

THE RELATIONSHIP BETWEEN LEVEL OF PHYSICAL ACTIVITY AND QUALITY OF  
LIFE OF COMMUNITY-DWELLING OLDER ADULTS

by

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July 2015

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The purpose of this study was to describe observed relationships between level of physical activity engagement, perceived quality of life, and life determinants (i.e., age, gender, race, and educational level) of community-dwelling older adults. Thirty-four Pitt County Council on Aging participants, ages 55 and older, participated in the study. Quality of Life (QOL) was measured using the World Health Organization Quality of Life-BREF (WHOQOL-BREF) while physical activity level was measured using the Rapid Assessment of Physical Activity (RAPA). The four domains of QOL that were measured included physical health (Domain 1), psychological state (Domain 2), social relationships (Domain 3), and environment (Domain 4). Results indicated significant bivariate relationships between physical health and  $VO_2\max$  ( $r=0.388$   $p=0.023$ ), as well as RAPA score ( $r=0.413$   $p=0.015$ ); psychological state and age ( $r=-0.518$   $p=0.002$ ), psychological state and RAPA score ( $r=0.506$   $p=0.002$ ), and the environment and RAPA scores ( $r=0.429$   $p=0.011$ ). Findings also suggested that age ( $b=-0.770$ ,  $t=-2.236$ ,  $p=.033$ ) and RAPA score ( $b=2.286$ ,  $t=2.487$ ,  $p=.019$ ) were important predictors of psychological health. Results from this study can be used by community-based senior centers in order to create more opportunities for physical activity, thus enhancing participants' quality of life.



THE RELATIONSHIP OF LEVEL OF PHYSICAL ACTIVITY AND QUALITY OF LIFE OF  
COMMUNITY-DWELLING OLDER ADULTS

A Thesis

Presented to the Faculty of the Department of Recreation and Leisure Studies

East Carolina University

In Partial Fulfillment of the Requirements for the Degree  
Master of Science in Recreational Therapy Administration

by

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July 2015

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## **Manuscript**

### **Introduction**

Research consistently indicates a positive relationship between physical activity (PA) and quality of life (QOL). Furthermore, there is a specific need to address these topics with regard to older adults. Older adults are rapidly becoming the largest population in the U.S., yet remain among the lowest percentage of those who participate in regular physical activity (Lees, Clark, Nigg, & Newman, 2005; U.S. Census Bureau, 2012). By understanding the physical activity perceptions and behaviors of this population, the relationship between PA and QOL can be better explained.

Physical activity is defined as “any bodily movement produced by skeletal muscles that results in energy” (Caspersen, Powell, & Christenson, 1985, p. 126). Research has shown that regular participation in PA can benefit multiple aspects of an older adult’s life, including one’s psychological health (McAuley et al., 2000; Stephens, 1988), physical health (Cardenas, Henderson, & Wilson, 2009; Erikssen et al., 1998; Lees et al., 2005), and social relationships (Everard, Lach, Fisher, & Baum, 2000; Giles-Corti & Donovan, 2002; Seeman et al., 1995; Sallis & Owen, 1999). Based on an integrated quality of life (IQOL) perspective, each aspect may impact an individual’s overall QOL (Ventegodt, Merrick, & Andersen, 2003). By addressing multiple areas, an individual’s quality of life can be positively impacted.

The World Health Organization Quality of Life Group (WHOQOL Group) defines quality of life as “individuals perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals,

expectations, standards, and concerns” (The WHOQOL Group, 1995, p. 1405). The term QOL is a broad concept meant to encompass a person’s physical health, psychological state, social relationships, and relationship to important features of their environment. Given the aging worldwide population, it is important to understand how to reduce the risk of disease and maximize life expectancy. It is also essential to integrate physical activity into the lives of older adults as a means to enhance QOL. Engagement in physical activity impacts psychological, physical, social, and environmental well-being of the individual (Cardenas et al. 2009; Erikssen et al., 1998; Everard et al., 2000; Giles-Corti & Donovan, 2002; Hofstetter, Hovell, & Sallis 1990; Lees et al., 2005; McAuley et al., 2000; Sallis & Owen, 1999; Seeman et al., 1995; Shores & West; 2008; Stephens, 1988); all are elements of an integrated quality of life.

### **Purpose of the Research**

The purpose of this study was to describe the relationship between level of physical activity engagement, perceived quality of life, and life determinants (i.e., age, gender, race, and educational level) of community-dwelling older adults ages 55 and older who participated in services provided by a county-based council on aging. For the purpose of this study, community dwelling older adults is defined as Council on Aging (CoA) participants. For the purposes of this study, community-dwelling older adults is referred to as CoA “congregate meal” members, meaning a number of them attend the CoA in order to receive meals. This research sought to address a series of research questions:

- 1.0 Is there a relationship between specific life determinants and the individual QOL domains (i.e., psychological, physical, social and environmental) of community-dwelling older adults?
- 2.0 Is there a relationship between specific life determinants and levels of physical activity of community-dwelling older adults?
- 3.0 Is there a relationship between PA levels of community-dwelling older adults and the individual QOL domains?
- 4.0 Can a mediation relationship between specific determinants of PA and PA levels of community-dwelling older adults explain variation in perceived quality of life and the individual QOL domains?

The goal of this study was to understand the relationship between perceived QOL and participants' PA level and whether a relationship existed between certain life determinants (age, body mass index [BMI], and VO<sub>2</sub>max) and the QOL of community-dwelling older adults in Pitt County, NC. In addition, the results were used to suggest recommendations that influence practice among community-based recreational therapy professionals and related activity-based providers.

### **Methodology**

This study was conducted in collaboration with the Pitt County Council on Aging (CoA). Data were collected via site visits and the voluntary completion of a brief survey (20-30 minutes). The survey included three questionnaires: a demographics questionnaire, the WHOQOL-BREF, and the Rapid Assessment of Physical Activity (RAPA). Each of the questionnaires played a role in determining the relationship between PA level and QOL.

## **Sampling and Sampling Technique**

All participants were community dwelling older adults, ages 55 and older, and identified as current participants of Pitt County CoA. Participation was voluntary and participants were eligible to withdraw at any time during data collection. The Pitt County CoA is a “501C3 non-profit agency with a commitment to improve the quality of life for older Americans through advocacy, services, life enriching activities, and friendship” (Pitt County Council on Aging, 2009). The CoA serves community-dwelling older adults throughout Pitt County, NC with facilities in the towns of Greenville, Farmville, Bethel, Fountain, and Grifton.

## **Instrumentation**

For the purpose of this study, a written survey was developed that included demographic information of the participants. In addition, measures of the individuals’ current PA level and perceived QOL were collected.

**Demographic Information.** Demographic information, including gender, age, height, weight, race, marital status, highest education level, employment, and yearly income, were collected for each participant. Whether the participant had recently experienced a positive life event (e.g., winning the lottery, buying a house, etc.) or a negative life event (e.g., decline in health, loss of a loved one, etc.) and the perceived impact (high, medium, minimal, or N/A) of the event on their quality of life was also collected.

The final question of the demographic survey sought to determine the participants’ self-reported level of physical activity. A question was assessed on a scale of 0 to 7, with zero (0) being inactive and seven (7) indicating the participant ran over 10

miles per week or spent over 3 hours per week in comparable physical activity. The adults' response to this scaled question, their reported BMI, age, and gender were used to estimate the respondents' VO<sub>2</sub>max (Jackson et al., 1990).

**Rapid Assessment of Physical Activity (RAPA).** The Rapid Assessment of Physical Activity (RAPA) questionnaire was used to determine participants' self-perceived, current physical activity level. The RAPA was originally developed as a way for healthcare professionals to quickly and easily assess an individual's PA level (University of Washington, 2006).

Activities were classified into three categories: light, moderate, and vigorous. Light activities included any activity that slightly increases an individual's heart rate but he/she can still talk and sing, such as walking leisurely, stretching, vacuuming, or light yard work. Moderate activities were described as activities where an individual's heart beats faster than normal and he/she can talk but no longer sing. Examples of moderate PA include fast walking, aerobics class, strength training, and gentle swimming. The third category, vigorous activity, was described as any activity that increases an individual's heart rate a lot and makes it difficult to talk. Vigorous activities might include jogging or running, exercising on a stair machine, and playing tennis, racquetball, pickleball, or badminton.

The RAPA was scored based on the individual's responses with an affirmative ("yes") answer, and the highest associated score (i.e., intensity of physical activity from 1 to 7). In addition, an affirmative answer for participating in activities to increase muscular strength added another point. Adults who participated in activities to improve

flexibility were awarded two (2) extra points, leading to a total possible score of 10 points. Any scores less than six were considered suboptimal.

**WHOQOL-BREF.** The WHOQOL-BREF, an abbreviation of the WHOQOL-100, was used to assess individuals' QOL with consideration of their value system, culture, personal goals, standards, and concerns. The WHOQOL-BREF breaks the aspects of an individual's QOL into four domains: physical health, psychological, social relationships, and environmental (WHO, 1990; WHO, 1996). Each domain includes a number of questions that provide a good representation of a person's QOL in each specific area.

Each item included in the WHOQOL-BREF is measured on a 5-point Likert-type scale, which is used to calculate a raw score. That raw score is then used to calculate a mean score for each domain (domain mean scores can range from 4-20). The mean score is multiplied by four to translate the domain score into a scaled score that correlates to the scores of the WHOQOL-100 (WHO, 1996). The higher the score on the WHOQOL-BREF, the higher an individual's perceived QOL.

**Data Collection Procedures.** A panel of professionals in the field of study reviewed the survey and associated instrumentation for content and readability. One site was used as a pilot test to validate the readability and layout of the survey. Based on the findings from the pilot survey, modifications to the data collection instruments were made, including changes in the visual presentation, formatting, and page breaks to enhance understanding and ease of administration. All sites (n=5) were visited on a day that was identified as high participant attendance days by the site directors. Each site was visited at least once.

Two sites were accessed twice to ensure greater representation, to clarify incomplete responses, and to increase overall respondent participation.

Due to the potential needs of this aging population, surveys were completed on either a 1:1 or small group basis to ensure participants' understanding of the questions. Before the survey was administered, the purpose of the study was explained and consent was obtained from each volunteer. Once an individual agreed to participate, he or she was able to begin answering questions. After the completion of the site visits and data collection, surveys were entered into Qualtrics survey software by the principal researcher for analysis using SPSS 20 software.

## **Results**

The research questions were tested using descriptive, correlation and regression analyses. Analyses were performed with respect to the demographic and physical activity level information and each of the related research questions. The descriptive frequencies were used to generate a profile of the sample population.

Bivariate analyses were conducted to determine if any significant relationships existed between life determinants (age, BMI, and VO<sub>2</sub>max), physical activity level (RAPA scores), and the individual domains of QOL. A linear regression was also used to explore whether physical activity level predicted QOL when controlling for significantly associated life determinants from the sample of older adults. The results for each research question offered insights into the relationship between PA level, certain life determinants, and each of the four QOL domains.

BMI was calculated based on the self-reported responses from participants to the questions about height and weight. BMI assesses an individual's body composition using



weight relative to height (Esmat, 2012). BMI was then used, along with age, gender, and self-reported physical activity (PA-R) score, to estimate each participant's VO<sub>2</sub>max. VO<sub>2</sub>max refers to an individual's maximum oxygen intake during maximal exercise expressed proportional to body weight. Analyses were conducted to determine whether age, VO<sub>2</sub>max, and BMI were correlated with the individual domains of the WHOQOL-BREF (physical health, psychological health, social relationships, and environment).

Surveys were distributed at all five Pitt County, NC Council on Aging (CoA) congregate sites. Of the estimated 100 CoA participants who attend these sites, 36 individuals completed the survey. Of the 36 respondents, two were omitted from the analyses due to incomplete survey response. Thus, data from 34 respondents (34%) were used for statistical analysis in the study.

**Demographic Information.** Demographic information including gender, age, race, marital status, education level, employment status, and yearly income were collected. In addition, respondents were asked whether they had experienced a positive or negative life-changing event that may have altered their QOL. If they responded 'yes', they were further asked whether the event had minimal impact, medium impact, or high impact. Finally, as a part of the WHOQOL-BREF, participants were asked whether or not they were currently ill.

Of the 34 respondents, the majority (91%) were female with ages ranging from 61-90 years (Mean = 75.26, SD = 8.151). Twenty-two (64.7%) participants identified as African-American, one person identified as Latino/Hispanic, and the remaining 11 (32.4%) identified as Caucasian. Most of the participants (55.9%) distinguished themselves as widowed. Fifty-six percent (55.9%) of respondents reported having a high

school diploma. The employment status of the sample indicated that 82.4% of respondents were retired.

Respondents were asked if they had recently experienced a positive event that impacted their QOL and the level of impact of this event. The majority of adults (67.6%) responded that the question was not applicable (N/A) to their situation. Eleven participants noted that a positive life-changing event occurred recently in their lives; three reported it had 'high' impact, six a 'medium' impact, and two a 'minimal' impact. Twenty-three (67.6%) respondents indicated that a negative life-changing event was not applicable (N/A). Eleven participants had experienced a negative life changing event recently; six indicated it had a 'high' impact, four a 'medium impact', and one a minimal impact on their lives.

As part of the WHOQOL-BREF, participants were asked whether or not they were "currently ill". This referred to whether the participants classified themselves as "well" or as a "persons with disease or impairment" (WHOQOL-BREF, 1990). Of the 34 study participants, 12 (35.3%) identified as being currently ill and 22 (64.7%) considered themselves to be well.

Table 1.

*Demographic Information of 34 Community-Dwelling Older Adults*

Question	N	%	Mean	Std. D
<b>Age</b>			75.26	8.15
<b>Gender</b>				
Male	3	8.8		
Female	31	91.2		
<b>Race</b>				
Caucasian	11	32.4		
African-American	22	64.7		
Latino/Hispanic	1	2.9		
<b>Marital Status</b>				
Single	4	11.8		
Married	7	20.6		
Divorced	4	11.8		
Widowed	19	55.9		
<b>Highest Education Level</b>				
High School Diploma	19	55.9		
GED	4	11.8		
B.S./B.A.	1	2.9		
Masters	1	2.9		
Other	9	26.5		
<b>Employment*</b>				
Part-Time	2	5.9		
Retired	28	82.4		
Unemployed	3	8.8		
<b>BMI</b>			27.07	7.65
<b>RAPA</b>			5.38	2.51
<b>QOL</b>				
Domain 1 (Physical Health)			70.53	18.34
Domain 2 (Psychological Health)			75.41	12.74
Domain 3 (Social Relationships)			77.38	15.70
Domain 4 (Environment)			74.62	17.97
<b>Currently Ill</b>				
Yes	12	35.3		
No	22	64.7		

\*One respondent unaccounted for (N=33)

**Relationship of Life Determinants, Physical Activity, and Quality of Life.** A series of correlation analyses were conducted to test for relationships between life determinants, physical activity level (RAPA), and the four individual QOL domains (physical, psychological, social, and environmental). For the purpose of this study, life determinants were defined as age, gender, BMI, and VO<sub>2</sub>max. However, due to the small number of male respondents, there was not enough variability to run analyses on the relationship between gender and other variables. See Table 2.

**Life Determinants and Individual QOL Domains.** Bivariate correlation analyses were conducted for each domain of the WHOQOL-BREF and participants' age, BMI, and VO<sub>2</sub>max. Two significant relationships emerged. Physical health (Domain 1) and VO<sub>2</sub>max had a correlation of  $r=.388$  ( $p=.023$ ) and psychological health (Domain 2) and age were significantly correlated as well ( $r=-.518$ ,  $p=.002$ ). There were no significant relationships between social relationships (Domain 3) and environment (Domain 4) and any of the life determinant variables.

**Life Determinants and RAPA.** Correlation analysis was used to determine if any significant relationships were present between life determinants (i.e. age, BMI, and VO<sub>2</sub>max) and the participants' RAPA scores. Findings showed a significant negative relationship between age and RAPA score ( $r= -.375$ ,  $p=.029$ ). RAPA scores were also correlated with VO<sub>2</sub>max ( $r=.490$ ,  $p=.003$ ). There was no significant relationship between BMI and RAPA scores.

**RAPA and QOL.** To determine if any significant relationships existed between respondents' RAPA scores and the individual domains of QOL, correlation analyses were conducted. Based on the analyses, physical health (Domain 1) and RAPA scores were

significantly correlated ( $r=.413, p=.015$ ). In addition, psychological health (Domain 2) and environment (Domain 4) were significantly correlated with RAPA scores with  $r=.506, p=.002$  and  $r=.429, p=.011$  respectively. There were no significant correlations between social relationships and physical activity level.

Table 2.

*Bivariate Correlations among the Study Variables (N=34)*

	1	2	3	4	5	6	7
1. Domain 1	-						
2. Domain 2	.466**	-					
3. Domain 3	.251	.041	-				
4. Domain 4	.542**	.648*	.105	-			
5. BMI	-.217	.020	-.102	-.063	-		
6. Age	-.137	-.518**	.017	-.225	-.170	-	
7. VO2max	.338*	.254	.118	.263	-.727**	-.348*	-
8. RAPA Score	.413*	.506**	.193	.429*	-.108	-.375*	.490**

\* $p \leq .05$  (2-tailed); \*\* $p \leq .01$  (2-tailed).

Domain 1= Physical Health

Domain 2= Psychological Health

Domain 3= Social Relationships

Domain 4= Environment

**Regression Analysis of Bivariate Relationships.** Due to the low number of respondents ( $N=34$ ), a mediation model could not be explored. Hierarchical regression analyses were conducted to understand the relationships between the individual domains of QOL and personal factors, and those life determinants significantly associated with these outcome measures. The first model (Model 1) included the variables  $VO_2\text{max}$ , age, and BMI. RAPA scores were then added to create Model 2. No significant relationships were found for Model 1 ( $F=1.997, p=.136$ ) or Model 2 ( $F=2.060, p=.112$ ) in predicting the physical health domain of quality of life.

Given that the first model (Model 1) predicting psychological health was significant ( $F=3.787, p=.020$ ), the second model was also tested. When RAPA was added in Model 2 the model improved ( $R^2_{\text{change}}=.127, F=4.877, p=.004$ ). There was a negative, significant relationship between psychological health and age ( $b=-.770, t=-2.236, p=.033$ ); older respondents reported worse psychological health on the QOL measure. RAPA score was also indicated as a significant predictor for psychological health ( $b=2.286, t=2.487, p=.019$ ). Adults who were more involved in physical activity reported greater levels of psychological quality of life. The final model accounted for approximately 40% of the variance in the dependent variable ( $F(4,29)=4.877, p=.004, R^2=.402$ ).

No significant relationships were observed between the social relationships domain nor environment domain in Model 1 (social relationships:  $F=0.185, p=.905$ ; environment:  $F=1.171, p=.337$ ) or Model 2 (social relationships:  $F=0.385, p=.817$ ; environment:  $F=1.712, p=.174$ ). See Table 3 for a full report of the findings from these analyses.

Table 3.

*Age and RAPA Score Predicting QOL (Psychological Health Domain)*

	B	SE B	$\beta$	t	p-value
Model 1. Control Variables					
Constant	132.491	-	-	-	-
BMI	-.012	.501	-.007	.025	.980
Age	-.770	.344	-.493	-2.236	.033
VO <sub>2</sub> max	.129	.529	.077	.244	.809
Model 2. with RAPA Scores					
Constant	140.841	-	-	-	-
BMI	-.432	.492	-.260	-.878	.387
Age	-.796	.318	-.509	-2.502	.018*
VO <sub>2</sub> max	-.557	.561	-.333	-.993	.329
RAPA Score	2.286	.919	.451	2.487	.019*

\*  $p < .05$ , \*\*  $p < .01$ Model 1.  $R^2 = .275$ ,  $p = .020$ Model 2.  $R^2 = .402$ ,  $R^2 \text{ Change} = .127$ ,  $p = .019$ **Discussion and Implications for Practice**

The results of this study offered insights to enhance an understanding of the relationships between life determinants, physical activity level, and the individual domains of QOL. In addition, the results can be used to inform recreational therapy practice with community-dwelling older adults.

Current literature supports the idea that regular participation in PA is beneficial not only to one's physical health, but also in their psychological status, social relationships, and environmental interactions. The literature, however, is deficient in addressing how PA can impact an individual's QOL. This study describes the observed relationships between level of physical activity engagement and certain life determinants

in a select subset of community-dwelling older adults ages 55 and older and how these factors were associated with specific domains of perceived quality of life.

In this study, a higher RAPA score and VO<sub>2</sub>max were associated with a higher perceived physical health QOL score. This meant that the higher one's physical activity level, the less likely the individual experienced physical pain preventing him/her from performing tasks or requiring daily medical treatment. Individuals with a higher level of PA may also have more energy, have better mobility, get more sleep, and perform activities of daily living more easily (WHOQOL-BREF, 1990). This is consistent with the literature indicating that increased levels of PA participation are associated with fewer disabling limitations (Phillips, Wójcicki, & McAuley, 2013). It is therefore essential that practicing recreational therapy professionals be cognizant of the role of PA in the daily programming for the older adult.

While in this study no significant relationships between psychological health and BMI or VO<sub>2</sub>max were found, a positive, significant relationship between individuals' RAPA score and psychological health was evident. These findings suggest that higher PA participation may lead to the achievement of greater self-efficacy and meaning in life. According to the World Health Organization, such outcomes are likely to have a positive impact on feelings of depression or anxiety (WHOQOL-BREF, 1990).

As discussed by McAuley et al. (2000), involvement in PA leads to increased happiness and satisfaction with life. The implications for recreational therapy and related services that impact psychological wellbeing are interrelated to those for the physical health domain. While this study found that PA was positively associated with psychological health, it also suggested that age is negatively associated with this domain



of quality of life. This negative relationship suggests that as people age, they are more likely to experience declines in psychological health, such as episodes of despair and depression. As noted by McAuley et al., these feelings may be diminished by increasing older adults' participation in PA.

Community-based senior centers and recreational therapy service providers can use this information in efforts to enhance QOL for seniors by adding a variety of PA opportunities. The qualified recreational therapist can provide these opportunities within the senior center itself as well as educate participants on PA opportunities outside of the senior center. Centers providing aging services can facilitate greater participation of enrollees in a range of targeted community-based programs. Active exercise programs within the senior centers may help enhance the physical and emotional wellbeing of the participant. In addition, community-based opportunities such as the North Carolina Senior Games and on-going exercise and physical activity programs within the local parks and recreation departments (e.g., Tai Chi, Yoga, Silver Sneakers, etc.) afford opportunities to increase PA among older adults. Facilities serving the aging population may also enter partnerships for reduced rates in private sector exercise programs in an effort to maintain the older adult in physical activity as well as enhance his or her engagement in the life of the community.

Regular health screenings may also be integrated into programs offered by centers. Such options can increase participants' knowledge of their health and strategies to improve their health. The regular health screenings should include a focus on fostering participation in regular PA. Increasing opportunities for PA and engagement in activity have proven to be effective in increasing VO<sub>2</sub>max. As suggested by the Integrative

Quality of Life (IQOL) meta-theory (Ventegodt, et al. 2003), by including a host of services, community-based programs can serve participants on a broader level and address both subjective and objective factors that influence QOL.

This study also identified a relationship between PA level and individuals' satisfaction with their environment. Literature suggests the more opportunities for activities, as well as the accessibility and safety of one's environment, the more likely individuals are to engage in regular bouts of activity (Hofstetter et al., 1990; Shores & West, 2008). The significant findings between physical activity level and the environment from this study support this relationship. However, the current study also suggests that aspects of an individual's life such as finances, health accessibility, and transportation as reflected in WHOQOL-BREF's environmental domain, could also be associated with the PA level of an individual.

Given the findings of the current study, local aging service providers may respond to environmental QOL by exploring internal and external facility and programming options. This provides older adults the opportunity to engage in PA in an accessible environment that is safe and affordable. Thus, recreational therapy professionals should acquire competencies in evidence-based PA modalities and provide these services within their facilities. In addition, by integrating trained recreational therapy and PA professionals into in-house programs, participants can be taught proper exercise techniques that enhance safety and reduce apprehension with PA participation. Prohaska et al. (2006) argued that the lack of access to low-cost community-based programs tailored to the needs of older adults is a barrier to participation. Community-based councils on aging can alleviate this barrier by creating partnerships with private wellness

agencies and local parks and recreation departments to generate discounts for seniors. Working with wellness centers to create PA group classes, such as an arthritis class, stretching group, or aquatics programs, may also attract the older population to these services. Offering group fitness classes presents further opportunities for socialization, thus enticing older adults' participation.

In order to facilitate older adults' engagement in PA programs and services, the issue of transportation must be addressed. Advocating with local government and other transportation services is essential to the inclusion of older adults in services. If older adults are unable to access PA opportunities, a negative impact on their QOL is more likely.

In the current study, no significant relationships were found between social relationships and life determinants or PA level. These findings are incongruent with the literature that typically suggests a significant relationship between social and emotional support and PA levels (Everard et al., 2000; Giles-Corti & Donovan, 2002; Seeman et al., 1995). The divergent results from this study may be due to the setting where these respondents were solicited. Respondents were gathered from a senior center system that provides social opportunities for the majority of participants. In turn, respondents may have felt that their social needs were met through their participation in the senior center, whereas their activity needs may most often be accomplished at their home (e.g., gardening, vacuuming, walking around the neighborhood, etc.).

Ferraro and Cobb (1987) examined the participation habits of senior center users. Based on interviews and observational data, the researchers concluded that frequent attendance is more likely among older adults who use the center primarily for

socialization and not just for meals. The bivariate relationships described in their study also supported the idea that members with higher activity participation in senior centers typically have higher life satisfaction, less anxiety, and greater social activity involvement. This relationship wasn't evident in this study; however, PA often promotes socialization (Everard et al., 2000; Giles-Corti & Donovan, 2002; Seeman et al., 1995; Sallis & Owen, 1999). The Pitt County CoA tries to promote socialization opportunities within all of the services provided to attendees.

Historically, physical inactivity increases with age (Lees et al., 2005). Only 66% of older men participate in regular PA, whereas the percentage of older women is only about 50% (U. S. Department of Health and Human Services, 1996). Prohaska et al. (2006) review of the literature on PA and aging also suggested that leisure-time PA is higher among older men than women. While the results of the current study did not find a significant correlation between social relationships and PA level, the literature reflects a consensus of the importance of social milieu. Community-based senior centers can offer group classes, both educational and PA-based, in order to nurture this population's socialization needs. Recreational therapy professionals should aim to create a sense of social belonging as a means to increase participation and compliance with PA among this population.

In order to further support the significant findings between QOL and life determinants and PA level, both age and RAPA scores were predictors of psychological status. These findings suggest that an individual's PA level (based on RAPA scores) was a predictor of psychological health. However, age was the strongest predictor of psychological health and was negatively associated with this domain of QOL. The

outcome may be due to the occasional deficits in emotional regulation associated with aging. Research, however, suggests that declines in an individual's emotional state can be delayed through PA participation and socialization (Costello, Kafchinski, Vrazel, & Sullivan, 2011; Mathews et al. 2010).

### **Limitations**

While the study offers important insights into the relationships between PA, life determinants, and QOL, there were several limiting elements to this study. Among the potential limitations are:

**Limited number of participants.** Due to the low number of respondents (n=34), the data may not be completely representative of the population. However, as noted by Gay and Airasian (2000), for higher validity and reliability, the minimum number of participants for correlation research is 30. This study met this minimum criteria.

**Representative nature of participants.** This study included predominantly female respondents and this may be seen as a limitation. In this study, 9% of the participants were male. This deviates from the percentage of males 65 and older (43%) in North Carolina in 2013 (NC Division of Aging and Adult Services, 2014).

**Participant education level.** Another limitation to the study may be the education level of respondents and the difficulty of some of the questions in the survey. The majority of respondents (55.9%) reported an education level of high school diploma. Only two participants (5.9%) had a Bachelor's degree or higher. There is the possibility that the respondents misunderstood some of the questions leading to inaccurate responses. Participants were given individual assistance to complete the questionnaire to improve accuracy of response.

**Respondent Truthfulness.** Finally, it was beyond the researcher's ability to control for truthfulness of response. While some questions may have been misinterpreted, some respondents may have not offered accurate responses to the questions.

### **Implications for Future Research**

Based on the literature and the results of this study, on-going research on the topic of PA level and its relationship to QOL is warranted. The information and outcomes presented in this study can be used both in community-based programs for older adults (e.g., senior centers), as well as clinical settings (e.g., nursing homes and assisted living centers) to better include physical activity in recreational therapy services as a means to enhance participants' QOL.

An individual's age and PA level seem to have the greatest impact on the perceived quality of life of the study participants. Therefore, maintaining higher levels of physical activity involvement and health across the lifespan are essential. Recreational therapy and PA professionals should ensure the provision of a host of services to promote healthy lifestyle habits and community engagement.

Although results from this study did not find a significant relationship between PA level and social relationships, the literature suggests otherwise and should not be ignored. Continued research on socialization and its relationship to PA level should remain a topic of interest.

While the sample size for this study was small, the results may still apply to the larger population of community-dwelling older adults. Additional research on this topic with a larger population is necessary in order to establish a more confident understanding

of the relationships between life determinants, PA level, and the perceived QOL of older adults.

The results from this study are generally congruent with that of the literature (Costello et al., 2011; Everard et al., 2000; Giles-Corti & Donovan, 2002; Hofstetter et al., 1990; Mathews et al., 2010; McAuley et al., 2000; Phillips et al., 2013; Seeman et al., 1995; Shores & West, 2008). The more an individual participates in regular PA, the more likely he/she are to have a higher perceived physical, psychological, and environment QOL. Understanding and addressing the physical activity behaviors of the older adult population is essential in enhancing overall QOL in each of these domains.

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## Appendix A

### Extended Literature Review

## **Extended Literature Review**

Physical activity behaviors of older adults and the role it plays in overall quality of life has been, and will continue to be, a topic of interest. This review of the literature discusses three broad areas of research as it relates to physical activity and quality of life. The first section discusses background information on older adults and the frequency of older adult participation in physical activity. The second section focuses on the physical activity behaviors of older adults and their motivators for PA. The final section addresses the effects of physical activity on quality of life (QOL), including the specific domains of QOL (i.e., psychological, physical, social, and environmental) (WHO, 2014).

### **Prevalence and Background Information**

The rapid growth of the older adult population, and the low exercise participation rates in older adults, age 65 and older, justifies the need for a better understanding of older adults' exercise behaviors (Lees, Clark, Nigg, & Newman, 2005). Literature has suggested that participating in the recommended amount of physical activity can reduce, or even prevent, functional declines associated with aging. Participating in physical activity can help in the reduction of cardiovascular disease, risk of falling, osteoporosis, and loss of muscle mass and strength (Cardenas, Henderson, & Wilson, 2009). Even with the substantial evidence of the benefits of regular exercise for older adults, the rate of older adults participation in exercise is among the lowest of all the age groups (Lees et al., 2005).

In addition to the obvious health benefits, participating in physical activity has also been associated with improved quality of life (QOL) in older adults (Phillips, Wójcicki, & McAuley, 2013). Quality of life is a broad term referring to an individual's

health status and life satisfaction. In reporting determinants of life satisfaction in older adults, it has been indicated that participation in leisure activities was the most significant predictor of life satisfaction (Riddick & Stewart, 1994). Furthermore, it has been found that older adults who increase their participation in leisure activities are more likely to maintain their overall well being (Silverstein & Parker, 2002).

Phillips et al. (2013) showed that there was a direct relationship between physical activity and an individual's self-efficacy, which, in turn, indirectly influences QOL through their physical and mental health status. Quality of life is an important component to health, especially in older adults. Research conducted by Orsega-Smith, Payne, and Godbey (2003) showed that community based recreation programs that offer opportunities for older adults to be physically and socially active have been shown to facilitate actual and perceived quality of life.

### **Older Adults and Physical Activity.**

According to the U.S. Census Bureau, as of the 2010 census, the number of adults age 65 and older accounted for 13% of the total population and is projected to increase to 20% by the year 2050 (U.S. Census Bureau, 2012). Surveys such as the Behavioral Risk Factor Surveillance System (BRFSS) found that only a third of persons 65 years and older participate in regular physical activity. The Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) suggest the recommended amount of physical activity as 150 minutes of moderate-intensity aerobic activity (i.e., brisk walking) every week and muscle-strengthening activities on 2 or more days a week (CDC, Physical Activity, 2014d). Dergance et al. (2003) found that approximately 58% of adults age 65 and older are totally sedentary, only 29% perform

any amount of regular physical activity, and a meager 10% of older adults follow the ACSM and CDC guidelines for recommended physical activity. This may be due, in large part, to the many perceived enablers and barriers to physical activity for older adults.

**Physical Activity Enablers.** A considerable amount of literature has been published on older adults' perceived benefits to participating in physical activity (Cardenas et al., 2009; Costello, Kafchinski, Vrazel, & Sullivan, 2011; Dergance et al., 2003; Lees et al., 2005; Mathews et al., 2010). Research on physical activity and older adults supports the notion that exercise might actually delay the progression of disabilities, chronic health problems, and disease associated with aging. This may include, but is not limited to, reduced risk of heart disease, type II diabetes, hypertension, osteoporosis, and falling (Cardenas et al., 2009; Lees et al., 2005; Dergance et al., 2003).

In a study conducted by Costello et al. (2011), 31 older adults, age 60 and older, participated in focus groups to discuss their perceptions of the terms “physically active” and “physically inactive,” motivators, barriers, advantages, and disadvantages to engaging in regular physical activity, and the ideal physical activity programs. Groups were assigned based on the individual's current physical activity behaviors (active or inactive) and were limited to 10 people per group to ensure each member got the opportunity to express his or her exercise opinions. Focus group discussions were audiotaped and transcribed and then coded for analysis to identify any common themes. Of the 30 participants, 21 (70%) were identified as active and 9 (30%) were identified as inactive to form a total of 6 focus groups. Each focus group consisted of two, 45 minute discussions, with a 10 minute break in between for a total of 90 minutes per group.



The results showed that differences between the active and inactive groups were found in perception of the physical activity construct, barriers to regular participation, and the components to an ideal physical activity program. However, when asked what comes to mind when picturing an inactive adult, both groups stated that they pictured a depressed person who is socially isolated perhaps with mobility impairments. Other similarities between the two groups included the advantages and disadvantages to older adults participating in PA. These included health and emotional benefits and the potential for injury and/or falling (Costello et al., 2011). The study provides depiction of the PA perceptions of both physically active and inactive older adults.

In another study by Mathews et al. (2010), 396 community dwelling older adults participated in focus groups to discuss perceived physical activity enablers and barriers. Like the study conducted by Costello et al. (2011), all focus group sessions were audiotaped and transcribed for accurate analysis. The most common reported enabler among participants was identified as the expectation of positive outcomes, including both health benefits and the overall sense of feeling better. Other enablers identified included social support and access to facilities and programs. In both studies, the health benefits associated with participation in regular physical activity, along with socialization and access to exercise programs and facilities, are the greatest benefits gained from being physically active.

**Physical Activity Barriers.** Just as there are perceived enablers or benefits to physical activity, there are also perceived barriers to engagement in physical activity. In a study by Dergance et al. (2003), barriers to physical activity were determined in a cohort of sedentary elderly. In-home, one-on-one interviews were conducted on 100 sedentary

community-dwelling older adults. The San Diego Health and Exercise Questionnaire (SDHEQ) and the Minnesota Leisure Time Physical Activity Questionnaire were both administered to participants to determine the various attitudes toward physical activity, as well as participants' self-perceived physical activity. Results from the study showed that a lack of good health was one of the greatest barriers to physical activity. Other barriers included lack of interest, self-discipline, knowledge, company, enjoyment, and self-consciousness. It was concluded that societal expectations and physical activity myths, such as health benefits can only be gained through vigorous activity, have also kept older adults from regular participation in physical activity.

Likewise, Lees et al. (2005) conducted a qualitative study to determine the perceived barriers of exercise in an effort to overcome them, thus helping older adults transition to a more active lifestyle. The research was part of a pilot study and used focus groups to generate an understanding of the attitudes and beliefs of older adults and exercise behaviors. Six focus groups were formed: three with exercisers (N=37) and three with non-exercisers (N=29), with a total of 66 participants. Participants were recruited from senior housing, senior centers, and swim clubs for older adults. Beyond meeting the age requirement for participation, the exact age of the participants was unknown. For the purpose of this study, exercise was defined as “any planned physical activity (e.g., brisk walking, swimming, water aerobics, line dancing, biking, exercise class, etc.) that is performed a minimum of three times per week for at least 20 minutes per session” (Lees et al., 2005).

The focus groups in the Lees et al. (2005) study were approximately 90 minutes in length and were conducted by a trained moderator. All sessions were audiotaped and

later transcribed, as well as documented by an assistant moderator. After the conclusion of each focus group, moderators discussed the session, noting common themes, unexpected items, and the dynamics of the group. The data were coded and analyzed for common themes, beliefs, attitudes, and barriers to the exercise behavior of older adults. Both exercise and non-exercise focus groups identified 12 total barriers to exercise. Five of the barriers to exercise for this population were more clearly significant and included: fear of injury/falling, inertia, time constraints, negative affect, and physical ailments (Lees et al., 2005). Of these five barriers, inertia (i.e., boredom with exercise, laziness, or being too busy) was considered a significant barrier to exercise in both the exercise and non-exercise focus groups; however, fear of falling was the most significant barrier to exercise amongst the non-exercise focus groups. Consequently, the results indicated that individuals were more sedentary had less confidence in their ability to participate in exercise safely, whereas the increased mobility of active individuals could potentially offset their fear of falling (Lees et al., 2005).

The results of these studies reinforce the notion that both enablers and barriers impact the ability of individuals to participate in physical activity and as demonstrated by Phillips et al. (2013) and Rejeski and Mihalko (2001), the level of physical activity has a direct impact on the quality of life of the older adult. It is essential, therefore, to address the level of physical activity of older adults to promote overall health and quality of life.

### **Quality of Life**

In defining QOL, one of the greatest limitations is the lack of a single definitive definition. In aging research, QOL is a term used to describe a broad array of health outcomes focusing on two categories: functioning and well-being (Phillips et al., 2013;

Rejeski et al., 2001). However, QOL can also be defined in psychological terms as a conscious cognitive judgment of satisfaction with one's life (Pavot & Deiner, 1993).

In general, quality of life (QOL) refers to one's well-being and satisfaction with life, which can often be synonymous with living a life of high quality. However, the World Health Organization defines quality of life as "individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (WHOQOL Group, 1998).

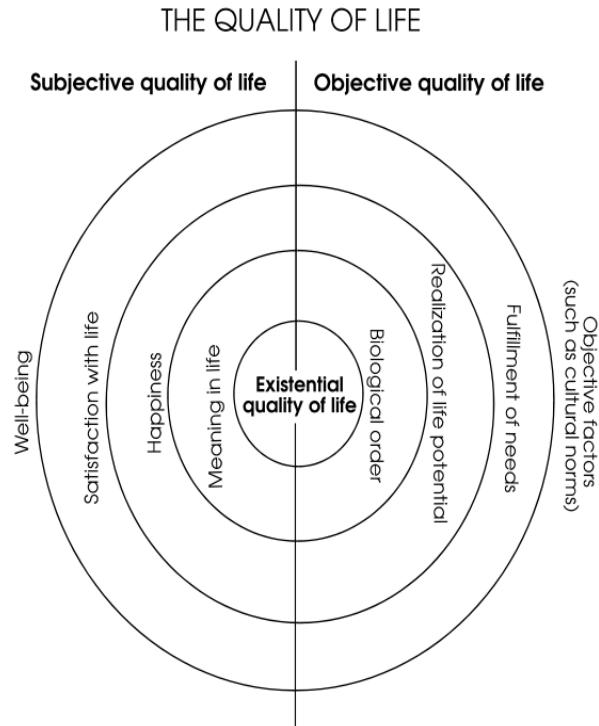
The Integrative Quality of Life theory (IQOL) further builds on the WHO perspective. As suggested by the IQOL theory, the notion of a good life can be observed from both objective and the subjective factors in an individual's life (Ventegodt, Merrick, & Andersen, 2003). IQOL is a meta-theory encompassing a number of existing quality of life theories in a subjective-existential-objective spectrum. It was developed by using existing constructs within the literature and considers various aspects including well being, satisfaction with life, happiness, meaning in life, the biological information system, realizing life potential, fulfillment of needs, and objective factors (Ventegodt, Merrick, & Andersen, 2003). It expands the predominant Health-Related Quality of Life constructs to incorporate non-physical aspects of well-being in order to determine the perceptions of quality of life in older adults (Gillespie-Kelley, 2009).

This theory encompasses eight factors on a subjective-existential-objective spectrum. As illustrated in Figure 1, these factors include well-being, satisfaction with life, happiness, meaning in life, biological order, realizing life potential, fulfillment of needs, and objective factors (such as cultural norms). Subjective QOL refers to well-being, satisfaction with life, happiness, and meaning in life. Objective QOL includes

biological order, realizing life potential, fulfillment of needs, and objective factors (such as cultural norms). Together, the two create this existential approach to QOL.

Figure 1

*Integrative Quality of Life (IQOL)*



Well-being refers to the subjective assessment of one’s own quality of life and is closely linked to how things function in an objective world with external life factors. Satisfaction with life simply means that an individual’s expectations, needs, and desires are being met; the feeling that life is the way it should be. Happiness is something deep in the individual that involves a special balance or symmetry. Meaning in life is often viewed as an intimate subject. It involves the acceptance of what is not only meaningful, but also meaningless.

The objective QOL factors pertain more to an individual's fundamental biological needs in life. Biological order denotes one's physical health. Realizing life potential involves living life to the fullest; good social relations, a meaningful job, and starting a family. The concept of fulfillment of needs is far less abstract than the rest of the factors. It simply means that when an individual's needs are being met, quality of life is higher. Objective aspects to QOL relate to the external factors in life, such as income, marital status, health status, and social interactions.

Related to both objective and subjective factors of the IQOL, there is consensus in the literature that a direct relationship exists between an individual's level of physical activity and their perceived QOL (Cardenas et al., 2009; Phillips et al., 2013; Rejeski & Mihalko, 2001). The literature further indicates that participating in activities, whether informal or formal, is important to the well-being of older adults (Everard et al., 1999).

In Rejeski and Mihalko's (2001) review of the literature on physical activity and QOL, the authors suggest that QOL should be elevated to the status of a psychological construct in order to create consistency and allow for stronger conclusions. It is also suggested that the relationship between mediating variables (mechanisms that possibly underlie the connection between physical activity and enhanced quality of life in older adults) of physical activity and global QOL should be examined (Rejeski & Mihalko, 2001). Although various measures were used to assess physical activity and perceived QOL, the results from both Rejeski and Mihalko (2001) and Phillips et al. (2013) are generally consistent: physical activity can have a positive impact on both the physical functioning and mental health status of older adults.

In the study conducted by Phillips et al. (2013), 321 older adults, ages 50-90 years, were recruited to participate in a cross-sectional study and then contacted again 18-months later for a follow up. Participants completed multiple questionnaires that assessed physical activity, self-efficacy, physical self-worth, disability limitations, and quality of life. Results from the study suggest that increases in physical activity were significantly associated with increases in self-efficacy, which, in turn were associated with fewer disability limitations and increases in physical self-worth. Furthermore, the authors found that increases in these factors, fewer disabilities and physical self-worth, were significantly associated with improvements in satisfaction with life. In addition, the authors found that increases in physical activity were significantly associated with increases in self-efficacy. “In turn, fewer disability limitations and increases in physical self-worth were significantly associated with improvements in satisfaction with life” (p. 1650). Given the aging worldwide population, it is important to understand how to reduce the risk of disease and maximize life expectancy. It is also imperative to enhance QOL of older adults during these later years through physical activity. Engagement in physical activity impacts psychological, physical, social, and environmental well-being, all elements of quality of life.

*Physical Health and Physical Activity.* According to the Centers for Disease Control and Prevention (CDC), about 720,000 Americans have a heart attack per year, killing nearly 380,000 people annually (CDC, 2014a). In another statistic by the CDC, one third of the American population, more than 72 million people, are considered obese (CDC, 2014c). Both of these diseases, cardiovascular disease and obesity, can be prevented by increasing an individual’s participation in physical activity. Research shows

that regular participation in physical activity can reduce an individual's risk for cardiovascular disease, fear of falling, osteoarthritis, and many other diseases and illnesses associated with aging (Cardenas et al, 2009; Erikssen et al., 1998; Lees et al., 2005).

In a study conducted by Erikssen et al. (1998), the relationship between physical fitness, changes in physical fitness, and mortality was tested among healthy middle-aged men over a 22 year period. Men ages 40-60 years old were recruited to volunteer to participate in a longitudinal study looking at the relationship of changes in physical fitness and mortality.

Each participant was tested on two occasions, 7 years apart, including a bicycle exercise test, clinical examination, and completing a questionnaire. The first survey included a sample of 2,014 men, but by the second testing period 7 years later, only 1,932 men were still alive. Of the 1,932 men, 1,756 (91%) were still eligible for the second round of tests (Erikssen et al., 1998). After the second survey, participants were classified into one of four quartiles (Q1= least fit, Q4=fittest) based on the changes in their exercise score between the first and second survey.

A follow-up was conducted 8 years later and it was found that 238 (17%) of the remaining participants had passed away either from cardiovascular causes, cancer, or an unknown reason. Based on the physical fitness level of each participant, the changes in their exercise score, and the death rate among participants, Erikssen et al. (1998) concluded that the change in physical fitness in healthy, middle-aged men has a highly significant effect on all-cause mortality.



These findings, along with the those from other studies (Cardenas et al., 2009; Erikssen et al., 1998; Lees et al., 2005) supports the notion that regular participation in PA has a positive correlation with not only an individual's overall physical health, but his or her overall QOL as well. Another aspect of QOL that can be positively associated with PA is psychological health.

*Psychological Health and Physical Activity.* The percentage of Americans diagnosed with a mental illness is increasing. The identification of ways to prevent incidents of mental illness and to effectively treat existing conditions is warranted. It is estimated that 83% of American adults are affected by a mental illness (CDC, 2014b). Mental illness can be defined as a health condition that is characterized by alterations in thinking, mood, or behavior associated with distress and/or impaired functioning, with depression and anxiety the leading diagnoses (CDC, 2014b).

An active lifestyle has been documented to show reduced symptoms of depression and anxiety, improved self-efficacy, more effective coping with stress, and an increase in an individual's overall satisfaction with one's life. In a study conducted by Stephens (1988), it was concluded that level of physical activity was positively associated with good mental health. Furthermore, Stephens found that this association does not apply equally to all groups but is most pronounced in women and elderly individuals, implying that these specific populations may have more to gain from a program of physical activity.

In another study conducted by McAuley et al. (2000), the effects of physical activity on changes in subjective well-being (SWB) were examined over a 12-month period. Inclusion criteria included being within the age of 60-75 years old, sedentary,

healthy to the degree that participation would not exacerbate existing symptoms, physician clearance, an adequate mental status, and the willingness to participate. After recruiting and screening potential participants, 174 individuals (49 males, 125 females) were identified as eligible. Participants were then randomly assigned to one of two treatment groups: an aerobic activity (i.e., walking) or a stretching and toning program. Both groups met 3 times a week for 6 months building up to 40 minutes of exercise.

Three different assessments were used to measure each participant's happiness, loneliness, and satisfaction with life. Baseline information, such as demographics, well-being, physical activity, and general medical history, were collected. Following the collection of baseline information, participants began their respective 6-month exercise program, either walking or stretching and toning. Physical activity logs were completed daily and assessments were re-distributed during the final week of the intervention. Finally, measures of well-being were completed once more 6-months post termination of the intervention.

Of the 174 participants who began the study, 153 individuals (88%) completed the 6-month exercise program. The overall findings suggests that exposure to a physical activity program leads to not only an increase in happiness and satisfaction, but also to a decrease in loneliness. These findings were consistent for both aerobic activity and the stretching and toning group.

The literature supports the idea that an increase in physical activity is positively correlated to an increase in psychological well-being. Although shown to yield psychological benefits, promotion of physical activity has also been associated with social relationships and support.

*Social Relationships and Physical Activity.* The role of social support in physical activity participation is one that has been vastly researched (Everard, Lach, Fisher, & Baum, 2000; Giles-Corti & Donovan, 2002; Seeman et al., 1995; Sallis & Owen, 1999). There are consistent findings that there is a positive relationship between informal activity and well-being, as well as a significant relationship between activity and social support and physical and mental health. Social support has also been related to a number of positive effects on older adults' cardiovascular, endocrine, and immune systems, and overall health (Everard et al., 2000).

In a study conducted by Everard et al. (2000), 244 older adults, mostly females (75%), ages 65-89, were asked to fill out various surveys in an attempt to assess the relationship between active engagement with life and functioning. The Activity Checklist and the Social Support Inventory were used as measures of engagement, where as the SF-12 Health Survey dealt with the functional aspect of health. The Activity Checklist was used to assess the individual's current activity levels based on four sub-categories: instrumental activities, social activities, high-demand leisure activities, and low-demand leisure activities. The Social Support Inventory addressed perceived social support by assessing type (instrumental and emotional) and style (directive or nondirective). The final assessment was included in order to assess the effects of physical and mental health functioning. However, due to the survey nature of this study, the physical functioning aspect of the assessment was omitted. Hierarchical linear regressions testing the relationship of activities and social support to mental and physical health were significant. Results showed that only maintenance of low-demand activities was

associated with enhanced mental health. In terms of greater physical health, maintenance of high-demand leisure, social, and instrumental activities were all positively associated.

In another study supporting the same notion of social relationships facilitating older adults' participation in physical activity, Seeman et al. (1995) used data from the MacArthur Research Network on Successful Aging Community Study, a longitudinal study of successful aging in men and women ages 70-79 years. Potential subjects participated in physical performance assessments, as well as face-to-face interviews. Based on assessment results, participants were selected to participate in the study based on high physical and cognitive functioning. A summary measure of social networking ties for each participant was also conducted including the type (emotional and/or instrumental) and frequency of support from the participants' spouse, children, relatives, and close friends. Participants willing and able to participate in a 2.5-year follow up were contacted and reassessed. Results after follow-up indicated that among the social networking variables, emotional support had the strongest effect on physical performance. Although instrumental support showed a nonsignificant association with changes in performance, when combined with emotional support, the strength of the effect of emotional support on physical performance was increased.

Sallis and Owen (1999), as cited by Giles-Corti and Donovan (2002), identified the importance of social support in the maintenance of physical activity participation. In the study, Giles-Corti and Donovan (2002) found that those who exercised with companions or were members of sporting clubs were likely to achieve recommended levels of physical activity. Although the social component may increase the appeal of

regular participation in PA, if the physical environment is not conducive for activity, PA becomes less appealing.

*Environment and Physical Activity.* The physical environment and its role in promoting participation in physical activity is one that is limited in published studies. It is often left out when considering physical activity cues and burdens. However, although sometimes passive, literature has shown that by making the environment accessible, convenient, safe, and appealing, it can encourage or discourage incidental physical activity (Giles-Corti & Donovan, 2002).

Hofstetter, Hovell, and Sallis (1990) identified positive insight between the convenience of facilities and neighborhood safety and increased self-efficacy, which is a factor that is positively correlated with physical activity participation (as cited by Giles-Corti & Donovan, 2002). The literature supports that the level of access to facilities is highly associated with whether or not physical activity participation is encouraged or discouraged (Giles-Corti & Donovan, 2002).

According to Shores and West (2008), the literature makes a connection between built environment of a community and the PA levels of its residents. However, Shores and West argue that the literature lacks the research on the relationship between PA levels and the built environment at the park level.

In the Shores and West (2008) study, four parks within the identified city limits were selected for observation. The protocol for data collection was outlined in the System for Observing Play and Recreation in Communities (SOPARC). The SOPARC relies on brief sampling techniques in which periodic scans of park environments are conducted by trained researchers (Shores & West, 2008). Target areas, all locations in which park users

may be active, were determined prior to beginning the data collection phase. Target areas of each park were scanned 4 times throughout the day (7:30-8:30am, 12:00-1:00pm, 3:30-4:30pm, and 6:30-7:30pm). During each scan, different observations were recorded, including number of participants, their observable personal characteristics, mode of participation, and participants' built park environment and open space usage.

A total of 560 scans led to the observation of the park activities of 2,113 visitors. After running statistical analyses on the data collected, researchers found that there were significant differences in activity intensities based on the target area. Frequency statistics revealed that target areas with playgrounds exhibited the most activity for all visitors, as opposed to shelter/picnic areas where the majority of activity was sedentary in nature. Moderate-intensity activity was primarily observed by visitors using sports fields and paths but park users achieving vigorous activity were mainly observed in areas featuring playgrounds and courts. These results suggest that built features (i.e., playgrounds, paths, sports fields, etc.) that support PA may be mechanisms to promote PA among community users.

When considering the environment, such as parks, it is imperative to take into account the type of activities that may take place. The findings from these studies (Giles-Corti & Donovan, 2002; Hofstetter et al., 1990; Shores & West, 2008) support the notion that by making the physical environment convenient, appealing, and safe, it improves the likelihood of PA taking place.

### **Summary**

Physical activity rates amid the older adult population are among the lowest of any of the age groups. There is a considerable amount of literature suggesting that an

increase in older adults' participation in physical activity can, indeed, have an effect on their physical, psychological, social, and environmental well-being, and indirectly enhance their overall quality of life. Understanding and addressing physical activity and each element of quality of life is essential in designing programs and services for the older adult population.

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## Appendix B

### Extended Results and Discussion

## Extended Results and Discussion

In addition to the analyses conducted to address the research questions, supplementary analyses were run in an attempt to better understand the physical activity behaviors and how they may impact the quality of life of participants. The type of life event participants may have experienced, as well as their current health status, was also considered in relation to perceived QOL.

**Type of Life Event and QOL.** Participants were asked whether or not they experienced a positive or negative life-changing event recently. Eleven respondents indicated that they recently experienced a positive life-changing event. Coincidentally, 11 respondents also identified they experienced a negative event. Interestingly enough, eight of the 11 respondents indicated that they experienced both a positive and a negative life-changing event. Correlation analyses were conducted for each QOL domain to determine if there was a relationship between the type of life event and the individual QOL domains. The only relationship found was between Domain 4 (environment) and a negative life event ( $r=-.840, p=.001$ ).

Table 4.

*Type of Life-Changing Event and QOL (N=31)*

	Domain 1		Domain 2		Domain 3		Domain 4	
	M	Std. D	M	Std. D	M	Std. D	M	Std. D
Positive Event Only	79.00	3.464	81.00	.00	70.67	13.05	85.33	13.05
Negative Event Only	62.67	6.51	68.67	12.50	73.00	3.46	75.00	.00
Both Pos. & Neg. Event	68.88	22.93	74.88	13.43	71.75	20.64	74.25	6.76
Neither	71.10	19.03	75.80	13.66	81.30	14.58	73.10	22.48

Domain 1= Physical Health  
 Domain 2= Psychological Health  
 Domain 3= Social Relationships  
 Domain 4= Environment

**Currently Ill and QOL.** To better understand the relationship between QOL and respondents' current health status (currently ill or not), correlation analyses were run. No significant relationships were found between Domain 2, Domain 3, or Domain 4. There was, however, a negative relationship between physical health (Domain 1) and health status ( $r=-.597, p=.000$ ).

### **Discussion and Implications for Practice**

In an attempt to better understand the results and the population, additional analyses were run to investigate whether any relationship existed between life events and QOL. The results reflected a negative relationship between experiencing a negative life event and an individual's environment (Domain 4). Negative events such as job loss,

financial difficulties, the loss of a loved one, or safety concerns all impact perceived environmental QOL. The implications may call for enhanced support systems to address these perceived threats. Such services as individual personal counseling, financial advising, and access to transportation all play a role in ensuring environmental security. In addition, creating opportunities for meaningful volunteer opportunities and post-retirement employment can impact perceived QOL in the environmental domain.

As may be anticipated, there was a significant relationship between perceived physical health and whether respondents identified themselves as currently ill. Maintaining physical health through accessible medical treatment and prevention services are key to perceived health and resultant chronic conditions and other conditions associated with the aging process.



## Appendix C

### Survey Instrument

Consent: Exempt survey research:

You are being invited to participate in a **research** study titled “The Relationship of Level of Physical Activity on the Quality of Life of Community-Dwelling Older Adults” being conducted by Kelly Schurtz, a graduate student at East Carolina University in the Recreation and Leisure Studies department. The goal is to survey 150+ community-dwelling older adults in Pitt County. The survey will take approximately 30 minutes to complete. It is hoped that this information will assist us to better understand physical activity behaviors and life determinants and their relationship to an individual’s quality of life. The survey is anonymous, so please do not write your name. Your participation in the research is **voluntary**. You may choose not to answer any or all questions, and you may stop at any time. There is **no penalty for not taking part** in this research study. Please call Kelly Schurtz at (336)406-1298 or Dr. Thomas Skalko at (252) 328-0018 for any research related questions or the Office of Research Integrity & Compliance (ORIC) at 252-744-2914 for questions about your rights as a research participant.

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Signature

---

Date

## Demographics Questionnaire

As a Council on Aging participant, we are asking for your assistance in exploring how participation relates to an individual's quality of life. This survey is designed to identify factors that may influence your engagement in physical activity and its relationship to your overall quality of life.

By agreeing to participate you are giving your permission to use your responses in the study. Please note that there are no personally identifying information requested and all responses are held as confidential. Individual responses will be placed into the group data.

I read the purpose of the study and agree to participate. I understand that the completion and submission of this survey gives my consent to participate in the study.

Yes

No

-----  
Gender:  Male  Female

1. Age: \_\_\_\_\_
2. Height: \_\_\_\_\_
3. Weight: \_\_\_\_\_
4. Race:
  - a. Caucasian
  - b. African-American
  - c. Latino/Hispanic
  - d. Asian/Pacific Islander
  - e. Native American
  - f. Other: \_\_\_\_\_
5. Marital Status
  - a. Single
  - b. Married
  - c. Divorced
  - d. Widowed
6. Highest Education Level
  - a. High School Diploma
  - b. GED
  - c. B.S./B.A.
  - d. Masters
  - e. PhD/MD

f. Other: \_\_\_\_\_

7. Employment
- a. Part-Time
  - b. Full-Time
  - c. Self-Employed
  - d. Retired
  - e. Unemployed

8. Yearly Income

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9. If you have had a recent positive, life-changing event that has impacted your quality of life, how much impact did it have?

- a. High Impact
- b. Medium Impact
- c. Minimal Impact
- d. N/A

10. If you have had a recent negative, life-changing event that has impacted your quality of life, how much impact did it have?

- a. High Impact
  - b. Medium Impact
  - c. Minimal Impact
  - d. N/A
-

Please choose one number below (0-7) to rate your current physical activity level.

I don't participate regularly in programmed recreation sport or physical activity:

- 0 – Avoid walking or exertion (e.g. always use the elevator, drive whenever possible instead of walking)
- 1 – Walk for pleasure, routinely use stairs, occasionally exercise sufficiently to cause heavy breathing or perspiration.

I participate regularly in recreation or work requiring modest physical activity: such as golf, horseback riding, calisthenics, gymnastics, table tennis, bowling, weight lifting, or yard work.

- 2 – 10-60 minutes per week
- 3 – Over one hour per week

I participate regularly in heavy physical exercise (such as running or jogging, swimming, cycling, rowing, skipping rope, running in place) or engage in vigorous aerobic type activity (such as tennis, basketball, or handball)

- 4 – Run less than one mile per week or spend less than 30 minutes per week in comparable physical activity.
- 5 – Run 1-5 miles per week or spends 30-60 minutes per week in comparable physical activity
- 6 – Run 5-10 miles per week or spends 1-3 hours per week in comparable physical activity
- 7 - Run over 10 miles per week or spends over 3 hours per week in comparable physical activity

Instructions

This assessment asks how you feel about your quality of life, health, or other areas of your life. **Please answer all the questions.** If you are unsure about which response to give to a question, **please choose the one** that appears most appropriate. This can often be your first response.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last two weeks.** Read each question, assess your feelings, and circle the number on the scale for each question that gives the best answer for you.

Are you currently ill?  Yes  No

		Very poor	Poor	Neither poor nor good	Good	Very Good
1 (G1)	How would you rate your quality of life?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very Satisfied
2 (G4)	How satisfied are you with your health?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	An extreme amount
3 (F1.4)	To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4 (F11.3)	How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
5 (F4.1)	How much do you enjoy life?	1	2	3	4	5
6 (F24.2)	To what extent do you feel your life to be meaningful?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
7 (F5.3)	How well are you able to concentrate?	1	2	3	4	5
8 (F16.1)	How safe do you feel in your daily life?	1	2	3	4	5
9 (F22.1)	How healthy is your physical environment?	1	2	3	4	5

		Not at all	A little	Moderately	Mostly	Completely
10 (F2.1)	Do you have enough energy for everyday life?	1	2	3	4	5
11 (F7.1)	Are you able to accept your bodily appearance?	1	2	3	4	5
12 (F18.1)	Have you enough money to meet your needs?	1	2	3	4	5
13 (F20.1)	How available to you is the information you need in your day-to-day life?	1	2	3	4	5
14 (F21.1)	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5

		Very poor	Poor	Neither poor nor good	Good	Very good
15 (F9.1)	How well are you able to get around?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16 (F3.3)	How satisfied are you with your sleep?	1	2	3	4	5
17 (F10.3)	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18 (F12.4)	How satisfied are you with your capacity for work?	1	2	3	4	5
19 (F6.3)	How satisfied are you with yourself?	1	2	3	4	5
20 (F13.3)	How satisfied are you with your personal relationships?	1	2	3	4	5
21 (F15.3)	How satisfied are you with your sex life?	1	2	3	4	5
22 (F14.4)	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23 (F17.3)	How satisfied are you with your living space?	1	2	3	4	5
24 (F19.3)	How satisfied are you with your access to health services?	1	2	3	4	5
25 (F23.3)	How satisfied are you with your transport?	1	2	3	4	5

		Never	Seldom	Quite Often	Very Often	Always
26 (F8.1)	How often do you have negative feelings such as blue mood, despair, anxiety, or depression?	1	2	3	4	5



Appendix D

IRB Approval



**EAST CAROLINA UNIVERSITY**  
**University & Medical Center Institutional Review Board**  
**Office**

4N-70 Brody Medical Sciences Building · Mail Stop 682  
600 Moye Boulevard · Greenville, NC 27834  
Office **252-744-2914** · Fax **252-744-2284** · [www.ecu.edu/irb](http://www.ecu.edu/irb)

## Notification of Exempt Certification

From: Social/Behavioral IRB  
To: [Kelly Schurtz](#)  
CC: [Thomas Skalko](#)  
[Kelly Schurtz](#)  
Date: 1/27/2015  
Re: [UMCIRB 14-001874](#)  
Quality of Life of Community-Dwelling Older Adults

I am pleased to inform you that your research submission has been certified as exempt on 1/27/2015. This study is eligible for Exempt Certification under category #2.

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

The UMCIRB office will hold your exemption application for a period of five years from the date of this letter. If you wish to continue this protocol beyond this period, you will need to submit an Exemption Certification request at least 30 days before the end of the five year period. The Chairperson (or designee) does not have a potential for conflict of interest on this study.

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IRB00000705 East Carolina U IRB #1 (Biomedical) IORG0000418  
IRB00003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418