as Predictor, Centered

IG contact as Moderator, and Sedentary Behavior as Outcome Variable

|	Sum of Squares	df	Mean Square	F	Sig.
Regression	2.908	3	.969	3.491	.020
Residual	18.328	66	.278		
Total	21.236	69			

Table 13

Moderated Regression Analysis with Centered Negative Perceptions of Aging as

Predictor, Centered IG contact as Moderator, and Sedentary Behavior as

Outcome Variable

1	2	3
Unstandardized coefficients / Standardized coefficient		

	B	SE	Beta	sig	B	SE	Beta	Sig	B	SE	Beta	Sig
Constant	1.605	.067		<.001	1.601	.065		<.001	1.632	.065		<.001
IOAS	.44	.101	.052	.667	−.012	.101	−.014	.908	−.012	.098	−.014	.907
CEQ					−.272	.113	−.290	.019	−.246	.111	−.262	.030
IOAS*CEQ									.352	.172	.235	.045

The overall moderation regression model was statistically significant, $F(3,66) = 3.491$ ($r^2 = .098$, $p = .020$, Table 9), indicating the combination of negative perceptions of aging, IG contact, and the interaction of negative perceptions of aging and IG contact accounted for 9.8% ($p = .20$) of the total variance in sedentary behavior time (Table 7). The interaction term was statistically significant ($r^2 = .137$, $p = .045$, Tables 8, 10). I rejected $H_0 3$ and determined that IG contact does function as a moderator of the relationship between negative perceptions of aging and sedentary behavior.

To verify moderation, I decided to plot the interaction. Analysis of the simple slopes was recommended for researchers who conduct MMR with interactions (Aiken & West 1991, Cohen et al. 2003, Hayes 2018). Using computer–generated ModGraph (Jose, 2008), I plotted the effects of the IV (negative perceptions of aging) along the X–axis, and the MV (IG contact) was represented by three lines designated as low, medium, and high (Figure 14).

Figure 14

Moderation Effect at High, Medium, and Low Levels
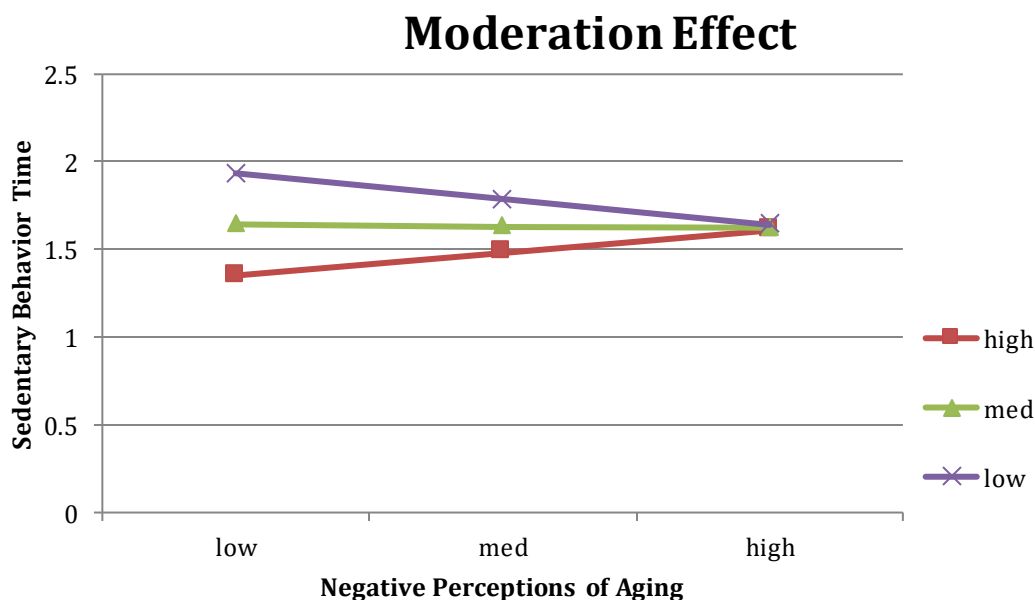
Table 14

Interaction Values as Presented by ModGraph

Moderator	Low	Med	High
High	1.35242	1.48065	1.60888
Med	1.64371	1.63420	1.62470
Low	1.93500	1.78776	1.64053

(n = 70, p = .045)

   Visual inspection of the interaction indicated that the conditional effect of

negative perceptions of aging on sedentary behavior was different at higher levels of

contact than it was at lower levels of contact. At low and medium levels of the

interaction, as negative perceptions of aging decreased, sedentary behavior increased. At

high levels, however, as negative perceptions of aging decreased, sedentary behavior

decreased. This change indicated that the interaction was effective in reducing sedentary behavior at higher levels. Guidelines for the presence of moderation were that a graph has different gradients and slopes were not parallel (Aiken & West 1991). Figure 14 presented a visual indication that moderation occurred. Therefore, I rejected $H_0 3$ and accepted $H_a 3$; IG contact moderated the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and over.

In addition to the interaction effect having statistical significance, Figure 17 indicated a change of direction in the relationship taking effect at higher levels. Inspection of the graph revealed when the change in direction occurred. Correspondingly, in Chapter 5, I provided further interpretation of why this change occurred, supporting the study's theoretical approach.

At low levels of moderation, the relationship between negative perceptions of aging and sedentary behavior was negative (Figure 15). Specifically, at high levels of IG contact, as negative perceptions of aging increased, sedentary behavior decreased from 1.93 to 1.64, a difference of .29 units. Similarly, at medium levels of IG contact, as negative perceptions of aging increased, sedentary behavior time decreased from 1.64 to 1.62 units (Figure 16), a difference of .02 units.
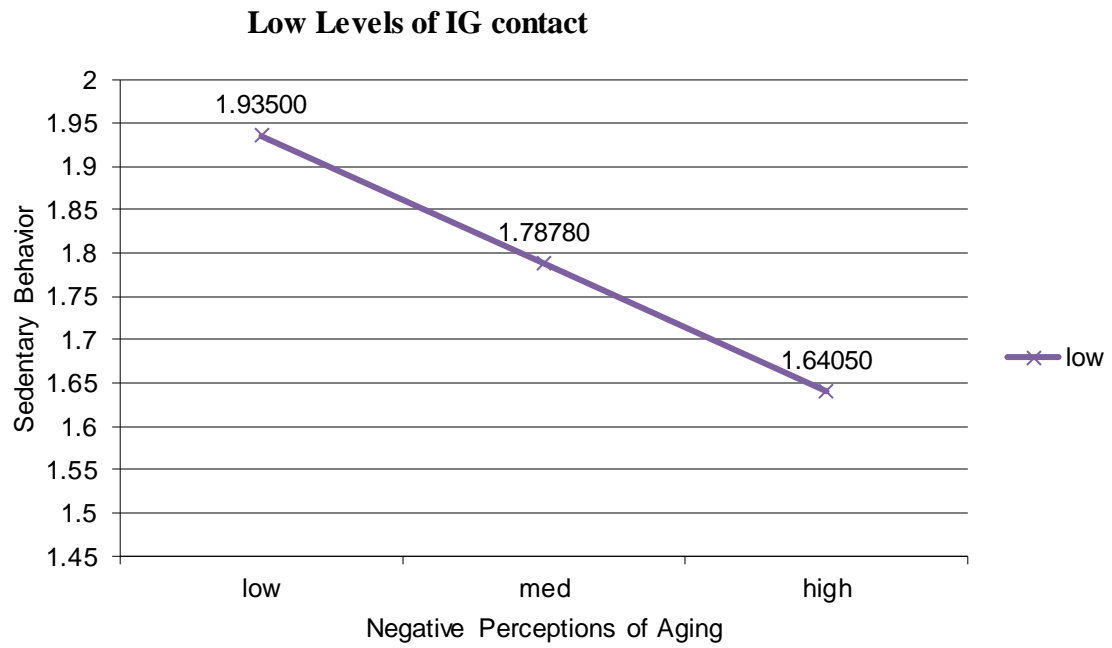
Figure 15

Low Levels of Moderation

Low Levels of IG contact

Figure 16

Medium Levels of Moderation

Medium Levels of Interaction
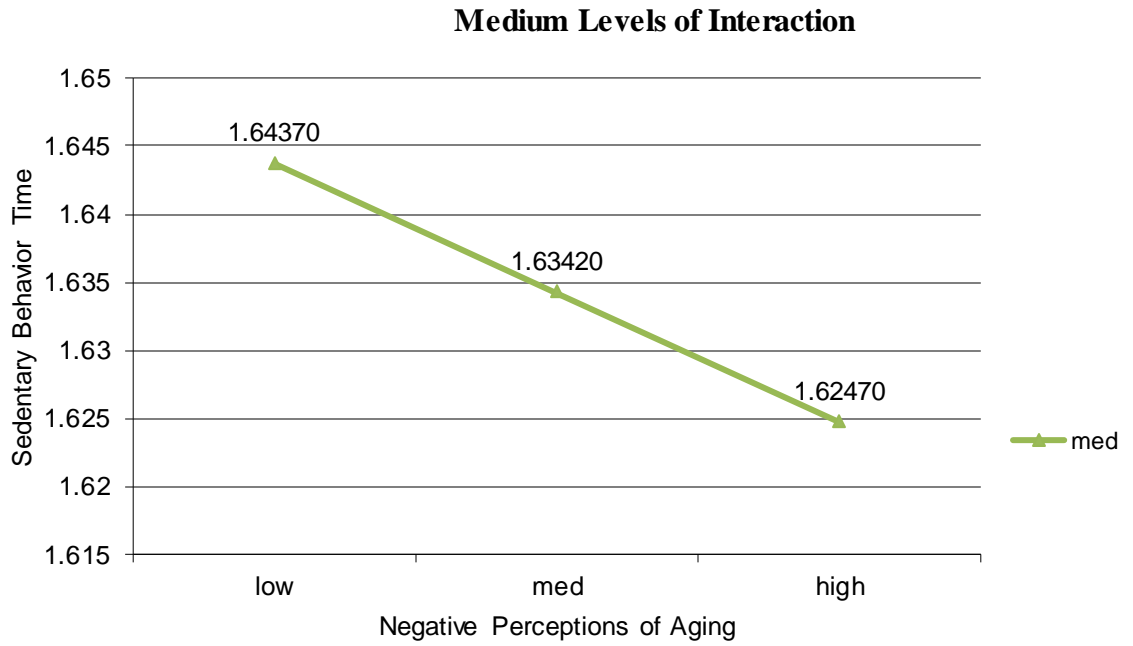
Figure 17

High Levels of Moderation

High Levels of Interaction
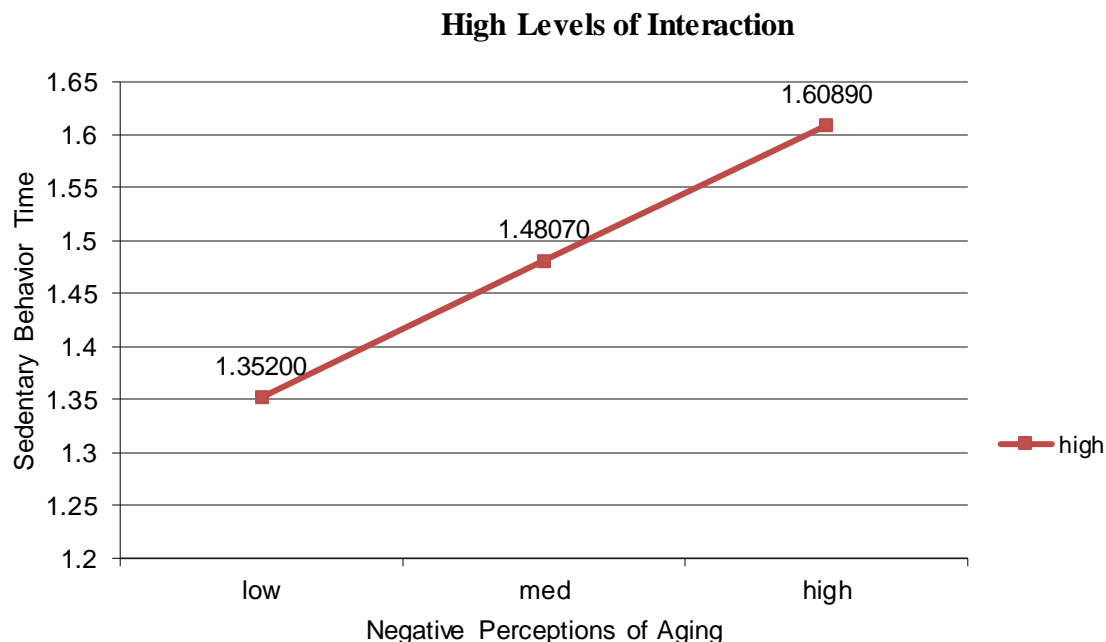
Figure 17 depicts a positive relationship between the variables at high levels of moderation. At high levels of IG contact, as negative perceptions of aging increased, sedentary behavior time increased from 1.35 to 1.60, a change of .25 units. The relationship between the predictor and outcome variables changed direction at high levels. In other words, at high levels of IG contact, sedentary behavior time decreased as negative perceptions of aging decreased.

Summary

In Chapter 4, I described the data collection, transformation, and analysis process as detailed in the research plan. The sample size met the required minimum of 77 participants before removing outliers. I demonstrated how removing seven outliers did

not affect the mean nor the statistical power of the model and enabled all assumptions to be met.

I utilized stepwise multiple regression to test the research hypotheses. I observed the effects of each variable and their relationship with the interaction variable and with the DV. I failed to reject $H_0 1$ when examining the relationship between levels of negative perceptions of aging and levels of sedentary behavior time. In the second research question, levels of IG contact had a statistically significant negative relationship with levels of sedentary behavior time. I rejected $H_0 2$ and accepted $H_a 2$.

Moderation analysis was conducted to examine the third research question, RQ3: Did IG contact moderate the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and over? The model summary as a whole and the interaction variable were both statistically significant. Visual inspection of the slopes confirmed the existence of moderation by showing the change in levels of sedentary behavior at different levels of negative perceptions of aging. Based on this evidence, I rejected $H_0 3$; IG contact moderated the relationship between levels of negative perceptions of aging and sedentary behavior. Additional interpretation of these findings, the study's limitations, the study's recommendations, and the implications of this study were presented in Chapter 5.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this quantitative cross–sectional study was to investigate whether there was a statistically significant relationship between negative perceptions of aging and sedentary behavior time in adults aged 75 and older. Through the research questions and hypotheses, I asked whether or not there was a statistically significant relationship between the predictor variable, negative perceptions of aging, and the outcome variable, sedentary behavior. I also examined whether IG contact moderated the relationship between negative perceptions of aging and sedentary behavior.

RQ1: What was the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older?

$H_0$1: There was no statistically significant relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older.

H_a1: There was a statistically significant relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older.

RQ2: What was the relationship between IG contact and sedentary behaviors in adults aged 75 and older?

$H_0$2: There was no statistically significant relationship between IG contact and sedentary behaviors in adults aged 75 and older.

H_a2: There was a statistically significant relationship between IG contact and sedentary behaviors in adults aged 75 and older.

RQ3: Did IG contact moderate the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older?

$H_0$3: IG contact did not moderate the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older.

H_a3: IG contact did moderate the relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older.

I used stepwise multiple regression to test RQ1: was there a statistically significant relationship between negative perceptions of aging and sedentary behavior. I failed to reject $H_0$1 in the first research question because there was no significant relationship between negative perceptions of aging and levels of sedentary behavior time. For RQ2, I tested if there was a statistically significant relationship between IG contact and sedentary behavior. Levels of IG contact had a statistically significant negative relationship with levels of sedentary behavior time, and I rejected $H_0$2. I tested RQ3 and asked, Did IG contact moderate the relationship between negative perceptions of aging and sedentary behavior? The combined interaction of negative perceptions of aging and IG contact on sedentary behavior was positive and statistically significant; I rejected $H_0$3 and accepted H_a3. Therefore, IG contact did moderate the relationship between negative perceptions of aging and sedentary behavior in adults over 75.

These results demonstrated a violation of the assumption of causality. The assumption required a significant causal relationship between the independent and DVs, as shown violated between levels of negative perceptions of aging and sedentary behavior time. Having a statistically significant moderation model with an insignificant IV

contradicted what Hayes (2018) described as a requirement for moderation as a critical antecedent to moderation. Pandy and Elliott (2010), however, suggested retaining the variable due to its theoretical relevance to the model. This study resulted in overall statistical significance; therefore, the contribution of the IV aided in the interpretation of the overall model (Shieh, 2008). The findings of this study indicate that combining high levels of IG contact with negative perceptions of aging throughout the lifespan may aid in decreasing sedentary behavior time in middle–old and oldest–old adults.

Interpretations of the Findings

Negative Perceptions of Aging and Sedentary Behavior

I first tested $H_0$1 of RQ1 to see if no statistically significant relationship existed between negative perceptions of aging and sedentary behaviors. Findings revealed a slight positive correlation between the variables; however, there was no statistical significance. I failed to reject $H_0$1, contradicting Barber et al. (2020) and Garcia, Meneguci, et al. (2021). Negative perceptions of aging accounted for a small amount of variance ($r^2 = .003$, $p = .667$) on sedentary behavior and were non significant. Levels of negative perceptions of aging accounted for .3% of the change in levels of sedentary behavior time within the study.

Table 8 shows the independent and combined effects of the variables as they were entered step by step into the regression. I entered negative perceptions of aging into Step 1 as an independent predictor before any other variables, showing the main effect alone and combined with other factors. In this context, Model 1 revealed the effect of negative perceptions of aging on sedentary behavior time without considering any other elements.

Model 1 indicated that 4.4% of the change in sedentary behavior was explained by levels

of negative perceptions of aging, indicating that for each one–unit increase in levels of

negative perceptions of aging, there was a predictable increase of .044 units in levels of

sedentary behavior time (β = .052, p = .667).

Levels of negative perceptions of aging had a positive yet non–significant

relationship with levels of sedentary behavior time, accounting for 4.4% of the total

variance. Normally, with a nonsignificant result during Step 1 of a stepwise regression,

the analysis ends due to low causal inference. The summary evaluation, which considered

the entire moderation model, was statistically significant ($p = .20$), and the interpretation

of the interaction effect continued.

Inspection of the predictor and outcome variables independently offered insight

into the non–significant relationship between negative perceptions of aging and sedentary

behavior in this study. I used the Image of Aging Scale to measure perceptions of aging.

This scale was proven valid for older adults and younger populations in various cultures

(Levy et al., 2004). I used the respondents' negative perceptions of aging to identify if

levels of negative perceptions of aging were related to levels of sedentary behavior time.

There was a small variance of 4.4% in sedentary behavior in the Model 1.

Model 1 of the regression showed a low R^2 (.003) and a negative ΔR^2 (–.012),

which further indicated that the model was not a good fit for the variables. A mediation

model may prove a better fit as IG contact had a stronger influence on sedentary behavior

than negative perceptions as an independent predictor. These findings supported those of

Weiss and Kornadt (2018), who found that older adults began to self–stereotype and conform to the perceptions of aging that they believed were true.

Inspection of the DV offered additional insight into the lack of causality. In this study, participants had an average daily sedentary time of 2 hours, 40 minutes (1.60 units), compared to a United States average of 8 hours, 30 minutes per day (Niklasson et al., 2023). Additionally, quality of life is not shown to be negated by less than two hours per day of sedentary behavior (Kim & Lee, 2019). Therefore, the responses may not have accurately represented the population as a whole. The high frequency of sedentary time responses was lower than high sedentary time nationwide, which may be misleading.

The Time Spent Sitting Scale (Van Cauwenberg et al., 2014) was a Belgian instrument included as part of a multidimensional questionnaire. The questions cover 12 concepts specific to older adults' sedentary behaviors. I chose this instrument because it was specific to the population I was investigating and because it covered the domains that were consistent with the literature on older adults and sedentary behavior. A limited amount of sedentary behavior was not a prerequisite for this study, which limited the homogeneity of the sample. The low amount of sedentary behavior time overall in the study was partially responsible for the lack of variance, whereas there was little room for variance. These results corroborated the findings of Ku et al. (2019), who estimated a possible 40 to 60% measurement error due to the lack of accuracy of self–report instruments used in sedentary behavior research.

Despite the instrument having a reliability coefficient of .77, in this study, it only rated at .40 (Table 2). Factor analysis (Table 3) indicated that five of the twelve concepts

accounted for over 70% of the variance in responses. This variance suggested that the survey was not appropriate for the population in this study. The words 'tram,' 'motorbike,' and 'public transit' required explanation during several in–person interviews, suggesting the terminology may have been misunderstood. Other reasons may be the low amount of sedentary time overall that participants engaged in and that their sedentary activities overlapped. Largely, sedentary time was entered based on self–recall rather than entered into an accelerometer, which is potentially less accurate for these reasons. The data, however, did provide limited information as to the influence negative perceptions of aging had on the small amount of sedentary time of these participants.

In line with Menkin et al. (2020), negative perceptions of aging appeared to contribute to a sedentary lifestyle. Although nonsignificant, the findings supported this with a variance of 4.4%, indicating that every one–unit increase in sedentary behavior time could be predicted by a .044 increase in negative perceptions of aging. Similarly, Wurm et al. (2017) recognized negative perceptions of aging as an underlying influence on sedentary behavior.

IG contact and Sedentary Behavior

Next, I tested RQ2 for a nonstatistically significant relationship between IG contact and sedentary behaviors. When added as a second predictor to levels of negative perceptions of aging, IG contact accounted for a small amount of variance ($r^2 = .82$, $p = .019$) on sedentary behavior, and it was statistically significant (Table 8). The main effects of levels of IG contact accounted for 8.2% of the change in levels of sedentary behavior time.

In Table 8, Model 2 indicated that 27.2% of the change in sedentary behavior could be explained by levels of IG contact ($\beta = -.290$, $t = 2.410$). For each one–unit increase in levels of IG contact, a predicted decrease of .272 units in levels of sedentary behavior time was expected. I rejected H_{02} and accepted H_a2, which supported the findings of Turner and Hooker (2020). The introduction of IG contact as a second predictor variable altered the strength and direction of negative perceptions of aging (Table 11, Model 2). In Model 2, the model showed that for each one–unit increase in levels of negative perceptions of aging, there was a decrease of $-.012$ units of sedentary behavior time predicted at a nonsignificant level ($p = .907$).

I found few studies relating IG contact to sedentary behavior (see Ruiz–Montero et al., 2020; Vermote et al., 2021; Wolff et al., 2014). According to Ruiz–Montero et al. (2020), the advancement of intergenerational programs targeting older adults' physical and mental health may lead to a decrease in sedentary behavior. Levy (2017) found that even low levels of IG contact resulted in decreased prejudice. Turner and Hooker (2020) found that positive perceptions of aging were developed during childhood and strengthened throughout the lifespan. Investigating IG contact as a mechanism for reinforcing these beliefs, as in this study, provided insight as to how much and at what levels this development occurs.

Moderation and Sedentary Behavior

I approached RQ3 by conducting a moderated regression analysis with centered variables. I introduced the interaction variable in Step 3 of the equation. The combined effect of negative perceptions of aging and IG contact was positive and significant.

Furthermore, for every one–unit increase in sedentary time, there was a .352 increase in the interaction (β = .235, p = .045). Therefore, the presence of IG contact was accepted as a moderator.

Levels of IG contact influenced the impact that levels of negative perceptions of aging had on predicting sedentary behavior time. The results indicated that, in explaining the variance in sedentary behavior time, the interaction decreased the main effect. By including IG contact, the predictive power of negative perceptions of aging changed 5.5%, from .044 to -.012 (ΔR^2 = .055). Therefore, IG contact explains negative perceptions of aging's prediction of sedentary behavior time by 5.5%. The interaction had a medium effect size of 9.8 (n = 70, p = .045). These findings corroborate those of Weiss and Kornadt (2018), who found that children began internalizing negative health–related age stereotypes and responded best to lifespan interventions.

Smaller effect sizes in gerontology tend to be because interventions were population–focused rather than individual–focused and indirectly related to the social determinant of health (Matthay et al., 2021). In the context of this study, a theoretical decrease of 30 minutes a day in sedentary time for each of the 70 participants would equal 35 hours. However, if that were expanded across Americans in 2020 aged 75 and older (n = 22,875), it would equal 476 days, and for all Earthlings over 75 years old, a decrease of 15.38 years (n = 269,794). Sedentary time increased by 5% each year after age 65, and health–related quality of life decreases, regardless of physical activity (Kim & Lee, 2019; Ku et al., 2019). Additionally, IG contact focuses on sustainable change in

aging attitudes, which are not immediate outcomes (Lee et al. 2020). Utilizing this expansive lens showed that the effect was both significant and meaningful.

At low levels of moderation, the relationship between negative perceptions of aging and sedentary behavior was negative (Figure 15). Specifically, at high levels of IG contact, as negative perceptions of aging increase, sedentary behavior decreased from 3 hours, 13 minutes (1.93 units) to 2 hours, 44 minutes (1.64 units), a difference of 29 minutes. Similarly, at medium levels of IG contact, as negative perceptions of aging increased, sedentary behavior time decreased from 2 hours, 44 minutes (1.64 units) to 2 hours, 42 minutes (1.62 units) (Figure 16), a difference of 02 minutes. These findings suggested that low levels of IG contact, as negative perceptions of aging strengthened from *somewhat matching my image* to *matching my image*, sedentary time decreased by 29 minutes.

Figure 17 shows the positive relationship between the variables at high levels of moderation. At high levels of IG contact, as negative perceptions of aging increased, sedentary behavior time also increased from 2 hours, 15 minutes (1.35 units) to 2 hours, 40 minutes (1.60 units), a change of 25 minutes. The relationship between the predictor variable and the outcome variable changed direction at high levels. In other words, at high levels of IG contact, as negative perceptions of aging decreased from *somewhat matching my image* to *does not match my image*, sedentary behavior time decreased by 25 minutes. This change indicated that the interaction was effective in reducing sedentary behavior at high levels. This study's findings were consistent with those of Alport (1957), Abrams et al. (2006), and Febriani and Sanitioso (2021) in that participants with higher

levels of IG contact experiences throughout their lives were less susceptible to stereotypical behavior.

In this study, I found that IG contact moderated the relationship between perceptions of aging and sedentary behaviors by modifying implicit ageist stereotypes. Schwartz et al. (2023) found that IG contact not only helped younger individuals develop positive attitudes towards aging, but also older adults developed positive self–views of aging. Additionally, they found that witnessing positive interactions between older adults had a positive and significant influence on younger study participants. In line with Schwartz et al. (2023), the findings in this study showed that IG contact throughout the lifespan had a positive influence on the relationship between perceptions of aging and sedentary time.

By combining IG contact with negative perceptions of aging, as in H_a3, individuals were able to challenge their misconceptions about aging through face–to–face contact. Consistent with Lee et al. (2020), who found effective intergenerational programs benefit both older and younger participants, this study suggested that negative perceptions of aging may change subtly for individuals of all ages who were exposed to IG contact. This effect was further demonstrated through the use of contact theory (Allport, 1954) by associating the concept of ageism with the variables in the study and showing how decreasing ageism through high levels of IG contact may reduce sedentary behavior.

Theoretical Foundation

Contact theory (Allport, 1954) was chosen for this study due to implicit and explicit ageism involving a lack of contact between younger generations and older generations. Allport (1954) found that the following four tenets were successful in averting prejudice: contact with a common goal, cooperation, sharing equal status, and support from a recognized authority figure. Pettigrew and Tropp's intergroup contact theory (1998), which was built upon the work of Gordon Allport (1954), added the development of friendship as an essential quality of contact. The addition of IG contact as a moderator was stimulated by Abrams et al. (2006), who first recognized the role of IG contact as a moderator combined with stereotype threat theory (Steele & Aronson, 1995). Similarly, this study researched how implicit ageism predicted behavior. The findings were consistent with contact theory, based on the responses to the survey instrument.

The Contact with the Elderly Questionnaire (Knox, 1986) was grounded in contact theory, representing the four tenets. Higher responses reflect higher levels of quality and quantity in each of the four realms of contact. The responses on a 7–point Likert scale fell between 3.65 and 6.52, with a mean score of 4.91 (Table 2). Responses in this range indicated that these participants experienced *somewhat frequent to very frequent* levels of contact that were *somewhat positive to very positive* in quality across the four domains. Additionally, the small standard deviation and statistical significance ($p = .019$, $\sigma = .59$) of the bivariate relationship between IG contact and sedentary behavior suggest these tenets were optimal for addressing ageist attitudes.

Dovidio et al. (2017) found that positive contact experiences addressed shifting implicit and explicit attitudes. According to their research, implicit attitude is related to contact quantity, while explicit attitude is related to contact quality. While this study measured both the quality and quantity of contact, I did not analyze the two separately. Combined levels of quality and quantity of contact were at each level of IG contact. The findings showed that at low levels of moderation, as negative perceptions of aging decreased, sedentary behavior increased (Figure 15). The lens of contact theory suggests that lower levels of contact may be higher in quantity yet lower in quality. Investigation at individual levels of quality and quantity contact may provide further insight into this inverse relationship.

In line with contact theory, Figure 17 showed that higher levels of quality and quantity of IG contact moderated the relationship between negative perceptions of aging and sedentary behavior positively and significantly. Therefore, as negative perceptions of aging became *less similar to one's image*, sedentary behavior time decreased by 25 minutes per week (Table 11). Conversely, at low levels of moderation, sedentary behavior time increased by 29 minutes; at medium levels, the increase was 2 minutes. Concerning contact theory, this change in direction suggested that low levels of IG contact reinforced negative perceptions of aging, while medium levels of contact were where attitudes changed. At high levels of IG contact, implicit and explicit perceptions of aging began to decrease, which contributed to one's sedentary behavior throughout life. Notably, high levels of IG contact included high levels of both quality and quantity, as described by the four tenets of contact theory.

Limitations

The largest limitation of this study was the lack of a causal relationship between negative perceptions of aging and sedentary behavior. The change in regression coefficients may further be explained by exploring the role of IG contact as a mediator rather than a moderator. The lack of relationship may reflect a low amount of sedentary behavior time in study participants. Adding a requirement of two hours of minimum sedentary time per day would have increased the generalizability and homogeneity of this study. The addition of sedentary behavior as a requirement would likely increase the reliability of the Time Spent Sitting Scale and improve the statistical significance of the main effects. The main effects may also improve with a larger sample size.

Additionally, investigation at individual levels of quality and quantity contact may provide further insight into the influence of moderation. In line with contact theory, lower levels of contact may be higher in quantity yet lower in quality. The directional change in the relationship at high levels may reflect changes in the quality and quantity of contact, specifically related to the four tenets of contact theory.

I used a cross–sectional design, therefore discounting longitudinal study. Researching these concepts through age cohorts over an extended period may be insightful. A cross–sectional design does not identify causal relationships between variables, which are important in social research (Cataldo et al., 2019). Additionally, cross–sectional designs had high non–response bias among older adults, which was a threat to external validity (Sedgwick, 2014). Following the recommendations of (Sedlakova & Souralova, 2019), I offered in–person data collection in addition to online

and mail–in surveys. During the in–person data collection process, I realized that the quantitative design was limited due to the amount of information that the study participants wanted to share. A mixed–methods or longitudinal study may provide rich insights as well as quantitative data.

Recommendations

In the spirit of post–positivism, I set the research goals to catalyze future research into how IG contact can be used throughout the lifespan as a way to develop healthy internal and external views of aging, which may mitigate some sedentary behaviors in adults aged 75 and older. I included IG contact to examine how the variable supports beliefs of active aging and autonomy while negating beliefs of helplessness and sedentariness (Yamashita et al. 2019).

The role of IG contact as a mediator is recommended to enhance this research. The findings of this study indicated that IG contact significantly accounted for changes in sedentary behavior, while negative perceptions of aging were developed before contact was established. Furthermore, testing for mediation may explain the distinction between contact quality and quantity, as they separately influence preconceived negative perceptions of aging.

Additional recommendations include the development of updated measurement tools for measuring IG contact and sedentary behavior time in older adults. Ideally, sedentary time would be measured using an accelerometer and a written account of activity. It was necessary to accurately capture and measure sedentary behaviors through self–report, while overlap in domains of sedentary behavior made self–report

challenging. Similarly, few robust measures of IG contact embody older adult experiences. While contact theory is recognized as effective against ageism, I found limited survey instruments to measure that effect.

Implications

The results of this study may provide insight for policymakers and organizations in developing age–friendly and healthy communities. Intergenerational programs reinforce positive beliefs about aging throughout the lifespan. Interventions focused on community members of all ages decrease negative perceptions of aging through high levels of contact with aging adults. The benefits from such programs could extend to decrease sedentary behavior over time.

Within the context of social determinants of health, research topics stemming from this study may include healthcare access and quality, education access and quality, social and community context, and neighborhood and built environment (U.S. Department of Health and Human Services, Secretary's Advisory Committee, 2008). By examining the effect of IG contact on perceptions of aging, geriatric health care costs could decrease, young cohorts may develop interests in working in gerontology or geriatrics, older adults may maintain self–concepts that support personal desires to work and volunteer later in life, and communities may enjoy intergenerational development opposed to multigenerational development. Although this study explicitly targeted adults aged 75 and older, stakeholders include policy, organizational, community, and individuals of all ages. Because sedentariness affects many adults aged 75 and older,

adopting a lifespan approach to behavior change will make a significant difference in the quality of life for adults aged 75 and older.

Conclusion

The purpose of this quantitative cross–sectional design study was to investigate whether there was a statistically significant relationship between negative perceptions of aging and sedentary behaviors in adults aged 75 and older. I also examined whether IG contact moderated the relationship between negative perceptions of aging and sedentary behaviors. The study was open to independent older adults aged 75 and older. The hope was to gain awareness of lifespan interventions that were proactive against negative self–perceptions through envisioning a positive future self that is mindful of sedentary behaviors. The findings highlighted that IG contact was ideal for strengthening those interventions.

The results from the study indicated that there was an interaction between negative perceptions of aging and IG contact that decreased sedentary behavior time in adults over age 75. The results showed that the inclusion of IG contact increased the predictive power of negative perceptions of aging by .3% to influence sedentary behavior time. There was also a negative and significant relationship between IG contact and sedentary behavior. High levels of IG contact lead to a decrease in sedentary behavior time in adults aged 75 and over. Although there was a non–significant relationship between negative perceptions of aging and sedentary behavior, the change in direction seen as IG contact was introduced into the equation offers an opportunity for future research.

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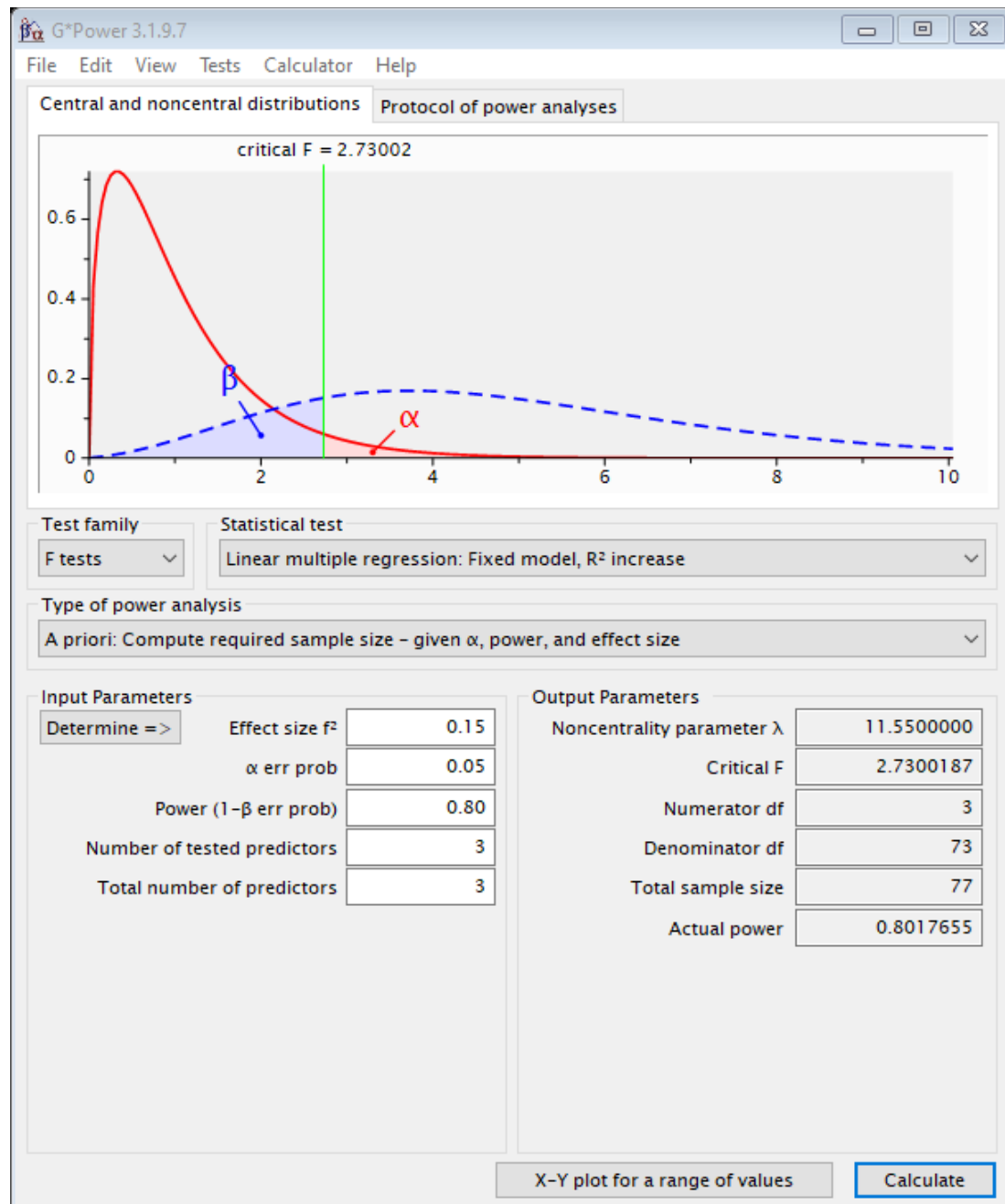https://doi.org/10.1177/1088868318762647

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Appendix A: Statistical Power Analysis

Appendix B: Recruitment Flyer

Online survey study seeks participants aged 75 and older
for research on sedentary behavior

A new study called "Intergenerational contact as a Moderator
Between Perceptions of Aging and Sedentary Behaviors"
could help care providers like doctors and counselors better
understand and help their patients.

This survey is part of the doctoral study
for Catherine Shirreffs, a Ph.D. student at Walden University.

<u>About the study:</u>
- Three 15–45 minute online surveys
- To protect your privacy, no names will be collected

<u>Volunteers must meet these requirements:</u>
- 75 years old or older
- Ability to function independently and carry out activities of daily living (eating, bathing, dressing, mobility, continence, toileting).
- Currently residing in a residence where they are not dependent on a caregiver (long–term care, nursing homes, and assisted living facilities are excluded from the study).

To confidentially volunteer, click
the following link:
[insert survey link]

Appendix C: Image of Aging Scale Permission to Use

Fw: Image of Aging scale

Levy, Becca <becca.levy@yale.edu>
Fri 7/3/2020 2:32 AM
To: Catherine Shirreffs <catherine.shirreffs@waldenu.edu>

📎 2 attachments (405 KB)
image of aging scale.levy, kasl, gill..pdf; Image of Aging Scale Levy, Kasl & Gill..docx;

Hi Catherine,

Your dissertation sounds like it is exploring an important topic.

Thank you for your interest in our scale. You are welcome to use it. Please see attached a version that I used in a study and the paper describing its development.

Good luck with your research. Please let me know what you find.

Sincerely,
Becca

Becca R. Levy, PhD
Professor of Epidemiology, Social & Behavioral Sciences Department
Yale School of Public Health
Professor of Psychology, Department of Psychology
Yale University

Appendix D: Contact with Elderly People Questionnaire Permission to Use

Re: Queen's University Scale, Measure of Intergenerational Contact

VK | Jane Knox ▓▓▓▓▓▓▓▓▓▓
Sun 10/25/2020 11:26 AM
To: Catherine Shirreffs

dear ms. shirreffs,

provided that your study is approved by the appropriate ethics review committee at your university, you have permission to use our CONTACT WITH THE ELDERLY QUESTIONNAIRE. i am assuming that this is the instrument that you are interested in. i am not aware of a QUEEN'S UNIVERSITY SCALE.

the instrument is described in:

Knox, V.J., Gekoski, W.L., & Johnson, E.A. (1986) Contact with and perception of the elderly. The Gerontologist, 26, 309-313.

good luck with your project.

v, jane knox, ph.d.
professor emerita
queen's university

Appendix E: Time Spent Sitting Scale Permission to Use

RE: Time spent sitting scale

JC

Mon 4/26/2021 1:16 AM

SB questionnaire English....
27 KB

Dear

My apologies for responding so slowly, I was on holidays last week.

You find an English version of the questionnaire attached. It is important to note that the questionnaire was assessed during an interview. Furthermore, just before this questionnaire the IPAQ-long last 7 days interview-version was used to assess physical activity. Therefore, participants were already 'trained' to reflect upon their activities in the past 7 days.

Do not hesitate to contact me, if you have any further questions.
Good luck with your doctoral reseach!

Best wishes

GHENT UNIVERSITY

FACULTY OF MEDICINE AND HEALTH SCIENCES

Appendix F: Katz ADL Scale

Instructions: For each of the following activities, please indicate your level of independence by giving yourself one (1) point if you are able to complete the task as described in the center column without assistance, and zero (0) points if you need assistance completing the task as described in the right hand column.

Katz Index of Independence in Activities of Daily Living
(This scale is in the public domain and available for reproduction.)

Activities Points (1 or 0)	Independence (1 Point) NO supervision, direction or personal assistance.	Dependence (0 Points) WITH supervision, direction, personal assistance or total care.
BATHING Points: _____	**(1 POINT)** Bathes self completely or needs help in bathing only a single part of the body such as the back, genital area or disabled extremity.	**(0 POINTS)** Need help with bathing more than one part of the body, getting in or out of the tub or shower. Requires total bathing
DRESSING Points: _____	**(1 POINT)** Get clothes from closets and drawers and puts on clothes and outer garments complete with fasteners. May have help tying shoes.	**(0 POINTS)** Needs help with dressing self or needs to be completely dressed.
TOILETING Points: _____	**(1 POINT)** Goes to toilet, gets on and off, arranges clothes, cleans genital area without help.	**(0 POINTS)** Needs help transferring to the toilet, cleaning self or uses bedpan or commode.
TRANSFERRING Points: _____	**(1 POINT)** Moves in and out of bed or chair unassisted. Mechanical transfer aids are acceptable	**(0 POINTS)** Needs help in moving from bed to chair or requires a complete transfer.
CONTINENCE Points: _____	**(1 POINT)** Exercises complete self control over urination and defecation.	**(0 POINTS)** Is partially or totally incontinent of bowel or bladder
FEEDING Points: _____	**(1 POINT)** Gets food from plate into mouth without help. Preparation of food may be done by another person.	**(0 POINTS)** Needs partial or total help with feeding or requires parenteral feeding.

TOTAL POINTS: _____   **SCORING:** 6 = High *(independent)* 0 = Low *(very dependent*

Source:
try this: Best Practices in Nursing Care to Older Adults, The Hartford Institute for Geriatric Nursing, New York University, College of Nursing, www.hartfordign.org.