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Motivation and Limits to Physical Activity in Adults Over 80 in an Assisted Living

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This is to certify that the doctoral dissertation by

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Walden University
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Abstract

Motivation and Limits to Physical Activity in Adults Over 80 in an Assisted Living

Setting

by

Christine M Childers

MS, University of Utah, 2005

BSc (Hons), University of East Anglia, 1996

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Health Psychology

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Abstract

Thirty percent of older adults fall every year with devastating physical and economic

consequences. Physical activity is the primary recommendation for fall prevention, but

less than 30% of older adults meet the physical activity guidelines of the various

professional organizations. Recent work demonstrated that psychological factors were

more specific in identifying fall risk but work on psychological issues related to physical

activity in the older adult is limited. This study explored motivation and limits to being

physically active in 76 adults with a mean age of 88 living in the assisted living setting,

using concurrent mixed method research. The theoretical foundation was a 3-pronged

method using self-determination, self-efficacy, and resilience theories to explore such

issues as autonomy, vicarious experience, and positivism. Quantitative data were used to

examine the individual influences of various psychological factors on physical activity

participation through multi regression analysis. No significant relationships were found,

although it emerged that fear of falling was a greater influence in limiting physical

activity than balance confidence or fall efficacy. Qualitative open-ended questions

further explored the research question with triangulation through interviews with activity

staff. Four primary themes emerged covering function, emotions, influences, and "want,"

demonstrating a strong desire for healthy living and independence. Results of this study

can assist the development of suitable programs for this population. Implications for

positive social change include the potential to increase physical activity and possibly

decrease the number of devastating falls in the older adult population.

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Chapter 1: Introduction to the Study

Introduction

The focus of this research was to explore the motivators and limitations for physical activity participation in the older adult population, those over 80 years old. According to the Centers for Disease Control and Prevention (CDC), one in three older adults fall every year with one in five of these falls causing serious injury such as fracture or head injury (CDC, 2016). The annual cost of these falls is estimated at over $31 billion, but the personal cost, in the form of loss of independence or the need to transition to a long-term care setting, is equally high. Physical activity is one of the primary recommendations for fall prevention (Moyer, 2012), and yet less than one in three older adults meet the minimum recommendations for physical activity as defined by the CDC (Gorina, 2016), and according to the American College of Sports Medicine (ACSM), only 11% meet the combined aerobic and strengthening recommendations (ACSM, 2018).

Recent work has shown that psychological issues may be more influential in fall prevention than physical ones, and a greater understanding of the psychological influences on falls is needed (Landers, Oscar, Sasaoka, & Vaughn, 2016). Social change is critical to increase the numbers of physically active older adults; however, developing, implementing, and sustaining appropriate programs remains extremely challenging (Lovarini, Clemson, & Dean, 2013). A greater understanding of the motivators and barriers or limitations to physical activity, whether they be psychological, physical, or something else, is needed to improve programs and subsequent compliance. Any

research that improves the understanding of physical activity participation and leads to increases in the number of physically active older adults will help toward fall prevention and decrease the huge social and personal costs of falls.

In this chapter I outline the background and recent research related to the problem of falls and physical activity in the older adult and identify a potential gap in the literature that needs to be examined. The chapter includes the research questions, theoretical framework, and nature of the study. I address definitions and assumptions of the work as well as the scope and limitations. Finally, I examine the significance of the work.

Background

One in three older adults falls every year, with an estimated one older adult falling every second of every day (CDC, 2016). In 2014 there were 29 million falls in the older adult population at a cost to the U.S. healthcare system of $31 billion and causing over 27,000 deaths (CDC, 2016). Of concern is that the number of falls increases with age, with approximately 10% of those aged 65–74 reporting a fall, compared to nearly 14% of those over 85 (CDC, 2016) Extensive work has been conducted on those over 65 years old living in the community with respect to falls and fall prevention, with the U.S. Preventive Services Task Force stating that there is no one reliable tool or approach that can identify those at risk for falls (Moyer, 2012). Of additional concern is the development of fear of falling or loss of self-efficacy in the older adult, often not directly linked to a fall (CDC, 2016), with the further concern that interventions to prevent falls have been shown to increase falls (Laybourne, Biggs, & Martin, 2008; Moyer, 2012).

Recently it was determined that psychological aspects and measures were more predictive of fall risk than physical measures (Landers et al., 2016).

Regardless of the prediction measurement, the intervention recommendations of the U.S. Preventive Services Task Force (2018) were exercise or physical therapy and vitamin D supplementation (Moyer, 2012), although a recent update eliminated vitamin D supplementation and emphasized that exercise or physical therapy were the only recommendations for fall prevention. While exercise has been shown to significantly reduce falls, the type and intensity is still not known, and motivation and adherence issues need significant further research (Stubbs, Brefka, & Denkinger, 2015). The concept of resilience is one theory attracting growing interest for understanding motivation and behavior change (Southwick, Bonanno, Masten, Panter-Brick, & Yehuda, 2014).

The idea of resilience is to change the focus from negatives to focus on the positive, which in the older adult population would be to change from the negativism of falls to the positive approach of activity promotion (Southwick et al., 2014). The CDC have established an exercise prescription for the older adult (CDC, 2015); however, only a third of older adults meet these recommendations (Gorina, 2016). Additionally, the ACSM, in collaboration with the American Heart Association, have published physical activity guidelines that are similar to those of the CDC and include both an aerobic and strengthening component. Indications are, however, that only 11% of those over 65 are meeting both components of the recommendation (ACSM, 2018).

Despite exercise and physical activity being the primary recommendations for fall prevention, there appears to be a gap in the research regarding these issues in the older adult with respect to self-efficacy, balance confidence, and fear of falling, and specifically in those over 80 years old. Duray and Genç (2017) remarked that they appeared to be the only authors looking into physical activity and fear of falling. Their samples were older adults with a mean age of 70 who were community dwelling in Turkey. (Duray & Genç, 2017). It would appear that there is still a gap with regard to addressing the over 80-year-old adults dwelling in the United States. Falls are the single most deadly and expensive issue in the rapidly growing over-80s population (CDC, 2016), exercise is the most recommended intervention (Moyer, 2012), psychological issues are the most predictive of falls (Landers et al., 2016), and a positive focus is recommended (Southwick et al., 2014). As a result, research needs to be undertaken to address the gap in the literature by looking at the links between self-efficacy, fear of falling, resilience, and physical activity levels. This would allow a greater understanding of why so few of this population meet physical activity guidelines and what can be done to promote increased physical activity for this population.

Problem Statement

The research problem was the number of older adults who fail to meet physical activity guidelines (Gorina, 2016) despite the fact that physical activity is the leading preventive intervention for falls, and currently one in three older adults fall every year (ACSM, 2018. CDC, 2016). Another concern with respect to falls and physical activity in the older adult was the development of fear of falling, which according to the CDC

(2017) can develop in individuals even without sustaining a fall. Activity restriction is often a self-imposed fall prevention intervention that ultimately leads to weakness and increased risk for falls (Boyd & Stevens, 2009). Dingová and Králová (2017) indicated that the psychological consequences of a fall are often more debilitating than the physical ones and include fear and loss of confidence.

Current numbers suggest that up to 85% of older adults experience fear of falling, and up to 55% admit to limiting their activity level as a result of this fear (Nyman, 2011). Recent research demonstrated that psychological measures were more predictive of future falls than the more traditional physical measurements that are commonly used (Landers et al., 2016). Despite this growing awareness of psychological issues and activity restriction, there has been little research into the influence of fear of falling or psychological issues on overall physical activity in the older adult population. Duray and Genç (2017) indicated that they believed they were the first to explore this concept, and did so on community dwelling older adults in Turkey (Duray & Genç, 2017). This gap in research regarding psychological issues that affect physical activity participation in the older adult in the United States needs to be addressed. The results from this work add to the information needed to promote participation and sustainment in physical activity for the older adult with the potential of decreasing falls in this population.

Purpose of the Study

The purpose of this study was to explore the links between physical activity, fear of falling, self-efficacy, balance confidence, and resilience in the oldest old adult population, those over 80 years of age. To address this gap, I developed a concurrent

mixed method approach with established scales being used to determine the correlation or relationship between the outcome or dependent variable of physical activity and the predictor or independent variables of fear of falling, self-efficacy, balance confidence, and resilience. Qualitative exploratory questions were asked of both the participants and the activity directors of the facilities to further understand what would help older adults increase their physical activity and therefore how the medical profession could be of most help.

Research Questions and Hypothesis

The overriding goal of this research was to explore why so few older adults meet the recommended physical activity guidelines. Specific research questions and quantitative hypotheses were as follows:

RQ1 (Quantitative): What is the influence of each of the predictor variables of fear of falling, self-efficacy, balance confidence, and resilience on physical activity participation by adults over the age of 80?

H_0: The predictor variables of fear of falling, self-efficacy, balance confidence and resilience have no influence on physical activity participation by adults over the age of 80.

H_a: The predictor variables of fear of falling, self-efficacy, balance confidence and resilience, are influential in physical activity participation by adults over the age of 80.

RQ2 (Qualitative): What motivates or limits older adults in being physically active?

I conducted a multiple regression analysis using the score from the Physical Activity Scale for the Elderly (PASE) as the outcome variable, and four predictor variables using the scores from the short Activities Specific Balance Confidence scale (ABC) the Falls Efficacy Scale–International (FES-I), the Connor-Davidson Resilience Scale (CD-RISC), and the Geriatric Fear of Falling Measure (GFFM).

I analyzed data using standard linear regression with all predictor variables being entered simultaneously, thereby allowing for the interpretation of the influence of each of the predictor variables on physical activity levels while controlling for the other variables (R. M. Warner, 2013).

Qualitative analysis was through exploration of the codes and themes that emerged from the answers to open-ended questions. I achieved this both by hand and then using NVivo software for additional analysis. I analyzed the themes that emerged and integrated them concurrently with the statistical analysis to provide a comprehensive answer to the research question.

Theoretical Framework for the Study

It has been argued that a theoretical framework should only be considered when one theory is being used to support the research process (Imenda, 2014). However, more recent work has presented the argument that when considering a topic as complex as physical activity and behavior change, multiple theories should be utilized (Grodesky, Kosma, & Solmon, 2006). This design is not for the theories to be competing, but rather that the different theories provide alternative constructs and allow for a greater understanding of the problem (Sweet, Fortier, Strachan, & Blanchard, 2012). The use of

three theories complements and reflects the concept of mixed method research, which integrates the strengths of both quantitative and qualitative work without competing but rather complementing (Mertens et al., 2016). The theories that I used in this research were self-determination theory, self-efficacy theory, and resilience theory.

Self-determination theory was introduced by Deci and Ryan (2000) with the emphasis of studying innate psychological rather than physiological needs as motivators to regulate behavior. Self-determination theory identifies three primary psychological needs, autonomy, competence, and relatedness, with the achievement of all three being linked to well-being (Deci & Ryan, 2000). These authors also explored the concept of intrinsic and extrinsic motivation, and it has been found that extrinsic motivation is less likely to support continuance or maintenance of behavior change, particularly physical activity (Grodesky et al., 2006). Self-determination theory is the only motivation theory to include the concept of autonomy (Ng et al., 2012). Patient autonomy is a current emphasis by the medical profession, and as such, a theory that includes the concept of autonomy is critical to understanding implementation of behavior change.

Self-efficacy theory was introduced by Bandura in 1977 primarily as a means of treating phobias. Bandura argued that psychological procedures and changes could improve self-efficacy, which subsequently influenced performance. Self-efficacy is considered the individual's confidence to act or perform a skill. Self-efficacy theory contains four expectations, performance accomplishment, vicarious experience, verbal persuasion, and emotional arousal (Bandura, 1977). Performance accomplishment is considered the most important of these expectations for achieving success, with vicarious

experience the second most influential. Verbal persuasion is generally considered the weakest of the expectations despite being the most frequently utilized in behavior change (L. M. Warner, Schüz, Knittle, Ziegelmann, & Wurm, 2011).

Resilience theory was first introduced by Garmezy in 1985 mainly through work on child development. Interest in resilience in the older adult is more recent, and emerged early this century, being described as a buzz word in 2012 (G Windle, 2012). Aging requires individuals to adapt to challenges and changes in life circumstances, and resilience is considered one of the factors that promotes successful aging (Morin, Galatzer-Levy, Maccallum, & Bonanno, 2017). The concept of focusing on positives rather than negatives is a key component in resilience theory, and clinicians should focus on moving individuals, and transferring energy, from negatives, thereby enhancing resilience (Bolton, Praetorius, & Smith-Osborne, 2016; Southwick et al., 2014).

These three theories, self-determination, self-efficacy and resilience are explored in greater detail in Chapter 2 of this work. The themes that emerge from the theories, autonomy, performance mastery, vicarious experience, and positivism, would all appear to be concepts that should be considered for promotion of physical activity in the older adult population. These theories were therefore used as guidance for the choice of surveys that were administered to statistically evaluate resilience and self-efficacy, as well as the psychological issues of fear of falling and balance confidence. I correctly anticipated that the themes that emerged from the qualitative data would reflect many of the concepts in the theories being used to frame the study.

Nature of the Study

Mixed method research has developed significantly since its introduction in the 1950s (McKim, 2017). The rationale for mixed method research is not just that two study methods are used, but that the data from the two methodologies are integrated and provide a depth and richness to the research question (Plano Clark & Ivankova, 2016). It has also been argued that just as multiple theories can complement each other, the combined methodologies increase the flexibility and understanding of the research question (Mertens et al., 2016). Mertens et al. (2016) discussed the fact that the definition of mixed method research was still being considered by the field. However, the idea of integration and combination of data to more fully answer the research question was an appropriate definition for this study.

For this study I adopted a concurrent data collection and analysis approach with both quantitative and qualitative work being equally weighted, although I accepted that one might emerge as more dominant after completion of data analysis. The key variables under consideration in this study were physical activity levels of the older adult population. I statistically measured the influence of the psychological variables of fear of falling, self-efficacy, balance confidence, and resilience with respect to physical activity. Finally, I explored the variables of motivators and limitations for physical activity qualitatively with open ended questions to both the older adult participants and the facility activities directors.

I utilized a time-space sampling concept in the assisted living environment. The assisted living environment housed over 800,000 older adults, with 53% being over 85.

Assisted living settings are traditionally one step in the continuum of care, but the growing emphasis on aging in place means that the assisted living environment is placing greater emphasis on wellness and fitness (Brecht, Fein, & Hollinger-Smith, 2009). I coordinated with the activity directors and administrators of various local assisted living facilities to gain permission to conduct the research, and a letter of agreement was signed with seven facilities prior to submission for Institutional Review Board (IRB) approval. Once approval was received, I contacted the facilities to establish a date and time for both the information session and the data collection. The latter involved me setting up in a high traffic location, and any resident who met the criteria of being over 80 years old and who had been at the information session was invited to participate. Residents who had not attended the information session were given the informational flyer and invited to take their time in deciding whether to participate. The final inclusion criteria included the ability of the resident, through verbal repetition, to understand the informed consent process and read English adequately.

Having completed the informed consent, the participants each completed the five surveys, which I presented to them in a package that was randomly sorted, thereby ensuring that no survey was always first or last, eliminating some of the fatigue issues. The sixth question in the package was the open-ended qualitative question to which they hand wrote their answers. On completion of the package, the participants were given a small token of appreciation. Additionally, the activity directors of the facility, with their consent, were interviewed in a brief, five-minute interview in which they were asked what they considered were the primary motivators or limitations to their residents being

physically active. I analyzed the data from the activity personnel and triangulated with the responses of the residents, with further triangulation to the statistical data that emerged from the surveys. I analyzed statistical data using SPSS software and multiple regression analysis, while the qualitative work was transcribed and analyzed for codes and themes both manually and with the use of NVivo qualitative analysis software.

Definitions

Key concepts and terms in this study were defined as follows:

Self-determination: Personal issues that influence motivation and include personality, motivation, aspiration, self-regulation, and universal psychological needs (Ryan & Deci, 2008)

Self-efficacy: The individual's confidence to act (Bandura, 1977)

Resilience: "The process of adapting well in the face of adversity, trauma, tragedy or significant sources of stress" (American Psychological Association, 2017)

Exercise: Structured and repetitive movements that fall within the more general term of physical activity (Kosma & Cardinal, 2016).

Physical activity: Any bodily movement that results in the expenditure of energy and can include household or occupational activities as well as sport and recreational activities (S. T. Johnson, Martin, Anens, Johansson, & Hellström, 2018).

Fear of falling: A multi-factorial issue that includes anxiety, self-efficacy and balance (O. Ribeiro & Santos, 2015). The belief that activity will lead to an inevitable fall, even in individuals who have no previous fall history (CDC, 2017). A temporary

apprehension specifically related to a threat of falling (Dingová & Králová, 2017; Payette, Bélanger, Léveillé, & Grenier, 2016)

Balance confidence: The presence or lack of confidence to maintain balance while performing normal daily activities (Dingová & Králová, 2017; Payette et al., 2016)

Fall efficacy: The individual's belief that they can cope with the threat of a fall (Dingová & Králová, 2017; Payette et al., 2016)

Assumptions

Assumptions that were made in this study included the idea that psychological issues are part of the reason both for and against participation in physical activity by the older adult population. This assumption was based on the work of Landers et al. (2016) after their demonstration that psychological issues were more predictive of falls than physical issues. This information, combined with the knowledge that individuals often restrict their activity levels due to fear of falling (Nyman, 2011) provided the information needed to make the assumption that psychological issues are a factor in physical activity participation. These assumptions were necessary because to date there does not appear to be any literature that can confirm this concept. Additional assumptions were that the participants would accurately complete the surveys, although some responder bias is normal in survey collection, particularly with respect to physical activity (Prince et al., 2008).

Scope and Delimitations

The focus for the research was developed from three strong existing theories, two of which, self-efficacy and self-determination, have been used before with respect to

physical activity and the older adult population (L.-L. Lee, Avis, & Arthur, 2007; Sweet et al., 2012). Resilience theory is being increasingly used with the older adult population, particularly with respect to healthy aging (G Windle, 2012) and was therefore equally as appropriate to be a contributing part of the framework for this study. Existing measures have been developed and validated for balance confidence, fear of falling, self-efficacy, resilience, and physical activity levels (Connor & Davidson, 2003; Huang, 2006; Peretz, Herman, Hausdorff, & Giladi, 2006; Washburn, Smith, Jette, & Janney., 1993; Yardley et al., 2005) These well-respected measurement scales were therefore utilized in this study, which I believe to be one of the first pieces of research to specifically attempt to tease out the relationship between the different components of fear of falling (Dingová & Králová, 2017), those of balance confidence, self-efficacy, and fear, through the use of the established scales. Careful analysis and determination of whether the best explanation was being offered with respect to the three well-chosen theories further enhanced construct validity (Haig, 2012).

The population chosen for this work was the adult over the age of 80 currently residing in an assisted living facility. The choice of residence was made because currently over 800,000 individuals reside in assisted living facilities nationwide, the majority of whom are over 85 (National Center for Assisted Living, 2018). The definition of the assisted living facility varies, but generally they encourage the older adult to be as independent and autonomous as possible while receiving basic levels of help, which are usually at the higher activity levels of driving, housecleaning, and cooking (Spitzer, Neuman, & Holden, 2004). Spitzer et al. (2004) have indicated that

assisted living has been considered as an interim between congregate housing and skilled nursing, but the focus on aging in place has put new emphasis on health and wellness in the assisted living arena (Brecht et al., 2009).

As a result, the assisted living environment was considered an ideal location to explore the reasons for physical activity participations and limitations. Inclusion criteria for this study was anyone over the age of 80 currently residing in the facility with the ability to comprehend spoken and written English. The latter inclusion criterion was because all the survey instruments were developed and validated in the English language. Generalization or transferability is limited by the final sample population but is representative of the population currently residing in assisted living facilities nationwide. Several assisted living facilities were utilized to achieve the required sample size, which further added to the demographics of the sample and increased the ability to generalize the results.

Limitations

Limitations to the study include the small sample size, $N = 70$, and the limited ability to generalize the results. The use of surveys, particularly with respect to physical activity, are prone to responder bias (Prince et al., 2008), but the use of pedometers to measure physical activity is also prone to habit changes and bias (Kowalski, Rhodes, Naylor, Tuokko, & MacDonald, 2012). A further limitation to the study was the use of multiple survey instruments and the risk of fatigue or duplication of answers by the respondent. To minimize this limitation, the surveys were randomized so that no one survey was always first or last in the package.

I am a practicing physical therapist, although this was unknown to the participants. However, I did approach the work from a physical activity perspective, and there is potential for bias in the interpretation of the qualitative material. To minimize this issue, I performed member checking of themes and ideas that emerge from the qualitative material; I also used qualitative analysis software. One of the benefits of mixed method research is the ability to compensate for strengths and weaknesses in the two methods through triangulation of the results (McKim, 2017).

Significance

The significance of this work is that it advances the understanding of the psychological issues related to physical activity in the older adult population. Issues surrounding fear of falling are often confounded by the interchangeable use of the terms fear of falling, fall efficacy, and balance confidence (Dingová & Králová, 2017). This attempt to tease out the relationship and influence of each of these factors on physical activity adds to the literature and discussion regarding the influence of psychological factors on physical activity. This was strengthened by the inclusion of the participants' personal perspectives on the motivators and limitations for physical activity.

For the medical profession, the contribution of this study is additional evidence with which to enhance program development designed for fall prevention. This can be achieved through a greater emphasis being placed on those aspects that emerged as critical in limiting physical activity in the older adult. For program directors in the assisted living environment, this information will enhance program development for activity promotion in the facility. The benefits to the research community are that this

study is one of a very few mixed method studies looking at physical activity participation in the older adult. This use of mixed method research highlighted the benefits of combining and integrating information that can be achieved from this methodology. The potential for social change is a greater understanding of how to improve physical activity in the older adult population and thereby potentially decrease the number of devastating falls for the older adult.

Summary

Falls in the older adult population are economically and socially extremely costly (CDC, 2016). Physical activity is currently the strongest recommendation for fall prevention, but currently less than a third of older adults meet the CDC guidelines for physical activity (Gorina, 2016) and only 11% meet the ACSM guidelines (ACSM, 2018). Psychological factors have been demonstrated as a stronger predictor for falls than physical issues that have been traditionally measured (Landers et al., 2016), although psychological issues related to physical activity participation have received minimal interest (Duray & Genç, 2017). The current study was a mixed method concurrent data collection study using older adults over the age of 80 residing in assisted living facilities. The theoretical framework was that of three well established theories, self-determination, self-efficacy, and resilience. For the study I used existing validated surveys to examine the different influences of the predictor variables of fear of falling, balance confidence, self-efficacy, and resilience on the outcome variable of physical activity levels. Qualitative data was also collected through open-ended questions to the participants and their activity staff regarding motivators and limitations to being

physically active. Further exploration of the literature and of the key concepts and theoretical foundations of this work are found in the following chapter.

Chapter 2: Literature Review

Introduction

Falls are a leading cause of injury and death in the older adult population,

accounting for $31 billion annually in Medicare costs (CDC, 2017). The number of falls

increases with age with those over 85 years of age experiencing the most falls at over

36% annually. Physical activity has been recommended by the CDC as a means of

decreasing the risk for falls (CDC, 2015), but few older adults meet the recommended

guidelines. Similarly, the ACSM have physical activity and strengthening

recommendations but remarked that only 11% of those over 65 are meeting these

recommendations (ACSM, 2018). Increasing physical activity in the older adult

population is an important public health and financial issue, but understanding their

reasons for not participating in physical activity is required prior to implementing

programs.

The purpose of this study was to explore the links between physical activity, fear

of falling, self-efficacy, balance confidence, and resilience in the oldest old adult

population, those over 80 years of age. The approach was a concurrent mixed method

study with established scales being used to examine for any correlation between physical

activity, fear of falling, self-efficacy, balance confidence, and resilience. Qualitative

exploratory questions were used to further understand what might help older adults

increase their physical activity and therefore how the medical profession can most help.

One in three older adults falls every year, with an estimated one older adult falling

every second of every day (CDC, 2016). In 2014, there were 29 million falls in the older

adult population at a cost to the U.S. healthcare system of $31 billion and causing over 27,000 deaths (CDC, 2016). Of concern is that the number of falls increases with age, with approximately 10% of those aged 65–74 reporting a fall, compared to nearly 14% in those over 85 (CDC, 2016) Extensive work has been conducted on those over 65 years old living in the community with respect to falls and fall prevention, with the U.S. Preventive Services Task Force stating that there is no one reliable tool or approach that can identify those at risk for falls (Moyer, 2012). Of additional concern are the psychological factors including the development of fear of falling or loss of self-efficacy in the older adult, often not directly linked to a fall (CDC, 2016), with the further concern that interventions to prevent falls have been shown to increase them (Moyer, 2012). Recently it was determined that psychological aspects and measures were more predictive of fall risk than physical measures (Landers et al., 2016).

Regardless of the prediction measurement, the intervention recommendations of the U.S. Preventive Services Task Force were exercise or physical therapy and vitamin D supplementation (Moyer, 2012), although a recent update eliminated vitamin D supplementation and emphasized that exercise or physical therapy were the only recommendations for fall prevention (U.S Preventive Services Task Force, 2018). While exercise has been shown to significantly reduce falls, the type and intensity is still not known, and motivation and adherence issues need significant further research (Stubbs et al., 2015). The concept of resilience is one theory that has growing interest in the understanding of motivation and behavior change (Southwick et al., 2014). The idea of resilience is to change focus from negatives to focus on the positive, which in the older

adult population would be to change from the negativism of falls to the positive approach of activity promotion (Southwick et al., 2014).

With respect to activity promotion, the CDC has established an exercise prescription for the older adult (CDC, 2015); however, only a third of older adults meet these recommendations (Gorina, 2016). Similar recommendations by the ACSM also include aerobic and strengthening components, but only 11% of adults over 65 meet both of the components (ACSM, 2018). Despite being the primary recommendation for fall prevention, there appears to be a gap in the research regarding exercise and physical activity in the older adult with respect to psychological factors including self-efficacy, balance confidence, and fear of falling, and specifically in those over 80 years old. Duray and Genç (2017) remarked that they appeared to be the only authors looking into physical activity and fear of falling. Their samples were older adults with a mean age of 70 and were community dwelling in Turkey. (Duray & Genç, 2017). It would appear that there is still a gap with regard to addressing the over 80-year-old adults dwelling in the United States. Falls are the single most deadly and expensive issue in the rapidly growing over 80s population (CDC, 2016), exercise is the most recommended intervention (Moyer, 2012), psychological issues are the most predictive of falls (Landers et al., 2016), and a positive focus is recommended (Southwick et al., 2014). As a result, this research was undertaken to explore the gap in the literature by looking at the links between self-efficacy, fear of falling, resilience, and physical activity levels. Results from this work will allow a greater understanding of why so few of this population meet physical activity

guidelines and what can be done to promote increased physical activity for the older adult.

This comprehensive review of the relevant literature related to this study looks at the theoretical foundations with respect to self-determination theory, self-efficacy theory, and resilience theory. I address the history of these theories and examine research using the theories with respect to falls and physical activity in the older adult. Key variables of the study include physical activity, falls, fall prevention and intervention, fear of falling, and psychological issues related to falling in the older adult population. I examine these variables individually and address a comparison of quantitative and qualitative approaches to these issues.

Literature Search Strategy

I conducted the literature search throughout graduate study but became focused on physical activity and psychological issues with respect to falls in the older adult population in 2017. The primary search engine used throughout was EBSCO*host* utilizing the CINAHL, MEDLINE, PsycARTICLES, and Cochrane database of systematic reviews as the primary databases. Initially however, for each key concept of the research, all databases were included, which added such bases as the Business Source Complete, American Doctoral Dissertations, Education Source, and Computers & Applied Sciences Complete. These additional databases added to the depth and breadth of studies found and included dissertations on similar projects (Franco et al., 2015), while the business and computer bases produced information on current technology available to prevent falls with the older adult (Chaumon, Cuvillier, Body, & Cros, 2016). Throughout

the study, I utilized Google Scholar, particularly for their option to search works that cited specific articles, allowing for exploration of subsequent concept development by new authors. This method proved particularly successful when searching for works that supported the idea of fall prevention causing harm rather than good as initially mentioned by Laybourne et al. (2008). During the research process I also found studies through investigation of references cited by authors.

Throughout the search process, the variability of the designation for the older adult meant that the key search phrase used was *older adult* OR *geriatric* OR *elderly*. This phrase allowed the capture of frequently used terminology for describing those over 65 and yielded excellent outcomes including over 21,000 results on the subject of *falls* AND *older adult* OR *geriatric* OR *elderly*. These terms were guided by Falck, McDonald, Beets, Brazendale, & Liu-Ambrose (2016), who listed the terms they used during their systematic review.

The research investigation started with the theoretical foundations, and self-determination theory yielded over 1,500 results since 1985. Deci and Ryan (2000) produced the seminal work on self-determination theory, and since then, Deci has authored over 45 additional studies. The 1993 work on *self-determination theory* and the *older adult* yielded only 32 results, but *self-determination* without the term *theory* but with the term the *older adult* yielded nearly 400 results, which demonstrated that the concept and not the theory was often used when considering the older adult population. Using all databases within EBSCO*host* provided over 8,000 results since 1888, this dropped to only 1,200 when AND *physical activity* was added and dropped to only 19

when AND *older adult* OR *geriatric* OR *elderly* was also added. Since 2000, Deci and Ryan have added significantly to the literature, including health related work but with minimal mention of the older adult. Work on self-determination and the older adult is limited primarily to work on autonomy and hospice care (Mackin et al., 2009; Zhang et al., 2015). Likewise, work on self-determination and physical activity is limited, with a primary focus of increasing physical activity in children and adolescents (Ha, Lonsdale, Lubans, & Ng, 2017).

Seminal work on self-efficacy theory stems from the 1970s and the work by Bandura. EBSCO*host* all databases revealed over 3,000 works on self-efficacy theory dating from 1977, with Bandura being the author of 9 of the cited works. Adding AND *older adult* OR *geriatric* OR *elderly* decreased the results to 125, but significantly more work than that of self-determination theory and the older adult population. *Self-efficacy* alone without the word theory AND *older adult* OR *geriatric* OR *elderly* yielded nearly 6,000 results since 1931, dropping only to 4,300 since 2007. These results demonstrate the recent and growing interest in the use of self-efficacy with the older adult population, with over 800 of these results being in the realm of physical activity.

Resilience and resilience theory yielded over 17,000 results dating back to 1907. This only shrunk to 15,657 results when the date was limited to 2007 to the present, demonstrating the fact that the interest in resilience theory has developed over the past decade. With respect to resilience and the older adult, van Kessel (2013) suggested that this research has advanced since 2000, with the term "emerging" being used in 2009 (Zautra, 2009). By 2012 resilience was labelled a "buzz word" with respect to healthy

aging (G Windle, 2012), and the fact that key terms *resilience* AND *older adult* OR *geriatric* OR *elderly* yielded 2,357 results dating back to 1984 and dropped to 1,655 dating from 2007 to the present confirms the recent interest and development of this concept. Seminal work in resilience theory is attributed to Garmezy in 1973, work that was subsequently published as part of the Dean Award lectures in 1985.

In contrast to the theoretical works and the older adult population, entering *falls* AND *older adult* OR *geriatric* OR *elderly* into EBSCO*host* all databases produced over 21,000 results dating from 1923. This included topics such as risk factors, aging, accidental falls, costs, and technology related to falls and fall prevention. Limiting this to 2008 to the present only lowered the number by a third despite removing over 80 years, demonstrating the ongoing concerns of researchers on this topic. Interestingly, however, of the 14,872-remaining works, only 193 were of a qualitative methodology, and only 44 indicated mixed methodology, demonstrating the paucity of qualitative and mixed method work in this area. Entering *falls* AND *prevention* yielded over 7,000 results since 1959 and this only dropped to 5,700 when limited to 2007 to present, of which 700 studies involved physical activity. *Falls* AND *psychological* OR *psychosocial* only yielded 2,000 results since 1948, revealing a lack of interest or awareness of these issues with respect to falls and the older adult, and because three quarters of these studies have been written since 2008, there is a clear demonstration that this is now a recognized issue and concern. *Physical activity* AND *benefits* yielded over 25,000 results since 1984. These results decreased to only 2,500 when considering the older adult; however, 2,000

of these were since 2007, again showing the increasing interest in physical activity for the older adult population.

Theoretical Foundation

There is a high demand for theories to be included within the psychology field, particularly concerning health behavior research (Sweet et al., 2012). In 2012 Sweet et al. remarked that only 36% of health behavior articles were based on theories. Similarly, Rhodes and Nasuti (2011) noted that use of theories or theoretical frameworks had varied significantly over time, with an increase in those theories involving environmental issues but also an increase in works citing no theory (Rhodes & Nasuti, 2011). As any behavior change, and specifically physical activity, is extremely complex, there is a strong recommendation for a multi-theoretical approach when considering physical activity (Grodesky et al., 2006). Sweet et al. (2012) emphasized that the use of multiple theories should not be designed as a competition between theories, but an opportunity to utilize constructs from the different theories to improve understanding. As a result, multiple theoretical approaches can improve comprehension and therefore the theoretical approaches under consideration in this work included self-determination theory, self-efficacy theory, and resilience.

Self Determination Theory (SDT)

Self-determination theory is considered a macro theory of human motivation and includes issues of personality, motivation, aspirations, self-regulation, and universal psychological needs (Deci & Ryan, 2008). Although SDT evolved from goal-directed behavior, instead of looking at the content of the goals, SDT looked at the way

individuals regulated their approach to the goals. There is also a stronger emphasis on studying innate psychological needs rather than the previously considered physiological needs (Deci & Ryan, 2000). These authors defined psychological needs as "nutriments that are essential for ongoing psychological growth, integrity and well-being" (pg.229), (Deci & Ryan, 2000).

The three primary psychological needs that were identified by Deci and Ryan were autonomy, competence, and relatedness. Achievement of these needs is linked to overall well-being, which Deci and Ryan (2000) stated, is more than affect but the presence or absence of vitality, psychological flexibility and a deep sense of wellness. Autonomy and self-determination are terms that have often been used synonymously (Ekelund, Dahlin-Ivanoff, & Eklund, 2014), but with SDT, autonomy was considered the feeling of being the originator of one's own feelings (Ng et al., 2012). Therefore levels of autonomy increased when an individual felt they had a choice in a situation (Kirkland, Karlin, Stellino, & Pulos, 2011). Competence was the psychological need of being able to interact with the environment and demonstrate one's own ability (Kirkland et al., 2011). Concerning physical activity, competence has been described as the ability to exercise and express one's own capacity (Sweet et al., 2012). Finally, relatedness was defined as a sense of belonging or being connected (Kirkland et al., 2011). Overall, SDT suggested that when these three needs are satisfied, an individual is more likely to initiate and maintain behavioral changes (Kirkland et al., 2011).

Beyond the three primary psychological needs, SDT addressed the issue of autonomy versus control with respect to self-determination. This concept runs the

spectrum from amotivation, through various levels of extrinsic motivation to intrinsic

motivation which is the highest form of autonomous control (Ferrand, Martinent, &

Bonnefoy, 2014). Amotivation was considered a lack of intrinsic and extrinsic

motivation when an individual does not feel that they will be able to achieve the proposed

outcome (Stephan, Boiché, & Scanff, 2010). In contrast, intrinsic motivation was the

highest end of the spectrum and reflected the greatest levels of self-determination

whereby an individual acts because of pleasant emotions, enjoyment or to achieve a sense

of accomplishment (Stephan et al., 2010). Between the anchors of amotivation and

intrinsic motivation, are three levels of extrinsic motivation that can challenge an

individual attempting behavior change.

The three forms of extrinsic motivation that emerged were external regulation,

introjected, and identified (Nigg & Durand, 2016). External regulation is forced on an

individual with emphasis on necessity, punishment or reward (Nigg & Durand, 2016). It

has been demonstrated that those individuals initiating an activity based solely on

external regulation are unlikely to continue or maintain the activity (Grodesky et al.,

2006). The second level of extrinsic motivation was introjected regulation, whereby the

individual has not fully internalized the motivation and often still only participates due to

guilt or obligation (Grodesky et al., 2006). Nigg and Durand (2016) stated that

introjected regulation is often a result of the individual trying to avoid negative feelings

or seeking to gain approval of others.

The third level on the extrinsic motivation spectrum is identified regulation. This

regulation was where the individual has realized the importance of the behavior, or

activity, for achievement of their goals, and understands the value of the behavior

(Grodesky et al., 2006). Grodesky et al. (2006) commented that individuals who initiated

an activity at the identified regulation stage were more likely to be successful and

maintain the desired behavior changes. Kirkland et al. (2011) discussed the fact that

intrinsic motivation and self-determined extrinsic motivation, such as social or fitness

issues, correlated with increased physical activity, compared to non-self-determined

extrinsic motivators, such as weight management or appearance, which were negatively

correlated with exercise levels.

Within the levels of motivation, a further concept identified in SDT, is that of

causality orientation which can affect the way in which individuals moderate their

behavior (Solberg, Halvari, & Ommundsen, 2013). These causality orientations start

with autonomous orientation whereby an individual can regulate their behavior based on

their interests and values. Control orientation is a desire for control or direction in the

way an individual behaves, and impersonal orientation is inefficacy and non-intentional

behavior (Solberg et al., 2013). Deci and Ryan (2008) further explained the causality

orientations stating that those with autonomous orientation have all three of the basic

psychological needs of autonomy, competence, and relatedness being met. Individuals

with control orientation have a thwarting of autonomy, but some competence and

relatedness needs are being met, while those with impersonal orientations generally have

all three needs being thwarted (Deci & Ryan, 2008).

Regardless of the causality orientation, SDT also indicated that individuals will

have life goals that may be developed from intrinsic or extrinsic aspirations (Deci &

Ryan, 2000). Deci and Ryan, (2000) stated that in general, those individuals that emphasized intrinsic aspirations would have more vitality than those who focused on extrinsic. Extrinsic aspirations included image, fame and wealth, while intrinsic aspirations were personal growth and relationships (Deci & Ryan, 2000). Although developed in the West, within an individualistic society, the concepts of SDT have been demonstrated as applicable in all cultures, although the interpretation of autonomous will vary depending on the culture (Deci & Ryan, 2000).

Self-determination theory is the only motivation theory that includes the specific concept of autonomy (Ng et al., 2012). As such it is a fundamental theory for the understanding of health behavior implementation and sustainment. The recent emphasis by the medical profession on promoting patient autonomy means that SDT is a critical component of any investigation into reasons for health behavior. SDT is a complex theory that is multifaceted, and all areas must be addressed to ensure comprehension and application.

Self-Efficacy Theory

In 1977, Bandura introduced an integrative framework to explain and predict psychological changes that were being observed in treatment settings. Focused mainly on the treatment of phobias, specifically snakes, Bandura presented the concept that psychological procedures could influence self-efficacy, which in turn influenced performance (Bandura, 1977). Bandura (1977) indicated that previously the ability to change was based primarily on cognitive processes, but that performance success was demonstrating the ability to create change. As a result, Bandura emphasized that

cognitive events can cause change, but that cognitive events are most readily changed by mastery of performance. Psychological changes can occur through processes other than performance mastery, and Bandura (1977) suggested that modeling and observation were essential components of behavioral change. Bandura (1977) therefore proposed the concept of self-efficacy emphasizing that psychological procedures create and strengthen self-efficacy, but that there was a second component to the theory, that of outcome expectation (Bandura, 1977).

The concepts of self-efficacy and outcome expectancy have been explored in depth since their introduction by Bandura (1977). In 1983, defending the concepts, Bandura argued that the outcomes expected by individuals will depend on their perception of how well they would perform in the situation (Bandura, 1983). Bandura (1983) explained that within self-efficacy theory, fear is the end product of a situation when people believe they have ineffective coping skills for the situation presented. Bandura (1983) focused on the fact that increased self-efficacy caused a decline in fear, but that fear itself, in the form of autonomic arousal, increased heart and respiratory rate, were not automatic reasons that caused people to avoid situations. Outcome expectations are considered the positive or negative consequences of an action, while self-efficacy is described as the individual's confidence to act (Bandura, 1977; Sweet et al., 2012). It was also discussed that both self-efficacy and outcome expectation must be specific to the behavior under consideration, and that the relationship between self-efficacy and outcome expectation will strengthen, the greater the activity specificity (Nigg & Durand, 2016).

Not only is there a close link with outcome expectation, but self-efficacy has been identified as multidimensional and can vary in magnitude, generality, and strength (Bandura, 1977). Magnitude considers the degree of difficulty of a task, generality looks at the specificity of the task, and strength looks at the expectations of the individual. In 1983 Bandura stressed that individuals could perform activities at weaker levels of self-efficacy which allows them to eventually overcome their anxieties for the activity. Within self-efficacy there are also four primary expectations that Bandura (1977) stated were sources of information that were evaluated by the individual to determine their ability to be successful. These expectations are performance accomplishment, vicarious experience, verbal persuasion, and emotional arousal (Bandura, 1977).

Performance accomplishment was considered by Bandura as the most effective of the four expectations. His conclusions were formed as a development of operant conditioning, and he presented that prior success and achievement would increase self-efficacy, whereas failure would undermine self-efficacy (L. M. Warner et al., 2011). Interestingly it has since been discussed that individuals with high self-efficacy will persevere through failure, but those with low self-efficacy will decrease or abort their efforts (Bandura, 1989). As an interesting reflection on this concept, it was found that adults who scored poorly on Wii-fit exercise games, remained low in self-efficacy concerning the exercise, despite physically having performed well (Chao, Scherer, Wu, Lucke, & Montgomery, 2013). Warner et al. (2011) reported that performance accomplishment or mastery were strong indicators of health behavior self-efficacy including exercise.

Vicarious experience has been considered the second strongest of the expectations and involves modeling or observation of others performing the behavior (L. M. Warner et al., 2011). Interestingly Warner et al. (2011) found no real hierarchy between mastery and vicarious experience with relation to exercise in the older adult. Fromholt Olsen et al. (2015) demonstrated that older adults particularly like group activities, using each other as role models and enjoying each other's accomplishments (Fromholt Olsen et al., 2015). Resnick (2002) remarked however that the role models need to be of similar age and gender for maximum effect. Verbal persuasion is the weakest of the four expectancies although ironically, as Warner at al. (2011) stated, is the most frequently utilized intervention. Warner et al. (2011) also emphasized that it is probably easier to verbally persuade someone that they are incapable of doing something than it is to persuade them to participate. It has however been shown that verbal encouragement and education can be particularly beneficial during recovery from a cardiac event and promoted self-efficacy toward exercise (Resnick, 2002). Fromholt Olsen et al. described the fact that older adults wanted positive communication, but that they also wanted instructors who had good knowledge regarding the aging body and who could create a feeling of trust and safety. Warner et al. (2011) remarked that vicarious experience and verbal persuasion are often combined under the title of social support which fails to demonstrate the individual strengths or weaknesses of the two components.

Emotional arousal has also been referred to as physiological state and initially denoted the anxiety and fear that people experience in threatening situations (Bandura, 1977). Bandura emphasized that working to decrease the fear arousal would increase

participation or specifically decrease avoidance, and that increased participation would improve coping skills through performance mastery. Since the introduction of the concept of emotional arousal, researchers have emphasized the perception, and more importantly, the interpretation of the responses is critical (L.-L. Lee, Arthur, & Avis, 2008). Working with older adults, particularly in the field of physical activity, Lee et al. (2008) remarked that the physiological reaction to activity may be perceived by the older adult as physical inefficacy, resulting in an undermining of their overall self-efficacy, and potential termination of the behavior.

Similar to the findings of Lee et al. (2008), Resnick (2002) remarked that older adults might need guidance on the interpretation of fatigue, muscle soreness or shortness of breath as normal reactions to activity rather than adverse events. Fromholt Olsen et al. (2015) remarked that exercise created positive emotions and sensations in the older adult and improvements in mood were reported. Positive and negative concepts have also been demonstrated in self-efficacy theory, with those who believed they were low in self-efficacy imagining failure and thinking of how situations will go wrong. In contrast, those with high self-efficacy imagined positive outcomes and saw themselves performing well (Bandura, 1989). Bandura further stated that those with a more optimistic outlook were more likely to succeed, since daily activities are never simple, and overcoming inevitable difficulties required a resilience within the self-efficacy of the individual.

Because of this resilience, Bandura (1989) indicated that those with higher self-efficacy perceived themselves differently and looked at challenges and difficulties as opportunities to master something, rather than threats to be overcome. In 2012 Bandura

remarked that people think pessimistically or optimistically as a result of their self-efficacy and this can self-enable or self-debilitate (Bandura, 2012). Reflecting the concepts of self-determination theory, Resnick (2002) remarked that external issues such as environmental distractions, and internal issues such as arousal or mood can be influential. These issues add to the complexity of the situation and can change the degree of control that is felt by the individual. Bandura (1977) likewise stated that daily life is diverse, and tasks can be approached differently on different days, with mood being a factor. These issues further reflected the fact that self-efficacy is task-specific and event specific (Sweet et al., 2012), and highlighted the fact that measurement scales need to be across domains and include all the different components of an activity domain (Bandura, 2012). Recently Bandura (2012) added the concept of resilient self-efficacy summarizing it as the ability to overcome obstacles or difficulties through perseverance. He also stated that resilient self-efficacy is learning to manage failure, so that it remains informative, rather than becoming demoralizing (Bandura, 2012).

In summary, the concept of self-efficacy theory is multidimensional with both self-efficacy and outcome expectations needing to be considered. Self-efficacy has different levels of magnitude, generality, and strength and requires the four expectations to be met, but with performance mastery and vicarious experience considered the strongest. Within any activity, there can be different levels of self-efficacy making it a very complicated concept to measure (Bandura, 1977, 1983, 2012).

Resilience Theory

According to the APA, resilience is the "process of adapting well in the face of adversity, trauma, tragedy, threats or significant sources of stress (para. 4)". The concept of resilience emerged late last century when in 1973 Garmezy wrote about competence and adaptation in adult schizophrenic patients and children at risk, subsequently published in 1985 as part of the Dean Award lectures (Garmezy, 1985). Early work in resilience theory primarily studied child development, and involved children and adolescents (G Windle, 2012). As a result of the childhood development research, early definitions of resilience focused on the ability of an individual to bounce back from adversity or risk, thereby implying that the individual had to have experienced some adverse situation and adapted as a result (Ong, Bergeman, & Boker, 2009). Ong et al. (2009) commented that initially the risk or adversity was deemed to be a single event. However, the definition has evolved to include cumulative risk issues, such as ongoing poverty or hunger, or a combination of multiple life events that caused subsequent maladjustment (Ong et al., 2009).

As a result of this evolution, resilience is now viewed as a dynamic concept that is present in all individuals, but that changes over time as a direct response to life events and experiences (van Kessel, 2013). The APA considered that resilience is not a trait that people either do or do not possess, but can be learned or developed in all individuals (APA, 2017). Resilience is considered the ability to rebound from adversity, a term utilized in all definitions, and to continue with life (van Kessel, 2013), but it is not always

superior function or even functioning at prior levels. However it is doing okay or better than expected (G Windle, 2012).

Since the initial work on child development, resilience has become a focus of research and is now used extensively in diverse situations. Current research includes specific diagnosis or health issues such as smoking (Berg et al., 2017), individuals with schizophrenia (Wartelsteiner et al., 2016), diabetes (Corathers et al., 2017), and HIV (Kuntz, Malinen, & Näswall, 2017). Resilience has been the topic of research for specific populations undergoing adversity such as incarcerated women (Sygit-Kowalkowska, Szrajda, Weber-Rajek, Porażyński, & Ziółkowski, 2017), and the Latino population post-hurricane Sandy (Cuervo, Leopold, & Baron, 2017). Resilience is also used extensively with research on military personnel including those in combat and experiencing post-traumatic stress disorder (Bezdjian, Schneider, Burchett, Baker, & Garb, 2017; J. D. Ribeiro et al., 2017; Vyas et al., 2016). Resilience has also been examined with respect to sports teams (Decroos et al., 2017), nursing students and professionals (Foster, 2016), and academia (Ricketts, Engelhard, & Chang, 2017), as well as ecological issues such as oil spills (Reams et al., 2017).

Despite the interest in resilience, an area that initially did not receive much attention was that of the older adult. In 2009, Zautra described the work on resilience and the older adult as an "emerging" field, and in 2012, Windle described resilience as the "buzz word" with respect to the older adult and the concept of healthy aging. The current social and economic issues related to the rapidly growing older adult population, and the medical costs of reactive health care, mean that more proactive work needs to be

undertaken. Emphasizing good mental health and well-being increases the implications for understanding and applying resilience in the older adult population (G Windle, 2012).

The older adult is often the victim of adversity, particularly within the more dynamic and multifactorial definition (Ong et al., 2009). The issues affecting the older adult can include chronic poverty, or multiple adverse events such as grief, illness, pain, and life transitions. Gulbrandsen (2016) emphasized the fact that older women are more prone to adverse events due to their general longevity, higher risk of being widowed, and a more significant likelihood of chronic health problems (Gulbrandsen, 2016). Interestingly it was shown that multiple adverse events showed no direct reduction of resilience in an individual, but that older males tended to be more resilient, again reflecting the increased burdens and higher risks of depression experienced by females (Morin et al., 2017). The act of aging requires significant adaptation to the many challenges being faced, and resilience may be a factor that allows older adults to overcome these challenges (Bolton et al., 2016).

The challenge for measuring resilience, is the fact that it is dynamic and multidimensional, and measuring one component may not present the full picture of an individual's resilience (Infurna & Luthar, 2017). Bolton et al. (2016) described protective factors that allowed the older adult to overcome life's adversities and described resilience as a dynamic process that can change and vary throughout life depending on the challenges and life stages. Bolton et al. described protective factors that improve resilience. These included grit, positive perspectives, and previous experience but the most critical factors were shown to be external connections, independence, and meaning,

the latter including religion, spirituality and a meaning to life (Bolton et al., 2016). These authors emphasized that practitioners and caregivers should use knowledge of protective factors to develop interventions and assistance for the older adult.

Also utilizing the term protective factors, Ong et al. (2009) likewise emphasized three categories including the same factor of external support. Ong et al. indicated that external support could include friends and family but also neighborhoods and social organizations. Other protective factors reported by these authors included individual attributes such as temperament and self-regulation, and relationships such as people they could trust, cohesion, and close support. The summary by Ong et al. was that resilience was not anything extraordinary but simple qualities and situations that could support the individual through adversity. When looking at optimal aging Ong et al. suggested that recovery from adversity was not as important as maintenance when coping with cumulative risks, and the emphasis was to focus on positive outcomes, a suggestion reflected by Bolton et al. (2016). It is also interesting to consider that in the older adult, success is not the avoidance of a mental diagnosis, as might be the case in the child or adolescent research, but more importantly the ability to adapt their functioning (Ong et al. 2009).

Adapting to adverse life events has been linked with overall health and importantly healthcare utilization (Ezeamama et al., 2016). Ezeamama et al. (2016) examined whether an accumulation of adverse events increased healthcare utilization and whether social support and mastery could predict improvement. The author's definition of mastery focused on a sense of control over life circumstances, reflecting the work of

Windle, Markland, and Woods (2008) who emphasized the need for control over the environment. Ezeamama et al. (2016) found that individuals with high health and financial mastery or control, exhibited less healthcare utilization and reported improved health status, however greater number of adversities did increase healthcare use. Ezeamama et al. also demonstrated that higher levels of mastery resulted in subsequent improvements in health reports and, interestingly, showed that social support did not lower healthcare use, but there was a strong protective effect on health from physical activity (Ezeamama et al., 2016).

It has been suggested that positive affect may have biological influence as well as psychological (Steptoe et al., 2009). After reviewing the research, Steptoe et al. (2009) surmised that four areas might mediate the positive affect on health, including genetics, lifestyle, psychobiological, and psychosocial issues. They concluded that the research demonstrated that positive affect is an independent predictor for health outcomes and may be linked with positive health behaviors which influenced the health outcomes. Steptoe et al. also concluded that positive affect is also correlated with protective biological process but that linking the protective behavior with the biological protection had not been demonstrated. However, Ezeamama et al. (2016) suggested that physical activity, a positive health behavior, may influence health issues through biological responses, and that it might additionally offset negatives.

The idea of focusing away from negativism was demonstrated by Smith and Zautra (2008) when they showed that increased resilience predicted increased positivism in women with arthritis. Smith and Zautra also showed that increased negativism was

reflected in an increased vulnerability (Smith & Zautra, 2008). It was also demonstrated that increased resilience resulted in increased positive emotion that decreased pain catastrophizing (Ong, Zautra, & Carrington, 2010). The concept of focusing on positives is reflected both by Bolton et al. (2016) and Southwick (2014) who stated that individuals and clinicians should transfer energy away from examining the negatives and move to enhancing resilience (Southwick et al., 2014). In the same article, Yehuda emphasized the need to move forward and not turn back as a concept of resilience, while Masten looked at resilience as a process of interaction and change between individuals and their environments (Southwick et al., 2014). Southwick et al. (2014) agreed that the complexity of resilience is such that different definitions may be needed depending on context and specificity, but there is no question that resilience is a dynamic process that involves adaptation to one or more life events (Southwick et al., 2014).

Reflecting on the fact that there are many components of resilience, has caused researchers to question whether evaluating one domain is sufficient to determine the resilience of an individual. Infurna and Luther (2016) emphasized that resilience is a multi-factorial concept and indicated that individuals may present with different rates of recovery in different domains. Infurna and Luther looked at spousal loss and demonstrated that there were potential recovery differences between the variables of life satisfaction, negative affect, positive affect, general health, and physical function (Infurna & Luthar, 2017). These authors suggested that a single outcome measure may not adequately demonstrate the level of recovery of the individual and therefore the levels of resilience, which they defined as a multidimensional construct. Resilience remains a

dynamic and complex concept and as such reflects self-determination theory with its multi-faceted components.

Literature Review Related to Key Variables and Concepts

Falls in The Older Adult

The Centers for Disease Control and Prevention (2017), have indicated that falls are the leading cause of fatal and nonfatal injuries in those aged greater than 65. The United States Census bureau estimates that between 2012 and 2050 the number of adults over the age of 65 will increase to 83.7 million, almost double that of 2012 (Ortman, Velkoff, & Hogan, 2014). In 1970 only 9.8% of the United States population was over 65 and by 2030 it is anticipated that this will increase to greater than 20% of all United States residents. By 2050, all baby boomers still alive will be 85 or older (Ortman et al., 2014).

Starting at 26.7% for those aged 65-74, the number of individuals experiencing a fall annually increases to 36.5% of those greater than 85 years of age (CDC, 2017). In 2014, it was estimated that 27,000 older adults died as a direct result of falls, and one third of all fall related deaths occurred in women of 85 years of age or greater (Burns, Stevens, & Lee, 2016). Medicare estimated that the cost of falls is currently at $31.3 billion (CDC, 2017), with the average cost of a non-fatal fall being $9,463, rising to greater than $29,000 when hospitalization was involved (Burns et al., 2016). Of concern is that despite evidence based fall prevention interventions, the percentage of individuals over 65 falling annually has not changed and hospitalizations related to falls have been increasing (Lovarini et al., 2013).

Fall Prevention and Intervention

Research addressing falls in the older adult population is extensive and diverse. The research includes topics such as falls causing and during hospitalizations (Haines, Lee, O'Connell, McDermott, & Hoffmann, 2015; D.-C. A. Lee, Pritchard, McDermott, & Haines, 2014), technology to detect or monitor falls (Ogonowski et al., 2016), medications related to falls (Rhalimi, Helou, & Jaecker, 2009), and talking with medical providers (D. C. A. Lee et al., 2015). One of the challenges of research with respect to falls is the definition of a fall. Peel (2011) suggested that the most accepted definition is that of "inadvertently coming to rest on the ground, floor, or lower level" (pg. 8). This definition is similar to the one used by the combined American and British Geriatric Societies (AGS/BGS) in their clinical practice guidelines of 2001. This panel remarked that most of the papers that they studied, failed to define a fall and chose their definition to be: "an event whereby an individual unexpectedly comes to rest on the ground or another lower level without known loss of consciousness" (pg. 6) (AGS/BGS, 2001) .

Screening. In 2015, Avin et al, determined that all older adults should be asked, on an annual basis about their fall history. Avin et al. (2015) determined that there was a lack of evidence regarding the type of questions that needed to be asked when an older adult presented with a fall history, and that clinicians needed greater guidance on matching the patient with appropriate testing and interventions. Similarly, Strupeit, Buss and Wolf-Ostermann (2016) demonstrated in their study that evidence is poor regarding the accuracy of risk assessments for falling (Strupeit, Buss, & Wolf-Ostermann, 2016). In 2016 it was determined that balance confidence, as measured by the ABC, and fear of

falling as measured by the Fear of Falling Avoidance Behavior Questionnaire were better predictors of falling than the physical tests normally conducted by physical therapists (Landers et al., 2016). Landers et al. (2016) concluded that psychological concepts might be stronger predictors for future falls than physical ability.

      Fall prevention. Prevention of falls in the older adult is a primary concern but the interventions most appropriate for fall prevention remain somewhat elusive. In 2003, Gillespie et al. determined that interventions that were likely to be beneficial were multidisciplinary, multifactorial screening, and intervention programs in the community, muscle strengthening and balance in the home, home hazard assessment, and modification, withdrawal of psychotropic medications, and tai chi exercise (Gillespie et al., 2003). Although published in 2001, the AGS/BGS clinical guidelines were reviewed in 2009 and like Gillespie et al. determined that a multifactorial risk assessment and individually designed interventions, which included balance, should be implemented to those deemed a fall risk. Despite strong evidence in support of multifactorial interventions there was also evidence that benefits may be more limited than initially anticipated and effect sizes small (Gates, Fisher, Cooke, Carter, & Lamb, 2008).

      In 2012, Moyer presented the clinical guidelines based on the US Preventive Services Task Force recommendations and found that only exercise or physical therapy and vitamin D supplementation could be recommended (Moyer, 2012), although a recent update eliminated vitamin D supplementation and emphasized that exercise or physical therapy were the only recommendations for fall prevention (U.S Preventive Services Task Force, 2018). Moyer (2012) stated that a multifactorial risk assessment should not

automatically be performed on individuals due to the limited benefit and potential harm.

Moyer cited no statistical significance being found in fall reduction with multifactorial

assessment and management. Statistical significance was found for vitamin D

supplementation in the earlier reports although was eliminated in the 2018 update.

Statistical significance was found for physical therapy or exercise for fall

reduction (Moyer, 2012). In an umbrella review of meta-analysis, Stubbs, Brefka, and

Denkinger (2015) found evidence that consistently supported exercise as a single

intervention and also individually tailored multifactorial interventions to reduce falls

(Stubbs et al., 2015), although Goodwin et al. (2014) found conflicting evidence that only

non-individually tailored multi component interventions, specifically exercise and

vitamin D, were effective at reducing falls and less costly than individually tailored

programs. Tricco et al. (2017) confirmed through systematic review and meta-analysis

that exercise alone was associated with decreased risk of injurious fall but that patient and

caregiver values and preferences should also be taken into consideration (Tricco,

Thomas, Veroniki, & et al., 2017).

Although the evidence on fall prevention is conflicting, overall there is support

for certain interventions being effective at reducing the numbers of falls, with exercise or

physical activity being a common factor throughout all the recommendations. Avin et al.

(2015) indicated that physical activity, without a balance and strengthening component, is

not effective at lowering fall risk, but did subsequently state that all older adults should

be encouraged to maintain physical activity with structured exercise. Avin et al. further

remarked that mode, intensity, and frequency of recommendations needed to be

determined through additional research. Despite the availability of varying levels of evidence, implementation, and sustainability of fall prevention programs is extremely challenging. Lovarini et al. (2013) indicated that although there is increased understanding of how to implement fall prevention programs, ensuring that the program use is sustained is less understood. Conducting a systematic review, Lovarini et al. found no theories to support or guide sustainability of community-based fall prevention programs, and financial support and the actual participation by the older adults were major issues related to sustainability. Lovarini et al. further indicated that fall prevention programs were not self-sustaining and needed supporting interventions to continue.

In a qualitative study of older adults, it was found that those individuals who accepted the program and attended, did so for self-benefit, believing the program would help reduce their fall risk (Calhoun et al., 2011). Those individuals who failed to participate, despite being invited, appeared to believe that it could not be of benefit. Goodwin, Jones-Hughes, Thompson-Coon, Boddy and Stein (2011) indicated that successful implementation of a fall prevention program required a change in attitude and beliefs of both the leaders and the participants (Goodwin, Jones-Hughes, Thompson-Coon, Boddy, & Stein, 2011). Older adults, whether choosing to participate in fall prevention programs or not, indicated anxiety and fear as a result of falling, and its known consequences (Calhoun et al., 2011), as well as a lack of perception of personal relevance of the fall prevention messages (Hughes et al., 2008). Psychological and psychosocial issues surrounding falls and fall prevention are particularly relevant if fall prevention programs and interventions are to succeed.

Psychological and Psychosocial Issues Related to Falls and Physical Activity

In 2016 Landers et al, determined that psychological assessments were more predictive of falls in the older adult than physical tests. Psychosocial issues related to falls and fall prevention is an area that has come under increased scrutiny particularly due to the high cost of fall prevention programs that have minimal participation (Nyman, 2011). Psychological and psychosocial issues also lend themselves to qualitative research methods which allow a more comprehensive understanding of the perspectives of the older adult (Elskamp, Hartholt, Patka, van Beeck, & van der Cammen, 2012; S. T. Johnson et al., 2018; McInnes, Seers, & Tutton, 2011).

One of the main psychological issues related to fall prevention and physical activity, is the concept of fear of falling. According to the CDC (2017) this developed in older adults regardless of whether they had sustained a fall and often resulted in a self-imposed activity restriction, in the belief that this would decrease fall risk. Activity restriction in reality can lead to an overall decline in social interaction, increased social isolation, depression, and increased fall risk (Boyd & Stevens, 2009). In addition, fear of falling can lead to decreased ability to perform activities of daily living, and lower quality of life with poor life satisfaction (Jung, Lee, & Lee, 2009). Dingová and Králová (2017) indicated that the psychological consequences of a fall were often similarly or more disabling than the physical consequences and included fear and loss of self-confidence. Dingová and Králová reported that research indicated 21 - 85% of older adults in the community experienced fear of falling, while 15-55% admitted to activity restriction as a result of fear of falling (Nyman, 2011).

Dingová and Králová (2017) interviewed older adults who all indicated developing a fear of falling as a result of a fall that required medical intervention, but also blamed their fear on weakness, old age, and poor health. Fear of falling is a multi-factorial issue and includes anxiety and self-efficacy as well as balance (O. Ribeiro & Santos, 2015). Ribeiro and Santos (2015) emphasized the need for further investigation into the psychological variables of depression and anxiety with respect to fear of falling. Ribeiro and Santos (2015) indicated that depression and anxiety were strongly associated with fear of falling and could cause older adults to be less confident in their abilities, which consequently increased their fear.

Dingová and Králová (2017) emphasized that often the terms fear of falling, falls efficacy, and balance confidence were used interchangeably in the research. These terms are in fact very different concepts that can and should be measured separately and play varying roles in the development of fear with relation to mobility and potential falls. Payette et al. (2016) categorized all psychological issues as FRPCs, fall-related psychological concerns and separated fear of falling, falls efficacy, and balance confidence. These terms have been defined as follows; fear of falling or fear is temporary apprehension specifically related to a threat of falling. Self-efficacy or falls efficacy is the individuals' belief that they can cope with the threat of a fall, while balance confidence is the presence or lack of confidence to maintain balance while performing normal daily activities (Dingová & Králová, 2017; Payette et al., 2016). Understanding the different levels of influence that each of these components exert on the older adult, with respect to their participation in physical activity, would allow for

appropriate modification of interventions to focus on overcoming the specific or greatest

limiting factor (Payette et al., 2016).

Psychological issues are important in the development of fear of falling, and also

play a significant role in the attitude and participation of older adults in fall prevention

and physical activity (Nyman, 2011). Nyman (2011) indicated that some older adults

believed that physical activity would increase their risk for falls and found that

knowledge was often insufficient to motivate older adults to participate in physical

activity. Interestingly many older adults failed to have a comprehensive discussion of

their falls with their health care provider, and those that did were often advised to slow

down or be careful (D. C. A. Lee et al., 2015). These types of instructions increased the

risk that the client limited their activity levels and is not evidence-based advice (D. C. A.

Lee et al., 2015).

The perceptions of the older adult towards fall prevention and physical activity is

diverse and includes decreasing burden for their family, enhancing their own well-being,

and that falls are inevitable and unpreventable (Shueh-Fen et al., 2016). Interestingly

many older adults demonstrated an optimistic bias towards falls and believed that they

were not likely to sustain a fall regardless of their age or prior fall history (Nyman, 2011).

Jansen et al. (2015) found that only sixteen percent of individuals recognized their own

fall risk and of those only ten percent felt a need for prevention intervention (Jansen et

al., 2015). Individuals who knew why they fell, such as an accidental trip, often declined

intervention, as did those for whom transportation to prevention programs was

challenging (Elskamp et al., 2012). Many individuals felt that prevention interventions

were useful for others, but not themselves (Elskamp et al., 2012; McInnes et al., 2011), with fear of losing their identity and independence being reasons for not wanting to participate with interventions (McInnes et al., 2011; W. Walker, Porock, & Timmons, 2011).

McInnes et al. (2011) emphasized the need to ensure that the older adult can retain control, choice and autonomy, reflecting the concepts of self-determination theory. Other issues that predominated the literature were that positive identification with messages regarding fall prevention are more palatable for the older adult than the negative message of falls (Mitchell et al., 2015). Goodwin et al. (2011) indicated that clearly both the older adult and the care professionals needed to work on changing their attitudes and beliefs if fall prevention interventions were going to be successful.

Physical Activity in the Older Adult Population

Over 20 years ago the American Colleges of Sports Medicine (ACSM) working closely with the CDC, the US Surgeon General and the National Institutes of Health (NIH) issued initial reports on physical activity (ACSM, 2018). The idea behind these reports was to determine appropriate amount and intensity of physical activity needed for improved health through the lifespan. By 1995, the CDC and the ACSM were recommending 30 minutes or more of moderate intensity physical activity on most days of the week. This recommendation was updated in 2007 when the ACSM and the American Heart Association published their combined recommendations of a minimum of 30 minutes of moderate intensity aerobic activity on five days per week, with activities for strengthening on two days per week (ACSM, 2018). These guidelines were further

examined and updated in 2008 in the Physical Activity guidelines advisory committee report, which stated that all Americans should achieve moderate intensity aerobic activity for 150 minutes per week, or 75 minutes per week of vigorous intensity aerobic activity, or a combination of the two. Muscle strengthening work should be done at moderate or high intensity and include all major muscle groups at least twice per week (ACSM, 2018).

With respect to the older adult population, the same recommendations apply and are reinforced by the CDC (2015) on their website, with details of what counts for specific levels of activity. Likewise, the Department of Health and Human Services (DHSS) recommends 150 minutes of moderate intensity activity or the equivalent in vigorous intensity, spread over at least three days per week but can be divided into small increments such as a brisk 15-minute walk. This aerobic activity should be supplemented with two days of strengthening activity (DHSS, 2018). The DHSS further suggested that those older adults with physical limitations due to chronic conditions should aim to be as physically active as their situation allows (DHSS, 2018). Interestingly, research has shown that older individuals who are physically active, but below the recommended guidelines, still decreased their mortality, although higher levels of physical activity equal or greater to the recommendations further decreased mortality (Hupin et al., 2015). Currently the office of Disease Prevention and Health Promotion, is working closely with the CDC, the NIH and the President's Council on Fitness, Sports and Nutrition to develop the second edition of the physical activity guidelines, scheduled for release in late 2018.

According to the ACSM (2018) however, only 11% of those over 65 met both the aerobic and strengthening guidelines and less than 5% of those over 85 met the guidelines. The CDC midcourse review for goals related to Healthy People 2020 confirmed that more adults over the age of 18 now met the aerobic recommendations. Those meeting recommendations is now nearly 50%, however no separate data for those over 65 was presented (CDC, 2018). This report also indicated that those over 18 participating in muscle strengthening recommendations had increased to 24.4% but remained the primary reason why only 21.3% of adults met both components of the physical activity guidelines (CDC, 2018).

Definitions of exercise intensity can be discussed in metabolic equivalents or METS. Light exercise is considered less than 3.0 METS, with moderate intensity at 3.0–5.9 METS and vigorous intensity greater than 6.0 METS (ACSM, 2018). To help individuals, understand these intensities, activities that represent a typical energy expenditure for each MET level have been suggested. These include slow walking around the home or standing doing light housework such as ironing for light intensity. Moderate intensity includes walking at a very brisk pace, heavy housework such as vacuuming or mopping, and recreational badminton or slow to fast ballroom dancing. Finally, vigorous activity would include hiking at steep grades, running or jogging, heavy farming, tennis or cross-country skiing (ACSM, 2018). The DHSS suggested that moderate intensity consists of activities that require a medium level of effort and used a 1–10 scale suggesting that a 5 or 6 would be moderate intensity and producing a noticeable increase in breathing and heart rate (DHSS, 2018). The DHSS further defined

vigorous intensity as a 7 or 8 on the scale with large increases in breathing and heart rate. The DHSS also stated that two minutes of moderate intensity is equal to one minute of vigorous intensity (DHSS, 2018).

The ACSM (2018) emphasized the importance of encouraging physical activity in those with cognitive impairment due to the benefits of activity on cognition but emphasized that safety should be a consideration. Likewise, mobility limitations should not be a barrier to physical activity which should be adapted to the individual's physical abilities (ACSM, 2018).

Strengthening

Within the various physical activity guidelines there was always a recommendation for strengthening work (ACSM, 2018: CDC, 2015). The ACSM (2018) emphasized that this should be of moderate or high intensity and include all major muscle groups, while the CDC also recommended all major muscle groups and incorporated suggestions such as lifting weights, resistance bands, push-ups and sit ups to use body weight, and heavy gardening such as digging (CDC, 2015). Within their section on fall prevention, the CDC (2017) emphasized that strengthening should be focused on the lower extremity, which therefore excluded push-ups and sit ups and changed the concept of lifting weights, issues that are not fully clarified in the exercise guideline recommendations. The ACSM recommended that individuals who have fallen should include exercise for balance, agility, and proprioceptive training but should also continue with the aerobic, strengthening, and flexibility work of their general physical activity recommendations. The ACSM does not specify a certain type of strengthening for fall

prevention (ACSM, 2018). Interestingly it is the strengthening aspect of the physical activity guidelines that was the primary reason for so few adults meeting these recommendations (CDC, 2018). A long term study of women and physical activity likewise demonstrated that younger women were more likely to meet the strengthening recommendations than older women, but this study had a mean age of 54 with a standard deviation of 12, so is not the population under consideration in this study (Morrow Jr, Bain, Frierson, Trudelle-Jackson, & Haskell, 2011).

The idea of strengthening would appear logical with respect to fall prevention, since weakness, particularly in the lower extremity, and balance are two of the most significant factors related to falls in the older adult (Maritz & Silbernagel, 2016). Loss of muscle mass and quality, termed sarcopenia, has been noted to occur from the third decade and a more significant loss is noted in older individuals which can contribute to fall risk (Abreu et al., 2014). Abreu et al. (2014) demonstrated that troponin levels dropped in older adults after a strength training program. Since troponin in the blood is an indicator of muscle damage or injury, it would suggest that strengthening the muscles makes them less vulnerable to injury and damage. Abreu et al. (2014) suggested that sarcopenia was often a contradictory weakness despite minimal loss of mass and suspected that poor quality of muscle, as evidenced by troponin in the blood, was much more of an issue with sarcopenia than quantity of muscle. Strengthening would appear to help quality of muscle as well as strength (Abreu et al., 2014). The ACSM (2018) remarked that individuals with sarcopenia needed to undergo strengthening before attempting aerobic activity.

In an extended study of sedentary older adults, aged 70–89, a moderately vigorous physical activity program included strengthening with an emphasis on the lower extremity using ankle weights (Pahor, Guralnik, Ambrosius, & et al., 2014). This study was focused on major mobility disability rather than falls but demonstrated the positive effects of moderate intensity physical activity that included strengthening in the older adult population. The study by Pahor et al. (2014) also demonstrated one of the challenges of multi intervention strategies, in that it was impossible to isolate the impact of strengthening on the outcomes (Ishigaki, Ramos, Carvalho, & Lunardi, 2014). Ishigaki et al. (2014) discussed the fact that while lower extremity strengthening was considered an essential component of mobility and function, there was limited research on the effect of strengthening with respect to fall prevention. In their analysis of studies, Ishigaki et al. (2014) commented that in most studies subjects showed improvement in lower extremity strength as well as balance, flexibility, and functional capacity, so it was impossible to understand the relative significance of each component, specifically strengthening (Ishigaki et al., 2014).

The US Preventive Services Task Force likewise indicated that their recommendation was exercise or physical therapy for fall prevention but emphasized that due to the diversity of interventions within the studies reviewed, it was impossible to identify any specific component of the exercise program (U.S Preventive Services Task Force, 2018). Interestingly only 30% of the trials examined by the US Preventive Services Task Force contained resistance training, with most of the studies focused on

gait, balance, and functional training, although increased gait and functional mobility will generally improve lower extremity strength.

Consideration must be taken regarding the long term effects of strengthening programs as beneficial effects can be short lived if the program is not sustained (Abreu et al., 2014), which supports all the activity guidelines and recommendations to include strengthening activities on a weekly basis.

Physical Activity and Exercise

Interestingly the definitions of exercise, physical activity and physical fitness can often be confused and used interchangeably (Caspersen, Powell, & Christenson, 1985). Citing the National Institute on Aging, Kosma and Cardinal (2016) indicated that exercise is structured and repetitive and falls under the more general term of physical activity which can include leisure time activities such as gardening (Kosma & Cardinal, 2016). Physical activity has been defined as any bodily movement that results in the expenditure of energy and can include household or occupational activities as well as sport and recreational (S. T. Johnson et al., 2018). Since exercise falls within the scope of physical activity, and that many older adults utilize leisure activities as their physical activity, rather than formal exercise, the term physical activity will be used throughout this paper with clarification when structured exercise is being discussed.

Despite the availability of activity recommendations, inactivity is currently the fourth leading risk factor for mortality worldwide (Devereux-Fitzgerald, Powell, Dewhurst, & French, 2016), and inactivity prevalence is at 35% in those over 75 years of age in the United States (Watson et al., 2016; Zubala et al., 2017). Inactivity is

considered no activity beyond that required for basic activities of daily living (Watson et al., 2016), although it is also recognized that some older adults engaged in greater daily activity through such things as walking for transportation or various leisure events (Chaudhury, Campo, Michael, & Mahmood, 2016). The overall benefits of increased physical activity included the reduction or delay of chronic illnesses such as heart disease and diabetes (Assad Farooqui, Yock-Theng, Bilger, & Finkelstein, 2014), improvement or prevention of depression and mental health disorders (Weinstein, Koehmstedt, & Kop, 2017), and improved functional mobility (Chaudhury et al., 2016).

A consideration with respect to meeting physical activity guidelines, or encouraging increased physical activity is the issue of potential musculoskeletal injuries. In an extended study of women, up to age 64, individuals who met the physical activity guidelines for moderate to vigorous physical activity were more likely to sustain an injury (Morrow Jr, DeFina, Leonard, Trudelle-Jackson, & Custodio, 2012). Individuals participating in running and contact sports tended to sustain more musculoskeletal injuries than those in non-contact sport or walking, and injuries tended to occur in the lower extremities. Head injuries were rare, suggesting severe falls were rare, with gradual onset injuries being the most commonly experienced (Morrow Jr et al., 2012). The study concluded however, that the risk of injury should not outweigh the known benefits of physical activity which should be encouraged in all adults.

Despite the known benefits of activity, and the availability of an activity prescription, it is currently estimated that less than a third of older adults met the recommendations (Gorina, 2016), while the ACSM considered only 11% met both the

aerobic and strengthening categories (ACSM, 2018). Unfortunately there are often

substantial barriers to activity participation encountered by the older adult including

limited locations and access to safe places in which to be active (Watson et al., 2016).

Chaudhury et al. (2016) explored the influence of the environment on physical activity in

the older adult and found that those who could exercise safely in their immediate

neighborhood were more likely to meet activity guidelines. Additionally living within

walking distance of shopping, banks, major transportation and leisure activities, resulted

in more activity being built into daily life (Chaudhury et al., 2016).

Kosma and Cardinal (2016) similarly found that personal good health, and a good

natural environment, were facilitators for physical activity, while health concerns and

lack of local physical activity locations or programs were the greatest barriers for the

older adult (Kosma & Cardinal, 2016). Barriers to physical activity have been described

as real or perceived, with real barriers being, for example, the weather, and perceived

being motivation or health concerns (Kosteli, Williams, & Cumming, 2016). Kosteli et

al. (2016) linked the perceptions of the individual to self-efficacy theory and commented

that the greater the perceived barriers the less likely an individual was to engage in

physical activity.

Linking participation in physical activity to other theories, specifically self-

determination theory, Kosma and Cardinal (2016) discussed the idea of an individual

having control over their behaviors, suggesting autonomy, as well as the need for

competence through decreased fear of injury or inability to participate. Finally, Kosma

and Cardinal also link participation to relatedness through the emotional and social

support of group-based activity. Taylor and Pescatello (2016) discussed the perceived experiences of older adults during physical activity, and found that both positive and negative values emerged including health benefits as positive, but negatives, such as time constraints, potentially outweighed the positives (Taylor & Pescatello, 2016). In contrast Kosteli et al. (2016) found that positive feelings that were promoted by physical activity proved to be strong predictors of future participation. This concept was also supported by Devereux-Fitzgerald et al. (2016) who stated that positive physical activity experiences increased the perceived value of the activity as well as the enjoyment. Devereux-Fitzgerald et al. emphasized that promotion of the enjoyment was a motivational issue, and acceptability is greater when there is a perception of enjoyment and subsequently value.

Research into physical activity in the older adult population lends itself to quantitative analysis through measurements such as interview, self-reported questionnaire or accelerometer data (Sun, Norman, & While, 2013). Self-report methods are limited by the ability of the participant to recall and by inability to accurately estimate the amount of physical activity (Falck, McDonald, Beets, Brazendale, & Liu-Ambrose, 2016). Accelerometer studies are more accurate but require greater skill for administration and interpretation and add to the cost of the study (Falck et al., 2016). Numbers gathered include metabolic equivalents, caloric expenditure, minutes of activity and frequency of activity, resulting in statistical data showing the number of older adults meeting physical activity recommendations or not. This can be further analyzed by age, gender, culture, residential, and socioeconomic status (Sun et al., 2013).

Although this activity data is very useful information, a primary limiting factor to this style of research is the volunteer participants or sample. It has been acknowledged that research of this nature attracted those older adults already physically active and those individuals who are sedentary are very hard to recruit for this type of study (Landers, Durand, Powell, Dibble, & Young, 2011). In addition to the sample limitations, statistical data failed to inform the reader as to why the older adult was physically active or not, and what methods or interventions could most appropriately be used to encourage participation (Devereux-Fitzgerald et al., 2016; Dionigi, 2006).

Qualitative research, with respect to physical activity participation is more limited and is needed to explore the motives and experiences of the older adult (Dionigi, 2006). Dionigi (2006) noted that qualitative work can often expose conflicting issues that failed to be revealed with quantitative data. Dionigi (2006) also exposed the fact that many older adults who competed in sports events said that they did so for fun on a survey, but, during interviews, admitted to enjoying the competitive element. Nyman (2011) emphasized the need to explore the psychosocial factors that influenced an older adult to participate in physical activity with specific reference to fall prevention. It has also been noted that the medical model and approach often failed to consider the psychosocial aspects of physical activity participation (Devereux-Fitzgerald et al., 2016; Nyman, 2011). Nyman stated that emphasizing positive benefits rather than negative issues was more predictive of physical activity participation, linking closely with resilience theory.

In summary there are many known benefits of participation in physical activity although few older adults met the activity recommendations (Chodzko-Zajko et al.,

2009). This failure to meet the recommendations appears to be due to multiple barriers, including perceptions of positive and negative implications and personal barriers such as health or time constraints (Taylor & Pescatello, 2016). Other concerns included the physical aspects of their immediate environment (Chaudhury et al., 2016), and lack of enjoyment in the activity. Quantitative data provides numbers but there is also a need for qualitative information to increase the understanding of motivation, perception and rational for participation in physical activity (Dionigi, 2006; Nyman, 2011). Developing a fuller understanding of all the perceived and real barriers and facilitators is a critical component of understanding the physical activity participation of the older adult.

Quantitative and Qualitative Review

Throughout the literature review, I included studies that utilized all methodologies, although the methodology used for research into physical activity, falls and fall related issues was predominantly quantitative. Work on the theoretical foundations included the mostly reported seminal works (Bandura, 1977; Deci & Ryan, 2000; Garmezy, 1985). Aspects of self-efficacy theory have been explored at both a quantitative and qualitative level, including the role of self-efficacy in schizophrenic clients, Wii fit games and understanding how patients felt after exercise programs (Cardenas et al., 2013; Chao et al., 2013; Fromholt Olsen et al., 2015). The work on resilience theory included interesting qualitative work as authors attempted to understand how and why individuals demonstrated resilience in adverse situations (Bolton et al., 2016), along with quantitative exploration of the concept which included optimal aging, and early life influences on resilience (Harris, Brett, Starr, Deary, & McIntosh, 2016;

Ong et al., 2009). There appeared to be minimal qualitative work involving self-

determination theory, and the quantitative work explored concepts such as motivation for

exercise, and the influence of gender on motivation (Ferrand et al., 2014; Guérin, Bales,

Sweet, & Fortier, 2012).

The research on physical activity presented both qualitative and quantitative

work, however quantitative predominated and allowed authors to demonstrate the ability

of exercise to combat depression (Heinzel, Lawrence, Kallies, Rapp, & Heissel, 2015)

and effects of physical activity on the frail older adult (de Labra, Guimaraes-Pinheiro,

Maseda, Lorenzo, & Millán-Calenti, 2015). Qualitative work on physical activity

included interviews to determine why older adults participated in sporting events (Kelley,

Little, Jong Seon, Birendra, & Henderson, 2014) as well as exploring the reasons why

individuals participated in physical activity (Kosteli et al., 2016). Falls and fall

prevention research presented with multiple systematic reviews and meta-analysis of

quantitative work which included the work by the American Geriatric Society (2001),

Gillespie et al. (2003) and Moyer (2012). Qualitative work included exploration of fear

of falling by Dingová and Králová (2017) as well as how best to present interventions

(Devereux-Fitzgerald et al., 2016; Elskamp et al., 2012). Interestingly Payette et al.

(2016) explored fall related psychological concerns from a quantitative perspective and

citing them, Dingová and Králová presented qualitative exploration of the same concept.

One of the very few mixed method approaches was presented by Johnson et al.

(2018) who looked at opinions on fall prevention and physical activity in the older adult.

This work allowed Johnson et al. to explore the opinions of the older adult with respect to

fall prevention, while quantifying their physical activity levels and then comparing the two. All the research styles and options offer diverse information on the issues being considered, however, overall, the quantitative approach dominated the work on physical activity and fall prevention and intervention in the older adult population, capturing the numbers but not always the reasons or perceptions of the individuals in the sample.

Summary and Conclusion

Themes emerging from the theoretical foundations included the need for individuals to retain autonomy through choice, and that behavior change can be influenced by the type of extrinsic or intrinsic motivation experienced by the individual (Deci & Ryan, 2000; Stephan et al., 2010). An individual must believe that they are capable of the behavior being considered, with prior success and role models playing an important role (Bandura, 1977). Finally overcoming adversity through external support, and the dynamic adaptation to challenges are critical components for resilience in the older adult (Southwick et al., 2014).

Themes that emerged from the fall prevention and intervention literature were a current lack of agreement on the primary method for fall risk identification and prevention. However, exercise or physical activity emerged to be the one common factor (Tricco et al., 2017). Presenting fall prevention interventions to the older adult is extremely challenging, and interventions that focused on negative issues, such as falls, appeared to be less successful than ones that focused on positive concepts such as health promotion (Goodwin et al., 2011; Mitchell et al., 2015). The majority of older adults failed to meet the recommended physical activity levels, and a greater understanding of

the psychological issues, rather than physical limitations, appeared to be an emerging

concept (Landers et al., 2016; Payette et al., 2016). Psychological issues surrounding

falls in the older adult included fear of falling, falls efficacy, and balance confidence

(Dingová & Králová, 2017; Payette et al., 2016).

Falls in the older adult population are extremely costly both financially and

personally, with one in three older adults falling annually and this number increased with

age (CDC, 2017). There was limited evidence and lack of agreement with respect to the

best ways to manage falls in the older adult population. There was however consensus

that physical activity, including structured exercise, was one of the best interventions for

managing falls in this population (Gillespie et al., 2003). Despite this knowledge, less

than 30% of older adults met the activity recommendations (Gorina, 2016), and

implementation and sustainability of physical activity and fall prevention programs for

older adults was very challenging (Nyman, 2011). The psychological issues surrounding

initiation and sustainment of physical activity in the older adult are extremely complex.

These included fear of falling, self-efficacy, and balance confidence issues, a desire for

positive messages rather than negative, and maintenance of autonomy, independence, and

identity (Dingová & Králová, 2017; W. Walker et al., 2011).

There was a lack of thorough research regarding the psychological issues, with

quantitative research providing data regarding lack of participation, and physical function

measurements. Qualitative research provided some insight as to why increasing physical

activity and fall prevention was challenging. However, qualitative work often looked at

more global issues, rather than specifics, surrounding fear of falling, and by nature of the

study design, often had a very small number of participants (Dingová & Králová, 2017; Elskamp et al., 2012). The theories of self-determination, self-efficacy, and resilience provided insight to the psychological and motivational issues surrounding behavior change. These included autonomy, competence, and relatedness (Ryan & Deci, 2000), intrinsic versus extrinsic issues and belief in oneself (Bandura, 1977), and promotion of positive concepts to overcome, adapt or resist adversity (G Windle, 2012).

The theories of self-determination, self-efficacy, and resilience are all multi-faceted, and fall prevention and risk is also a multi component concept, specifically when considering the psychological issues related to fear of falling, falls efficacy, and balance confidence (Dingová & Králová, 2017). What is not fully understood was the level of contribution of each of these psychological issues with respect to physical activity participation by the older adult.

I attempt to help fill the gap in the literature by providing a mixed method study. This methodology allowed quantitative data on psychological issues related to falls and physical activity to be collected, while simultaneously providing qualitative data that sought to understand the perspective of the older adult.

Goodwin et al. (2011) remarked that few studies utilized mixed methodology to research ways of implementing fall prevention evidence into programs. Goodwin et al. indicated that mixed method research was the ideal approach for work on determining fall prevention participation, and ability to change, as it demonstrated the numbers as well as the reasons for participation. Goodwin et al. remarked that most of the studies

restricted themselves to quantitative analysis which limited understanding of the

individuals involved, either participants or leaders (Goodwin et al., 2011).

Chapter 3: Research Method

Introduction

The purpose of this study was to explore the links between physical activity, fear of falling, self-efficacy, balance confidence, and resilience in the oldest old adult population, those over 80 years of age. To address this gap, I developed a concurrent mixed method approach, with established scales being used to explore any correlation between physical activity, fear of falling, self-efficacy, balance confidence, and resilience. Qualitative exploratory questions were presented to the participants and activity directors to further understand what would help older adults increase their physical activity and therefore how the medical profession could be of help.

In this chapter I consider the primary issues related to the research. I discuss the rational for using assisted living facilities and a time space sampling strategy along with the selection criteria for the participants and their recruitment. I explain the justification for mixed method research along with the rationale for concurrent data collection and the use of additional frameworks and critical realism paradigm. I introduce the role of the researcher and discuss any perceived power issues and bias. The instrumentation that I used is analyzed for validity and reliability and there is an explanation of the quantitative and qualitative data analysis procedures. Finally, I explain the issues of validity, rigor and trustworthiness including credibility, transferability, dependability, and confirmability with respect to this study. This chapter concludes with identification of the ethical issues that I presented to the IRB for this study.

Setting

Since the early 1990s, the assisted living setting has undergone significant development and growth in its provision of housing and services for the older adult population (Schwarz, 2001). There is significant variation in definition of assisted living, but it is generally agreed that assisted living falls between congregate housing and skilled nursing but can overlap both (Spitzer et al., 2004). Assisted living has also been described as a long term alternative providing personal and health care in a group setting while optimizing the individual's independence (Schwarz, 2001). Assisted living is also a location where residential and personal services are provided for older adults who either cannot fully care for themselves or chose not to live independently (United States Census Bureau, 2012). Overall, the descriptions of the assisted living environment imply that the older adult is encouraged to be as independent and autonomous as possible while receiving basic levels of help, primarily for higher level activities such as driving, housecleaning, and cooking, although many of the individuals also require assistance for bathing (Spitzer et al., 2004).

According to the National Center for Assisted Living (2018), currently more than 835,000 Americans live in assisted living facilities, 53% of whom are over 85 years old and another 30% are 75-84. The median stay in the facility is 22 months with 60% of residents transitioning to skilled nursing facilities due to higher medical needs (National Center for Assisted Living, 2018). With the aging of America, there is a growing emphasis on aging in place, and the traditional role of the assisted living as one step in the continuum of care is changing to that of a platform for the delivery of services that

change with the needs of the client (Spitzer et al., 2004). As a result, research looking at the future needs and designs of assisted living environments places a strong emphasis on wellness and fitness centers (Brecht et al., 2009).

These fitness and wellness centers, however, are not going to be utilized if the clientele is not motivated to participate in physical activity. Since sedentary behavior can speed up the physical decline of an individual and therefore hasten their transition to needing greater medical care (Watson et al., 2016), it is in the best interests of both the individuals and the facility to encourage physical activity. To accomplish this, staff need to understand how to motivate the older adults to participate. With over 80% of the residents of the assisted living environment aged over 75, it is an ideal location for research aimed at the population of older adults over 80. This research study also provides critical information for the planning and development of physical activity programs within the facilities to maximize the health and well-being of the clients.

Research Design and Rationale

The overriding goal of this research was to explore why so few older adults meet the physical activity guidelines. Specific research questions were as follows:

RQ1 (Quantitative): What is the influence of each of the predictor variables of fear of falling, self-efficacy, balance confidence, or resilience, on physical activity participation by adults over the age of 80?

RQ2 (Qualitative): What motivates or limits older adults in being physically active?

The concept of mixed method research has developed significantly since it was initially introduced in the 1950s, and more formally initiated in the late 1980s (McKim, 2017). The idea behind mixed method research is not simply that two methods are used, but that the data from the two different methods is integrated to provide depth and richness to answer the research question (Plano Clark & Ivankova, 2016). It has also been argued that mixed method research allows for the two methods to make up for the strengths and weaknesses of the other (Shannon-Baker, 2016), while also demonstrating that the two methods do not compete but complement each other by increasing flexibility and understanding of the research question (Mertens et al., 2016).

Various frameworks for mixed method research have been suggested, including a linear style triangulation framework (Turner, Cardinal, & Burton, 2017), and a circular style socioecological framework (Plano Clark & Ivankova, 2016). This circular framework places the research question and the two methodologies in the center, and then radiates out with guiding concepts and questions that the researcher must address as they plan and develop their work. Of primary importance is the need for the researcher to define mixed method work, and many definitions have emerged since its initiation. Defining mixed method research is a concept still under consideration in the field (Mertens et al., 2016), but the idea of integration of the different data to provide a better answer to the research questions would define the purpose of this study (Plano Clark & Ivankova, 2016; Turner et al., 2017). In the center of the socioecological framework, further questions for the researcher include deciding on the timing of data collection.

Concurrent data collection is generally used when a more comprehensive understanding of factors influencing a topic are being explored, such as physical activity in the older adult (Plano Clark & Ivankova, 2016). Plano Clark & Ivankova (2016) indicated that sequential data collection is more for theory development and understanding. A second area that needs consideration is the weighting of the two methods within mixed method research, whether one set of data is going to influence the study more than the other (Plano Clark & Ivankova, 2016). This study was designed to keep both methods of equal weighting, although it was anticipated that during the analysis stage one might emerge as more influential than the other. However, this did not occur, and both remained equally weighted throughout.

Further considerations for mixed method researchers include the use of other frameworks such as theories or paradigms (Shannon-Baker, 2016). Shannon-Baker (2016) discussed the critical realism paradigm, which is a framework that explores causal relationships using theory to guide the research process. In this study, I used the theories of self-efficacy, self-determination, and resilience as a framework for guidance. Shannon-Baker also indicated that critical realism emphasizes how emotions and mental perspectives are important in the mixed method work, allowing the emergence of perspectives and understanding rather than just statistics, which was the primary purpose of my study.

Plano Clark and Ivankova (2016) added final broader circles on the outside of their socioecological framework for mixed method research, which included the influences of the research team and participants, the influence of journal editors and

professional bodies, and the influence of the institution and IRB process. Some of these areas were critical in the adoption of mixed method research for my study. The medical profession still has limited qualitative or mixed method research (McKim, 2017), despite arguments that randomized controlled trials fail to capture the true picture of the effect on the patient (R. B. Johnson & Schoonenboom, 2016). As a result, I chose mixed method work for this research to ensure that a depth of understanding from the participants perspective was gained. I appreciated that Walden University supported and encouraged the use of mixed method work.

The purpose of this study was to explore the psychological and other factors that influence physical activity participation in those over 80 years of age. The surveys that I used were well-established and had all been validated and demonstrated reliability. These surveys allowed me to statistically determine the influences of self-efficacy, balance confidence, fear of falling, and resilience with relation to physical activity levels. The statistics however could not answer why or what else might influence older adults and what motivates or limits them in their physical activity. These concepts could only be explored through qualitative data collection. The strength of mixed method research is that the two are combined both at collection and analysis, allowing the data to provide a rich, thorough examination of the topic. I hope that this understanding of factors that influence physical activity participation will improve future program development.

Role of the Researcher

I was a participant throughout the work but in various roles. Initially I worked in an administrative role, meeting the different individuals at the various facilities to gain

the letter of approval, determining the key activity directors in the facility, and finally

setting a date and time for the information session and data collection. Once the date had

been decided, posters were provided to the facility to advertise the event, and I presented

an information session describing the nature of the study prior to the event to increase

interest and potential participation. At the information session, a flier explaining the

details of the research was handed out to allow the residents time to consider their interest

in participation. On the agreed date for the data collection event, usually just a few days

after the information session, I set up in the approved location with identifying materials,

data collection materials, pens, clipboards and the small appreciation gifts. I also ensured

that there was water available for the participants.

During the data collection I was again a participant, this time working directly

with each resident who was willing to participate in the study by completing the informed

consent form. I used repeat verbalization from the participant regarding the nature of the

study and the right to withdraw as a way of demonstrating the participants ability to

proceed with the study. I also collected the quantitative demographic data with the

participant to ensure it was fully completed and the participant understood the optional

nature of the contact information. On completion of the informed consent, I gave the

participants a package containing both the quantitative and qualitative survey questions

and set them up comfortably to complete it.

The participants were all given the option to return to their own room or a private

location to complete the survey, although most chose to remain in the primary location.

Those who did leave the immediate area coordinated with me regarding collection of the

completed survey and administration of their gift. I was available throughout the data collection process to answer questions, but the participants were encouraged to complete the package independently to avoid any influence by me. During the completion of the package, I participated as a coordinator for the quantitative component, to ensure that the participant understood and completed the materials. When the participants were answering the qualitative question, I probed them, where appropriate, to add examples to their answers, thereby acting in a facilitator role for the qualitative work.

During the interviews with the activity directors, I was participating as the interviewer and asked the preset interview questions and probed for additional details and more examples as appropriate.

The primary reason for a time space sampling concept was to ensure that participants were not sought only after, or in conjunction, with an exercise-based activity. The timing in most of the facilities coincided with resident ambulation or transportation from the dining room after meals, or at the end of a general resident event such as a town hall meeting. These types of timing ensured that all residents were equally available.

Other ethical issues involved with this study included the fact that older adults over 80 years are considered vulnerable adults. Careful wording in the informed consent assured all participants of their ability to stop or withdraw at any time, continue later, or terminate their participation, and a few participants did choose to leave the study before completing all of the survey package (see Appendixes A,B,C).

The use of incentives is a challenging topic, however Liljas et al. (2017) remarked that monetary gifts, refreshments or prizes were shown to encourage participation by the

older adult population. In the assisted living environment, residents do not generally

require monetary gifts, as they rarely go shopping, or refreshments, as food and snacks

are available to them all day. During the data collection time water or coffee was

available in all the locations, but it was also decided that a small gift for their room would

be offered. Hand soap, lotion, or after shave was presented at the end of the survey

completion, or when the participant left if they chose to leave early. This decision to add

a gift was in anticipation that it would be appreciated and might promote increased

participation (Liljas et al., 2017). The expressed gratification of the participants for the

small gift justified the decision.

Methodology

Participant Selection Logic

The older adult population over 80 years of age is a hard to reach population,

particularly with respect to research on health promotion (Liljas et al., 2017). Lijas et al.

(2017) emphasized the need to engage community connections, use professionals for

informed consent, flexibility in timing and the importance of the location of the study.

The concept of using a facility for sampling and subsequent snowball sampling has been

widely used, but is subject to significant responder bias (Magnani, Sabin, Saidel, &

Heckathorn, 2005). A sampling strategy that has been particularly successful for hard to

reach populations is that of time-space or time-location sampling (Semaan, 2010). Time-

space sampling has been used, successfully, for challenging research such as risky sexual

behavior (Stueve et al., 2001), and adolescent club drug use and behavior (Grov, Kelly, &

Parsons, 2009). Although it is primarily designed for access to individuals potentially

engaging in risky or illegal behavior, the concepts of time-space sampling presented an interesting option for working with the older adult population.

Sample data should be representative of the population under consideration to allow greater generalization, and the procedure for sampling should ensure that potentially all members of the population could be reached (Magnani et al., 2005). Using facilities such as senior centers, renders the research specific to those adults capable and willing to use the facility, while snowball sampling can have a bias towards those initially recruited since they are likely to identify others similar to themselves (Magnani et al., 2005), as a result I chose to use a time space sampling concept. Semaan (2010) talked about three stages for time space sampling, the first being formative, basic information gathering, then preparatory, which is interviews with key personnel to determine appropriate locations, and finally the sampling phase where the data is collected (Semaan, 2010).

Time-space sampling identifies locations and times where the population under consideration may be congregating and creates a venue-day-time unit (VDT) when the researcher will be present (Semaan, 2010). Utilizing this concept, working with the activity directors or administrators of the facilities, I established VDT units in several facilities, and during that time, data collection was achieved from subjects who met the selection criteria. High profile locations were utilized. These included the primary activity area immediately following a town hall meeting, a bistro style sitting room near the dining area following breakfast, the library of the facility mid-morning, and the computer room of a facility throughout the morning. These locations, along with the

publicity and the previously presented information session, ensured that anyone residing in the facility had an equal chance of participating in the research.

Prior to the data collection event, I presented an information session explaining the nature and intent of the research and answered all the residents' questions. These included approximate time required for the surveys, if there was provision for those visually impaired, and why the research was being done. A flier detailing the intent and nature of the study was made available at the information session for the residents to take and read as they considered their interest in participating.

Participants were required to meet the selection criterion which included being over 80 years of age and the ability to speak and read English, since all the instruments used were developed and validated in English. Ability to comprehend and sign the informed consent was critical so that the participants were fully aware of their rights and understood the research protocols. Determination of meeting this criterion was established by the participants being asked to repeat the primary objectives of the study and confirm their right to refuse or withdraw at any time, prior to signing the informed consent. Residents who had legal guardians were a special consideration. I worked with the administrators of the facilities, to access the guardian, and obtain consent, for any individual with legal guardianship who expressed interest in participating in the study. This was the case with two of the participants.

Calculating sample size for quantitative studies can be achieved using suggestions made by Cohen (1988). Multiple regression analysis demonstrates effect size through R^2 and Cohen recommended that small be considered $< .13$, medium $.13 - .26$ and large $>.26$

(Cohen, 1988). In addition to the work of Cohen, Tabachnick and Fidell (2001)

suggested a formula for the calculation of sample size for a regression analysis study, as

follows:

$N >= (8/f^2) + (m\text{-}1)$

Where: $f^2 = R^2/(1\text{-}R^2)$

M = number of predictor variables (Tabachnick & Fidell, 2001).

Calculations using this formula were conducted using a conservative estimate of a

small effect size .13 and with four predictor variables. This resulted in the

recommendation of a sample of a minimum of 57 individuals, calculations with medium

and large effect size were 26 and 15 respectively while a very conservative effect size of

.06 suggested a minimum of 130 participants. I therefore decided that an ideal sample

size would be a sample of 75 individuals which would allow for any who might withdraw

or who were unable to complete the surveys, however the minimum goal was for a

sample of 60. This minimum goal reflected similar size samples in comparable work.

The work by Landers et al. (2016), which demonstrated psychological issues were more

predictive of falls than physical issues, had a total of 64 participants, while Alexander et

al. (2015) had 31 individuals from an independent living setting and Leung et al. used

114 participants specifically from assisted living locations, which was the setting for this

study (Alexander, Sartor-Glittenberg, Bordenave, & Bordenave, 2015; Landers et al.,

2016; Leung et al., 2017).

A study of meta-analysis and systematic reviews demonstrated similar but

generally lower sample sizes except where large multi-national site studies were

performed. Looking at balance and physical activity in the older adult, the sample size averaged 61 participants, and when the two studies that included over 100 participants were excluded the remaining studies had a sample size of an average of 54 subjects (McMullan et al., 2018). Similarly a review of studies regarding physical activity and osteoarthritis presented an average sample size of 39 when the large multicenter sites of over 1000 participants were removed (Wallis, Webster, Levinger, & Taylor, 2013). It would therefore appear that the original calculation of 57 could prove adequate, with an aim of 60 to allow for drop out and a lofty goal of 75 to further strengthen the statistical analysis.

Qualitative work proposes sample size differently, and the primary focus for qualitative work is often considered to be the concept of saturation, however this has been criticized (Hennink, Kaiser, & Marconi, 2017). Hennink et al. (2017) discussed the fact that within a study, emergence of new themes can reach saturation after nine in depth interviews, but fully understanding the meaning of the themes can take 16-24 interviews. Hennink et al. (2017) emphasized the need to not just hear the information but truly understand it. Walker (2012) discussed the fact that the idea of saturation emerged with grounded theory research where the researcher was developing a theory from the data, however many researchers failed to report how they determined that saturation had been reached (J. L. Walker, 2012). Walker remarked that for qualitative description, where a study is, for example, examining the reason behind physical activity participation, saturation would be once the information became repetitive and should be reported as the reason for the sample size.

O'Reilly and Parker (2013) remarked that transparency was more important than saturation and commented that the emergence of themes can be limitless, therefore saturation would never be achieved. O'Reilly and Parker also commented on the difference between deductive work that is trying to confirm an idea, versus inductive, which is trying to develop an idea, and saturation in these two approaches is very different. O'Reilly and Parker also remarked that the sample should be made up of individuals who best represented the topic being explored, and that transparency of the method for data collection was more important than the concept of saturation (O'Reilly & Parker, 2013). Boddy (2016) indicated that qualitative samples can be too big, thereby yielding unwieldy amounts of data that challenged accurate interpretation, but that the concept of in-depth can have different interpretations and produce very different amounts of data (Boddy, 2016).

Saturation is discussed at length by Mason (2010) in an analysis of Ph.D. studies and their choice of sample size. Mason argued that the experience of the interviewer can be significant in the achievement of saturation, since an experienced author may get all themes covered in relatively fewer interviews (Mason, 2010). Mason also discussed the fact that specific numbers are often used, in many cases influenced by IRB requirements or university protocols, and demonstrated that numbers ending in 0 tended to be preferred with a median of 28 participants over 560 studies, with a range of 1–95 participants Mason also discussed the fact that even though some researchers suggested suitable numbers for different types of qualitative work, their rationale for the choice of number was rarely offered (Mason, 2010). O'Reilly and Parker (2013) remarked that many

researchers stop recruiting participants when time or money become limited rather than when the sample was adequate. In general, it was agreed that transparency of the decision for the sample size, and rationale for ending recruitment should be appropriately reported rather than just stating that saturation occurred (O'Reilly & Parker, 2013; J. L. Walker, 2012).

I modeled the mixed method approach used by Johnson et al. (2018) where they added an open-ended question to the end of their survey. Johnson et al. (2018)mailed 525 surveys and received 378 back of which 262 had answered the open ended qualitative question. The primary difference between my study and that of Johnson et al. is that I worked with the participants in person, so there was the opportunity to encourage them all to answer the open-ended question, which was the case, although a few participants opted to only answer motivation or limitation and not both. The participants were specifically asked to give examples where appropriate. Open ended questions with the opportunity to probe for more detail is strongly recommended in qualitative work (Rubin & Rubin, 2012).

While this method yielded significant amounts of data, since almost all the participants completed the qualitative questions, the fact that the answers were already written down and based on only two questions made the data manageable and the larger sample, for qualitative work, did ensure that the elusive concept of saturation was achieved. As anticipated, few new ideas emerged after the first 25 participants, but the availability of greater data allowed further consolidation and integration of the qualitative work. Interestingly, Miller and Brown (2017) remarked that in their study on motivators

for physical activity, they thought they had reached saturation after five interviews, but then new data emerged as they started to incorporate some male subjects. This demonstrated the fact that saturation may not always be achieved through the smaller numbers. Lewis, (2009) anticipated that qualitative answers could be used to explain some of the outliers in the quantitative data, where applicable, while acknowledging their existence (Lewis, 2009).

I further triangulated the data through interviews with the activity staff at the assisted living, where questions were asked regarding motivation and limitation of physical activities and I prompted the interviewees to give more details and examples. Triangulation is a major factor in mixed method research and can include comparison between the quantitative and qualitative material as well as additional qualitative work (Withall, Jago, & Fox, 2011). Withall et al. (2011) used two different groups of individuals for their qualitative data collection to increase the triangulation. I used a similar concept by including the activity director perspectives. Since most assisted living facilities have one primary activities director, the number was limited to the number of facilities used. One facility was experiencing an interim between activity directors due to a recent retirement, so no one was available for interview, while at another facility two directors agreed to participate. In total five interviews with staff from activity departments were included in the study, adding a level of triangulation for the data.

The plan for recruitment of participants involved identification of assisted living facilities in the city of San Marcos and surrounding locations in Southern California. A quick Google search revealed seven locations within the city of San Marcos, with

significantly more facilities within a 30-mile radius. The management and/or activity directors of the facilities were contacted with an initial request, followed by a meeting where the full details of the study procedure were explained. At this meeting, key facility staff, namely activity directors, were identified and permission was sought from management to interview these personnel, subject to their agreement. The activity directors were then individually approached to determine their willingness to participate, they were given a flier with more information and time to consider their willingness to participate. If agreeable, a time was set for their interview, usually on the same day, but after, the resident data collection. If the employee did not wish the facility to know they participated, a confidential number to the researcher was provided on the flier giving them the option to arrange the interview confidentially, however none of the employees chose this option.

To promote interest at the facilities posters were provided prior to the agreed dates, to allow for publicity of the study, and a description of the study appropriate for the facility newsletter was also provided. Finally, prior to the data collection date, I offered an information session for the residents at which the details of the study were presented, and all their questions were answered. A detailed flier explaining the study was handed out at this event for the residents to use when considering participation. Within the concept of time space sampling, a high traffic location within the facility was identified and on the established date, I set up in the provided location, with all residents who passed through the location, and met the criteria of being over 80 years of age, being eligible to participate in the research. Individuals who were at the information session

were invited to participate immediately, and residents not at the information session were given the detailed flier explaining the research and given time to consider if they wished to participate. I worked directly with all the residents who agreed to complete the surveys. This procedure was repeated in six different assisted living locations to achieve the sample size goal, $N = 76$.

Interviews with the activity directors all occurred at the end of the time space sampling period. The format of these interviews were the completion of the informed consent for activity directors, followed by a recorded interview in which I asked the questions and then, as needed, I probed for examples and further clarification (Rubin & Rubin, 2012). The interviews were all conducted in a private location such as an office or empty conference room.

Instrumentation

Qualitative Instrumentation

The qualitative questions that were used for the older adult participants consisted of a two-part question to which they hand wrote the answer during the data collection process. The questions were:

- What motivates you to be physically active? Please give examples.

- What limits you from being physically active? Please give examples.

Miller and Brown (2017) presented a qualitative research study into facilitators and barriers to physical activity in the older adult. Their research questions were similar to those used in this study, including what stimuli are responsible for motivation toward physical activity, factors that facilitate, and then perceived barriers toward being

physically active. Miller and Brown, (2017) however used multiple interview questions

for each of their research questions including, what makes the individual go to the gym,

do they enjoy exercise, does the location make it easier for them, does their health limit

them?

Miller and Brown (2017) remarked that the list of questions they provided was

not exhaustive and not all questions were always used in the interview, but the questions

were tailored to each individual participant. Miller and Brown acknowledged that effort

was made not to ask leading questions but itemizing the questions to include for example,

the gym, enjoyment, socialization, and stress appeared to add some bias to the

respondent. I decided that the question in this study would be kept specific to motivation

and limitations. Participants could and did include any concept that they believed

allowed or limited their physical activity. The request for examples was a standard

procedure in qualitative work and prompts individuals to expand on their answers (Rubin

& Rubin, 2012).

Interviews with the activity directors of the specific assisted living facilities

followed similar guidelines, focused on simplicity and trying not to ask leading questions.

The interview questions were:

- What do you think motivates your residents to being physically active? Please
  give examples.
- What do you feel limits your residents from being physically active? Please give
  examples.

I encouraged examples for each question and probed where appropriate for more details or clarification.

Construct validity considers the idea of whether the best explanation is chosen for applying the data to the theories being used (Haig, 2012). Newton (2012) also remarked on the need for ensuring that the test, or questions, were suitable for measuring the concepts under consideration. In qualitative work this requires the questions to be appropriate for obtaining the desired data. The questions in my research study were designed to maintain simplicity and directness but ensuring the addition of examples. In the quantitative data collection I focused on specific psychological aspects and theories, while the qualitative concept approached the work more broadly, and, as I had anticipated did not necessarily yield psychological factors, but other issues that were important for participation in physical activity. Triangulation between the quantitative data and the two different sources of qualitative data further add to the construct validity of the study. Qualitative question sheets are found in Appendix A.

Quantitative Instrumentation

Demographic Data

It is critical that there is an understanding of the sample population, and to provide appropriate information in the study to allow the reader to consider if generalizability is possible. Shenton (2004) discussed the fact that generalizability is limited within qualitative work due to the smaller sample sizes but remarked that if the reader of the research can relate their own sample population to that of the study, then transferability was improved. As such it is critical to accurately and thoroughly describe

the sample population and to do this an initial data sheet of demographic information was collected. This information included the following

- Name, to allow subsequent follow up as needed. The name was kept separately from the data.

- Contact number (optional), to allow follow up as needed. This was also kept separately from the data and was not provided by most of the participants.

- Age and date of birth, to ensure that the participants meet the inclusion criteria of being over 80.

- Gender, for sample description purposes.

- Ethnicity, for sample description purposes.

- Basic medical history, including yes/no questions covering a history of arthritis, heart condition, high blood pressure, diabetes, lung conditions, osteoporosis, and neurological conditions. These are common conditions found in the older adult population and allowed for further assessment of the sample population adding the option to control for within the regression analysis.

- History of falls within the past 6 months, to gain a fuller assessment of the sample population adding the option to control for within the regression analysis.

Demographic data sheet is found in Appendix B.

Falls-Efficacy Scale International

In 1990 the original Falls Efficacy Scale (FES) was introduced by Tinetti, Richman, and Powell as a measure designed to assess fear of falling through evaluation of an individual's rating of their fear of falling while performing certain basic daily activities (Tinetti, Richman, & Powell, 1990). The 10-item scale was scored on a 1-10 Likert scale which was subsequently lowered to a 4 item Likert scale, ranging from not at all concerned, to very concerned (Yardley et al., 2005). Despite the changes, the scale continued to be criticized, although it had excellent psychometric properties, for its concentration on very basic functional activities. As a result it failed to capture the more demanding activities generally performed by community dwelling older adults, and there was a lack of investigation into social activities (Yardley et al., 2005). As a result, in 2005, Yardley et al. investigated the possibility of a 16-item scale, the FES–I.

This new 16 item scale added more demanding activities such as walking in a crowded area, walking on a slope and included social situations such as visiting a friend and going to a social event. Initial evaluation of the scale was performed on 673 participants with a mean age of 74.7 (SD 7.10). Internal reliability, Cronbach's $\alpha = 0.96$, test-retest reliability, intraclass correlation coefficient (ICC) $= 0.96$ (Yardley et al., 2005). The demonstrated reliability of the FES-I was as good as the existing FES and the authors felt that they had managed to change the concept to concern about falling rather than fear of falling, thereby capturing the emotion but without the intensity that the word fear created. Yardley et al. (2005) felt that this new scale would be particularly useful for

higher functioning community dwelling older adults due to its inclusion of the higher functioning items and the social component.

In 2010, Delbaere et al. investigated the FES-I through a longitudinal validation study and were able to establish cut off points on the scale to predict low, moderate, and high concern for falling. Delbaere et al.were also able to determine that the more recently released short version of the FES-I demonstrated similar validity and reliability compared to the initial validation study of the FES (Delbaere et al., 2010). The short FES-I had been introduced in 2008 and contained only 7 items from the FES-I chosen to avoid duplication and maximize discrimination between those who had and had not fallen (Kempen et al., 2008).

The short version demonstrated excellent test-retest reliability with Cronbach's α = 0.92 and ICC = 0.83, with the correlation between the FES-I and the short FES-I at 0.97. These authors recommended use of the short version in a clinical setting but the longer version for research studies as the FES-I demonstrated higher discrimination between groups by age, gender and fall history although the differences were small (Kempen et al., 2008). In 2014, Hill, McMeekin and Parry reassessed the internal validity of the FES-I and found it even stronger than originally noted by Yardley et al. in 2005. Hill et al. concluded that the FES-I directly measures the single factor of fear of falling (Hill, McMeekin, & Parry, 2014). I therefore decided to use the FES-I as developed by Yardley et al. in this study. The test is permitted for reproduction and use in non-commercial research and educational purposes with no additional written permission required. Copy of the test can be found in Appendix C.

Activities Specific Balance Confidence Scale

In 1995, Powell and Myers determined a need for a scale that could asses balance confidence during a variety of activities, including activities of a higher level that might be undertaken by the community dwelling older adult population (Powell & Myers, 1995). Powell and Myers, (1995) developed a 16 item scale in which participants rated their confidence level from 0%, no confidence, to 100% total confidence, and the scores were then averaged to reveal the ABC score (Powell & Myers, 1995; Skipper & Ellis, 2015). In 2004, Lajoie and Gallagher were able to establish a cut off score of 67%, above which the participant presented a low fall risk and below 67% indicated an increased fall risk (Lajoie & Gallagher, 2004).

Powell and Mayers (1995) tested their scale on 60 community dwelling older adults aged between 65 and 95 but with no mean indicated, and demonstrated excellent psychometric properties for the scale, with Cronbach's $\alpha = .96$. In 2014, Cleary and Skornyakov tested the ABC on 44 community dwelling older adults with a mean age of 84.2 and demonstrated a total ICC of 0.879 demonstrating good test-retest reliability (Cleary & Skornyakov, 2014). Interestingly Cleary and Skornyakov, (2014) remarked that one item, that of reaching for a small can at eye level, performed poorly with an ICC of 0.340, with several other items scoring just below 0.75 which they considered the minimally acceptable test retest reliability score. Cleary and Skornyakov, (2014) also remarked that their high Cronbachs $\alpha = 0.973$ revealed the probability of item redundancy and referred to the six item ABC.

In 2006 a short version, or six item, version of the ABC was suggested and tested on 157 older adults (Peretz et al., 2006). Peretz et al. (2006) identified the items from the original 16 item ABC that scored the lowest, thereby indicating severe lack of confidence and proposed the six item ABC. Their test demonstrated Cronbach's α = 0.81–0.90 on the individual items and an ICC of 0.78 in community dwelling older adults. Peretz et al. (2006) concluded that the six item scale had psychometric properties that were comparable to the original 16 item scale.

Since its introduction, the short version of the ABC has undergone further analysis. Schepens, Goldberg and Wallace (2010) confirmed that it was a valid measurement of balance confidence in community dwelling older adults, and that the short version truly represented the more challenging balance activities that older adults may have to undertake. Schepens et al. also found that the short version was better at distinguishing between fallers and non-fallers and, being shorter, recommended it as a more clinic friendly assessment of balance confidence. Schepens et al. also emphasized that the shorter version had removed most of the items that might have inflated the original scale, and be a more accurate assessment of balance confidence in the older adult (Schepens, Goldberg, & Wallace, 2010).

Recently, Skipper and Ellis (2015) tested the short version of the ABC on 251 underserved older adults with a mean age of 71 and demonstrated excellent internal reliability with Cronbach's α = .90 and an ICC of .81 ($p<.01$). Skipper and Ellis also performed a multiple regression analysis and found that the short ABC was the only variable used that could predict total fall risk. As a result, I decided to utilize the ABC-6

or short version of the ABC, to decrease time taken for testing, and to eliminate the redundancy and inflation of the lower level items, thereby increasing accuracy of balance confidence measurements. The short version of the ABC is freely available for non-commercial research and education purposes (Peretz et al., 2006). Copy of the test can be found in Appendix C.

Geriatric Fear of Falling Measure

The fear of falling is a challenging concept to objectively measure. Historically the most popular way to measure fear of falling was a simple dichotomous question, yes or no are you afraid? (Huang, 2006). Simple Likert scales have also been used with either numeric boundaries 1–10 or descriptions such as very much, somewhat or not at all (Huang, 2006). Alternatively, researchers have used the FES and the ABC, but it has now been established that fear of falling is a different concept to falls efficacy and balance confidence and should be measured separately (Hadjistavropoulos, Delbaere, & Fitzgerald, 2011).

To separate the concept of fear of falling, the GFFM was developed by Huang (2006) and specifically includes psychological and social concerns that may influence the fear of falling. The scale comprised of 15 items scored from 1 (never) to 5 (always) with the total score ranging from 15–75 and higher scores demonstrating a greater fear of falling (Chen, Edwards, & Janke, 2017). The scale included questions that cover the concepts of risk prevention, modifying behavior, and psychosomatic symptoms (Huang, 2006). The scale was initially developed and tested on Taiwanese older adults and demonstrated Cronbach's $\alpha = 0.86$ (Huang, 2006). In 2009 it was compared to the FES

and ABC and demonstrated Cronbach's α = 0.88 and also demonstrated the ability to detect change over an 8 week period, which the FES and ABC were unable to achieve (Huang & Wang, 2009).

Despite the good psychometric properties of the GFFM, little work has been done on community dwelling older adults in the United States. To address this deficit, Chen, Edwards and Janke (2017) conducted psychometric testing on 88 older adults in the United States, emphasizing that falls efficacy and fear of falling are correlated but unique constructs and therefore a good measurement of fear of falling was needed (Chen et al., 2017). Chen et al. demonstrated a Cronbach's α = 0.84 and ICC = .79, on a sample with a mean age of 77 from community centers and independent living facilities. Chen et al. complimented the scale for not asking older adults to rate their fear based on hypothetical situations and the incorporation of full details of an activity. Chen et al. did however remark that the items from the psychosomatic subscale did not score as well as the other items, and it was considered that cultural differences influenced the wording, which may not be as relevant to older adults in the United States. The GFFM is freely available for non-commercial research and educational purposes with no additional permission required. Copy of the test can be found in Appendix C.

Physical Activity Scale for the Elderly

Measuring physical activity levels in the older adult is challenging and is currently limited to two primary methods, self-reported recall, considered indirect, or using accelerometer or pedometer testing considered direct measurement (Kowalski et al., 2012). The benefits of indirect measurement, through survey or questionnaires

include cost, time, and minimal interference with the daily life of the older adult

(Kowalski et al., 2012). In contrast, direct measurements are more expensive, more time

consuming for the researcher, and intrusive for the participant, with probability that the

participant may change their habits knowing they are being monitored (Kowalski et al.,

2012). Surveys however have demonstrated a strong probability of both under and over

estimation by the older adult which needs to be considered by any researcher (Prince et

al., 2008).

The PASE was introduced in 1993 by Washburn, Smith, Jette and Janney, it was

specifically designed to look at activity levels of the older adult population (Washburn et

al., 1993). The original study involved a sample of 277 community dwelling older adults

and showed good validity through significant correlation with measures of health status

including grip strength, leg strength, and sickness impact profile (Washburn, McAuley,

Katula, Mihalko, & Boileau, 1999). Additional validity was determined in 1999 on

sedentary older adults with significant correlation between the scale and physiologic

issues (Washburn et al., 1999). That same year Washburn and Ficker compared the

PASE with accelerometer testing and found significant correlation, concluding that the

PASE was a valid measure of activity in the older adult. Interestingly, Prince et al.

(2008) remarked that correlation testing measures the strength of the relationship between

the direct and indirect measurements but does not asses the level of agreement between

the two measures, recommending additional testing to determine how appropriate it is to

substitute a survey for pedometers or accelerometers.

In 2004, the PASE was assessed through comparison with Actigraph monitors and the PASE was found to be a stable valid instrument for assessing the older population (Dinger, Oman, Taylor, Vesely, & Able, 2004). However, Ewald, McEvoy and Attia (2010) found that pedometers were more accurate for assessing overall physical activity, to specifically identify health indicators such as body mass index (Ewald, McEvoy, & Attia, 2010). Likewise, it was found that the PASE cannot be used to predict specific health measures such as body composition or cardiovascular parameters (Logan, Gottlieb, Maitland, Meegan, & Spriet, 2013).

When working with the older adult, it is critical that the measure is appropriate to their types of activity. Walking is frequently a major component of physical activity for the older adult, and the measurement tool needs to capture walking and other lower intensity activities as well as shorter periods of activity (Kowalski et al., 2012). The PASE was specifically developed for the older adult population and has demonstrated adequate validity (Dinger et al., 2004; Washburn & Ficker, 1999; Washburn et al., 1999; Washburn et al., 1993). As a survey it is quick to administer, is non-intrusive for the participant, and cost effective. However, it has been suggested that this survey is administered in person to provide an opportunity for clarification for the older adult participant, a concept that is estimated to improve comprehension and compliance (Chase, 2013). Copyright is held by the New England Research Institute and is available for research for a nominal fee (New England Research Institutes, 2018). Copy of permission to use can be found in Appendix D.

Connor-Davidson Resilience Scale

The CD-RISC was introduced in 2003 as a much needed measure for the growing

interest in resilience (Connor & Davidson, 2003). The content for the scale was chosen

from various sources which, at the time, were the primary concepts of resilience. These

included hardiness and control, developing strategies with clear goals, self-esteem, humor

when dealing with stress, and the strengthening effects of stress (Connor & Davidson,

2003). The scale that was developed by Connor and Davidson contained 25 items each

with a 5-point scoring range from not true at all, scored at 0, to true nearly all of the time,

scored at 4. The scale is based on how the person felt over the month prior to testing, and

has a final score ranging from 0–100, with higher scores demonstrating greater resilience

(Connor & Davidson, 2003). According to their website, the mean score for the general

population is 80.7, with the mean score for those individuals with generalized anxiety

being 62.4 ("CDRISC. The Connor-Davidson resilience scale," 2016). Reliability and

validity were tested by the authors with Cronbach's $\alpha = 0.89$ and ICC of 0.87. The

authors tested both the general population, and clinical samples, and concluded that the

CD-RISC was able to quantify resilience, and was sensitive enough to detect changes in

individuals receiving treatment (Connor & Davidson, 2003).

In 2008 the CD-RISC was used to measure resilience in community dwelling

older women due to the growing interest in healthy aging (Lamond et al., 2008). Lamond

et al. (2008) remarked that prior to their study they were not aware of the CD-RISC being

used on the older adult population, but that it had demonstrated excellent psychometrics

on younger populations. Lamond et al. (2008) found the ICC to be 0.92 in their sample,

very comparable to that of Connor and Davidson, and concluded that the psychometric

properties of the CD-RISC in the older adult were good. In 2016, Gulbrandsen offered a

review of the literature and concluded that the CD-RISC was a reliable and valid scale

that could be used on older adult populations. An additional systematic review of the

CD-RISC in older adults also confirmed that it was an appropriate scale to use, but

acknowledged the smaller sample sizes of the studies reviewed (Cosco, Kaushal,

Richards, Kuh, & Stafford, 2016).

The scale is copyrighted and is not available in the public domain. No printed

versions are authorized in articles or dissertations, and some unauthorized and incorrect

versions can be found. The genuine scale is available for purchase on the Connor-

Davidson website for research and clinical application, and once purchased can be used

as indicated in the application, but the scale can never be published in full ("CDRISC.

The Connor-Davidson resilience scale," 2016). Copy of permission to use can be found

in Appendix E.

Procedures for Recruitment, Participation and Data Collection

A working relationship with various assisted living facilities in Southern

California was established. After obtaining approval from management, and completion

of the IRB process, the activity directors were contacted to establish, a venue-day-time

unit (VDU) for the resident data collection and a date for the information session. At this

time the activity directors also had their interview explained to them, they were given the

explanatory flier, and allowed time to consider if they would be willing to participate.

The venue-day-time unit was determined based on anticipated high traffic, for example

after a meal or popular activity that a majority of the residents attend (Semaan, 2010). It

has been shown that incorporating research into planned activities or programs can be

beneficial with the older populations, ensuring minimal diversion from their normal

routines (Liljas et al., 2017). Prior to the agreed venue day time unit, I provided the

information session for the residents. This was typically at an event such as resident

council meeting, where I explained the purpose, design and method of the research . All

questions were answered at the information session and a detailed flier repeating the

purpose and method of the study was given out. At the established venue day time unit, I

set up and any resident that met the criteria of being over 80 was invited to participate.

Those not at the information session were given the detailed flier and given time to

consider their interest in participating. Ability to comprehend spoken and written English

was the only additional criterion that the participants needed to meet, beyond their age.

All residents that were interested in participating were asked to complete an

informed consent, and consent to release health information. The full details of the study,

length of time anticipated, and rationale for the study, along with explanation of right to

withdraw and possible adverse events such as fatigue were clearly explained. The

maintenance of confidentiality was also clearly explained in the informed consent. The

complex co-morbidities of the older adult, including cognitive decline, mean that

obtaining informed consent can be challenging (Chase, 2013). Chase (2013)

recommended that large font is used for the consent form, and the researcher must be

prepared to explain the procedure multiple times as needed to ensure comprehension, and

it was my experience that several of the participants indeed requiried multiple repetitions of the consent process.

Inability of the participant to demonstrate comprehension, through repeat verbalization, and after careful repeated explanation, was considered inability to provide informed consent. If it became apparent that the individual was not an appropriate candidate, they were still given a survey package, but the letter A was added to the number of the package on the demographic data sheet. All surveys with the A designation were considered invalid. When the resident subsequently returned the survey having completed it in whatever capacity they were able, they were given the thank you gift like all other participants. Only I was aware that the participant had been excluded from the study through the identification on the survey package. This happened on two occasions during the data collection process.

Despite the positive effects of exercise on those with cognitive impairments (ACSM, 2018), for this study, their inability to respond appropriately to the surveys would render their responses inappropriate. However, individuals with physical disability or mobility limitations were encouraged to participate as modified physical activity for these individuals is recommended (ACSM, 2018). Provision was made through the availability of large writing instruments, clip boards, and physical assistance with writing for those with disability. On agreement, and confirmed understanding of the process, all participants signed the informed consent and were given a copy for their records.

Once informed consent had been received, initial descriptive data was collected

on a single sheet, including name, age, contact number (optional), gender and ethnicity,

basic medical history and then I added onto the sheet, the number of the package that the

resident has been assigned. The package contained all the elements of the study, the

different measurement instruments and questions. The use of a numbered package

ensured that all the data from each participant was kept together, and if needed, could be

linked back to the participant. However, the identification sheets were kept separately,

locked away in a locked office, from the packets, also locked away in a different location

in a locked office, to ensure participant confidentiality. Most of the participants declined

or were unable to provide a contact number, with many of them not having a separate

phone line from that of the facility. Although a few participants failed to complete some

of the questions, no follow up was attempted due to this lack of specific personal phone

numbers, which was taken as an indication that no follow up would be desired.

Once the descriptive data was obtained the participant completed the

measurement tools in the package, which were randomly assembled so that each

participant was completing the surveys in a different order. I was always readily

available to answer questions and assist with comprehension as needed. Those

participants who were unable to complete the surveys independently due to visual or

physical limitations, worked directly with me to complete the survey at their dictation.

Participants were given the option to return to their room or another private location to

complete the package and in these cases I arranged a mutually convenient collection

point to reclaim the surveys and give the participants their gifts. Once complete, the

participants concluded the study and any additional questions they had were answered. Participants were thanked for their time with their choice of a small gift, from hand lotion, hand soap or after shave.

After all the residents had completed the surveys, I also conducted a short interview with the activity director or member of the activity staff, if they had indicated willingness to participate. Informed consent was obtained that included notifying the participant that they were being recorded, and then the two questions were asked, with additional probing for examples as needed to ensure comprehensive data was collected (Rubin & Rubin, 2012). This interview was conducted in a private location, usually the office of the activity director.

Data Analysis Plan

Quantitative data analysis was conducted using SPSSv25 software. During data collection, quality control is critical to ensure that errors are kept to a minimum (R. M. Warner, 2013). The use of large font for all the measurement tools, helped eliminate the risk of individuals skipping lines and answering the wrong questions, although this did occur in a few instances. My presence throughout the data completion helped eliminate errors from misunderstanding the question, however the self-report nature of the measurement tools is prone to responder bias (R. M. Warner, 2013). Incomplete surveys were a challenge; but in general, those individuals who failed to complete the survey only missed one of the tests, usually the last in their package. This justified the random nature of the surveys. Additionally, some of the instrument tools being used allow for incomplete answers, for example, the ABC recommended calculating the average from

the number of answered questions, rather than using a 0 for missing answers. The use of

the short version of the ABC also helped eliminate missing answers (Peretz et al., 2006).

According to Warner (2013) SPSS will work with empty cells and consider them

unanswered questions, therefore leaving cells in SPSS blank was used for missing

answers. Variables were entered into SPSS as numeric values, with these being assigned

when needed, for example gender was coded 1 and 2, and ethnicity data had numerical

values assigned. All the medical data was simple yes or no answers, so these too were

coded as 1 and 2. All the tests had a numeric score so no further conversion to numeric

data was required. Data was entered using the packet numbers representing the

participants, and data was double checked for accuracy and completeness. Data

screening is increasingly complex when there are multiple predictor variables (R. M.

Warner, 2013). The first step for each of the variables, including the outcome variable,

was to perform a histogram analysis to check for outliers, and any that were discovered

were confirmed for data entry errors.

Warner (2013) indicated that impossible answers or extreme ones can be selected

out in SPSS, however for extreme rather than impossible answers, the qualitative data

was first considered to determine whether the extreme answer was probable. One of the

benefits of the mixed method research design was the ability to use one type of data to

overcome the weaknesses of the other (Mertens et al., 2016). The second stage of data

cleaning for the multiple variables was the production of a scatter plot for each pair of

quantitative variables to determine if there was demonstration of a linear relation again

with no extreme outliers. Another concept for the success of multiple regression was the

presence of a wide range of scores on the outcome variable. Since there was significant

variance in physical activity levels in the participants this further improved the strength

of the data analysis (R. M. Warner, 2013). Detailed discussion on data screening can be

found in Chapter 4.

The hypothesis being studied was as follows:

H_0: The predictor variables of fear of falling, self-efficacy, balance confidence,

and resilience have no influence on physical activity participation by adults over

the age of 80.

H_a: The predictor variables of fear of falling, self-efficacy, balance confidence,

and resilience, are influential in physical activity participation by adults over the

age of 80.

A multiple regression analysis was conducted using the score of the PASE as the

outcome variable and four predictor variables, the scores from the short ABC, the FES-I,

the CD-RISC and the GFFM. Data was run using a simultaneous or standard regression

with all predictor variables being entered together. This method of regression analysis

allows for control of all the predictors equally while assessing the influence of each of

them (R. M. Warner, 2013). This form of analysis allowed for interpretation of the

influence of each of the predictor variables being examined, while controlling for the

other variables. This information allowed for a better understanding of the issues

involved in promotion or sustainment of physical activity and how future interventions

should be designed.

Qualitative analysis was undertaken by transcription of the resident answers into one location for evaluation, and full transcription of the interviews with the activity directors. The first step of qualitative data analysis was careful reading and sorting of the data and application of codes. Ravitch and Carl (2016) emphasized that coding is not analysis but the initial sorting procedure and should be carefully guided by the research question (Ravitch & Carl, 2016). Ravitch and Carl (2016) also indicated that some researchers start with pre-existing codes and look for material in the data that fits the codes, while other researchers use the data to identify codes based on repetition of material. I adopted the second approach and used the theoretical frameworks to guide the initial coding.

Once codes had been developed the next step was categorization (Saldana, 2016). Both Saldana (2016) and Ravitch and Carl (2016) indicated that categorization is a way of connecting the codes and linking different ideas within the transcripts. Labelling of the categories was concise and informative while ensuring that the label did not add a bias from the researcher (Rubin & Rubin, 2012). Once coding and categorization had been achieved, themes should emerge, if the initial work has been done carefully and systematically, and it is the themes that produce the most vivid parts of the data, specifically the material that will answer the research question (Saldana, 2016). Strong discrepancies in the data were addressed through triangulation with the statistical data and if not resolved were acknowledged and incorporated as appropriate in the results. Lewis (2009) emphasized that within qualitative work, discrepant data should be carefully and rigorously examined to determine if the emerging themes supported the

discrepancy. However, Lewis also agreed that any discrepant data, whether it fitted within identified themes or not, should be acknowledged by the researcher.

An issue with coding that can occur is that of inter or intra coder reliability (Saldana, 2016). Saldana (2016) emphasized that inter coder reliability is generally only an issue when multiple researchers are working on the same project. However, Saldana (2016) also emphasized that an individual researcher should be careful when approaching coding, and use colleagues, mentors or peers as consultants during the coding process to ensure validation of the findings. It is also recommended that reflection on the process is journaled to allow subsequent clarification for decisions being made and thereby improve intra coder reliability (Saldana, 2016). During the coding process, I utilized the concept of member checking with peers to validate the codes being used, and I also maintained careful documentation, through journaling, of the decision-making process throughout the analysis stage..

A key component to mixed method research is the successful combination or integration of the two sets of data (Plano Clark & Ivankova, 2016). Charts were created that showed where the qualitative themes were linked to the quantitative surveys, and whether they complemented or opposed each other. This ensured that throughout the analysis, both data sets were equally considered, and their integration was emphasized. Further triangulation of all data and journal entries ensured a comprehensive analysis. The use of NVivo software further explored the relationships and codes and added to the triangulation of the quantitative and qualitative data.

Threats to Validity

Threats to internal validity are primarily due to the inability to rule out other issues that may explain any association between the variables that are being examined (Frankfort-Nachmias, Nachmias, & DeWaard, 2015). Frankfort-Nachmias et al. (2015) emphasized the fact that the design of the research must attempt to eliminate any additional factors influencing or changing the dependent variable. In my research, the dependent variable was physical activity levels, as measured by a reliable and valid instrument the PASE. Since the predictor variables were all questionnaires and there was no direct intervention, the threats to internal validity were minimized. There is always a chance that individuals will bias their responses, if they are influenced by the different questions, but the use of five different surveys, two open ended questions, and an adequate sample size minimized the risks to internal validity. An issue with internal validity that was present in my study, was fatigue and duplication associated with the participants answering five different surveys. The order of the packages was randomized, and with five surveys plus the qualitative question page, the six sections of the package, fully randomized, produced 36 versions of the research package. As a result, no one survey page was always the first or last one completed by the participants, which minimized any threats to internal validity from fatigue or repetition. The randomization concept was fully justified as demonstrated by several of the participants failing to complete the last survey in their package due to fatigue.

Construct validity explores the question of whether the best explanation has been chosen for the application of the data with respect to theory (Haig, 2012). Haig, (2012)

explored three concepts that helped with validity including explanatory breadth,

simplicity, and analogy. The idea of explanatory breadth is that the theory used, with

respect to the data, is the most coherent with the greatest relationship to the data (Haig,

2012). Simplicity involved using theories with the fewest assumptions and analogy

included using theories that are already recognized in the field. Other issues important

for validity are the correct administration of the tests, characteristics, and appropriateness

of the tests (Newton, 2012). In my research I used three well established theories that

have all been used with respect to the older adult population (Bandura, 1977; Garmezy,

1985; Ryan & Deci, 2008). I also used measures that have all been validated on the

sample population and were administered with no change in language or protocol

(Connor & Davidson, 2003; Huang, 2006; Peretz et al., 2006; Washburn et al., 1993;

Yardley et al., 2005). During analysis it was critical that relationship to theories was

explored openly and extensively, with the added advantage in my study that there were

themes within the theories that already overlapped.

Statistical conclusion validity is a complex subject that primarily determines

whether the statistical data provided can reasonably be used to confirm or reject the null

hypothesis (García-Pérez, 2012). García-Pérez (2012) suggested some interesting

options to confirming the statistical conclusion validity but also commented that

historically three areas needed to be considered. These included statistical power,

whether there is the chance that an effect will emerge that does not exist, and how the

size of the effect be confidently measured (García-Pérez, 2012). These factors lead many

authors to focus mainly on power and significance and consideration of type I and type II

errors. Garcia-Perez (2012) suggested that primary areas where statistical conclusion

validity can be controlled are the use of appropriate and adequate statistical tests,

appropriately applied to the research problem. Avoiding statistical conclusion issues

includes ensuring that the sample size is appropriate to the test being considered and

repeated testing of the data is limited to control for error (García-Pérez, 2012). In my

study the minimum sample size aimed for was 57 and 76 was achieved. Data was not

statistically tested until all participants had completed the material. Statistical testing was

limited to the standard linear regression to ensure that repeat testing was controlled.

MacKenzie (2003) indicated that statistical conclusion validity refers to whether

the relationship between cause and effect can be confirmed. MacKenzie blamed

statistical conclusion errors on poor initial conceptual development of the study and poor

use of measurement tools (MacKenzie, 2003). In my study, the use of established

measurement tools rather than developing measurements, helped eliminate some of these

issues (MacKenzie, 2003), along with a strong understanding of what was being

measured. Use of mixed method research is a methodology that allows the weaknesses

of one method to be strengthened by the data emerging from the other (Shannon-Baker,

2016). Statistical conclusion validity can be further strengthened using the themes that

emerged from the qualitative data to support or deny the statistical results.

External threats usually present as a result of the selection process of the sample

(Frankfort-Nachmias et al., 2015). External validity is a serious concern when

individuals self-select to participate in the research. This can be particularly problematic

when the research is attempting to determine the appropriateness of intervention

programs (Frankfort-Nachmias et al., 2015), however, my study was seeking information and exploring concepts with the view to future interventions. To minimize threats to external validity, the time space sampling strategy utilized a high traffic time in the assisted living, rather than specifically interviewing residents after or in conjunction with an activity program, which would have biased the participants to those who already enjoy physical activity.

The conclusions that I have drawn from the data are made with the understanding that this was a small, but sufficient, sample and was specific to residents of the assisted living environment. The diversity of the participants reflected that of the assisted living arena, predominantly white female, however this also represented the current cohort of individuals over the age of 80. Generalization to future cohorts of 80-year-old individuals is not possible, but the information may be used as a basis for program development for the current and nearby cohorts.

Issues of Trustworthiness

Reliability and validity are challenging concepts within qualitative work and the terms trustworthiness, accuracy, and dependability are often used instead (Lewis, 2009). Cypress (2017) discussed the fact that the rigor and trustworthiness of qualitative research is often challenged, and there is a need for the qualitative researcher to exercise extreme rigor due to the inevitable subjectivity occurring within qualitative work. Cypress (2017) described trustworthiness as quality, authenticity, and truthfulness, and further argued that ensuring that the four criteria of credibility, transferability,

dependability, and confirmability are met, can significantly improve the strength of the research.

The concept of credibility in qualitative work has been compared to that of internal validity in quantitative work (Shenton, 2004). Credibility is determining the realism of the findings, which is achieved through appropriate questions, quality analysis, and suitable participants (Shenton, 2004). Ravitch and Carl (2016) indicated that several questions should be asked by the researcher to determine if credibility has been established, and these reflect the thoughts of Shenton (2004) by including quality of selection site and participants, quality of the question, and analysis of the data. Shenton (2004) further suggested that credibility can be strengthened by the researcher using established methodology and ensuring familiarity of the culture of the organizations involved. In my study, I used the assisted living environment, an arena with which I am very familiar, although it was critical to ensure an appropriate and adequate understanding of each of the locations used. This was achieved through initial meetings with management and activity directors, prior to performing the actual study, and was clearly demonstrated in the significant difference and diversity of the locations.

Shenton (2004) also suggested that credibility can be strengthened through random sampling and triangulation. The time space sampling concept encouraged a random sample, and the unique concept of mixed method research ensured triangulation through comparison and consolidation of the two types of data (Plano Clark & Ivankova, 2016). Triangulation was also achieved by using several different locations, as well as discussions and interviews with activity directors. Credibility also requires that the

researcher is careful to acknowledge their role in shaping the interpretations of the material and connecting the concepts, and reflecting carefully on one's own bias (Cypress, 2017; Ravitch & Carl, 2016).

Transferability is often compared to external validity or generalizability (Ravitch & Carl, 2016). Transferability is the ability of the results of qualitative research to be applied to larger populations than just the individuals included in the study. This concept can be particularly challenging in qualitative work due to the smaller sample sizes, which can seem to limit generalizability (Shenton, 2004). In my work, several assisted living facilities were included to achieve the sample size, thereby increasing the transferability of the data to the broader concept of all assisted living facilities. Transferability is also increased if the researcher provides sufficient description of the contextual issues to allow the reader to put the study into perspective (Ravitch & Carl, 2016). Shenton (2004) recommended careful description of location, and participants, which he felt allowed others to relate their experience to the study, thereby increasing generalizability. Ultimately, qualitative work must be considered within the context of the study, and similar or subsequent work can further add to transferability.

Dependability in qualitative research has been compared to reliability and looks at whether the data is consistent and stable over time. Most importantly, dependability looks at whether the data answers the research question (Ravitch & Carl, 2016). Cypress (2017) suggests improving dependability by other expert researchers reviewing the transcripts and validating the themes that have been identified by the primary researcher. Member checking can significantly increase the dependability of the work (Lewis, 2009).

Finally confirmability, which is compared to objectivity in quantitative research, requires the researcher to evaluate their own agenda, and bias, and the dangers of imposing these onto the research (Ravitch & Carl, 2016). Lewis (2009) recommended that the researcher described their own assumptions, beliefs, and potential biases and how they were controlled for within the study. Cypress (2017) agreed that researcher bias is a threat to validity, and recommended reflexivity through journaling, and self-reflection, throughout the research process. The use of mixed method research helps steer the researcher from their bias due to the statistical analysis of the quantitative data that can support the themes identified. However, throughout the process I maintained a reflective journal to help define how bias was eliminated and acknowledged. Ravitch and Carl (2016) further recommended having partners in the research process who can read the material, and discover bias or faulty conclusions, thereby allowing a more objective approach to be taken.

Overall qualitative work requires the researcher to clearly explain their decision process and reveal any potential bias or influence on their work. Shenton (2004) recommended the concept of trustworthiness as an umbrella term for validity and reliability, and recommended the concepts of credibility, transferability, dependability, and confirmability as discussed. Shenton felt that demonstration of these areas established trustworthiness and ultimately the work should do justice to the participants and their experiences (Ravitch & Carl, 2016). It is anticipated that the rich description of the process, careful data analysis, and well written results with discussion allows me to demonstrate trustworthiness.

Ethical Procedures

Ethical considerations are particularly important when working with the older

adult population who are considered vulnerable (Fisher, 2013). For my project the first

consent issue was seeking cooperation from various community assisted living facilities

to hold the research sessions at their location. The letter of agreement is shown in

Appendix F, which was signed by each of seven facilities that initially indicated a

willingness to act as community partners.

Institutional permission IRB was applied for on acceptance of the research

proposal and was granted after one revision. IRB approval number: 06-27-18-0471157.

All participants were required to sign and agree to an informed consent, which outlined

the risks and benefits to them for participation. This included the risk of fatigue and

possible stress due to the nature of the questions involving fear of falling, and balance

confidence. A confidential Institute on Aging hotline number was provided in the

consent form in case of subsequent anxiety or stress by the older adult. The participants

signed the consent form at the time of the data collection and were given a copy for their

records. Two individuals who wanted to participate were identified by management as

having a legal guardian. The informed consent forms were forwarded to the guardian and

once signed and returned, the data was collected from the participant.

As the data was collected, the demographic identification data was taken on one

sheet, this sheet also included the number of the survey package that the individual

completed. These two items, personal sheet and survey package, were kept separately,

each in different locked cabinets, in a locked office. All participants had the right to

withdraw at any time during the data collection process. The facility partners will all be

offered an opportunity for the researcher to return to their facility, to present the results to

management and residents as desired.

Surveys that were used were all freely available to the public except for the PASE

and the CD-RISC. All confirmation of right to use these two surveys was submitted in

the IRB proposal, and can be seen in Appendix D and E. ("CDRISC. The Connor-

Davidson resilience scale," 2016; New England Research Institutes, 2018).

There were no known power or personal issues. All participants received a small

gift for participating that was their choice from hand soap, lotion or after shave. As

previously indicated this hard to reach population enjoy a small gift as encouragement to

participate (Liljas et al., 2017).

Summary

A mixed method research study was used to explore the question of what

psychological and other factors influence physical activity participation in the older adult

over 80. Mixed methodology research is not just the collection of two types of data but a

careful integration of the two to allow a comprehensive answer to the research questions

with each method making up for the weaknesses of the other (Shannon-Baker, 2016) A

time space sampling strategy was used due to the known challenges of achieving

appropriate samples within this population (Liljas et al., 2017; Semaan, 2010). The

assisted living setting was chosen for this study since currently over 800,000 older adults

reside in this setting, the majority of whom meet the selection criteria of being over 80

years of age. Additional criteria included the ability to understand written and spoken

English and be able to participate in the informed consent procedure. Five quantitative, validated, survey instruments were administered, addressing issues of self-efficacy, fear of falling, balance confidence, physical activity and resilience followed by a qualitative question of what motivates or limits participation in physical activity, the answer to which was handwritten by the participant or dictated to the researcher.

Data analysis was conducted using SPSS software with a regression analysis of the outcome variable of physical activity and the predictor variables of self-efficacy, fear of falling, balance confidence, and resilience. Qualitative material was analyzed for themes that emerged and the two types of data were integrated throughout the analysis and results phase. The issue of validity was addressed using pre-validated instruments for data collection, and the random nature of the sampling strategy. Trustworthiness was addressed in the triangulation of the data, thorough description of the process, and awareness of the researcher bias as a practicing physical therapist.

Ethical issues, including that of the participants being considered a vulnerable population were offset by the fact that no physical activities were performed, just survey questions. Informed consent was obtained from all participants or their legal guardian and included their right to stop at any time. The informed consent also included a 24-hour hotline number to the Institute on Aging, should the participants subsequently feel distressed or anxious because of talking about the topics under review.

Once all approvals were obtained, the data was collected and analyzed, and the results are presented in the following chapter.

Chapter 4: Results

Introduction

The purpose of this study was to explore the links between physical activity, fear of falling, self-efficacy, balance confidence, and resilience in the oldest old adult population, those over 80 years of age. The approach was a concurrent mixed method study with established scales used to determine any correlation or relationship between the outcome or dependent variable of physical activity to the predictor or independent variables of fear of falling, self-efficacy, balance confidence, and resilience. I used qualitative exploratory questions to further understand what would help older adults increase their physical activity and therefore how the medical profession can most help.

The overriding goal of this research was to explore why so few older adults meet the recommended physical activity guidelines. Specific research questions were as follows:

RQ1 (Quantitative): What is the influence of each of the predictor variables of fear of falling, self-efficacy, balance confidence, and resilience, on physical activity participation by adults over the age of 80?

RQ2 (Qualitative): What motivates or limits older adults in being physically active?

In this chapter I describe the locations and the individuals who participated in the study. I also discuss the data collection process and thoroughly explain the quantitative and qualitative data analysis. I present the quantitative results and then discuss the results incorporating the mixed methodology in answering the research questions. Finally, I

consider the issue of trustworthiness as presented in Chapter 3 with respect to the actual research process.

Setting

The assisted living settings that agreed to be the community partners for this research were all contacted after IRB approval was granted. At this time, one of the facilities withdrew for personnel reasons. At a second facility, the activities director initially worked with me to set dates and times for the information session and data collection; however, this individual retired suddenly and unexpectedly between setting the dates and the actual sessions. The retirement of the director coincided with a change of ownership for the facility. The remaining activity personnel in the facility worked with me on the agreed dates and times; however, the number of individuals who participated was not as great as anticipated. I believed that this decreased participation was due to the assistant personnel not having been as involved during the early stages of the study. All other facilities remained stable in terms of personnel, ownership, and willingness to participate. The information sessions and data collection events ran smoothly due primarily to the excellent support of the activity personnel and management.

Demographics

A total of 81 participants completed the research process. Two were immediately eliminated due to being under the age of 80, and another two had been identified during the informed consent process as cognitively unable to accurately complete the surveys. The remaining 77 individuals all participated, although some failed to complete one or

more of the surveys in the package, and ultimately 70 individuals had sufficient data to be included by SPSSv25 during the analysis stage. The demographics of the entire 77 participants can be seen in Table 1 with respect to gender, race, and positive responses to medical questions, and Table 2 for descriptive statistics of age and scores on each of the surveys.

As anticipated, the majority of the participants were female ($n = 51$, 66%) compared to 34% male, which was representative of the 2:1 female to male ratio in current population over the age of 75 (United States Census Bureau, 2011). Ninety six percent of the participants indicated they were White not Hispanic, with only three individuals identifying as a different race, one Hispanic and two African American. This again links closely with population statistics where currently the over 85 year old group is the least racially diverse cohort (United States Census Bureau, 2010). The age of the participants ranged from 80 to 103 with a mean of 88 years old. The majority of the participants indicated that they had a history of arthritis, heart condition, and hypertension, while a minority indicated diabetes, pulmonary issues, osteoporosis, or a neurological condition. Only 26% of the participants indicated a fall in the past 6 months.

Data Collection

Numbers

Eighty-one individuals completed the survey packages during the data collection events at the various facilities. Of these, four were eliminated due to age or cognitive ability, and seven had missing data in the form of at least one entire survey not

completed. This resulted in a total of 70 individuals being included in the statistical

analysis, although all 77 responses to the qualitative data were included. Five activity

directors or staff agreed to be interviewed, resulting in five short interviews that were

transcribed in full and included in the analysis.

Location

Six different assisted living facilities were involved as community partners, and

they reflected the diversity of the assisted living environment. The first location was a

small, nine-bed facility, affiliated with but separate from a large independent living

environment next door. Residents ranged from bed bound, to wheelchair dependent to

independently ambulatory. Three of the other locations were very similar to each other,

approximately 200-bed facilities with residents ranging from those who are virtually

room bound, to those who are very mobile but using electronic wheelchairs and scooters

to achieve this, to those who ambulate, the majority of whom use some type of assisted

device. One location was primarily a memory care assisted living facility, and here the

residents were more ambulatory, but only one of them met the cognitive criteria for the

study. The final location was similarly a 200-bed unit, but their marketing promoted

active living within the assisted living concept. Here use of electronic mobile devices

was less apparent, and while there was a wealth of assistive devices for those ambulating

around the facility, many individuals ambulated independently. Overall the data

collection events ran for approximately 2 hours each, with individuals completing the

survey in as little as 10 minutes to as much as 50 minutes. A few participants failed to

complete the last survey in their package due to fatigue, but most of them worked through the entire package.

All the data was hand written by the participants or with my assistance onto the survey packages. The survey package included all the quantitative instruments and the qualitative question. Individuals completed the package and then handed it back to me. Interviews with the activity staff were recorded on a voice recording application, which is freely available from the apple iPhone application store. I then transcribed these recordings in full into a word document.

All data was collected following the format of the information sessions and subsequent data collection events as described in Chapter 3 and submitted to the IRB. No adverse or unusual circumstances occurred during the data collection, and many of the participants indicated interest in subsequently learning the results. Positive remarks for the appreciation gift confirmed the appropriateness of this concept; some individuals declined a gift, but most chose to accept.

Data Analysis

Quantitative Data Analysis

All statistical data was entered onto SPSSv25. Once all the data had been entered, the first process was identification of outliers and any incorrect data entry. Initially, histogram and box plots were developed for each of the variables, the PASE, the ABC, the CD-RISC, the FES-I and the GFFM. Histogram analysis showed a small positive skew for both the PASE and the FES-1, (see Figures 1, and 2). Warner (2013) remarked that a positive skew is often found in variables that have an option of a minimum score of

zero, and I therefore decided to analyze the individual variables with a box plot for more specific outlier identification. The PASE identified one outlier, which on further examination was incorrectly scored data, which was amended. The ABC, CD-RISC, and GFFM had no outliers identified, but the FES-I initially had several identified. Further examination of these cases demonstrated individuals who had indicated a score of one, no concern, but also written onto the survey that they never do this activity. As a result, they were scoring very positively, when they no longer performed the activity either due to physical inability or lack of fall efficacy. I determined that three of these cases should be eliminated due to this contradictory nature of their scoring. The other two, after further examination, were kept in the study as they appeared to be genuine answers but were two of the highest scores, indicating a high level of fear with respect to fall efficacy.

Having confirmed that individual variables were correct, I conducted multivariate analysis for outliers. This was done through histogram and scatter plot diagrams, and then I conducted a Mahalanobis Distance analysis. Warner (2013) discussed the multivariate screening process as starting individually, moving into bivariate analysis, and then using the Mahalanobis d to obtain information regarding the extent of the outliers. SPSSv25 allows the researcher to perform this analysis, and then the Mahalanobis d scores are compared to a chi squared distribution chart for the number of predictor variables being used. With four predictor variables, χ^2 listings at $p = .001$ were 18.47 and $p = .01$ were 13.25. None of the cases in the study were above either of these numbers, the highest being 10.8; however, the box plot identified two outliers as shown in Figure 3. These two cases were independently examined, and again, it was the two

cases of very high FES-I scores. I determined that because these outliers did not fall outside the numbers suggested in the Mahalnobis *d* analysis, that the regression analysis would be run both with and without these two cases. Having completed the data screening and confirmed that all data entry appeared correct, there were no univariate outliers and only the two bivariate outliers, and there appeared no indication of pattern, trend, or heteroscedasticity (see Figure 4). It appeared that the assumptions had been met, and a linear regression analysis was performed.

Qualitative Data Analysis

I began qualitative data analysis the moment I received it. As participants made comments, my thoughts were developing, and as I typed the answers to the qualitative questions into Word documents, codes were already emerging. These would be considered initial or first level coding and were done without any intentional preplanning or ideas (Ravitch & Carl, 2016). Codes that emerged included items within the participant limitations such as weakness, pain, balance, age, and physical issues, while participant motivation codes that emerged included health, feels good, and active. Once all the qualitative data had been transcribed into Word documents, these were uploaded into NVivo 12 software program, and I used the initial codes from the transcribing to create nodes, the software program title for the sorting process. As I developed nodes, NVivo required that the nodes have a title, which is the categorization of the codes as described by Saldana (2016). These categories were influenced both by the codes that had initially emerged as well as the theoretical foundation of the study. The categories that emerged included age, external influences, falls and fear, health benefits, internal

motivation, personality and mood, and physical disability. As can be noted, the use of

the theories during this initial categorization highlighted the work of Deci and Ryan

(2000) and the concepts within self-determination theory of internal versus external

motivation. Internal motivation remarks included; "if it's important to me then I push on"

(participant 32), "good for me to be active" (participant 46), "I am motivated to be as

safely independent as possible" (participant 85). External motivation included; "we need

to stimulate them" (activity director 1), "my husband and children" (participant 73), "stay

in good health for my daughter" (participant 77), "others who seem to be having fun"

(participant 40).

The concept of external support was also reflected in resilience theory as well as

mood and personality that are additional aspects of resilience (Ong et al., 2009).

Comments emerging that were categorized into mood and personality included; "I'm

lazy" (participant 1), "ennui—don't like to exercise" (participant 33), as well as positive

issues; "I feel better" (participants 13, 15, 65 and 70).

Self- efficacy theory was reflected in the nodes of health benefits and mood

(Bandura, 1983), and included the following remarks; "strong desire to be healthy"

(participant 72), "good health for a long life" (participant 77), "maintain health"

(participant 6), and "I sleep better and think more clearly" (participant 40).

Once all the data had been coded into the different categories, I analyzed these

categories using NVivo for similarities and differences to initiate development of themes.

I started this process with word clouds of each of the nodes which I printed and posted on

a board for full examination (see Figure 5 for an example), at this time member checking

with respected colleagues occurred to confirm agreement with coding, categories, and emerging themes. Comparison charts were developed within NVivo as further support and triangulation for theme development, and I further explore the nodes to see whether their contents favored motivation or limitation. Overall four of the modes were dominated with motivational concepts for being active, these were; what could happen, "the fastest way to age is if you don't stay active" (participant 86), activities, "pool exercise is fun, (participant 72), health benefits, "a strong desire to be healthy" (participant 72), and internal motivation "I want to continue doing the things I like" (participant 66), "they do not want to have to go to a skilled nursing facility" (AD 1). Five of the nodes were dominated by limitations to being physically active and included; physical disability "joint stiffness" (participant 82), age "age continues to advance" (participant 18), "I'm old" (participant 48), caregiving "extra care and responsibility for spouse" (participant 12), falls and fear "I never expected the impact it [the fall] has had" (participant 80), "the fear of falling is the greatest fear of all" (participant 29), and lack of appropriate activities "I wish they had ballroom dancing" (participant 86), "the classes are so modest, I wouldn't call them exercise" (participant 41).

Two nodes emerged as supporting both motivation and limitations to physical activity, these were external influences where, for example, the adult children's questions about their weekly activity added to motivation to participate in activities, but time spent with adult children was also considered a limitation to physical activity. Similarly, personality and mood were well reflected in both motivation and limitation with individuals blaming being lazy or not liking exercise as limitations, but boredom and

feeling better were strong indicators for participating in physical activity. These two nodes, external influences and personality and mood were also the ones that had the most items coded as reflected in the hierarchy chart (shown in Figure 6) with physical disability, a primary limitation, also emerging as a frequently coded item.

Further cross checking of codes and categories within the nodes established the following themes. Firstly, the ideas of physical disability and health promotion were combined into the theme of function, secondly, external and internal influences were combined into the theme of influences. Thirdly, the concepts of individual personality or mood emerged as a primary theme and was titled emotions. Finally, an additional concept also emerged, that of "want". This theme appeared strongly in the word clouds of multiple nodes and on further exploration it became apparent that the concept of "want" was a link throughout many of the participants comments. Exploration of the word "want" in the *Merrian-Webster online dictionary* indicated that it is both a verb and noun with both forms emphasizing a need, a strong desire for, and a deficiency or lack (Merrian-Webster, 2018). Emergence of the concept of "want" is demonstrated by the activity directors who stated; "they want to stay as independent as possible" (AD 1), as well as the participants; "I want and need to keep active" (participant 79), "I don't want to need constant help" (participant 71).

Throughout the qualitative data there were no apparent discrepancies, although some areas were cited as both motivation for some individuals as well as limitations for others, with health issues being an example where one individual was motivated to exercise after his knee replacement surgeries, where others remarked that knee pain was a

primary limitation. These differences were not considered discrepancies in the data but added to the richness of the content.

Results

Quantitative Results

The linear regression analysis was run with the scores from the PASE as the outcome variable and the scores from each of the other surveys, the ABC, CD-RISC, FES-1 and GFFM as the predictor variables. A model summary of the analysis can be seen in Table 3. The regression was not statistically significant, $R = .312$, $R^2 = .097$, adjusted $R^2 = .042$, $F(4, 65) = 1.75$, $p = .15$. Physical activity scores could not be predicted from this group of variables that included fear of falling, balance confidence, resilience, and falls efficacy. The contribution of the individual predictors was also not significant but as anticipated the FES -I and the GFFM were negatively related, indicating that the higher fear of falling scores and falls efficacy scores resulted in lower physical activity levels. Correlations are shown in Table 4.

When the regression was completed without the two outliers, results were similar, again not statistically significant, $R = .357$, $R^2 = .128$, adjusted $R^2 = .072$, $F(4, 63) = 2.31$, $p = .07$.

The proportion of variance in physical activity uniquely explained by each of the predictor variables can be determined by squaring the part correlation as provided by SPSS (R. M. Warner, 2013). These numbers after squaring were: ABC = 0.0176, FES-I = 0.0196, CD-RISC = 0.0529 and the GFFM = 0.1. Although, again, these numbers were not statistically significant it would appear to suggest that the GFFM was the strongest

predictor for physical activity, and resilience as scored by the CD-RISC was a greater predictor than balance confidence and falls efficacy.

Overall, within the quantitative analysis, there was insufficient statistically significant data to rule out the null hypothesis which therefore stands that the predictor variables of fear of falling, self-efficacy, balance confidence, and resilience have no influence on physical activity participation by adults over the age of 80. However, the benefits of mixed method research include the fact that answers, beyond those specifically sought in the surveys, can be explored further by using the qualitative data.

Answering the Research Question

The overriding research question for this study was an exploration of why so few older adults meet the recommended physical activity guidelines. The PASE clearly demonstrated a very low activity level in this population with a mean age of 88 and a PASE score range of 0–240 with a mean score of 82, on a scale that ranges from 0–400 or more (New England Research Institutes, 2018). The scale indicated that the mean for the general population is 102.9 but in those aged 76-100, the mean for men is 101 and for women 62. My work demonstrated significantly lower for the men with a mean of 70 and range of 2–188, but higher for the women with a mean of 86.6 and a range of 0–209. All participants indicated that they participated in seated activities with 93% indicating daily and 45% of those indicating that this was for more than four hours. Most participants indicated they walked on at least some days, but when asked about exercise or activities requiring greater energy expenditure than walking, the number of individuals who indicated "never" became the majority, and 44% also indicated they never did any

form of activity specifically for increasing muscle strength. Remarks such as; "I avoid physical activity, I only do it when it is absolutely necessary" (participant 34), added confirmation that physical activity is not a high priority for many of these individuals.

Having demonstrated that within this sample, the physical activity levels of these older adults, would fall below the recommended activity guidelines, the research question was seeking to understand why they failed to meet these guidelines through a greater understanding of issues that motivate or limit their physical activity participation. Clear indications of limitations and motivation to being physically active emerged within the theme of function and included inability to walk, being dependent on a wheelchair, pain, weakness, and medical issues, as well as the desire for a healthy life and to remain active. Emotions presented both motivation and limitations to being physically active and included laziness, ennui, and not liking exercise, as well as feeling good with exercise and enjoying certain activities.

Interestingly, I was exploring psychological issues, specifically fear of falling which did emerge as the most probable influence on physical activity in the linear regression analysis. The GFFM scores ranged from 15–63, where 15 is the minimum possible score indicating no fear and 75 being the maximum score demonstrating the greatest fear. The mean score for this sample was 40 demonstrating a moderate level of fear of falling within the sample. Interestingly one of the activity directors felt that fear was a significant influence on activity participation but only 8 of the 76 participants mentioned falls or fear in the qualitative component, although 20 participants (26%) indicated a fall in the past six months. Those that did mention their fall indicated that it

had a significant impact; "I never expected the impact it has had" (participant 80) and; "the fear of falling is the greatest fear of all" (participant 29).

As anticipated resilience emerged as very strong in this sample population with a mean score of 77/100. The concepts of healthy aging suggest that resilience needs to be strong and this population of individuals with a mean age of 88, fell close to the mean score for the general population of 80.7 (Connor & Davidson, 2003). Connor and Davidson (2003) suggested that generalized anxiety falls around 62 on their scale which would appear to demonstrate that this sample did not fall near this category, despite anxiety being a strong component of fear of falling. Resilience was clearly apparent in the theme of emotion that emerged in the qualitative data, including; "use it or lose it" (participant 83), "living motivates me" (participant 22), "I don't want to appear too old" (participant 58).

Other strong motivators that emerged from the data were influences, both intrinsic and extrinsic with participants being more active to encourage their spouse to remain active, the presence of friends who take them out, the interest of adult children in their physical activity, and the apparent enjoyment of others. Intrinsic influences included a strong awareness of the need to remain active for a healthy life and to function independently. Finally, the theme of "want" emerged very strongly and may be reflected in the high resilience score, while also reflecting a level of internal motivation. The participants want to keep active, they want to remain independent, they want to keep healthy and enjoy a quality of life, as well as not wanting to appear old and not wanting to be like others in the facility who they perceive as physically impaired. They also want

activities that interest and challenge them; "the classes are so modest I wouldn't call them exercise" (participant 41), "pool exercise is fun but not done as often as needed" (participant 72), "I wish they had ballroom dancing" (participant 86).

Evidence of Trustworthiness

Credibility

The concept of credibility started with my strong familiarity with the assisted living environment and specifically the individual community partners within this study. Despite significant diversity between the facilities, an understanding of their principles such as providing an active elder environment, versus a primarily supportive one enabled the participants to be approached appropriately. The quality of the participants as a representative sample of this population is seen in the demographic data, (see Tables 1 and 2), and clearly represented the current cohort of individuals greater than 80 years of age. Further strengthening of credibility was achieved through random sampling and within the facilities all individuals were eligible, no individuals were specifically sought, although they were all volunteers and as such may represent the more active individuals within the facility. Triangulation was achieved using multiple facilities as well as through interviews with the activity directors, which clearly reflected the thoughts and remarks of the participants, strengthening the data.

Transferability

Transferability reflects the ability of the work to be generalized beyond the individuals within the study. The demographic data would indicate that this sample is representative of the cohort of those over the age of 80, but awareness of their living

within the assisted living environment should be emphasized. The concept of assisted living is to provide a level of assistance with activities of daily living, as a result, within the PASE, very few individuals claimed any physical activity related to daily household activity. This therefore, limits the transferability beyond the assisted living environment since the PASE scores are reflective of the assistance provided within the facility.

Dependability

Dependability focuses on whether the data answers the question. Member checking with respected colleagues can strengthen dependability and I used several respected colleagues to help with this throughout the qualitative analysis stage, as well as thorough inspection of the data with respect to the specific research question.

Confirmability

I am a licensed practicing physical therapist, with a potential bias toward promotion of physical activity. Throughout the data collection phase, I was careful not to influence the participants and when questions were asked during the data collection, the answers were kept very neutral and I just rephrased the question to ensure the participant could answer. When I was working individually with a participant who needed assistance with the survey, I read the questions out loud, verbatim, and the participants response was recorded verbatim. I kept notes throughout the data collection and analysis phase to recall how I had made decisions, and these were returned to and explored as the analysis progressed, to ensure an objective approach was taken throughout the process.

Summary

In summary, the quantitative data failed to demonstrate any statistical significance therefore the null hypothesis could not be rejected and remained that the predictor variables of fear of falling, self-efficacy, balance confidence and resilience have no influence on physical activity participation by adults over the age of 80. However, strong themes emerged from the qualitative data that resilience in the form of personality of these individuals is both a motivator and limiter of physical activity, along with external influences such as family and friends. Physical disability emerged as a strong limitation for many individuals although fear of falling was not an issue for many of the participants, despite the fear of falling measurement emerging as more of an influence on physical activity than the other scales. Finally, a theme of "want" emerged as both positive and negative, they want to be active and they want more appropriate activities, while they do not want to become like the others they perceive as physically disabled, nor do they want to become the "statistic of an old person whose foot slipped off the brake" (participant 85).

These emerging themes and the relevance of the results within the theoretical framework of the study will be examined and discussed in Chapter 5.

Table 1

Demographics of Gender, Race, and Medical Conditions of Total Eligible Participants

	n	Percent answering yes
Gender female	51	66
Gender male	26	34
White not Hispanic	74	96
Black/African American	2	3
Hispanic	1	1
Arthritis	47	61
Heart condition	47	61
HTN	39	51
DM	16	21
Pulmonary issues	8	10
Osteoporosis	23	30
Neurological condition	3	4
Fall in past 6 months	20	26

Table 2

Demographics of Age and Scores on the Surveys of Total Eligible Participants

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Age	77	23	80	103	88.09	4.69
PASE	77	240	0	240	81.86	57.95
ABC	77	100	0	100	51.57	26.11
CDRISC	75	53	47	100	77.35	15
FESI	76	40	16	56	28.21	8.78
GFFM	76	48	15	63	39.67	12.19

Table 3

Model Summary of Regression Analysis

R	R²	Adjusted R²	Std. Error of the Estimate	R² Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
0.312	0.097	0.042	56.222	0.097	1.750	4	65	0.150	2.302

Table 4

Correlations Between Variables

	PASE	ABC	CDRISC	FESI
PASE				
ABC	0.18			
CDRISC	0.24	0.20		
FESI	-0.04	-0.59	-0.27	
GFFM	-0.14	-0.70	-0.21	0.64
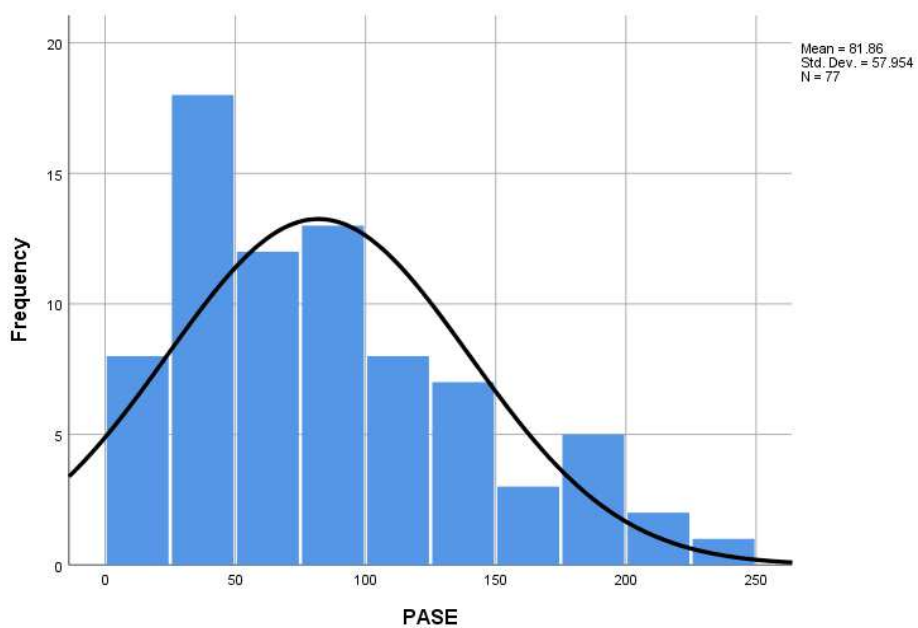
Figure 1. Histogram of the PASE variable demonstrating positive skew.
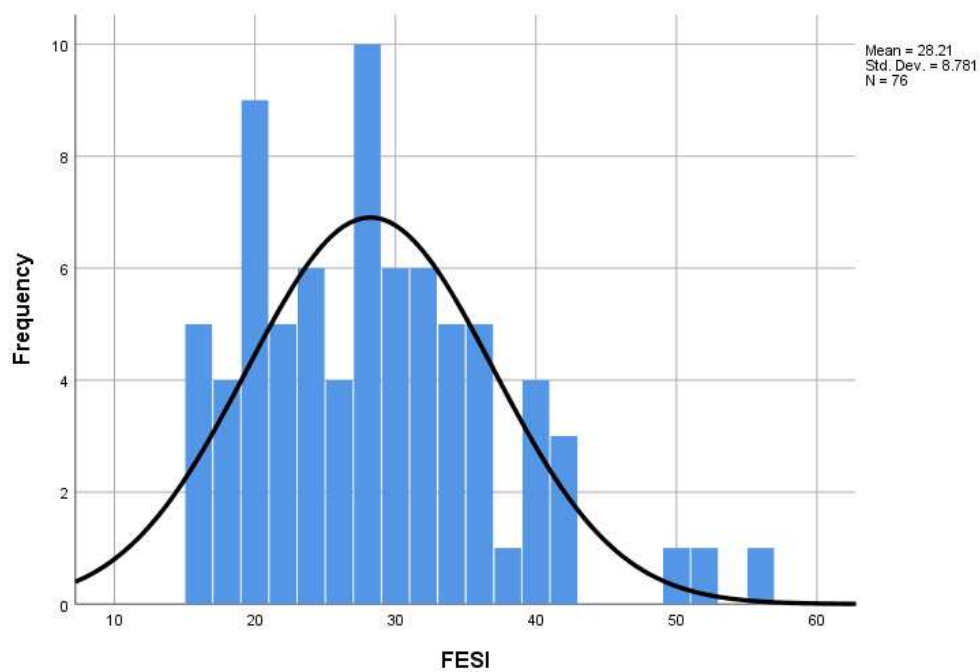
Figure 2. Histogram of the FES-I variable demonstrating positive skew.
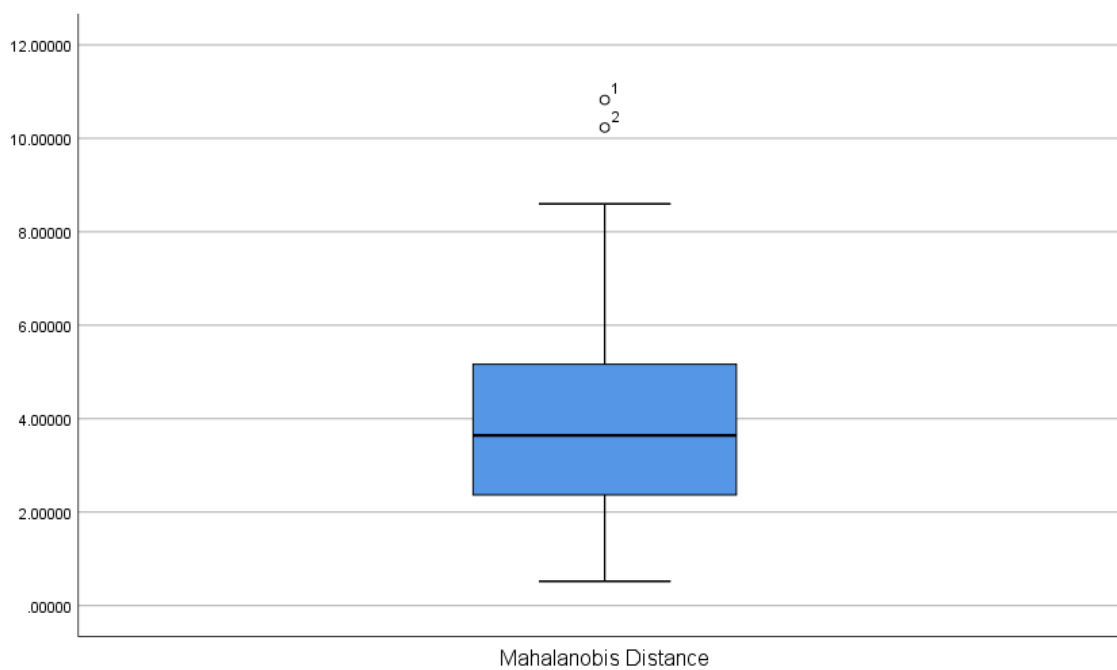
Figure 3. Box plot of Mahalanobis Distance showing two outliers.
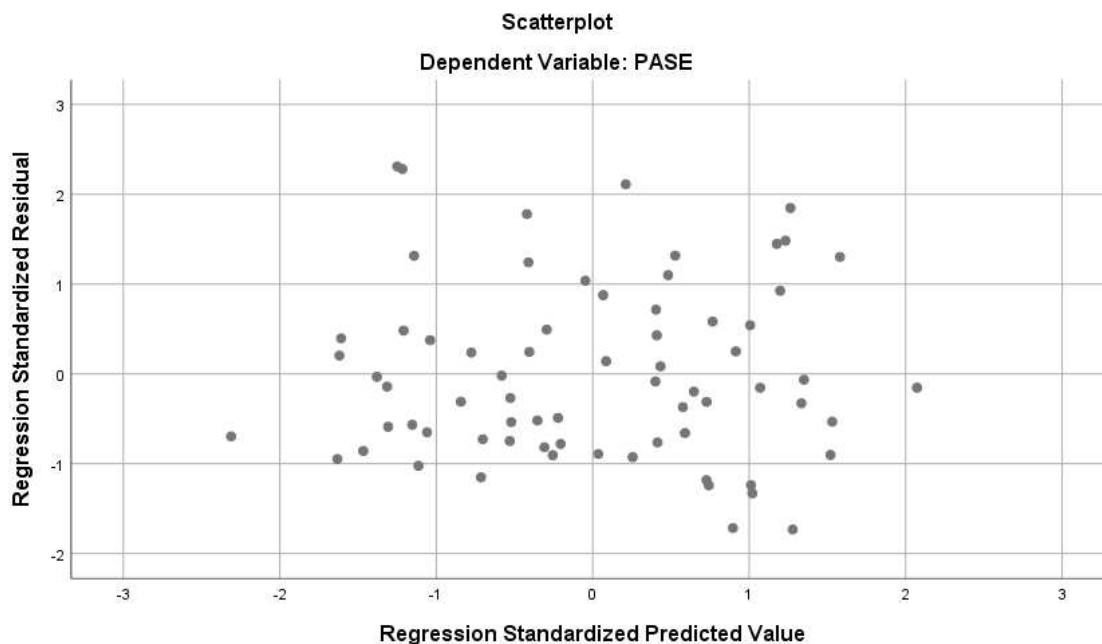
Figure 4. Scatterplot to assess standardized residuals from linear regression to predict physical activity levels from balance confidence, resilience, fall efficacy and fear of falling.

Figure 5. Word cloud of participant motivation node in NVivo.

Figure 6. Hierarchy chart representing number of items coded.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to explore the links between physical activity, fear of falling, self-efficacy, balance confidence, and resilience in the oldest old adult population, those over 80 years of age. The approach was a concurrent mixed method study with established scales used to determine any correlation or relationship between the outcome or dependent variable of physical activity to the predictor or independent variables of fear of falling, self-efficacy, balance confidence, and resilience. I used qualitative exploratory questions to further understand what would help older adults increase their physical activity and therefore how the medical profession can most help.

The goal of the study was to determine why so few older adults meet the physical activity recommendation. Although this sample scored higher on the physical activity measure than anticipated for their age, overall, a generally low level of physical activity was demonstrated by the participants. The quantitative analysis did not reveal any significance to confirm the influence of the variables on physical activity, so the null hypothesis could not be rejected. However, the fear of falling measure would seem to be the strongest of the predictors for physical activity. Four themes emerged strongly between the quantitative and qualitative work including function, the inability to be physically active due to disabilities and functional limitation, as well as the need to be physically active to maintain function, specifically independence. The second theme was influences, the different influence of both intrinsic and extrinsic factors including the desire to be healthy as well as the influence of family and friends. The theme of

emotions supported the concept of resilience, which emerged strongly in the quantitative data, and included feeling good, "use it or lose it," and wanting not to appear too old. The final theme that emerged very strongly was the idea of "want." The participants clearly wanted to remain independent, they wanted to be able to function, and they wanted to be active. They also wanted activities that motivated and challenged them as well as not wanting to be a statistic for age related accidents.

Interpretation of the Findings

Interpretation of Findings In the Theoretical Framework

This study was approached through a multi theoretical framework consisting of three well established theories. Resilience theory emerged strongly in the study. This sample of older adults with a mean age of 88 had a mean resilience score on the CD-RISC of 77/100, close to the mean score for the general population, and well above the cut off for generalized anxiety. Windle (2012) indicated that resilience was the buzz word for the older adult and healthy aging, and Bolton et al. (2016) suggested that it is resilience that allows the older adult to cope with the many challenges and adverse events associated with aging. The comments by the participants of the study regarding the desire to stay healthy and independent, "the motivation to be physically active is a strong desire to be healthy" (participant 72), would appear to reflect and support the thoughts of Bolton et al., who also indicated that external connections, independence, and meaning were the most critical of the protective factors that improve resilience. Ong et al. (2009) further emphasized external support. The themes that emerged clearly demonstrated

external connections, including staying healthy for their daughter, answering to their adult children about their weekly activity, and being active to support their spouse.

Interestingly the concept of external influences being beneficial would appear opposed to self-determination theory, where intrinsic motivators are considered the highest level of autonomous control (Ferrand et al. 2014). Strong internal motivation emerged in this study with individuals commenting on wanting to remain in good health and independent, but the external influences were also strong in this population. Grodesky et al. (2006) clarified that extrinsic motivation based solely on external regulation is unlikely to result in behavior change or implementation.

However, Grodesky et al. (2006) also remarked that identified regulation, where an individual realizes the importance of a behavior, is critical for success and maintenance of a behavior change. The participants in this study clearly demonstrated an understanding of the relationship between being active and retaining their independence and health; "It makes me feel better, and I know I need it" (participant 12), "maintain health" (participant 14), and "I want to remain as an independent person" (participant 18). These concepts also supported the work of Kirkland et al. (2011) who stated that physical activity was greater in those considering social or fitness issues rather than weight management or personal appearance, which were negatively correlated with exercise. As a result, the data and theories of this work appear to support the concept of focusing on an emphasis of healthy living and positive social and personal wellness, rather than the negatively correlated issues of weight management or fall prevention.

Self-efficacy theory was more challenging to support in this study due to the issues surrounding the FES-I. The FES-I contains questions regarding falls efficacy related to the daily activities of the individual such as cleaning the house, citing examples of sweeping, vacuuming or dusting, going to the shop, or going to answer the telephone before it stops ringing (Yardley et al., 2005). For many of the individuals in this study, by living in the assisted living environment they no longer needed to perform these activities and, in some cases, have not done so for over 10 years. The suggestion in the survey is that if they have not performed the activity recently they should answer how they think they would feel if they did have to do the activity, but this is particularly challenging for an individual who has not attempted the activity for greater than 10 years. Many participants indicated no concern for these activities as they have no fear of falling with an activity they never attempt. The mean score of 28 for the FES-I on a scale of 16–64 probably failed to accurately capture the fall efficacy of this population. This study clearly demonstrated the need for new or adapted scales for the older adult population if there is to be a true understanding of their fall efficacy.

Within the concept of self-efficacy theory, the idea of vicarious experience did emerge from the comments of the participants including "others who seem to be having fun" (participant 40), reflecting the comments of Warner et al. (2011), Fromholt Olsen et al. (2015) and Rose (2008) who all emphasized the need for social modelling. All of these authors also demonstrated that the older adults like group activities and using each other as role models, and this emerged in the qualitative data of this study from both the participants and the activity directors. Both the participants and the activity directors

remarked on the influence of the classes, including the positivity and encouragement that the activity staff added to the activity. Fromholt Olsen et al. and Rose also remarked that older adults wanted trusted instructors with good knowledge of the aging body and remarks from the participants such as "the classes are so modest that I wouldn't call them exercise" (participant 41), "not enough things that are simple and fun to do" (participant 40), would suggest that activity programs in assisted leaving could better capture the needs of their population, thereby potentially increasing physical activity levels in this cohort.

Overall, the theories were well supported and represented in the data, with resilience theory emerging strongly. There was, however, a limitation to the falls-efficacy data, which meant that this work was unable to achieve the goal of teasing out the differences between fear of falling, self-efficacy, and balance confidence, although fear did emerge as a stronger influence on physical activity. Fear as a primary limiter, however, was not fully supported by the qualitative data where few individuals remarked on falls or fear of falling. Overall, however, the theoretical framework provided an excellent outline for the construction of this work, guiding the choice of data collection surveys and questions.

Interpretation of Other Findings

Falls in the older adult population. Surprisingly, only 26% of the sample reported having had a fall in the past 6 months, which is below the traditionally reported 33% and 36% in those over 85 years of age (CDC, 2017). Very few of the participants commented on falls as a limiting factor or motivator for physical activity. However,

significant numbers of the participants did comment on healthy living and being independent, and it could be considered that these remarks reflect a desire not to experience a fall, which might limit their lifestyle or their independence. Those individuals who did remark on falls demonstrated the extent to which this truly is a life changing event "I fell a few years ago, it slowed me down" (participant 11), "I never expected the impact it [a fall] has had" (participant 80), "the fear of falling is the greatest fear of all" (participant 20). It is highly probable that those individuals who have sustained a fall, that potentially restricted their activity as a result would be less likely to attend an event that is specifically considering physical activity or choose to be in a high traffic location within their facility. It must therefore be considered that many of the individuals who had experienced falls, or fear of falling were not participants in the research. This reflects the work of Landers et al. (2011) when they remarked that sedentary individuals are extremely difficult to recruit for this type of study.

Physical activity and the older adult. The physical activity levels of this sample appeared to be higher than anticipated for this age group. The PASE manual suggests that those over 76 years old score a mean of 62 for women and 101 for men, while the women in this study with a mean age of 88 years had a mean physical activity score of 87 and ranged up to 209. The men in this study scored below the mean at 70 with a range of 2–188. Research does suggest that the self-report of physical activity is limited by recall and self-control (Falck et al., 2016), and that research into physical activity tends to attract those already physically active (Landers et al., 2011).

Scores as low as zero from participants in this research study would suggest that, while this study may have attracted those individuals who were generally more active, even those leading significantly sedentary lives did participate. It has been suggested that health issues are often cited for nonparticipation in physical activity (Hupin et al., 2015), and this was reflected by the participants; "muscles are weakening due to my condition" (participant 7), "I had a stroke, it hurts to walk" (participant 19), "arthritic pain in hips and knees" (participant 20). Hupin et al. (2015) also suggested that many older adults do not recognize physical activity as a health benefit, a concept that was not supported in this research. Many individuals cited health benefits as their motivation for physical activity; "I walk to prevent stiffness" (participant 74), "good health for a long life" (participant 77), "to be able to stay healthy" (participant 19). It would therefore appear that emphasis on physical activity as a health benefit is an area that could be well utilized to promote activity in this population.

Being sedentary is a challenge for the health profession, and inactivity is currently the fourth leading risk factor for mortality (Devereux-Fitzgerald et al., 2016), with inactivity cited at 35% in those over the age of 75 (Watson et al., 2016; Zubala et al., 2017). Watson et al. (2016) defined inactivity as no activity beyond that required for basic activities of living. In this study, 93% of the participants indicated that they did participate daily in seated activities such as reading or watching television, with 45% of these stating that this was for greater than 4 hours daily. The provision of extensive household support in the assisted living environment means that activities of daily living for this population are primarily the basic acts of dressing, grooming, and hygiene.

Interestingly, 49 participants did indicate some light housework had been performed in the past week, mostly washing dishes, while only eight indicated doing any heavier housework, and five indicated some outdoor gardening, citing their patio as an incentive to perform this activity.

One of the primary attractions and marketing issues of the assisted living environment is the provision of housekeeping services, but this would appear to be adding to an immediate reduction of physical activity in the residents.   Consideration of offering gardening activities for residents could prove a way to increase physical activity whether on their own patio or in a community garden. Individuals with pets, often encouraged within the assisted living environment, commented on the need to walk their dog as incentive for physical activities. Potentially having facility pets that need walking could increase activity without the added burden of daily care provision for the animal.

It has been demonstrated that the simple message of telling people to stand after 30 minutes of sitting can successfully decrease sedentary time in a group with a mean age of 74 (Gardiner, Eakin, Healy, & Owen, 2011). This simple concept could easily be introduced within an assisted living setting with adaptations for those unable to stand. Hupin et al. (2015) also indicated that the greatest benefits for decreasing mortality related to sedentary behavior, were in those who went from minimal or no physical activity, to some activity, and suggested that potentially the target activity recommendations currently presented by the various organizations including the CDC and ACSM could be too high. Interestingly the PASE focused on walking, a popular activity for this age group, and asked about exercise participation and household

activities, but there was no clarification of seated exercise or methods to improve activity during time spent sitting. Many of the participants indicated that they exercised daily in the facility, participating in the organized exercise activities, many of which are performed totally in sitting. This may have caused inflation of their scores, since they did participate in exercise albeit seated, and the PASE score may be weighted based on the anticipation that even light exercise is in standing.

Potentially, a survey that seeks information on seated activity levels, such as simple exercises while watching television, or seated tai chi and chair exercise programs, might add to the understanding of sedentary behaviors in adults, and allow the development of interventions to further address sedentary time. It should also be noted that the PASE does not specifically measure physical activity with relation to activity recommendations, so there is no ability to confirm numbers of individuals meeting these guidelines. However, the PASE does ask about muscle strengthening activities which are an important part of the recommendations and the component that the ACSM (2018), state only 5% of those over 85 are meeting. In my study 44% indicated that they never did any activity specifically for strengthening their muscles, but the remaining 56% indicated at a minimum of 1–2 days, with 20% indicating that they performed muscle strengthening activities 5–7 days of the week. This would suggest, that within this sample, more than average numbers were performing muscle strengthening activities, within the activity recommendations. This could be the result of onsite classes that include some weights, or the availability of equipment at an onsite wellness center.

However, the intensity of these exercises was not measured, and the weights used may be insufficient for appropriate strengthening.

Mixed methodology. This research highlighted the benefits and strengths of mixed method research. The quantitative data failed to reveal any significance but provided a wealth of information regarding this sample population, while the qualitative data provided more specific and personal information on these individuals and their motivations as well as their limitations. Without the qualitative data there would not have been the emergence of this cohorts' strong desire to continue healthy living and retain their independence, while still having numerical data to put the qualitative work in perspective. Similarly the surveys alone would not have captured their emotions of feeling good and loving life and their deep desire to be active; "feels good, sharpens the mind" (participant 10), "it makes me feel better" (participant 12), but in many cases needing more support from the environment in which they live; " not enough things that are simple and fun to do" (participant 40), "pool exercise is fun but not done as often as needed" (participant 72). My research would certainly reflect the comments of Mertens et al. (2016) when they stated that within mixed method the two methods do not compete but complement each other by increasing flexibility and understanding of the research question.

Limitations of the Study

Primary limitations to the study include the sample size $n = 76$, the locations, and the demographics. The sample size failed to produce statistically significant results and the very small effect size, $R^2 = .097$ fell below the small effect size of $<.13$ which had

been used to determine sample size. A smaller effect size of .06 had calculated a need for 130 participants, so a sample of over 100 individuals would have been preferable to improve the statistical analysis. Conversely, the 76 participants provided a very rich amount of qualitative data that allowed four strong themes to emerge.

Description of the population included in the sample, demonstrate that this was a relatively typical example of individuals currently over the age of 80, with a female majority and a lack of diversity. The description of the different facilities, along with the demographics, should help others to determine if the results can be generalized to their population. Activity levels of this population need to be understood within the concept that these individuals are living in an assisted living facility. As such, physical activity levels cannot be generalized to a more traditional community dwelling population, where daily household tasks can add significantly to their activity.

A considerable limitation to the study was the wording and format of the FES-I. This scale was very challenging for the assisted living residents to answer since they no longer perform many of the activities. It was also challenging for individuals to try and imagine how they would feel performing an activity that they had not needed to perform for many years, in some cases decades. Similar issues were found with the ABC although their recommendation to omit any unanswered questions from the scoring allowed a more genuine score to be obtained than could be achieved by omitting questions from the FES-I.

Trustworthiness

Throughout the research I have attempted to demonstrate trustworthiness. I have

provided an open and full description of the locations and participants and made a strong

attempt at randomized sampling. The time and place of the data collection encouraged

randomization and inclusion of all individuals living in the facility, but the voluntary

nature of the study precluded those individuals not willing or interested in participating.

The use of respected faculty colleagues for member checking emerging concepts and

themes added to the dependability of the work, and the possibility of my personal bias

has been acknowledged throughout.

Recommendations

This study has demonstrated a strong desire by this sample population of those

over 80, to remain physically active and independent. Choosing to live within an assisted

living setting, these individuals want activities that satisfy them. Work by Rose (2008)

has indicated many of the general issues that these individuals desire in physical activity

interventions, which were reflected by the participants of the study. These include

trusted leadership, and sufficiently challenging activities but adaptable to individual

abilities. Further investigation into the specifics of how interventions such as classes, can

meet the needs of this population, needs to be determined and disseminated to the

relevant individuals organizing and leading these activities.

One of my goals in this work was to attempt to identify the different levels of

relevance between falls-efficacy, balance confidence, and fear of falling with respect to

physical activity participation. This was not achieved and further work on examining the different influences and the different types of intervention for each concept is needed.

Additionally, there needs to be research and development into adapted or new surveys to measure these concepts, but specifically falls efficacy, to be suitable for an older more sedentary and more supported population. Finally, there needs to be further investigation into whether the physical activity guidelines are appropriate for this oldest old population who are now available in greater numbers than ever before and will grow significantly over the next few years.

Implications

The impact for positive social change demonstrated in this study is the need to change the approach for encouraging physical activity to one of healthy living rather than a negative message such as fall prevention. This study will allow assisted living facilities to promote healthy living and by doing so have the potential to increase activity and thereby decrease falls in the older adult. This in turn will decrease mortality and improve independence and quality of life, for this oldest old population.

This study has also highlighted the benefits of mixed method research and its ability to provide greater depth in answering the research question. Adding a simple qualitative question into a package collecting quantitative data proved to be a simple way of obtaining a substantial amount of rich, highly informative data.

Clinicians and individuals working with this population should start to focus on a positive emphasis of promoting healthy living. They should also work with these older adults to determine how they can promote activity, whether it be through gardening,

walking a dog, fun activities or more strenuous exercise classes. The older adults want to be active, they need to be supported.

Conclusion

Within the older adult population, those over 80, living in the assisted living setting, many are physically active and often, despite physical limitations, want to remain as active as possible. Individuals working with these older adults need to focus on the positive message of healthy living, rather than negative issues. Those designing activity programs need to think about creating and developing interesting and desired ways to maintain physical activity. This might be achieved through the addition of household type activities, now lost to those within the assisted living, or adding more interesting classes such as ballroom dancing, or more strenuous exercise. Simple activities that decrease sedentary time are also needed since most of this population, however active, admit to daily extended time in sitting. This study clearly demonstrated the invaluable partnership that is the essence of mixed method research.

References

Abreu, E. L., Cheng, A.-L., Kelly, P. J., Chertoff, K., Brotto, L., Griffith, E., . . . Brotto, M. (2014). Skeletal muscle troponin as a novel biomarker to enhance assessment of the impact of strength training on fall prevention in the older adults. *Nursing Research, 63*(2), 75-82.

Alexander, J. L., Sartor-Glittenberg, C., Bordenave, E., & Bordenave, L. (2015). Effect of the matter of balance program on balance confidence in older adults. *GeroPsych: The Journal of Gerontopsychology and Geriatric Psychiatry, 28*(4), 183-189. doi:10.1024/1662-9647/a000121

American College of Sports Medicine. (2018). *Guidelines for exercise testing and prescription* (10th ed.). Philadelphia, PA: Wolters Kluwer.

American Geriatrics Society and British Geriatrics Society. (2001). Prevention of falls in older persons: American Geriatric Society/ British Geriatric Society Clinical practice guideline. Retrieved from https://geriatricscareonline.org/application/content/products/CL014/html/CL014_BOOK001.html

American Psychological Association. (2017). The road to resilience. Retrieved from http://www.apa.org/helpcenter/road-resilience.aspx

Assad Farooqui, M., Yock-Theng, T., Bilger, M., & Finkelstein, E. A. (2014). Effects of financial incentives on motivating physical activity among older adults: Results from a discrete choice experiment. *BMC Public Health, 14*(1), 1-18. doi:10.1186/1471-2458-14-141

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215. doi:10.1037/0033-295X.84.2.191

Bandura, A. (1983). Self-Efficacy determinants of anticipated fears and calamities. *Journal of Personality & Social Psychology, 45*(2), 464-469.

Bandura, A. (1989). Regulation of cognitive processes through perceived self-efficacy. *Developmental Psychology, 25*(5), 729-735. doi:10.1037/0012-1649.25.5.729

Bandura, A. (2012). On the functional properties of perceived self-efficacy revisited. *Journal of Management, 38*(1), 9-44. doi:10.1177/0149206311410606

Berg, C. J., Haardörfer, R., McBride, C. M., Kilaru, V., Ressler, K. J., Wingo, A. P., . . . Smith, A. (2017). Resilience and biomarkers of health risk in Black smokers and nonsmokers. *Health Psychology, 36*(11), 1047-1058. doi:10.1037/hea0000540

Bezdjian, S., Schneider, K. G., Burchett, D., Baker, M. T., & Garb, H. N. (2017). Resilience in the United States Air Force: Psychometric properties of the Connor-Davidson Resilience Scale (CD-RISC). *Psychological Assessment, 29*(5), 479-485. doi:10.1037/pas0000370

Boddy, C. R. (2016). Sample size for qualitative research. *Qualitative Market Research, 19*(4), 426-432.

Bolton, K. W., Praetorius, R. T., & Smith-Osborne, A. (2016). Resilience protective factors in an older adult population: A qualitative interpretive meta-synthesis. *Social Work Research, 40*(3), 171-182. doi:10.1093/swr/svw008

Boyd, R., & Stevens, J. A. (2009). Falls and fear of falling: burden, beliefs and behaviours. *Age and Ageing, 38*(4), 423-428. doi:10.1093/ageing/afp053

Brecht, S. B., Fein, S., & Hollinger-Smith, L. (2009). Preparing for the future: Trends in continuing care retirement communities. *Seniors Housing & Care Journal, 17*(1), 75-90.

Burns, E. R., Stevens, J. A., & Lee, R. (2016). The direct costs of fatal and non-fatal falls among older adults — United States. *Journal of Safety Research, 58*, 99-103. doi:0.1016/j.jsr.2016.05.001

Calhoun, R., Meischke, H., Hammerback, K., Bohl, A., Poe, P., Williams, B., & Phelan, E. A. (2011). Older adults' perceptions of clinical fall prevention programs: A qualitative study. *Journal of Aging Research, 2011*, 7. doi:10.4061/2011/867341

Cardenas, V., Abel, S., Bowie, C. R., Tiznado, D., Depp, C. A., Patterson, T. L., . . . Mausbach, B. T. (2013). When functional capacity and real-world functioning converge: The role of self-efficacy. *Schizophrenia Bulletin, 39*(4), 908-916. doi:10.1093/schbul/sbs004

Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Reports, 100*(2), 126-131.

CDRISC. The Connor-Davidson resilience scale. (2016). Retrieved from http://www.connordavidson-resiliencescale.com/

Centers for Disease Control and Prevention. (2015). Physical activity basics Retrieved from https://www.cdc.gov/physicalactivity/basics/index.htm

Centers for Disease Control and Prevention. (2016, October 11, 2016). Home and recreational safety: Older adult falls. Retrieved from

https://www.cdc.gov/homeandrecreationalsafety/falls/index.html

Centers for Disease Control and Prevention. (2017). Falls and fall injuries among adults aged > 65 years - United States, 2014. Retrieved from https://www.cdc.gov/mmwr/volumes/65/wr/mm6537a2.htm?s_cid=mm6537a2_w

Centers for Disease Control and Prevention. (2018). Healthy People 2020 midcourse review. Physical Activity. Retrieved from https://www.cdc.gov/nchs/data/hpdata2020/HP2020MCR-C33-PA.pdf

Chao, Y.-Y., Scherer, Y. K., Wu, Y.-W., Lucke, K. T., & Montgomery, C. A. (2013). The feasibility of an intervention combining self-efficacy theory and Wii Fit exergames in assisted living residents: A pilot study. *Geriatric Nursing, 34*(5), 377-382. doi:10.1016/j.gerinurse.2013.05.006

Chase, J. D. (2013). Methodological challenges in physical activity research with older adults. *Western Journal of Nursing Research, 35*(1), 76.

Chaudhury, H., Campo, M., Michael, Y., & Mahmood, A. (2016). Neighbourhood environment and physical activity in older adults. *Social Science & Medicine, 149*(Supplement C), 104-113. doi:10.1016/j.socscimed.2015.12.011

Chaumon, M.-E. B., Cuvillier, B., Body, S., & Cros, F. (2016). Detecting falls at home: User-centered design of a pervasive technology. *Human Technology: An Interdisciplinary Journal on Humans in ICT Environments, 12*(2), 165-192. doi:10.17011/ht/urn.201611174654

Chen, T.-Y., Edwards, J. D., & Janke, M. (2017). Examination of the psychometric properties of the geriatric fear of falling measure among community-dwelling

older adults in the United States. *Journal of Applied Gerontology, 0*(0), 0733464817716969. doi:10.1177/0733464817716969

Chodzko-Zajko, W. J., Proctor, D. N., Singh, M. A. F., Minson, C. T., Nigg, C. R., Salem, G. J., & Skinner, J. S. (2009). Exercise and physical activity for older adults. *Medicine & science in sports & exercise, 41*(7), 1510-1530.

Cleary, K. K., & Skornyakov, E. (2014). Reliability and internal consistency of the activities-specific balance confidence scale. *Physical & Occupational Therapy in Geriatrics, 32*(1), 58-67. doi:10.3109/02703181.2013.875091

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum.

Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). *Depression and anxiety, 18*(2), 76-82.

Corathers, S. D., Kichler, J. C., Fino, N. F., Lang, W., Lawrence, J. M., Raymond, J. K., . . . Dolan, L. M. (2017). High health satisfaction among emerging adults with diabetes: Factors predicting resilience. *Health Psychology, 36*(3), 206-214. doi:10.1037/hea0000419

10.1037/hea0000419.supp (Supplemental)

Cosco, T. D., Kaushal, A., Richards, M., Kuh, D., & Stafford, M. (2016). Resilience measurement in later life: a systematic review and psychometric analysis. *Health & Quality of Life Outcomes, 14*, 1-6. doi:10.1186/s12955-016-0418-6

Cuervo, I., Leopold, L., & Baron, S. (2017). Promoting community preparedness and

resilience: A Latino immigrant community-driven project following hurricane

Sandy. *American Journal Of Public Health, 107*(S2), S161-S164.

doi:10.2105/AJPH.2017.304053

Cypress, B. (2017). Rigor or reliability and validity in qualitative research: Perspectives,

strategies, reconceptualization, and recommendation. *Dimensions of Critical Care*

Nursing July/August, 36(4), 253-263.

de Labra, C., Guimaraes-Pinheiro, C., Maseda, A., Lorenzo, T., & Millán-Calenti, J. C.

(2015). Effects of physical exercise interventions in frail older adults: a systematic

review of randomized controlled trials. *BMC Geriatrics, 15*, 1-16.

doi:10.1186/s12877-015-0155-4

Deci, E. L., & Ryan, R. M. (2000). The "What" and "Why" of goal pursuits: Human

needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-

268. doi:10.1207/S15327965PLI1104_01

Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human

motivation, development, and health. *Canadian Psychology/Psychologie*

canadienne, 49(3), 182-185. doi:10.1037/a0012801

Decroos, S., Lines, R. L. J., Morgan, P. B. C., Fletcher, D., Sarkar, M., Fransen, K., . . .

Vande Broek, G. (2017). Development and validation of the characteristics of

resilience in sports teams inventory. *Sport, Exercise, and Performance*

Psychology, 6(2), 158-178. doi:10.1037/spy0000089

10.1037/spy0000089.supp (Supplemental)

Delbaere, K., Close, J. C. T., Mikolaizak, A. S., Sachdev, P. S., Brodaty, H., & Lord, S.

R. (2010). The Falls Efficacy Scale International (FES-I). A comprehensive longitudinal validation study. *Age and Ageing, 39*(2), 210-216. doi:10.1093/ageing/afp225

Devereux-Fitzgerald, A., Powell, R., Dewhurst, A., & French, D. P. (2016). The acceptability of physical activity interventions to older adults: A systematic review and meta-synthesis. *Social Science & Medicine, 158*(Supplement C), 14-23. doi:10.1016/j.socscimed.2016.04.006

Dinger, M. K., Oman, F., Taylor, E. L., Vesely, S. K., & Able, J. (2004). Stability and convergent validity of the physical activity scale for the elderly (PASE). *Journal of Sports Medicine and Physical Fitness, 42*(2), 186-192.

Dingová, M., & Králová, E. (2017). Fear of falling among community dwelling older adults. *Central European Journal of Nursing & Midwifery, 8*(1), 580-587. doi:10.15452/CEJNM.2017.08.0005

Dionigi, R. (2006). Competitive sport and aging: The need for qualitative sociological research. *Journal of Aging and Physical Activity, 14*(4), 365-379.

Duray, M., & Genç, A. (2017). The relationship between physical fitness and falling risk and fear of falling in community-dwelling elderly people with different physical activity levels. *Turkish Journal Of Medical Sciences, 47*(2), 455-462. doi:10.3906/sag-1511-101

Ekelund, C., Dahlin-Ivanoff, S., & Eklund, K. (2014). Self-determination and older people - A concept analysis. *Scandinavian Journal of Occupational Therapy, 21*(2), 116-124. doi:10.3109/11038128.2013.853832

Elskamp, A. B. M., Hartholt, K. A., Patka, P., van Beeck, E. F., & van der Cammen, T. J. M. (2012). Why older people refuse to participate in falls prevention trials: A qualitative study. *Experimental Gerontology, 47*(4), 342-345. doi:10.1016/j.exger.2012.01.006

Ewald, B., McEvoy, M., & Attia, J. (2010). Pedometer counts superior to physical activity scale for identifying health markers in older adults. *British Journal of Sports Medicine, 44*(10), 756-761. doi:10.1136/bjsm.2008.048827

Ezeamama, A. E., Elkins, J., Simpson, C., Smith, S. L., Allegra, J. C., & Miles, T. P. (2016). Indicators of resilience and healthcare outcomes: findings from the 2010 health and retirement survey. *Quality Of Life Research: An International Journal Of Quality Of Life Aspects Of Treatment, Care And Rehabilitation, 25*(4), 1007-1015. doi:10.1007/s11136-015-1144-y

Falck, R. S., McDonald, S. M., Beets, M. W., Brazendale, K., & Liu-Ambrose, T. (2016). Measurement of physical activity in older adult interventions: a systematic review. *British Journal of Sports Medicine, 50*, 464-470.

Ferrand, C., Martinent, G., & Bonnefoy, M. (2014). Exploring motivation for exercise and its relationship with health-related quality of life in adults aged 70 years and older. *Ageing and Society, 43*(3), 411-427. doi:10.1017/S0144686X12001092

Fisher, C. B. (2013). *Decoding the ethics code. A practical guide for psychologists* (3rd ed.). Los Angeles, CA: SAGE.

Foster, S. (2016). Promoting resilience in nursing. *British Journal Of Nursing (Mark Allen Publishing), 25*(20), 1155-1155.

Franco, M. R., Tong, A., Howard, K., Sherrington, C., Ferreira, P. H., Pinto, R. Z., & Ferreira, M. L. (2015). Older people's perspectives on participation in physical activity: a systematic review and thematic synthesis of qualitative literature. *Br J Sports Med*, bjsports-2014-094015.

Frankfort-Nachmias, C., Nachmias, D., & DeWaard, J. (2015). *Research methods in the social sciences* (8th ed.). New York, NY: Worth publishers.

Fromholt Olsen, C., Wiken Telenius, E., Engedal, K., Bergland, A., Olsen, C. F., & Telenius, E. W. (2015). Increased self-efficacy: the experience of high-intensity exercise of nursing home residents with dementia - a qualitative study. *BMC Health Services Research, 15*(1), 1-12. doi:10.1186/s12913-015-1041-7

García-Pérez, M. (2012). Statistical conclusion validity: Some common threats and simple remedies. *Frontiers in Psychology, 3*(325). doi:10.3389/fpsyg.2012.00325

Gardiner, P. A., Eakin, E. G., Healy, G. N., & Owen, N. (2011). Feasibility of reducing older adults' sedentary time. *American Journal of Preventive Medicine, 41*(2), 174-177.

Garmezy, N. (1985). Competence and adaptation in adult Schizophrenic patients and children at risk. In R. Cancro & S. R. Dean (Eds.), *Research in the Schizophrenic Disorders: The Stanley R. Dean Award Lectures Vol. II* (pp. 69-112). Dordrecht: Springer Netherlands.

Gates, S., Fisher, J. D., Cooke, M. W., Carter, Y. H., & Lamb, S. E. (2008). Multifactorial assessment and targeted intervention for preventing falls and injuries among older people in community and emergency care settings:

systematic review and meta-analysis. *BMJ, 336*(7636), 130-133.

doi:10.1136/bmj.39412.525243.BE

Gillespie, L. D., Gillespie, W. J., Robertson, M. C., Lamb, S. E., Cumming, R. G., &

Rowe, B. H. (2003). Interventions for preventing falls in elderly people. *Cochrane*

Database Syst Rev, 4(4).

Goodwin, V., Jones-Hughes, T., Thompson-Coon, J., Boddy, K., & Stein, K. (2011).

Implementing the evidence for preventing falls among community-dwelling older

people: A systematic review. *Journal of Safety Research, 42*(6), 443-451.

doi:10.1016/j.jsr.2011.07.008

Gorina, Y. (2016). Quick Stats: Percentage of adults aged >65 years meeting 2008 federal

guidelines for leisure-time aerobic and muscle-strengthening activities, by age and

type of activit - United States, 2000-2002 and 2013-2015. *MMWR Morb Mortal*

Wkly Rep 2016. Retrieved from

https://www.cdc.gov/mmwr/volumes/65/wr/mm6537a9.htm

Grodesky, J. M., Kosma, M., & Solmon, M. A. (2006). Understanding older adults'

physical activity behavior: A multi-theoretical approach. *Quest, 58*(3), 310-329.

doi:10.1080/00336297.2006.10491885

Grov, C., Kelly, B. C., & Parsons, J. T. (2009). Polydrug use among club-going young

adults recruited through time-space sampling. *Substance Use & Misuse, 44*(6),

848-864. doi:10.1080/10826080802484702

Guérin, E., Bales, E., Sweet, S., & Fortier, M. (2012). A meta-analysis of the influence of

gender on self-determination theory's motivational regulations for physical

activity. *Canadian Psychology/Psychologie canadienne, 53*(4), 291-300.

doi:10.1037/a0030215

10.1037/a0030215.supp (Supplemental)

Gulbrandsen, C. (2016). Measuring older women's resilience: Evaluating the suitability

of the Connor-Davidson Resilience Scale and the Resilience Scale. *Journal Of*

Women & Aging, 28(3), 225-237. doi:10.1080/08952841.2014.951200

Ha, A. S., Lonsdale, C., Lubans, D. R., & Ng, J. Y. Y. (2017). Increasing students'

physical activity during school physical education: rationale and protocol for the

SELF-FIT cluster randomized controlled trial. *BMC Public Health, 18*(1), 11-11.

doi:10.1186/s12889-017-4553-8

Hadjistavropoulos, T., Delbaere, K., & Fitzgerald, T. D. (2011). Reconceptualizing the

role of fear of falling and balance confidence in fall risk. *Journal of Aging and*

Health, 23(1), 3-23. doi:10.1177/0898264310378039

Haig, B. D. (2012). From construct validity to theory validation. *Measurement:*

Interdisciplinary Research and Perspectives, 10(1-2), 59-62.

Haines, T. P., Lee, D. C. A., O'Connell, B., McDermott, F., & Hoffmann, T. (2015). Why

do hospitalized older adults take risks that may lead to falls? *Health Expectations:*

An International Journal of Public Participation in Health Care & Health Policy,

18(2), 233-249. doi:10.1111/hex.12026

Harris, M. A., Brett, C. E., Starr, J. M., Deary, I. J., & McIntosh, A. M. (2016). Early-life

predictors of resilience and related outcomes up to 66 years later in the 6-day

sample of the 1947 Scottish mental survey. *Social Psychiatry And Psychiatric*

Epidemiology, 51(5), 659-668. doi:10.1007/s00127-016-1189-4

Heinzel, S., Lawrence, J. B., Kallies, G., Rapp, M. A., & Heissel, A. (2015). Using exercise to fight depression in older adults: A systematic review and meta-analysis. *GeroPsych: The Journal of Gerontopsychology and Geriatric Psychiatry, 28*(4), 149-162. doi:10.1024/1662-9647/a000133

Hennink, M. M., Kaiser, B. N., & Marconi, V. C. (2017). Code saturation versus meaning saturation: how many interviews are enough? *Qualitative health research, 27*(4), 591-608.

Hill, H., McMeekin, P., & Parry, S. W. (2014). Does the falls efficacy scale international version measure fear of falling: a reassessment of internal validity using a factor analytic approach. *Age and Ageing, 43*(4), 559-562. doi:10.1093/ageing/afu059

Huang, T.-T. (2006). Geriatric fear of falling measure: Development and psychometric testing. *International journal of nursing studies, 43*(3), 357-365. doi:10.1016/j.ijnurstu.2005.04.006

Huang, T.-T., & Wang, W.-S. (2009). Comparison of three established measures of fear of falling in community-dwelling older adults: Psychometric testing. *International journal of nursing studies, 46*(10), 1313-1319. doi:10.1016/j.ijnurstu.2009.03.010

Hughes, K., van Beurden, E., Eakin, E. G., Barnett, L. M., Patterson, E., Backhouse, J., . . . Newman, B. (2008). Older persons' perception of risk of falling: implications for fall-prevention campaigns. *American Journal Of Public Health, 98*(2), 351-357.

Hupin, D., Roche, F., Gremeaux, V., Chatard, J.-C., Oriol, M., Gaspoz, J.-M., . . . Edouard, P. (2015). Even a low-dose of moderate-to-vigorous physical activity

reduces mortality by 22% in adults aged≥ 60 years: a systematic review and meta-analysis. *Br J Sports Med*, bjsports-2014-094306.

Imenda, S. (2014). Is there a conceptual difference between theoretical and conceptual frameworks? *Journal of Social Sciences, 38*(2), 185-195.

Infurna, F. J., & Luthar, S. S. (2017). The multidimensional nature of resilience to spousal loss. *Journal of Personality and Social Psychology, 112*(6), 926-947. doi:10.1037/pspp0000095

10.1037/pspp0000095.supp (Supplemental)

Ishigaki, E. Y., Ramos, L. G., Carvalho, E. S., & Lunardi, A. C. (2014). Effectiveness of muscle strengthening and description of protocols for preventing falls in the elderly: a systematic review. *Brazilian Journal of Physical Therapy, 18*(2), 111-118. doi:10.1590/S1413-35552012005000148

Jansen, S., Schoe, J., van Rijn, M., Abu-Hanna, A., van Charante, E. P. M., van der Velde, N., . . . Moll van Charante, E. P. (2015). Factors associated with recognition and prioritization for falling, and the effect on fall incidence in community dwelling older adults. *BMC Geriatrics, 15*, 1-10. doi:10.1186/s12877-015-0165-2

Johnson, R. B., & Schoonenboom, J. (2016). Adding qualitative and mixed methods research to health intervention studies: Interacting with differences. *Qualitative health research, 26*(5), 587-602. doi:10.1177/1049732315617479

Johnson, S. T., Martin, C., Anens, E., Johansson, A.-C., & Hellström, K. (2018). Older adults' opinions on fall prevention in relation to physical activity level. *Journal of*

Applied Gerontology, 37(1), 58-78. doi:10.1177/0733464815624776

Jung, D., Lee, J., & Lee, S.-M. (2009). A meta-analysis of fear of falling treatment programs for the elderly. *Western Journal of Nursing Research, 31*(1), 6-16. doi:10.1177/0193945908320466

Kelley, K., Little, S., Jong Seon, L., Birendra, K. C., & Henderson, K. (2014). Articulating meanings of positive adjustment to aging through physical activity participation among older adults. *Journal of Park & Recreation Administration, 32*(1), 63-79.

Kempen, G. I. J. M., Yardley, L., Van Haastregt, J. C. M., Zijlstra, G. A. R., Beyer, N., Hauer, K., & Todd, C. (2008). The Short FES-I: a shortened version of the falls efficacy scale-international to assess fear of falling. *Age and Ageing, 37*(1), 45-50. doi:10.1093/ageing/afm157

Kirkland, R. A., Karlin, N. J., Stellino, M. B., & Pulos, S. (2011). Basic psychological needs satisfaction, motivation, and exercise in older adults. *Activities, Adaptation & Aging, 35*(3), 181-196. doi:10.1080/01924788.2011.596764

Kosma, M., & Cardinal, B. J. (2016). Theory-based physical activity beliefs by race and activity levels among older adults. *Ethnicity & Health, 21*(2), 181-195. doi:10.1080/13557858.2015.1047741

Kosteli, M.-C., Williams, S. E., & Cumming, J. (2016). Investigating the psychosocial determinants of physical activity in older adults: A qualitative approach. *Psychology & Health, 31*(6), 730-749. doi:10.1080/08870446.2016.1143943

Kowalski, K., Rhodes, R., Naylor, P.-J., Tuokko, H., & MacDonald, S. (2012). Direct

and indirect measurement of physical activity in older adults: a systematic review of the literature. *International Journal of Behavioral Nutrition and Physical Activity, 9*(1), 148. doi:10.1186/1479-5868-9-148

Kuntz, J. R. C., Malinen, S., & Näswall, K. (2017). Employee resilience: Directions for resilience development. *Consulting Psychology Journal: Practice and Research, 69*(3), 223-242. doi:10.1037/cpb0000097

Lajoie, Y., & Gallagher, S. P. (2004). Predicting falls within the elderly community: comparison of postural sway, reaction time, the Berg balance scale and the Activities-specific Balance Confidence (ABC) scale for comparing fallers and non-fallers. *Archives of Gerontology and Geriatrics, 38*(1), 11-26. doi:10.1016/S0167-4943(03)00082-7

Lamond, A. J., Depp, C. A., Allison, M., Langer, R., Reichstadt, J., Moore, D. J., . . . Jeste, D. V. (2008). Measurement and predictors of resilience among community-dwelling older women. *Journal of Psychiatric Research, 43*(2), 148-154. doi:10.1016/j.jpsychires.2008.03.007

Landers, M. R., Durand, C., Powell, D. S., Dibble, L. E., & Young, D. L. (2011). Development of a scale to assess avoidance behavior due to a fear of falling: The fear of falling avoidance behavior questionnaire. *Physical Therapy, 91*(8), 1253-1265. doi:10.2522/ptj.20100304

Landers, M. R., Oscar, S., Sasaoka, J., & Vaughn, K. (2016). Balance confidence and fear of falling avoidance behavior are most predictive of falling in older adults: Prospective analysis. *Physical Therapy, 96*(4), 433-442.

doi:10.2522/ptj.20150184

Laybourne, A. H., Biggs, S., & Martin, F. C. (2008). Falls exercise interventions and reduced falls rate: Always in the patient's interest? *Age and Ageing, 37*(1), 10-13. doi:10.1093/ageing/afm190

Lee, D.-C. A., Pritchard, E., McDermott, F., & Haines, T. P. (2014). Falls prevention education for older adults during and after hospitalization: A systematic review and meta-analysis. *Health Education Journal, 73*(5), 530-544. doi:10.1177/0017896913499266

Lee, D. C. A., Day, L., Hill, K., Clemson, L., McDermott, F., & Haines, T. P. (2015). What factors influence older adults to discuss falls with their health-care providers? *Health Expectations: An International Journal of Public Participation in Health Care & Health Policy, 18*(5), 1593-1609. doi:10.1111/hex.12149

Lee, L.-L., Arthur, A., & Avis, M. (2008). Using self-efficacy theory to develop interventions that help older people overcome psychological barriers to physical activity: A discussion paper. *International journal of nursing studies, 45*(11), 1690-1699. doi:10.1016/j.ijnurstu.2008.02.012

Lee, L.-L., Avis, M., & Arthur, A. (2007). The role of self-efficacy in older people's decisions to initiate and maintain regular walking as exercise — Findings from a qualitative study. *Preventive Medicine, 45*(1), 62-65. doi:10.1016/j.ypmed.2007.04.011

Leung, P.-M., Ejupi, A., van Schooten, K. S., Aziz, O., Feldman, F., Mackey, D. C., . . . Robinovitch, S. N. (2017). Association between sedentary behaviour and

physical, cognitive, and psychosocial status among older adults in assisted living. *BioMed Research International*, 1-7. doi:10.1155/2017/9160504

Lewis, J. (2009). Redefining qualitative methods: believability in the fifth moment. *International Journal of Qualitative Methods, 8*(2), 1-14.

Liljas, A. E. M., Walters, K., Jovicic, A., Iliffe, S., Manthorpe, J., Goodman, C., & Kharicha, K. (2017). Strategies to improve engagement of 'hard to reach' older people in research on health promotion: A systematic review. *BMC Public Health, 17*(1), 349-349. doi:10.1186/s12889-017-4241-8

Logan, S. L., Gottlieb, B. H., Maitland, S. B., Meegan, D., & Spriet, L. L. (2013). The Physical Activity Scale for the Elderly (PASE) questionnaire: Does it predict physical health? *International Journal Of Environmental Research And Public Health, 10*(9), 3967-3986. doi:10.3390/ijerph10093967

Lovarini, M., Clemson, L., & Dean, C. (2013). Sustainability of community-based fall prevention programs: A systematic review. *Journal of Safety Research, 47*, 9-17. doi:10.1016/j.jsr.2013.08.004

MacKenzie, S. B. (2003). The dangers of poor construct conceptualization. *Journal of the Academy of Marketing Science, 31*(3), 323-326.

Mackin, M. L., Herr, K., Bergen-Jackson, K., Fine, P., Forcucci, C., & Sanders, S. (2009). Research participation by older adults at end of life: barriers and solutions. *Research In Gerontological Nursing, 2*(3), 162-171. doi:10.3928/19404921-20090421-05

Magnani, R., Sabin, K., Saidel, T., & Heckathorn, D. (2005). Review of sampling hard-

to-reach and hidden populations for HIV surveillance. *AIDS, 19*, S67-S72. doi:10.1097/01.aids.0000172879.20628.e1

Maritz, C. A., & Silbernagel, K. G. (2016). A prospective cohort study on the effect of a balance training program, including calf muscle strengthening, in community-dwelling older adults. *Journal of Geriatric Physical Therapy, 39*(3), 125-131. doi:10.1519/jpt.0000000000000059

Mason, M. (2010). Sample size and saturation in PhD studies using qualitative interviews. *Forum: Qualitative Social Research, 11*(3), 1-19.

McInnes, E., Seers, K., & Tutton, L. (2011). Older people's views in relation to risk of falling and need for intervention: a meta-ethnography. *Journal of Advanced Nursing, 67*(12), 2525-2536. doi:10.1111/j.1365-2648.2011.05707.x

McKim, C. A. (2017). The value of mixed methods research: A mixed methods study. *Journal of Mixed Methods Research, 11*(2), 202-222. doi:10.1177/1558689815607096

McMullan, I. I., McDonough, S. M., Tully, M. A., Cupples, M., Casson, K., & Bunting, B. P. (2018). The association between balance and free-living physical activity in an older community-dwelling adult population: a systematic review and meta-analysis. *BMC Public Health, 18*(1), 431-431. doi:10.1186/s12889-018-5265-4

Merrian-Webster. (2018). Dictionary. Retrieved from https://www.merriam-webster.com/dictionary/want

Mertens, D. M., Bazeley, P., Bowleg, L., Fielding, N., Maxwell, J., Molina-Azorin, J. F., & Niglas, K. (2016). The future of mixed methods: A five year projection to

2020. Retrieved from

https://mmira.wildapricot.org/resources/Documents/MMIRA%20task%20force%
20report%20Jan2016%20final.pdf

Miller, W., & Brown, P. (2017). Motivators, facilitators, and barriers to physical activity
in older adults: A qualitative study. *Holistic Nursing Practice July/August, 31*(4),
216-224.

Mitchell, B., Keating, N., de Jong Gierveld, J., Gotzmeister, D., Zecevic, A. A., Klinger,
L., & Salmoni, A. (2015). "People are getting lost a little bit": Systemic factors
that contribute to falls in community-dwelling octogenarians. *Canadian Journal
on Aging, 34*(3), 397-410. doi:10.1017/S071498081500015X

Morin, R. T., Galatzer-Levy, I. R., Maccallum, F., & Bonanno, G. A. (2017). Do multiple
health events reduce resilience when compared with single events? *Health
Psychology, 36*(8), 721-728. doi:10.1037/hea0000481

Morrow Jr, J. R., Bain, T. M., Frierson, G. M., Trudelle-Jackson, E., & Haskell, W. L.
(2011). Long-term tracking of physical activity behaviors in women: the WIN
Study. *Medicine and science in sports and exercise, 43*(1), 165.

Morrow Jr, J. R., DeFina, L. F., Leonard, D., Trudelle-Jackson, E., & Custodio, M. A.
(2012). Meeting physical activity guidelines and musculoskeletal injury: The
WIN study. *Medicine and science in sports and exercise, 44*(10), 1986.

Moyer, V. A. (2012). Prevention of falls in community-dwelling older adults: U.S.
Preventive Services Task Force recommendation statement. *Annals of Internal
Medicine, 157*(3), 197-204.

National Center for Assisted Living. (2018). Facts and figures. Retrieved from

    https://www.ahcancal.org/ncal/facts/Pages/Residents.aspx

New England Research Institutes. (2018). Physical Activity Scale for the Elderly.

    Retrieved from https://www.neriscience.com/Resources/Products/PASE

Newton, P. E. (2012). Clarifying the consensus definition of validity. *Measurement:*

    Interdisciplinary Research and Perspectives, 10(1-2), 1-29.

Ng, J. Y. Y., Ntoumanis, N., Thøgersen-Ntoumani, C., Deci, E. L., Ryan, R. M., Duda, J.

    L., & Williams, G. C. (2012). Self-determination theory applied to health

    contexts: A meta-analysis. *Perspectives on Psychological Science, 7*(4), 325-340.

    doi:10.1177/1745691612447309

Nigg, C. R., & Durand, Z. (2016). The theoretical basis for engagement in physical

    activity among older adults. *Annual review of Gerontology & Geriatrics, 36*, 251-

    x.

Nyman, S. R. (2011). Psychosocial issues in engaging older people with physical activity

    interventions for the prevention of falls. *Canadian Journal on Aging, 30*(1), 45-

    55. doi:10.1017/S0714980810000759

O'Reilly, M., & Parker, N. (2013). 'Unsatisfactory Saturation': a critical exploration of

    the notion of saturated sample sizes in qualitative research. *Qualitative research,*

    13(2), 190-197. doi:10.1177/1468794112446106

Ogonowski, C., Aal, K., Vaziri, D., Von Rekowski, T., Randall, D., Schreiber, D., . . .

    Wulf, V. (2016). ICT-based fall prevention system for older adults: Qualitative

    results from a long-term field study. *ACM Transactions on Computer-Human*

Interaction (TOCHI), 23(5), 1-33. doi:10.1145/2967102

Ong, A. D., Bergeman, C. S., & Boker, S. M. (2009). Resilience comes of age: defining features in later adulthood. *Journal of Personality, 77*(6), 1777-1804. doi:10.1111/j.1467-6494.2009.00600.x

Ong, A. D., Zautra, A. J., & Carrington, R. M. (2010). Psychological resilience predicts decreases in pain catastrophizing through positive emotions. *Psychology and Aging, 25*(3), 516-523. doi:10.1037/a0019384

Ortman, J., Velkoff, V., & Hogan, H. (2014). An aging nation: The older population in the United States. Population estimates and projections.

Pahor, M., Guralnik, J. M., Ambrosius, W. T., & et al. (2014). Effect of structured physical activity on prevention of major mobility disability in older adults: The life study randomized clinical trial. *JAMA, 311*(23), 2387-2396. doi:10.1001/jama.2014.5616

Payette, M.-C., Bélanger, C., Léveillé, V., & Grenier, S. (2016). Fall-related psychological concerns and anxiety among community-dwelling older adults: systematic review and meta-analysis. *Plos One, 11*(4), 1-17. doi:10.1371/journal.pone.0152848

Peretz, C., Herman, T., Hausdorff, J. M., & Giladi, N. (2006). Assessing fear of falling: Can a short version of the Activities-specific Balance Confidence scale be useful? *Movement Disorders, 21*(12), 2101-2105.

Plano Clark, & Ivankova, N. V. (2016). *Mixed methods research. A guide to the field*. Los Angeles, CA: SAGE.

Powell, L. E., & Myers, A. M. (1995). The activities-specific balance confidence (ABC) scale. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 50*(1), M28-M34.

Prince, S. A., Adamo, K. B., Hamel, M. E., Hardt, J., Gorber, S. C., & Tremblay, M. (2008). A comparison of direct versus self-report measures for assessing physical activity in adults: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity, 5*(1), 56. doi:10.1186/1479-5868-5-56

Ravitch, S. M., & Carl, N. M. (2016). *Qualitative research. Bridging the conceptual, theoretical, and methodological* Thousand Oaks, CA: SAGE publications.

Reams, M. A., Harding, A. K., Lam, N. S. N., O'Connell, S. G., Tidwell, L., Anderson, K. A., & Subra, W. (2017). Response, recovery, and resilience to oil spills and environmental disasters: Exploration and use of novel approaches to enhance community resilience. *Journal of Environmental Health, 80*(2), 8-15.

Resnick, B. (2002). The impact of self-efficacy and outcome expectations on functional status in older adults. *Topics in Geriatric Rehabilitation, 17*(4), 1-10.

Rhalimi, M., Helou, R., & Jaecker, P. (2009). Medication use and increased risk of falls in hospitalized elderly patients: A retrospective, case-control study. *Drugs & Aging, 26*(10), 847-852. doi:10.2165/11317610-000000000-00000

Rhodes, R. E., & Nasuti, G. (2011). Trends and changes in research on the psychology of physical activity across 20years: A quantitative analysis of 10 journals. *Preventive Medicine, 53*(1), 17-23. doi:10.1016/j.ypmed.2011.06.002

Ribeiro, J. D., Gutierrez, P. M., Joiner, T. E., Kessler, R. C., Petukhova, M. V., Sampson,

N. A., . . . Nock, M. K. (2017). Health care contact and suicide risk documentation prior to suicide death: Results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). *Journal of Consulting and Clinical Psychology, 85*(4), 403-408. doi:10.1037/ccp0000178

10.1037/ccp0000178.supp (Supplemental)

Ribeiro, O., & Santos, Â. R. (2015). Psychological correlates of fear of falling in the elderly. *Educational Gerontology, 41*(1), 69-78. doi:10.1080/03601277.2014.924272

Ricketts, S. N., Engelhard, G., Jr., & Chang, M.-L. (2017). Development and validation of a scale to measure academic resilience in mathematics. *European Journal of Psychological Assessment, 33*(2), 79-86. doi:10.1027/1015-5759/a000274

Rose, D. J. (2008). Preventing falls among older adults: no "one size suits all" intervention strategy. *Journal Of Rehabilitation Research And Development, 45*(8), 1153-1166.

Rubin, H. J., & Rubin, I. S. (2012). *Qualitative interviewing. The art of hearing data* (3rd ed.). Thousand Oaks, CA: SAGE publications.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78. doi:10.1037/0003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2008). A self-determination theory approach to psychotherapy: The motivational basis for effective change. *Canadian Psychology/Psychologie canadienne, 49*(3), 186-193. doi:10.1037/a0012753

Saldana, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). Thousand Oaks, CA: SAGE publications.

Schepens, S., Goldberg, A., & Wallace, M. (2010). The short version of the Activities-specific Balance Confidence (ABC) scale: Its validity, reliability, and relationship to balance impairment and falls in older adults. *Archives of Gerontology and Geriatrics, 51*(1), 9-12. doi:10.1016/j.archger.2009.06.003

Schwarz, B. (2001). Introduction. *Journal of Housing for the Elderly, 15*(1/2), 1.

Semaan, S. (2010). Time-space sampling and respondent-driven sampling with hard-to-reach populations. *Methodological Innovations Online, 5*(2), 60-75. doi:doi:10.4256/mio.2010.0019

Shannon-Baker, P. (2016). Making paradigms meaningful in mixed methods research. *Journal of Mixed Methods Research, 10*(4), 319-334. doi:10.1177/1558689815575861

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information, 22*(2), 63-75.

Shueh-Fen, C., Su-Fei, H., Li-Ting, L., Mei-Chuen, W., Jung-Yu, L., Jong-Long, G., . . . Guo, J.-L. (2016). Patterns of perspectives on fall-prevention beliefs by community-dwelling older adults: a Q method investigation. *BMC Geriatrics, 16*, 1-10. doi:10.1186/s12877-016-0307-1

Skipper, A., & Ellis, R. (2015). Examining the validity and reliability of the ABC-6 in underserved older adults. *Journal of Applied Gerontology, 34*(6), 761-778. doi:10.1177/0733464813495711

Smith, B. W., & Zautra, A. J. (2008). Vulnerability and resilience in women with arthritis: Test of a two-factor model. *Journal of Consulting and Clinical Psychology, 76*(5), 799-810. doi:10.1037/0022-006X.76.5.799

Solberg, P. A., Halvari, H., & Ommundsen, Y. (2013). Linking exercise and causality orientations to change in well-being among older adults: Does change in motivational variables play a role? *Journal of Applied Social Psychology, 43*(6), 1259-1272. doi:10.1111/jasp.12088

Southwick, S. M., Bonanno, G. A., Masten, A. S., Panter-Brick, C., & Yehuda, R. (2014). Resilience definitions, theory, and challenges: Interdisciplinary perspectives. *European Journal Of Psychotraumatology, 5*. doi:10.3402/ejpt.v5.25338

Spitzer, W. J., Neuman, K., & Holden, G. (2004). The coming of age for assisted living care. *Social Work in Health Care, 38*(3), 21-45. doi:10.1300/J010v38n03_02

Stephan, Y., Boiché, J., & Scanff, C. L. (2010). Motivation and physical activity behaviors among older women: A self-determination perspective. *Psychology of Women Quarterly, 34*(3), 339-348. doi:10.1111/j.1471-6402.2010.01579.x

Steptoe, A., Dockray, S., Wardle, J., Steptoe, A., Dockray, S., & Wardle, J. (2009). Positive affect and psychobiological processes relevant to health. *Journal of Personality, 77*(6), 1747-1776. doi:10.1111/j.1467-6494.2009.00599.x

Strupeit, S., Buss, A., & Wolf-Ostermann, K. (2016). Assessing risk of falling in older adults—A comparison of three methods. *Worldviews on Evidence-Based Nursing, 13*(5), 349-355. doi:10.1111/wvn.12174

Stubbs, B., Brefka, S., & Denkinger, M. D. (2015). What works to prevent falls in

community-dwelling older adults? Umbrella review of meta-analyses of randomized controlled trials. *Physical Therapy, 95*(8), 1095-1110. doi:10.2522/ptj.20140461

Stueve, A., O' Donnell, L. N., Duran, R., Doval, A. S., Blome, J., Stueve, A., . . . Blome, J. (2001). Men who have sex with men survey. *Time-space sampling in minority communities: Results with young Latino men who have sex with men, 91*, 922-926.

Sun, F., Norman, I. J., & While, A. E. (2013). Physical activity in older people: a systematic review. *BMC Public Health, 13*, 449-449. doi:10.1186/1471-2458-13-449

Sweet, S. N., Fortier, M. S., Strachan, S. M., & Blanchard, C. M. (2012). Testing and integrating self-determination theory and self-efficacy theory in a physical activity context. *Canadian Psychology/Psychologie canadienne, 53*(4), 319-327. doi:10.1037/a0030280

Sygit-Kowalkowska, E., Szrajda, J., Weber-Rajek, M., Porażyński, K., & Ziółkowski, M. (2017). Resilience as a predicator of mental health of incarcerated women. *Psychiatria Polska, 51*(3), 549-560. doi:10.12740/PP/OnlineFirst/62617

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Needham Heights, MA: Allyn & Bacon.

Taylor, B. A., & Pescatello, L. S. (2016). For the love of it: Affective experiences that may increase physical activity participation among older adults. *Social Science & Medicine, 161*(Supplement C), 61-63. doi:10.1016/j.socscimed.2016.05.034

Tinetti, M. E., Richman, D., & Powell, L. (1990). Falls efficacy as a measure of fear of falling. *Journal of Gerontology, 45*, 239-243.

Tricco, A. C., Thomas, S. M., Veroniki, A., & et al. (2017). Comparisons of interventions for preventing falls in older adults: A systematic review and meta-analysis. *JAMA, 318*(17), 1687-1699. doi:10.1001/jama.2017.15006

Turner, S. F., Cardinal, L. B., & Burton, R. M. (2017). Research design for mixed methods: A triangulation-based framework and roadmap. *Organizational Research Methods, 20*(2), 243-267. doi:10.1177/1094428115610808

U.S Preventive Services Task Force. (2018). Final recommendation statement: Falls prevention in community-dwelling older adults: Interventions. Retrieved from https://www.uspreventiveservicestaskforce.org/Page/Document/Recommendation StatementFinal/falls-prevention-in-older-adults-interventions1#Pod7

United States Census Bureau. (2010). The next four decades. The older population in the United States: 2010 to 2050. Retrieved from https://www.census.gov/prod/2010pubs/p25-1138.pdf

United States Census Bureau. (2011). The older population: 2010. Retrieved from https://www.census.gov/prod/cen2010/briefs/c2010br-09.pdf

United States Census Bureau. (2012). Industry Statistics Portal. Business Data from the US Census Bureau. Retrieved from https://www.census.gov/econ/isp/sampler.php?naicscode=62331&naicslevel=5#

US Department of Health and Human Services. (2018). Physical Activity Guidelines, Acitve Older Adults. Retrieved from

https://health.gov/paguidelines/guidelines/chapter5.aspx

van Kessel, G. (2013). The ability of older people to overcome adversity: A review of the resilience concept. *Geriatric Nursing, 34*(2), 122-127. doi:10.1016/j.gerinurse.2012.12.011

Vyas, K. J., Fesperman, S. F., Nebeker, B. J., Gerard, S. K., Boyd, N. D., Delaney, E. M., . . . Johnston, S. L. (2016). Preventing PTSD and depression and reducing health care costs in the military: A call for building resilience among service members. *Military Medicine, 181*(10), 1240-1247.

Walker, J. L. (2012). Research column. The use of saturation in qualitative research. *Canadian Journal of Cardiovascular Nursing, 22*(2), 37-41.

Walker, W., Porock, D., & Timmons, S. (2011). The importance of identity in falls prevention. *Nursing Older People, 23*(2), 21-26.

Wallis, J. A., Webster, K. E., Levinger, P., & Taylor, N. F. (2013). What proportion of people with hip and knee osteoarthritis meet physical activity guidelines? A systematic review and meta-analysis. *Osteoarthritis and Cartilage, 21*(11), 1648-1659. doi:10.1016/j.joca.2013.08.003

Warner, L. M., Schüz, B., Knittle, K., Ziegelmann, J. P., & Wurm, S. (2011). Sources of perceived self-efficacy as predictors of physical activity in older adults. *Applied Psychology: Health and Well-Being, 3*(2), 172-192. doi:10.1111/j.1758-0854.2011.01050.x

Warner, R. M. (2013). *Applied statistics. From Bivariate through multivariate techniques.* (2nd ed.). Thousand Oaks, CA: SAGE publications.

Wartelsteiner, F., Mizuno, Y., Frajo-Apor, B., Kemmler, G., Pardeller, S., Sondermann, C., . . . Hofer, A. (2016). Quality of life in stabilized patients with schizophrenia is mainly associated with resilience and self-esteem. *Acta Psychiatrica Scandinavica, 134*(4), 360-367. doi:10.1111/acps.12628

Washburn, R. A., & Ficker, J. L. (1999). Physical Activity Scale for the Elderly (PASE): the relationship with activity measured by a portable accelerometer. *Journal of Sports Medicine & Physical Fitness, 39*(4), 336-340.

Washburn, R. A., McAuley, E., Katula, J., Mihalko, S. L., & Boileau, R. A. (1999). The physical activity scale for the elderly (PASE): Evidence for validity. *Journal of Clinical Epidemiology, 52*(7), 643-651. doi:10.1016/S0895-4356(99)00049-9

Washburn, R. A., Smith, K. W., Jette, A. M., & Janney., C. A. (1993). The physical activity scale for the elderly (PASE): Development and evaluation. *Journal of Clinical Epidemiology, 46*(2), 153-162. doi:10.1016/0895-4356(93)90053-4

Watson, K. B., Carlson, S. A., Gunn, J. P., Galuska, D. A., O'Connor, A., Greenlund, K. J., & Fulton, J. E. (2016). Physical inactivity among adults aged 50 years and older - United States, 2014. *MMWR: Morbidity & Mortality Weekly Report, 65*(36), 954-958. doi:10.15585/mmwr.mm6536a3

Weinstein, A. A., Koehmstedt, C., & Kop, W. J. (2017). Mental health consequences of exercise withdrawal: A systematic review. *General Hospital Psychiatry, 49*(Supplement C), 11-18. doi:10.1016/j.genhosppsych.2017.06.001

Windle, G. (2012). The contribution of resilience to healthy ageing. *Perspectives in Public Health, 132*(4), 159-160.

Windle, G., Markland, D. A., & Woods, R. T. (2008). Examination of a theoretical model of psychological resilience in older age. *Aging & Mental Health, 12*(3), 285-292.

Withall, J., Jago, R., & Fox, K. R. (2011). Why some do but most don't. Barriers and enablers to engaging low-income groups in physical activity programmes: a mixed methods study. *BMC Public Health, 11*(1), 507-507. doi:10.1186/1471-2458-11-507

Yardley, L., Beyer, N., Hauer, K., Kempen, G., Piot-Ziegler, C., & Todd, C. (2005). Development and initial validation of the Falls Efficacy Scale-International (FES-I). *Age and Ageing, 34*(6), 614-619. doi:10.1093/ageing/afi196

Zautra, A. J. (2009). Resilience: One part recovery, two parts sustainability. *Journal of Personality, 77*(6), 1935-1943.

Zhang, N., Ning, X.-h., Zhu, M.-l., Liu, X.-h., Li, J.-b., & Liu, Q. (2015). Attitudes towards advance care planning and healthcare autonomy among community-dwelling older adults in Beijing, China. *BioMed Research International, 2015*, 453932-453932. doi:10.1155/2015/453932

Zubala, A., Macgillivray, S., Frost, H., Kroll, T., Skelton, D. A., Gavine, A., . . . Morris, J. (2017). Promotion of physical activity interventions for community dwelling older adults: A systematic review of reviews. *Plos One, 12*(7), 1-36. doi:10.1371/journal.pone.0180902

Appendix A: Qualitative Instrumentation

Please write in your answers to the following:
What motivates you to be physically active – please give examples

What limits you to being physically active – please give examples.

Activity director interview outline
1. What motivates your residents to being physically active?
   Please give examples
2. What limits your residents to being physically active?
   Please give examples

Appendix B: Demographic Data Collection Instrument

Demographic data:
Name_____
Contact number (optional)_____
Age_____ DOB_____ (month/year)
Gender   M (1)_____ F(2)_____
Ethnic origin:
1.White not of Hispanic origin _____
2.Hispanic   _____
3.Black/African American   _____
4.Indian/Alaska native   _____
5.Asian Indian   _____
6.Chinese   _____
7.Filipino   _____
8.Other Asian   _____

Do you have a history of any of the following conditions? Please circle your answer

Arthritis	Yes No	Diabetes	Yes No
Heart condition	Yes No	Lung condition	Yes No
High blood pressure	Yes No	Osteoporosis	Yes No

Neurological disease such as Parkinson's   Yes   No
Have you experienced a fall in the past 6 months   Yes   No

Survey data package number:_____

The Activities-specific Balance Confidence (ABC) Scale
(This scale is in the public domain and available for reproduction.)

For <u>each</u> of the following activities, please indicate your level of self-confidence by choosing a corresponding number from the following rating scale:

0%   10   20   30   40   50   60   70   80   90   100%
no confidence   completely confident

"How confident are you that you will <u>not</u> lose your balance or become unsteady when you…

…stand on your tiptoes and reach for something above your head? ____%

…stand on a chair and reach for something? ____%

…are bumped into by people as you walk through the mall?____%

… step onto or off an escalator while you are holding onto a railing? ____%

… step onto or off an escalator while holding onto parcels such that you cannot hold onto the railing? ____%

…walk outside on icy sidewalks? ____%

FES – 1
Now we would like to ask questions about how concerned you are about the possibility of falling. For each of the following activities please put a check mark in the box that represents how concerned you are that you might fall if you did this activity. If you currently do not do an activity, please answer how you think you would feel if you did the activity.

	Question	Not at all concerned - 1	Somewhat concerned - 2	Fairly concerned - 3	Very concerned - 4
1	Cleaning the house (eg sweep, vacuum or dust)				
2	Getting dressed or undressed				
3	Preparing simple meals				
4	Taking a bath or shower				
5	Going to the shop				
6	Getting in or out of a chair				
7	Going up or down stairs				
8	Walking around in the house				
9	Reaching for something above your head or on the ground				
10	Going to answer the telephone before it stops ringing				
11	Walking on a slippery surface (eg wet or icy)				
12	Visiting a friend or relative				
13	Walking in a place with crowds				

14 Walking on an uneven surface (eg rocky ground, poorly maintained pavement)

15 Walking up or down a slope

16 Going out to a social event (eg religious service, family gathering or club meeting)

GFFM

We are now asking questions on your behavior related to fear of falling. Please answer all questions with a check mark in the relevant box where 1 = never, 2 = rarely, 3 = sometimes, 4 = very often and 5 = always. If you do not currently do the activity in question, try and imagine how you feel if you had to do the activity

Question:	1 NEVER	2 RARELY	3 SOMETIMES	4 VERY OFTEN	5 ALWAYS
To avoid climbing to reach up high, I will take advantage of new tools or techniques, such as using a long handled mop to wipe tiles					
When walking on steep terrain					

or going outdoors, I will use an umbrella or cane for support to prevent myself from falling					
I will sit on a chair when taking a bath or hold some support					
I need assistance when going out (e.g. I used to take buses but now take either a taxi or ask others for a ride)					
Nowadays, I do less housework that requires more walking, such as sweeping and mopping					
When there is an obstacle on the ground or floor, I prefer to detour than go over it					
I go out less during rainy days					
I will ask others for help when I need something					

that's too high to reach				
I will take care to avoid passing close to places where objects are piled up				
Nowadays I do less outdoor activities (e.g. trips, community activities or visiting friends)				
I have changed my exercise style (e.g. from active to passive, from outdoor to indoor, or less frequent)				
I don't sleep well because I worry about falling				
My heart races when I think about falling after climbing up to reach something high				
I frequently recall terrible experiences I've had falling				
I have become more sensitive, agitated, irritable				

and critical of others.					

PASE and CD-RISC are copyrighted and cannot be reproduced within a document

Appendix D: Permission to use the PASE

Thank you for your recent purchase of the Physical Activity Scale for the Elderly (PASE). This e-mail is confirmation that we have received your payment. You can download a master copy PDF of the instrument and the associated administration and scoring manual at the links below

Instrument: Download

Administration and Scoring Manual: Download

Appendix E: Permission to use CD-RISC

Dear Christine:

Thank you for your interest in the Connor-Davidson Resilience Scale (CD-RISC). We are pleased to grant permission for use of the CD-RISC in the project you have described under the following terms of agreement:

1. You agree (i) not to use the CD-RISC for any commercial purpose unless permission has been granted, or (ii) in research or other work performed for a third party, or (iii) provide the scale to a third party without permission. If other colleagues or off-site collaborators are involved with your project, their use of the scale is restricted to the project described, and the signatory of this agreement is responsible for ensuring that all other parties adhere to the terms of this agreement.

2. You may use the CD-RISC in written form, by telephone, or in secure electronic format whereby the scale is protected from unauthorized distribution or the possibility of modification. In all presentations of the CD-RISC, including electronic versions, the full copyright and terms of use statement must appear with the scale. The scale should not appear in any form where it is accessible to the public, and should be removed from electronic and other sites once the project has been completed.

3. Further information on the CD-RISC can be found at the www.cd-risc.com website. The scale's content may not be modified, although in some circumstances the formatting may be adapted with permission of either Dr. Connor or Dr. Davidson. If you wish to create a non-English language translation or culturally modified version of the CD-RISC, please let us know and we will provide details of the standard procedures.

4. Three forms of the scale exist: the original 25 item version and two shorter versions of 10 and 2 items respectively. When using the CD-RISC 25, CD-RISC 10 or CD-RISC 2, whether in English or other language, please include the full copyright statement and use restrictions as it appears on the scale.

5. A student-rate fee of $ 30 US is payable to Jonathan Davidson at 325 Carolina Meadows Villa, Chapel Hill, NC 27517 , USA, either by PayPal (www.paypal.com , account mail@cd-risc.com), cheque, bank wire transfer (in US $$), international money order or Western Union.

6. Complete and return this form via email to mail@cd-risc.com.

7. In any publication or report resulting from use of the CD-RISC, you do not publish or partially reproduce items from the CD-RISC without first securing permission from the authors.

If you agree to the terms of this agreement, please email a signed copy to the above email address. Upon receipt of the signed agreement and of payment, we will email a copy of the scale.

For questions regarding use of the CD-RISC, please contact Jonathan Davidson at mail@cd-risc.com . We wish you well in pursuing your goals.

Sincerely yours,

Jonathan R. T. Davidson

Kathryn M. Connor,

If you have any questions regarding your recent purchase, please contact

media@neriscience .com

Appendix F: Letter of Cooperation From Research Partner.

Letter of Cooperation from a Research Partner

Community Research Partner Name – Name of AL facility
Contact Information – Name of manager and/or activities director.
Date
Dear Christine Childers,

Based on my review of your research proposal, I give permission for you to conduct the study entitled "What are the psychological or other factors that influence physical activity participation in the older adult", within the Insert Name of Community Partner. As part of this study, I authorize you to pre- advertise the event, arrive and set up at an agreed time, date and space venue and ask our residents if they would like to participate. We also authorize you to talk with the activities director for member checking and then subsequently contact any of our residents who have voluntarily given their contact details for follow up. We also agree to have you return once the project is completed to share your results with our residents. Individuals' participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include: Provision of a space with high resident traffic at the agreed time and date with tables and chairs. We reserve the right to withdraw from the study at any time if our circumstances change. I understand that the student will not be naming our organization in the doctoral project report that is published in Proquest.

I confirm that I am authorized to approve research in this setting and that this plan complies with the organization's policies.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the student's supervising faculty/staff without permission from the Walden University IRB.

Sincerely,
Authorization Official
Contact Information

Walden University policy on electronic signatures: An electronic signature is just as valid as a written signature as long as both parties have agreed to conduct the transaction electronically. Electronic signatures are regulated by the Uniform Electronic Transactions Act. Electronic signatures are only valid when the signer is either (a) the sender of the email, or (b) copied on the email containing the signed document. Legally an "electronic signature" can be the person's typed name, their email address, or any other identifying marker. Walden University staff verify any electronic signatures that do not originate from a password-protected source (i.e., an email address officially on file with Walden).