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The correlates of physical activity in rural and urban older adults

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The correlates of physical activity in rural and urban older adults

by

Arjun Hariharan

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Exercise and Sport Science (Biological Basis of Physical Activity)

Program of Study Committee:

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Ames, Iowa

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ABSTRACT

Introduction: Regular physical activity (PA) has been shown to be beneficial. A lower percentage of rural compared to urban/metropolitan older adults participate in PA. Maintaining desired amounts of PA among elderly individuals with limited access to community and health care facilities and other psychological and environmental barriers is critical to public health . Thus, the purpose of this study was to determine the individual, psychological and perceived environmental barriers and their correlation with PA in rural and urban older adults.

Methodology: After approval from the Institutional Review Board at Iowa State University, 150 survey questionnaires were distributed to older adults attending stroke detection clinics organized at various locations within the state of Iowa.

Results: Of the 150 surveys, 41 and 31 surveys were received from rural and urban locales respectively. Land-use mix diversity, Physical Activity Self Efficacy, Social Support from friends and Competence Motivation for physical activity were significantly higher ($p < 0.05$) in urban subjects. Affective attitude and Satisfaction With Life Score was significantly higher ($p < 0.05$) among rural subjects. In the entire cohort, PA was significantly correlated with Intention to Exercise ($r = 0.46$), Barrier Self Efficacy ($r = 0.42$), Satisfaction With Life Scale ($r = 0.36$), Physical Activity Self Efficacy ($r = 0.34$), Perceived Behavioral Control ($r = 0.28$) and Instrumental Attitude ($r = 0.20$). When all correlates were entered into a regression model, only Intention to Exercise ($R^2 = 0.213$) was significantly associated with PA in the total cohort. In the rural group, Barrier Self Efficacy, depression and Pros and Cons of exercise were associated with PA ($R^2 = 0.511$). Intention to exercise and education were associated with PA in the urban sample ($R^2 = 0.390$).

Discussion: The findings do not support locale to be associated with PA behavior in older adults residing in Iowa. The levels of PA were similar between urban and rural populations under study. However, PA correlates differ between the urban and rural older adults and must be considered when planning exercise intervention for respective groups.

CHAPTER 1. INTRODUCTION

Regular exercise and physical activity (PA) have been shown to be beneficial by mitigating the risk of coronary heart disease, diabetes mellitus, obesity and other chronic diseases as well as improving mood, decreasing anxiety and playing an important role in improving health related quality of life. Similar beneficial effects have been well documented in older adults (U.S Department of Health and Human Services, 1996). PA has an important role in helping older adults preserve independence, control weight, and maintain muscle, joint and bone health (American College of Sports Medicine, 1998).

People over the age of 65 constitute one of the fastest growing population segments among industrialized nations (U.S Senate Special Committee on Aging, 1987). They also have many of the chronic health conditions which are preventable by physical activity (Berg & Cassel 1990). Exercise like any other component of health care is bounded by physical, personal and environmental factors (Arcury et al. 2006). These factors change from individual to individual and from one society to another. Targeting these factors is as important as prescribing the precise intensity, duration and frequency of exercise.

In an industrialized country the population of older adults often gets divided into those living in either urban or rural areas. The factors that promote and limit physical activity in these areas differ from each other. While those living in urbanized cities frequently have excellent transport facilities and easy access to health centers, their rural counterparts are often deprived of the same. Apart from the above factors, lower education and socioeconomic level may also have an undue bearing on the mind frame of the rural older adults.

According to The Centers for Disease Control and Prevention (CDC, 1998) a lower percentage of rural compared to urban/metropolitan adults aged 65 to 74 years participated in leisure-time physical activity. Women aged 40 years and older in rural areas were one third more likely to be physically inactive than were their urban counterparts (Brownson et al., 2000). When compared to urban adults, rural women especially those who were educated and lived in the South, were more sedentary (Wilcox, Bopp, Oberrecht, Kammermann & McElmurray, 2000). Our review of literature suggests that few studies have focused on determining the correlates of physical activity in the rural elderly population. One such study assessed psychological and perceived environment correlates of PA in rural older African-American and White women residing in Fairfield County, SC which is more developed as compared to Mid-Western Iowa (Wilcox et al. 2000).

Maintaining required amounts of PA among elderly individuals with limited access to community and health care facilities and other psychological and environmental barriers is critical to preserve function, independence, quality of life. It should be a public health priority. Thus, the purpose of this study is to determine individual, psychological and perceived environmental barriers and their correlation with PA in rural and urban older mid-western adults.

CHAPTER 2. LITERATURE REVIEW

Introduction

Exercise or participation in regular physical activity is a behavior influenced by a myriad of factors. Understanding these factors is vital for an individual's long term participation in a routine exercise program. Health promotion campaigns are often aimed at changing beliefs or knowledge on the assumption that such changes are necessary to bring about a change in behavior. Unfortunately, changes in awareness, attitudes, beliefs and knowledge about exercise do not guarantee changes in exercise behavior (Biddle & Mutrie, 2008). A number of theoretical models have been proposed that attempt to explain the association of these myriad factors with exercise. These will be briefly described here

Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB)

The Theory of Reasoned Action, as proposed by Ajzen and Fishbein, is based on the assumption that intention to perform a behavior is an immediate determinant of the behavior (Ajzen, 1988). Intention refers to the extent to which a person "plans", "is determined" or "has decided" to perform the behavior (Hausenblas, Carron, & Mack, 1997). Intention, in turn, is predicted from the two constructs of attitude and subjective normative factor. Subjective normative factor or subjective norms refer to the perceived social pressures to perform the behavior. Subjective norm is a combination of perceptions about the expectations of important others (e.g. family, friends, etc.) and motivation to comply with those expectations (Hausenblas, et al., 1997).

The theory has been extensively used in studies researching physical activity behavior. A meta analysis of 31 exercise studies yielded 162 effect sizes and found that

intention had a large effect on exercise behavior ($ES=1.09$, $SD=0.7$, $r=0.47$) and attitude had a large effect on intention ($ES=1.22$, $SD=0.5$, $r=0.52$). The effect of attitude on intention was twice that of subjective norm ($ES=0.56$, $SD=0.7$, $r=0.27$). A significant difference was also seen between the relationship of attitude and exercise ($ES =0.84$) and between subjective norm and exercise behavior ($ES=0.18$). Thus, subjective norm is useful in predicting intention to exercise and a direct predictor of exercise behavior (Hausenblas, et al., 1997). Thus TRA's attitudinal component appears to be influential in predicting intentions to be physically active but, on the other hand, the TRA seems to omit other potentially important determinants of action, such as environment and health influences.

Ajzen's TRA was insufficient for explaining behaviors where volitional control is incomplete and where resources and skills are required. Ajzen proposed an extension of the TRA for such behaviors with an additional variable of perceived behavioral control. Perceived behavioral control was defined by Ajzen as 'the perceived ease or difficulty of performing the behavior' and was assumed to reflect past experience as well as anticipated impediments and obstacles (Ajzen, 1988). Thus, inclusion of perceived behavioral control in the TPB helped reveal the personal and environmental factors that affect behavior (Ajzen 1985).

The TPB has been extensively used in the study of physical activity. Physical activity is a behavior with many barriers and frequently little volitional control. A meta-analysis of 72 studies (Hagger, Chatzisarantis, & Biddle, 2002) indicated that intention was the only direct predictor of behavior ($r=0.51$). Intention was predicted more strongly by attitudes ($r = 0.60$) than subjective norms ($r = 0.32$) and Perceived Behavioral Control ($r=0.57$) was associated with behavior through intention.

The Transtheoretical Model (TTM)

According to the TTM, recovering from problem behaviors or successful behavior change involves movement through a series of stages (Prochaska, DiClemente, & Norcross, 1992). The various stages of change include precontemplation (are not currently physically active and have no intention of doing so in the near future) and contemplation (not currently physically active but who have an intention to start in the near future). Individuals in the next stage, preparation, according to Marcus and Simkin (1994) are individuals who are ‘currently exercising some, but not regularly’. The action stage represents people who are currently active, but have only recently started. The last stage is the stage of maintenance. It includes those who are currently physically active and have been for some time, usually at least six months (Biddle & Mutrie, 2008).

A recent study located differences within a stage. Three subgroups of contemplators existed: early and middle contemplators, and those in pre-preparation. Early contemplators are viewed as individuals who have low self-efficacy, view few benefits and many disadvantages of exercise and are at risk of regression. Middle contemplators are individuals with low self-efficacy and approximately equal pros and cons towards exercise. Individuals in pre-preparation are those who are ready to move to the next stage (i.e., stage of preparation), elicit high self-efficacy and report low disadvantages of exercise. Thus with its various stages, the transtheoretical model helps delineate change in adoption of health related behavior.

The TTM assists individuals in making transitions across the various stages of change in exercise related health behavior (Prochaska & Marcus, 1994). The transtheoretical model states that stage transition results from stage-specific cognitive and behavioral process. According to Kim (2008), cognitive processes obtain information from an individual’s own

actions while information for behavioral processes is obtained from environment events. People at different stages of change are hypothesized to use distinct processes of change. In a study detailing the association of stage and processes of change with adoption and maintenance of muscular fitness-related behavior, Cardinal & Kosma (2004) observed cognitive processes to peak in the contemplation stage while behavioral processes steadily increased from the precontemplation to maintenance stage at which point the behavioral processes leveled off.

Stage-match intervention uses the main constructs of the TTM and is matched to the individual's stage of readiness for exercise behavior (Kim, 2008). Hence, stage-matched interventions use different strategies and techniques based on the stage the individual is in to bring about effective changes in exercise behavior. A recent study on Type 2 diabetics in South Korea (Kim, Hwang, & Yoo, 2004) compared a stage-based intervention with regular physical activity education advice. The stage based intervention included stage matched counseling strategies based on the main constructs of the TTM such as processes of change (POC), self efficacy (SE) and decisional balance (DB) along with individual exercise prescription and telephone counseling. Significant increases in overall stage of change (SOC) and physical activity levels were noted in the stage matched intervention group. A higher percentage (77.4 %) of the participants progressed from baseline in the intervention group as opposed to only 4.3% in the control group. Similar increases in SOC and physical activity have been observed in other studies comprising of urban older adults (King, Pruitt et al., 2000) and in younger adults in a worksite setting (Marcus & Simkin, 1994).

Social Cognitive Theory

The social cognitive theory (SCT) was developed in the 1980's by Albert Bandura. According to Bandura (2004), the social cognitive theory specifies a core set of determinants, the mechanism through which they work and the optimum ways of translating this knowledge into effective health practices. The core determinants for effective health practices of individuals include knowledge of health risk and benefits of different health practices, perceived self efficacy, outcome expectations, health goals people set for themselves and perceived social and structural facilitators. Bandura (2004) states that change in health behavior requires motivation and self-regulation. People must learn to monitor their health behavior, motivate themselves, set goals and establish social support to sustain their effort. Strategies to increase social support and self-regulatory skills have been highlighted by Nahas, Goldfine, & Collins (2003) in their report on determinants of physical activity in adolescents and young adults. A recent intervention study by Ince (2008) using the social cognitive concepts as explained by Bandura (2004) and Nahas, et al. (2003) on 62 undergraduate students resulted in significant improvements in exercise behavior and other benefits like health responsibility, nutrition, social support and stress management.

Self-efficacy, a key construct of social cognitive theory, is defined as people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses (Bandura, 1997). Bandura (1986) listed four sources of efficacy information, namely prior success and performance attainment, imitation and modeling, verbal and social persuasion and judgments of physiological states. Schwarzer (1992) stated self-efficacy to be a very powerful behavioral determinant and its inclusion in theories of health behavior therefore is warranted.

Hofstetter, et al. (1991) found self-efficacy to predict walking in a large adult community. Similarly, Sallis, et al. (1992) have shown self-efficacy to predict exercise change over time. McAuley & Blissmer (2000) state that the relationship between self-efficacy and physical activity is complex. Self-efficacy beliefs are likely to be more influential in conditions that are challenging in comparison to situations that are more habitual and require less effort.

Self Determination Theory

Deci and Ryan (1985) proposed the self determination theory. It is a macro-theory of human motivation concerned with the development and functioning of personality of social contexts. According to Deci and Ryan (1985), the theory focuses on the degree to which people endorse their action and engage in actions with a full sense of choice. The theory also suggests human beings are active organisms, with innate tendencies toward psychological growth and development, who strive to master ongoing challenges and to integrate their experiences into a coherent sense of self. In order to function effectively and overcome challenges, human beings must be able to satisfy the three basic psychological needs of individual competence, autonomy and relatedness. According to Deci and Ryan (1985), to the extent to which the basic needs are satisfied, people will function effectively and develop in a healthy way, but to the extent that they are thwarted, people will show evidence of ill-being and non-optimal functioning.

Motivation, though often recognized as a single construct, is governed by a myriad of factors and personal experiences. Ryan and Deci (2000) stated that people can be motivated because they value an activity or because there is strong external coercion. They can be urged into action by an abiding interest or by a bribe. They can behave from a sense of personal

commitment to excel or from fear of being observed. These situations contrast between cases of having internal motivation versus being externally pressured by an individual or situation. Extrinsicly motivated behaviors are those that are performed to obtain rewards or outcomes that are separate from the behavior itself (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997).

Self determination theory suggested that people experience more self-determined (or internally controlled) types of motivation when the activities they participate in make them have competence (the ability to effectively perform the behavior), relatedness (authentic social connections with others) and autonomy (the power to make their own choices). More self-determined types of motivation are desirable because they are associated with positive experiences and continued motivations to participate (Deci & Ryan, 1985). In a study comparing exercise adherence in 40 university students participating in either Tae Kwan Do or aerobic exercise, Ryan, et al., (1997) observed better adherence in the Tae Kwan Do group. On further analysis, they attributed the better adherence to increased enjoyment and competence motives in the Tae Kwan Do participants. In the exercise domain, exercise is more extrinsically motivated as compared to sport. Most people maintain their exercise activities that are not inherently interesting or enjoyable to them but have something to gain from it (Ryan, Williams, Patrick, & Deci, 2009). A lack of intrinsic motivation to exercise activity leads to low adherence in a long term perspective. In a recent meta analysis of the self –determination continuum, Chatzisarantis, Hagger, Biddle, Smith, & Wang (2003) found moderately strong correlations between more self-determined forms of motivation and measures of intention and competence.

Socio-Ecological Theory

Ecological models of health behavior are models proposing that behavior is influenced by interpersonal, sociocultural, policy, and physical-environmental factors (Sallis & Owen, 2002). The purpose of the ecological model is to primarily focus on the environmental causes of behavior and to identify environmental interventions to promote health (McLeroy, Bibeau, Steckler, & Glanz, 1988). Ecological theory has been extensively used to determine correlates of physical activity. Seasons are often associated with physical activity and time spent outside is the best correlate of physical activity in young children (Sallis & Owen, 2002). Irrespective of socio-economic status of people, those residing near the coast reported higher levels of physical activity (Bauman, Smith, Stoker, Bellew, & Booth, 1999). Proximity to physical activity programs is an important factor for both young individuals (Sallis, Prochaska, & Taylor, 2000) as well as older adults (Booth, Owen, Bauman, Clavisi, & Leslie, 2000). Convenient exercise facilities not only were strongly associated with physical activity but also strongly predicted vigorous physical activity in men although these findings were not true in for case of women (Sallis, Bauman, & Pratt, 1998). A cross sectional study by Hoehner, Brennan Ramirez, Elliott, Handy, & Brownson (2005) in higher and lower income areas of St. Louis, MO (representing a “low-walkable” city) and Savannah GA (representing a “high-walkable” city) showed associations between presence of near-by recreational facilities and use of the facilities and also between use of the facilities and meeting the recommendations through recreational activity. However, no direct association was present between the presence of recreational facilities and meeting recommendations. These findings suggest that individual-level factors and other environmental supports must be present before an individual engages in the recommended level of recreational activity.

Increasing participation in regular physical activity has now become a national priority for many industrialized nations. Interventions have the best effect when they alter and modify the underlying correlates that influence physical activity. Exercise, like any other component of health care, is bounded by physical, personal and environmental factors (Arcury et al. 2006). The failure to meet the Healthy People 2000 recommendation are a result of the lack of understanding the underlying determinants that govern an individual or society's participation in leisure time physical activity. In a recent review of the correlates of adults' participation in physical activity, Trost, Owen, Bauman, Sallis (2002) have concluded that participation is influenced by a diverse range of personal, social and environmental factors. These factors are referred to as determinants.

Determinants denote a reproducible association or predictive relationship other than cause and effect. Determinants that reside or originate within the individual are included under personal factors. These include demographic correlates, biomedical status, past and present physical activity performance, and psychological states and traits associated with physical activity (Dishman 1988). In studies comparing men and women, physical activity patterns were higher among males when compared to females and were also inversely associated with age (Trost, Owen, Bauman, Sallis 2002). Overweight and obesity also has a strong negative influence on physical activity. Martinez-Gonzalez, Martinez, Hu, Gibney, and Kearney (1999) found that after controlling for age, time spent sitting, sex, education, social class, marital status, smoking, country of origin, individuals in the upper quintile for leisure time physical activity were approximately 50% less likely than those in the lowest quintile to be classified as obese.

Psychological determinants of physical activity include enjoyment of physical activity, expected benefits, value of physical activity outcomes, intentions, perceived

behavioral control, normative beliefs, knowledge of health and exercise, self efficacy, self-motivation and stage of change. In a study examining the influence of self-efficacy perceptions in a cohort of healthy adults between the ages of 50 and 64, baseline self efficacy perceptions significantly predicted exercise adherence after 2 yr of follow up (Oman and King 1998). In a population of elderly men and women, barriers to physical activity such as lack of time, too weak, too tiring, fear of falling, bad weather and no exercise partners, emerged as the greatest influence on leisure time activity (Lian, Gan, Pin, Wee, Ye 1999).

The physical environment acts as a determinant of physical activity. Accessibility to a facility, the appeal of the surrounding environment, perceived threats and climatic conditions are the strongest predictors of physical activity among environmental factors (Dishman 1988; Trost, Owen, Bauman, Sallis, Brown 2002). Access to a facility is a necessary but not a sufficient facilitator of community sport and exercise participation. Perceived convenience of the exercise setting and actual proximity to home or place of employment are consistent discriminators between those who choose to enter or forgo involvement and between those who adhere or dropout in supervised exercise programs (Dishman 1988). In one supervised exercise program, those most likely to drop out actually lived closer to the chosen activity setting, although they perceived inconvenience as a factor leading to their return to inactivity (Gettman, Pollock, Ward 1983). A study involving Australians aged 60 yr and over, found that having friends who participated regularly in physical activity, safe footpaths for walking, and having access to a park were significantly associated with regular physical activity (Booth, Owen, Bauman, Clavish and Leslie 2000).

Correlates of Physical Activity in Rural Older Adults

People over 65 years of age constitute one of the fastest growing population segments among industrialized nations. They also carry the greatest proportion of chronic disease burden, disability and health care utilization (King, Rejeski, and Buchner 1998). PA has an important role in helping older adults preserve independence, control weight, and maintain muscle, joint and bone health (American College of Sports Medicine, 1998). Although regular PA is critical for the promotion of health and function as people age, people over 50 years of age represent the most sedentary segment of the adult population (King, Rejeski, and Buchner 1998). This is particularly true for persons over 75 years of age.

Similar to their younger counterparts, participating in PA by older adults depends upon many different factors. These factors change from individual to individual and from one society to another. However, several studies suggest that rural older adults are consistently less active than their urban counterparts. In a study comparing the physical activity patterns between rural and urban older adults in the various regions of the US, the prevalence of physical inactivity was the highest in the most rural (33.1%) and the 2 least urban categories (range: 25.7% to 25.9%). The odds of being physically inactive were 43% higher in the most rural compared with the most urban categories. In the South, prevalence of Physical Inactivity was 43.1% in the most rural areas as compared to 26.7% in the most urban area. In contrast, the prevalence of physical inactivity in the west was highest in the 2 urban categories (24.3% to 24.5%) and lowest in areas categorized as most rural (19.7%). No association was found between physical inactivity and degrees of urbanization in the Northeast or West (Matin et al. 2005). While age group and gender are commonly assessed correlates of PA, not many studies have looked into other determinants of physical activity among urban and rural older adults. In a recent study, age and education level was found to

negatively influence PA in rural older women. In the same study, higher perceived stress and low self efficacy strongly decreased PA participation in rural older women while fewer depressive symptoms and the perception of greater pros than cons remained independent predictors of higher PA. On the whole, age was negatively associated with self-efficacy and social support (Wilcox et al. 2003). However, this study specifically assessed women only.

Conclusion

Exercise behavior is governed by a myriad of factors ranging from personal, or within ones thought process, to the environment. The factors also differ to a great extent with different age groups. Given the dearth of research assessing determinants in rural older adults, it is difficult to develop physical activity interventions which are specifically tailored to this unique group. Research in the past has tried to ascertain these factors using an underlying psychological theory. Not many studies have focused on using all the theories at once. One such approach was carried out by Wilcox and coworkers (Wilcox, Castro, King, Housemann, & Brownson, 2000) to determine key factors in rural and urban older adults residing in South Carolina. A comparative study between rural and urban older adults by Parks, Housemann, & Brownson (2003) found income as a significant predictor of PA with lower income individuals reporting lower level of PA. Once these determinants have been identified, they can be used to develop physical activity interventions which are focused specifically on removing the barriers and promoting the incentives in this unique group. Hence the purpose of the current study is to determine the correlates of physical activity by incorporating the vital constructs from these behavioral theories along with environment and other health related factors that have been shown to influence physical activity in a mid-western rural and urban setting.

CHAPTER 3. METHODOLOGY

Participants and Procedure

After approval from the Institutional Review Board at Iowa State University, 150 survey questionnaires were distributed to older adults attending stroke detection clinics organized at various locations within the state of Iowa. The questionnaire included an explanation of the purpose of the study and benefits to the participants. Participants were instructed to place completed surveys in sealed envelopes. Each participant received \$20 in the form of gift cards as compensation.

Measures

Age, sex, level of education, county of residence, nearest town, distance from nearest town, marital status, current perceived health status, perceived health status as of 5 years ago, and perceived health barriers to doing things were obtained by self-report. These items as well as depressive symptom and quality of life were tested as a socio-demographic variable.

Depression and Stress

The participants completed a five-item version of the Geriatric Depression Scale (Hoyle, et al., 1999). The scores ranged from 0 to 5 (higher indicating greater depressive symptoms). The 5 items of the GDS has been shown to have good sensitivity (.97) specificity (.85) positive predictive value (.97) and accuracy (.90) for predicting depression and internal consistency ($\alpha = .80$) (Hoyle, et al., 1999).

Satisfaction with life Sore

Life satisfaction refers to a cognitive judgmental process. Shin and Johnson (1978) defined life satisfaction as a “global assessment of a person’s quality of life”. The study included the Satisfaction With Life Scale (Diener, Emmons, Larsen, & Griffin, 1985) which is a 5 item questionnaire rated on a seven point Likert scale. The score ranges from 5 to 35 and a higher score indicates greater satisfaction with life. A study by Diener et al. (1985) on older adults indicated a inter rater reliability of 0.73.

Physical Activity

PA was measured using the Physical Activity for the Elderly (PASE) (Washburn, Smith, Jette, & Janney, 1993). The PASE is a brief instrument designed specifically to assess physical activity in older persons over a 1-week time frame. Participation in leisure activities, including walking outside the home; light, moderate, and strenuous sport, recreation activities and muscle strengthening were recorded as never, seldom (1–2 days/wk), sometimes (3–4 days/week), and often (5–7 days/week). Duration of the activities were categorized as less than 1 hour, between 1 and 2 hours, 2–4 hours, or more than 4 hours. Paid or unpaid work, other than work that involves mostly sitting activity, was recorded in total hours per week. Housework (light and heavy), lawn work/yard care, home repair, outdoor gardening, and caring for others were recorded as yes/no (Washburn, McAuley, Katula, Mihalko, & Boileau, 1999). PASE is a reliable and valid measure of PA in older adults ($r = 0.75$) (Washburn, et al., 1993). PASE has been validated in older adults against two PA gold standards: doubly labeled water ($r = 0.58$) (Schuit, Schouten, Westerterp, & Saris, 1997) and with portable accelerometry ($r = 0.64$) for those over the age of 70 years; (Washburn, et al., 1999).

Perceived Physical Environment

The land-use mix diversity subscale of the Neighborhood Environment Walkability Scale (Saelens, Sallis, Black, & Chen, 2003) was used as a measure to indicate proximity of various locations like grocery store, post office, library and other such facilities to ones residence. The measure consisted of 23 questions scored on a scale from 5 to 1 where 5 represented within 1 to 5 minutes walking distance, 4 indicated 6 to 10 minute walking distance and 3, 2 and 1 indicating 11 to 20 minutes, 21 to 30 minutes and more than 31 minutes walking distance respectively. A response of “don’t know” or “Not Applicable” was given 1 point. The subscale had a test retest reliability of 0.78.

The Neighborhood Satisfaction subscale of the Neighborhood Environment Walkability Scale (Saelens, et al., 2003) was used as a composite measure to assess perceptions of environment quality. This measure consisted of 17 items scored on a scale from 1 (strongly dissatisfied) to 5 (strongly satisfied). Example items include satisfaction with "how easy and pleasant it is to walk in your neighborhood," and "access to shopping in your neighborhood". The scores across all items were summed and divided by the number of items to arrive at a total scale score. Higher scores indicated greater levels of satisfaction with their neighborhood characteristics. This subscale of the NEWS has a reliability of 0.80 (Saelens, et al., 2003).

Self Efficacy for Physical Activity

Self-Efficacy was measured with the Exercise Self-Efficacy Scale (EXSE) (McAuley, 1993). The 8 item scale assesses the participant’s beliefs in their ability to continue exercising at a moderate intensity for 3 times per week for 40 minutes or more over the next 1 month. Participants rated their confidence between 0% (Not at all confident) to 100%

(highly confident). The mean score was calculated as physical activity self efficacy. The construct validity of EXSE has been demonstrated in previous research by its association with those social-cognitive factors theorized to be antecedents or consequences of self efficacy (Bandura, 1997; McAuley, et al., 2007). These include exercise behavior (McAuley, et al., 2005), social influences (McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003) and affect (McAuley, Jerome, Marquez, Elavsky, & Blissmer, 2003).

Barrier Self Efficacy for Physical activity

The study measured barrier self efficacy using a 12-item barrier self-efficacy scale designed by McAuley and Mihalko (1998) to assess adults' perceived capabilities to exercise three times per week for next three months in the face of barriers (e.g., bad weather, lack of interest/boredom, pain and discomfort). Subjects rated their degree of confidence that they could exercise in the event that a barrier circumstance were to occur on a 0% through 100% scale (0% = No confidence at all ;100 % = Highly confident). Hausenblas, Nigg, Downs, Fleming & Connaughton (2002) reported an internal consistency of 0.88.

Attitude, Subjective Norm, Intention and Perceived Behavioral Control

The current study measured the various constructs of the Theory of Planned Behavior. The constructs were measured using questions in a previous study on older adults by Gretebeck et al. (2007). Attitude towards PA was measured using a 7-point semantic differential bipolar adjective scale (from -3 to 3). The scale consisted of 8 adjective pairs. 5 of the 8 items measured the instrumental dimension and the remaining 3 items were used to assess the affective aspect of attitude. Mean scores were calculated for instrumental and affective attitude and more positive score indicated optimistic attitude. Cronbach alpha for this scale was 0.94.

A single item was used to quantify subjective norm. Participants rated their level of agreement with the statement "Most people who are important to me think I should perform PA regularly." Subjective norm was scored from 1 to 5 on a Likert type scale with a higher score representing greater influence by others to perform PA.

Perceived behavioral control was measured with 3 items. Subjects rated the ease or difficulty and amount of control they had over performing PA for 30 minutes 3 days per week as well as number of events that prevented PA performance on 5-point Likert-type scales. An average score was calculated with higher scores representing greater perceived control over performing PA. Cronbach alpha was reported at .70 (Gretebeck et al. 2007).

Intention was measured with 2 items. Subjects rated the likelihood of being physically active for 30 minutes 3 days/week. A second item asked if the participants intended to perform PA for 30 minutes/day for at least 3 days/week in the next 2 months. Items were scored from 1 to 5 on Likert-type scales, and a mean score was calculated. A higher score reflected greater intention to participate in PA. Cronbach alpha for the intention measure was high at .91 Gretebeck et al. (2007).

Physical Activity Decisional Balance (pros and cons of PA)

Participants completed a 16 item questionnaire on decisional balance, of which 10 items question were pertaining to "pros" of PA while 6 items measured "cons" of PA (Marcus, Rakowski, & Rossi, 1992). Participants rated how each item affected their decision or not to engage in regular physical activity. The "pros" items were summed to produce raw scores that could range from 10 to 50. The "cons" items were summed to produce raw scores that could range from 6 to 30. As instructed by Marcus, et al. (1992) the pros and cons scales were converted to t scores so that they can be comparable. Good internal consistency ($\alpha = .95$

for pros and $\alpha = .79$ for cons) and validity (increased pros and decreased cons with advancement in stage of exercise behavior) has been reported (Marcus, et al., 1992).

Social Support

Peer support for PA (from friends consisting of 15 items and from family consisting of 5 items) was assessed using a 20 item questionnaire in which participants rate how often family and friends engaged in acts that were supportive of PA in the past 3 months, from 1 (none) to 5 (very often) (Sallis, Grossman, Pinski, Patterson, & Nader, 1987). As mentioned by Sallis, et al. (1987), family meant “member of the same household” and friends were defined as “friends, acquaintances or coworkers”. Good test – retest reliability ($r = .57$ to $.86$) has been documented (Sallis, et al., 1987). The mean of the scores were calculated, higher score indicating greater social support.

Motives for Physical Activity

Motivation for physical activity was assessed using the Motives for Physical Activity Measure - Revised (MPAM-R) (Ryan et al. 1997). It is a questionnaire intended to assess the strength of five motives for participating in physical activities. The five motives assessed were - Fitness, which refers to being physically active out of the desire to be physically healthy and to be strong and energetic; Appearance, which refers to being physically active in order to become more physically attractive, to have defined muscles, to look better, and to achieve or maintain a desired weight; Competence/Challenge, which refers to being physically active because of the desire just to improve at an activity, to meet a challenge, and to acquire new skills; Social, which refers to being physically active in order to be with friends and meet new people; and Enjoyment, which refers to being physically

active just because it is fun, makes you happy, and is interesting, stimulating, and enjoyable (Ryan, et al., 1997).

Statistical Analysis

This study mainly focuses on correlates of PA in rural and urban older adults. Differences in the correlates of PA between the two groups were examined by one way ANOVA. A correlational matrix was constructed using Pearson correlational coefficients to determine the association between the various correlates of PA behavior and PASE. A step-wise linear regression was conducted to determine the constructs most associated with PASE in the rural, urban and both groups. Owing to the small sample size, effect sizes were calculated for those correlates which were associated with PASE. Finally, the components of each theory were regressed with PASE as the independent variable to determine the association between each theoretical construct and physical activity in the two groups. A $p < 0.05$ was considered statistically significant and $p < 0.10$ was considered as reflecting a statistical trend. Unless indicated otherwise, all data are presented as mean \pm SEM. Data were analyzed using SPSS for Windows 17.0.

CHAPTER 5. RESULTS

We distributed 150 surveys to rural and urban subjects who were attending a stroke detection clinic at various locations across the state of Iowa. Of the 150, 41 surveys (55%) from rural locales and 31 surveys (41%) from urban centers were returned.

Socio-demographic Characteristics

Table 1 provides the socio-demographic characteristics of the rural and urban subjects. Compared to the urban subjects, rural older adults were significantly less educated and lived further away from the nearest town or city. However, the rural group had higher Satisfaction with Life scores.

Comparison of Physical Activity and its Correlates

Table 2 is a Pearson correlation coefficient matrix of all the correlates of PA measured in this study. Not surprisingly, components of each theoretical construct were correlated with each other. For example, Perceived Behavioral Control was significantly correlated with Physical Activity Self Efficacy ($r = 0.65$) and Physical Activity Self Efficacy was significantly associated with Barrier Self Efficacy ($r = 0.70$). More importantly, the measure of physical activity, PASE, was associated with Intention to Exercise ($r = 0.46$), Barrier Self Efficacy ($r = 0.42$), Satisfaction With Life Scale ($r = 0.36$), Physical Activity Self Efficacy ($r = 0.34$), Perceived Behavioral Control ($r = 0.28$) and Instrumental Attitude ($r = 0.20$).

Table 3 provides the analysis of the correlates of physical activity by group. Effect sizes were also calculated for the correlates of PA that were significantly different between the groups (i.e., either $p < 0.05$ or that showed a trend towards significance at $p < 0.10$). The

two groups did not differ significantly in their reported physical activity and were equally satisfied with their neighborhood. The urban subjects reported significantly higher land-use mix diversity, physical activity self efficacy, social support from friends and competence motivation for physical activity. Urban older adults also tended ($p < 0.10$) to have greater appearance and fitness motivation. Affective attitude and Satisfaction With Life Score was significantly higher among rural subjects. These differences had effect sizes of moderate size.

Regression Analysis of Physical Activity with Psychological Theories

In determining the variables most correlated with physical activity for both groups, Intention to exercise was the only significant correlate with PASE ($R^2 = 0.213$, $p = 0.000$). However, separate linear regression analyses of the rural and urban samples revealed differences in associations of the theories with physical activity. In the rural group, Barrier Self Efficacy, Geriatric Depression Scale score, and Pros and Cons of Physical Activity were associated with PASE ($R^2 = 0.511$, $p < 0.001$). Only Intention to exercise and education were associated with PASE in the urban sample ($R^2 = 0.390$, $p = 0.003$).

In order to determine the theoretical model most associated with PA behavior, regression analysis was also done with each theory regressed independently against the PASE score for the rural, urban and both groups considered together. These individual theoretical components included in the analysis are in Table 4. When both groups were considered together, Socio-demographics, Theory of Planned Behavior, Social Cognitive Theory, and the Socio-Ecological model explained 24% ($R^2 = 0.24$, $p < 0.05$), 21% ($R^2 = 0.21$, $p < 0.05$), 17% ($R^2 = 0.17$, $p < 0.05$) and 6% ($R^2 = 0.06$, $p < 0.05$) of the variance in PASE, respectively. None of the Motives for PA entered the regression model in either the entire group, the urban group, or the rural group.

In the urban group, Socio-demographics and TPB explained 36% and 25% of the variance in PASE, respectively. Of all the socio-demographic correlates, “Stand in the way of things” and Education were the only ones significantly associated with PASE. Intention was the only TPB construct predictive of PASE in urban subjects. Land-use mix diversity, a component of the Socio–Ecological model, explained for 15% ($R^2 = 0.15$, $p < 0.05$) of the variance in PASE in the urban group. Physical activity self-efficacy, part of the Social Cognitive Theory, explained 14% ($R^2 = 0.14$, $p < 0.05$) of the variance in PASE.

In the rural group, socio-demographics and the Social Cognitive Theory equally explained 27% ($R^2 = 0.27$, $p < 0.05$) of the variance in PASE. Of all the socio-demographic correlates, Satisfaction with Life Score and Education were the only ones associated with PASE. Barrier Self Efficacy, a component of the Social Cognitive theory, explained 27% of the variance in PASE. Similar to the urban group, Intention was the only TPB construct that entered into the model ($R^2 = 0.18$, $p < 0.05$).

Table 1 Socio-demographic characteristics of rural and urban individuals

Characteristics	Urban	Rural
Age, year (M \pm SE)	73 \pm 2	75 \pm 1
Gender (%) [§]		
Male	50	28
Female	50	72
Marital Status (%)		
Never Married	0	3
Married	59	67
Divorced	10	13
Widowed	29	17
Education (%)*		
Some High School	0	10
High School Diploma	30	46
Some College or Vocational Degree	30	22
College Degree	20	7
Post-graduate Work or Degree	13	2
Graduate or Professional Degree	7	5
Distance from nearest town or city, Mi	2.7 \pm 0.9	6.8 \pm 1.4 *
Present Health Status (%)		
Excellent	14.6	20.0
Good	61.0	53.3
Fair	19.5	26.7
Poor	2.4	0.0
Health compared to five years ago (%)		
Better	2.4	13.3
About the same	70.7	63.3
Worse	24.4	23.3
Health trouble in your way of doing things you want to do (%)		
Not at all	36.6	46.7
A little or same	41.5	43.3
A great deal	19.5	10.0
Geriatric Depression Scale	1 \pm 0.2	1 \pm 0.2
Satisfaction With Life Scale	23 \pm 1	27 \pm 1 *
Weight, Kgs	76.2 \pm 2.3	82.3 \pm 3.67
Height, Meters	1.67 \pm 0.01	1.69 \pm 0.02
BMI, Kg/m ²	27.3 \pm 7	28.5 \pm 1.0

* P < 0.05 , [§] P < 0.10 for trend

Table 2 Correlation Coefficients of the various correlates of PA with both groups considered together

Pearson Correlation	PASE	GNS	Barriers Self-Efficacy	Physical Activity Self Efficacy	TPB - Instrumental Attitude	TPB - Affective Attitude	TPB - Soc Norm	TPB - Per Beh Cont	TPB - Intention	Ger Dep Scale	SWLS	SS Family	SS - Friends	Motives - Interest Enjoyment	Motives - Competence	Motives - Appearance	Motives - Fitness	Motives - Social	ProsVSCons	Locale / 0=R,1=U	Land use mix-diversity	
PASE	1.00																					
GNS	0.05	1.00																				
Barriers Self-Efficacy	0.42**	0.11	1.00																			
Physical Activity Self Efficacy	0.34**	0.26*	0.70**	1.00																		
TPB - Instrumental Attitude	0.20*	0.36**	0.37**	0.23	1.00																	
TPB - Affective Attitude	0.22	0.32*	0.34**	0.23	0.69**	1.00																
TPB - Social Norms	0.19	0.20	0.45**	0.53**	0.30*	0.22	1.00															
TPB - Perceived Behavioral Control	0.28*	0.15	0.49**	0.65**	0.46**	0.41**	0.47**	1.00														
TPB - Intention	0.46**	0.14	0.58**	0.65**	0.33**	0.33**	0.28*	0.76**	1.00													
Geriatric Depression Scale	-0.31	-0.20	-0.07	-0.07	-0.39	-0.23	-0.15	-0.17	-0.07	1.00												
Satisfaction With Life Scale	0.36**	0.32**	0.24	0.26*	0.33*	0.23	0.07	0.30*	0.36**	-0.53	1.00											
Social Support Family	0.16	0.25*	0.40**	0.49**	0.18	0.11	0.40**	0.22	0.18	-0.01	0.21	1.00										
Social Support - Friends	-0.01	-0.09	0.14	0.31*	-0.01	-0.02	0.18	0.11	0.07	0.08	-0.08	0.54**	1.00									
Motives - Interest Enjoyment	0.11	0.30*	0.47**	0.59**	0.26*	0.28*	0.57**	0.49**	0.46**	-0.01	0.14	0.40**	0.31**	1.00								
Motives - Competence	0.14	0.21	0.50**	0.62**	0.19	0.20	0.50**	0.47**	0.49**	-0.06	0.11	0.40**	0.36**	0.89**	1.00							
Motives - Appearance	-0.04	0.28*	0.44**	0.54**	0.28*	0.17	0.50**	0.50**	0.35**	-0.06	0.07	0.40**	0.37**	0.69**	0.71**	1.00						
Motives - Fitness	0.12	0.23	0.50**	0.61**	0.34**	0.16	0.69**	0.57**	0.44**	-0.12	0.21	0.32**	0.25*	0.72**	0.69**	0.82**	1.00					
Motives - Social	0.00	0.23	0.33**	0.37**	0.23	0.21	0.45**	0.26*	0.21	-0.04	-0.03	0.38**	0.42**	0.79**	0.75**	0.64**	0.52**	1.00				
ProsVSCons	0.10	0.19	0.32**	0.51**	0.18	0.19	0.30*	0.46**	0.39**	-0.16	0.30*	0.27*	0.14	0.33**	0.36**	0.29*	0.38**	0.11	1.00			
Locale / 0=R,1=U	0.06	-0.16	0.08	0.32**	-0.22	-0.28	0.19	0.13	0.00	0.07	-0.24	0.12	0.25*	0.19	0.25*	0.23	0.23	0.13	0.01	1.00		
Land use mix-diversity	0.08	0.07	0.24	0.19	0.07	0.07	0.10	0.20	0.16	-0.07	-0.05	0.13	0.11	0.04	0.07	0.17	0.14	0.07	0.03	0.30*	1.00	

* P<0.05 level ; ** p < 0.01 ; R = Rural; U = Urban; GNS = General Neighborhood Satisfaction; SS = Social Support

Table 3 Differences in Physical activity score (PASE) and PA correlates in rural and urban subjects

Correlates (range of possible scores)	Urban	Rural	Cohen's <i>d</i>
PASE score (0 – 840.9)	152.0 (15.5)	144.8 (12.1)	
Land use mix-diversity (1 – 5)	2.2(0.2)	1.6 (0.1) *	0.61
General Neighborhood Satisfaction (1- 5)	4.0 (0.1)	4.2 (0.1) †	0.32
Self Efficacy			
Barriers (0 – 100)	38.6 (5.0)	34.4 (4.7)	
Physical Activity (0 – 100)	48.4 (6.3)	26.8 (4.9) *	0.66
Theory of Planned Behavior correlates			
Instrumental Attitude (-3 - +3)	1.9 (0.3)	2.4 (0.2) †	0.44
Affective Attitude (- 3 - + 3)	1.6 (0.3)	2.1 (0.2) *	0.57
Social Normative factors (1 – 5)	4.1 (0.2)	3.5 (0.3)	
Perceived Behavioral Control (PBC) (1 – 5)	3.7 (0.2)	3.4 (0.2)	
Intention (1 – 5)	3.6 (0.3)	3.6 (0.2)	
Pros and Cons for physical activity	0.1 (2.7)	- 0.10 (2.1)	
Social Support			
Family (1 – 5)	1.9 (0.2)	1.7 (0.2)	
Friends (1 – 5)	1.7 (0.2)	1.3 (0.1) *	0.52
Motives for Physical Activity			
Interest and Enjoyment (7 – 49)	30.8 (2.0)	26.1 (2.2)	
Competence (7 – 49)	31.1 (2.0)	25.1 (2.1) *	0.51
Appearance (6 – 42)	28.7 (1.2)	24.4 (1.8) †	0.47
Fitness (5 – 35)	28.8 (1.0)	24.8 (1.6) †	0.49
Social (5-35)	17.0 (1.4)	14.8 (1.6)	

Data are Mean (Standard Error), * $p < 0.05$, † $P < 0.10$

Table 4 Association of PASE with individual theories of PA behavior

Correlates (range of possible score)	Urban	Rural	Both
Socio-demographics	0.36 (0.004)	0.27 (0.007)	0.24 (0.000)
Age	0.03 (NS)	0.06 (NS)	0.05 (NS)
Gender	0.00 (NS)	0.00 (NS)	0.00 (NS)
Education	0.13 (0.038)	0.07 (0.028)	0.01 (NS)
Marital Status	0.01 (NS)	0.00 (NS)	0.01 (NS)
Distance from town	0.00 (NS)	0.02 (NS)	0.01 (NS)
Overall Health	0.01 (NS)	0.00 (NS)	0.07 (0.025)
Health status five years ago	0.01 (NS)	0.10 (NS)	0.01 (NS)
Standing in the way of things	0.23 (0.009)	0.13 (NS)	0.17 (0.001)
Geriatric Depression Score	0.03 (NS)	0.09 (NS)	0.06 (NS)
Satisfaction With Life Score	0.03 (NS)	0.14 (0.024)	0.07 (NS)
Socio-Ecological Model	0.15 (0.037)	NS	0.06 (0.046)
Land use mix diversity	0.15 (0.037)	0.00 (NS)	0.06 (0.046)
General Neighborhood Satisfaction	0.02 (NS)	0.00 (NS)	0.00 (NS)
Social Cognitive Theory	0.14 (0.046)	0.27 (0.002)	0.17 (0.001)
Barriers Self Efficacy	0.08 (NS)	0.27 (0.002)	0.17 (0.001)
Physical Activity Self Efficacy	0.14 (0.046)	0.10 (NS)	0.12 (NS)
Social Support from Family	0.04 (NS)	0.03 (NS)	0.03 (NS)
Social Support from Friends	0.00 (NS)	0.00 (NS)	0.00 (NS)
Theory of Planned Behavior	0.25 (0.006)	0.18 (0.014)	0.21 (0.000)
Instrumental Attitude	0.16 (NS)	0.14 (NS)	0.09 (NS)
Affective Attitude	0.08 (NS)	0.05 (NS)	0.05 (NS)
Social Normative factors	0.07 (NS)	0.06 (NS)	0.06 (NS)
Perceived Behavioral Control (PBC)	0.14 (NS)	0.04 (NS)	0.08 (NS)
Intention	0.25 (0.006)	0.18 (0.014)	0.21 (0.000)
Motives for Physical Activity	NS	NS	NS
Interest and Enjoyment	0.01 (NS)	0.06 (NS)	0.04 (NS)
Competence	0.08 (NS)	0.01 (NS)	0.03 (NS)
Appearance	0.00 (NS)	0.00 (NS)	0.00 (NS)
Fitness	0.01 (NS)	0.04 (NS)	0.03 (NS)
Social	0.00 (NS)	0.01 (NS)	0.00 (NS)

Data are variance explained via R^2 (P value, NS=Not significant)

Chapter 5. DISCUSSION

Study Compared to Previous Literature

Lack of participation in physical activity can be linked to a myriad of social, psychological and health reasons. In the past, several studies (Brownson, et al., 2000; Trost, Owen, Bauman, Sallis, & Brown, 2002; Wilcox, et al., 2003) have assessed correlates of PA in rural populations. However, relatively few studies have compared these correlates with otherwise similar urban groups. Moreover, most of these previous studies have had a relatively narrow focus, primarily assessing socio-demographic correlates of PA such as age, education, income levels, gender and race. The extent to which rural older adults and urban older adults differ in their attitudes towards PA remain uncertain. Thus, the main purpose of the present study was to assess a wide range of correlates of PA, including socio-demographic, psychological, and environmental correlates of physical activity in older adults residing in urban and rural Iowa. For the entire cohort of older adults assessed here, PA, assessed by PASE, was significantly associated with Intention to Exercise ($r = 0.46$), Barrier Self Efficacy ($r = 0.42$), Satisfaction With Life Scale ($r = 0.36$), Physical Activity Self Efficacy ($r = 0.34$), Perceived Behavioral Control ($r = 0.28$) and Instrumental Attitude ($r = 0.20$). However, there were differences among the rural and urban groups which will be discussed below.

Socio-demographic Correlates

In this study physical activity was assessed using the PASE scale. There was not a significant difference in reported PA levels between the urban and rural subjects. This

finding is at odds with previous literature (Brownson, et al., 2000; Parks et al., 2003). One reason for this disparate finding may be that the current study did not quantify PA nor was PA reported in terms of the Surgeon General's physical activity recommendations. Second, the rural counties assessed here had agriculture as the primary occupation, so these adults may have been more active. Third, unlike previous studies which had a diverse sample population and reported African Americans to have low levels of PA, all subjects in this were Caucasian. In addition, both sexes were equally represented in the present study. Previous relevant research included primarily women (Brownson, et al., 2000; Wilcox, et al., 2000) . Finally, most of the subjects (74%) reported good to excellent current health status. This may have contributed to the lack of difference in physical activity levels amongst the two groups.

Consistent with other studies comparing rural and urban groups, education was significantly different between the two groups. However, it was only associated with the behavior of PA in urban subjects. In contrast to previous literature (Duelberg, 1992; Macera, Croft, Brown, Ferguson, & Lane, 1995), this study did not find a significant association between any socio-demographic measures and PA when the groups were considered together.

Environmental Correlates

Not surprisingly, there were significant differences in the environmental correlates between rural and urban subjects. Land use mix diversity (i.e., indicative of places one can approach by foot easily) and distance from the nearest town were significantly different among the two groups. Land use mix diversity alone was associated with PA behavior in the urban group but this association was relatively weak ($R^2 = 0.15$). In general, , urban

environments offer higher land–use diversity and more access to places that promote PA behavior. For example, the rural group generally did not have any access to sidewalks in their neighborhoods while the urban group did. On the other hand, both groups were relatively satisfied with their neighborhoods with rural subjects being slightly more satisfied. This may be explained by the finding that 78% of the subjects in both the groups reported little to no limitation to PA. People with little to no limitations tend to report greater neighborhood satisfaction (Morris, McAuley and Motl, 2008).

Psychological, Social and Behavioral Correlates

This study assessed psychological and behavioral correlates based on the constructs of Theory of Planned Behavior (Ajzen, 1988), Social Cognitive Theory (Bandura, 1986, 1997) and Self Determination Theory (Ryan & Deci, 2000; Ryan, et al., 1997). There were significantly higher instrumental and affective attitudes in rural subjects than the urban group. Unlike previous literature (Brenes, Strube, & Storandt, 1998; Trost, et al., 2002), but similar to a study by Michels and Kugler (1998), intention was the only TPB construct that was significantly associated with PA behavior, or PASE. This was true for urban subjects as well as when both the groups were considered together. Brenes et al. (1998) did not take duration of exercise into consideration and also measured intention over a 3 month period unlike the 20 minute and 2 month periods used in the present study. Older adults often cannot exercise for prolonged periods and also find it difficult to judge their intention over a long period of time. This could have resulted in the observed difference in this study. However, none of the other constructs of the TPB, namely normative factor, perceived behavioral control and attitude, explained a significant proportion of the variance in PASE.

Barrier and Physical Activity Self Efficacy was assessed in this study. It was hypothesized that rural subjects would have lower Barrier and PA Self Efficacy than the urban group and higher levels would be associated with PA. Contrary to this hypothesis, both rural and urban subjects did not differ in Barrier Self Efficacy; although it explained the largest amount of variance of PASE in the rural older adults ($R^2 = 0.27$). We speculate that higher Barrier Self Efficacy in the rural group may have offset the reduced Land Use Mix Diversity and, in so doing, contributed to greater levels of physical activity. Physical Activity Self Efficacy was significantly lower in the rural subjects compared to urban counterparts; however, contrary to our hypothesis and previous literature (Booth, et al., 2000; King, et al., 2000), it was not associated with physical activity in either rural or urban subjects. This finding may be a result of the relatively small sample size and the age range of our study. Another factor which may have influenced this finding was how PA was defined or phrased in the questionnaires. Although all the questionnaires we used had been previously found to be valid and reliable, subtle differences in how PA was defined may have affected subject responses. For example, the Barrier Self Efficacy Questionnaire (McAuley et al. 1998) defined “Physical Activity” as “Exercise” while the Intensity questionnaire (Gretebeck et al. 2007) phrased “Physical Activity” as “Physical Activity”. Rural subjects may not have viewed some of their daily activities (e.g., the physical demands of farming) as exercise or PA *per se* and so their responses may have been skewed.

Intrinsic motivation for physical activity in older adults has not received much attention in the literature. The present study is unique in that intrinsic motivation for physical activity was assessed under five domains – Interest/Enjoyment, Competence, Appearance, Fitness and Social. Rural subjects recorded lower levels of motivation in all domains

compared to urban counterparts; competence attained statistical significance, while appearance and fitness tended to be lower ($p < 0.10$). Regardless, none of the motivational domains explained any of the variance in PA in either of the groups.

Considerable research suggests that social support is as an important predictor of physical activity in both urban and rural populations (Booth, et al., 2000; King, Castro, et al., 2000; Parks, et al., 2003; Wilcox, et al., 2000). Social support for PA was assessed under 2 categories – Family support and Friends support. Surprisingly, social support was not associated with PA behavior in either group, although social support through friends was significantly higher in the urban subjects.

Previous research suggests that depression and satisfaction with life can affect PA. The rural subjects reported significantly higher satisfaction with life which was contrary to our hypothesis. Our review of literature did not locate any studies comparing life satisfaction among rural and urban residents, although studies have reported significantly higher Satisfaction With Life in more active people (McAuley, et al., 2000; Rejeski & Mihalko, 2001). As supported by Wilcox et al. lower depressive scores were significantly associated with higher PASE scores in rural older adults. The factors explaining the most variance in PA in rural subjects in this study, namely Barrier Self Efficacy, depression, and pros and cons towards PA, are similar to the findings by Horne (1994) on rural older homemakers.

Implications for Interventions to Promote PA

Contrary to previous thinking, locale (i.e residing in urban or rural environment) was not strongly associated with PA (Table 4). Environment explained only 15% of the variance in PASE in the urban group and did not enter the model in the rural group. The mean General

Neighborhood Satisfaction Scale in this study was high. Thus, when subjects are generally satisfied with the neighborhood it does not appear to influence PA performance. Irrespective of the group, none of the five domains of Motives for Physical Activity were associated with PASE. As noted from the correlational matrix (Table 2), Motives for Physical Activity were significantly associated with most other constructs assessed. Owing to this inter-variability, the variance explained by Motives for Physical Activity was likely subsumed by other PA correlates and did not enter the model.

Socio-demographics and TPB were most associated with PASE in the urban subjects. Of all the socio-demographic correlates, “Stand in the way of things” was most associated with PASE. Thus, physical limitations are a significant barrier to PA behavior in older adults. Intention to exercise was the only TPB construct that was significantly associated with PASE. Hence, when prescribing exercise to urban subjects, one must take their physical or health-related shortcomings into consideration. Conducting group sessions and community based programs would enhance one’s intention to perform regular PA. Watching peers exercise (i.e., modeling) and performing supervised exercise program in the community (i.e., vicarious experiences) would likely increase Physical Activity Self Efficacy. The latter explained 14% of the variance in PASE in the present study.

In the rural subjects, a significant finding in this study was that the socio-ecological theory constructs were not associated with PASE. Barrier Self Efficacy, or the confidence a person has in overcoming barriers and perform PA, accounted for 27% of the variance in PASE. When promoting exercise in a rural environment, one must therefore take into account the barriers faced by the subjects. Addressing ways to overcome the barriers would likely increase PA participation and maintenance of exercise behavior.

In both groups, Intention to Exercise was the only TPB construct that was significantly associated with PA behavior. An individual's intention towards short and long term adherence to PA must be considered when prescribing exercise to both these groups of unique adults. The PASE scores seen in the present study were similar to those found in rural older adults by Wilcox et al. (2003). Wilcox et al. (2003) found PASE to be significantly associated with Self Efficacy similar to this study. This study extends the one by Wilcox et al. (2003) by measuring Barrier Self Efficacy and the various Theory of Planned Behavior constructs and their association with PASE. According to Azjen and Fisbein (1975), if a person intends to do a behavior then it is likely that he will do it. Intention is guided by attitude towards the behavior as well as subjective norms, or a combination of perceived expectations from relevant individual or groups. Hence, promoting factors that would change an individual's attitude towards exercise like education sessions, explaining benefits, conducting fun-filled group play activities for older adults would enhance or positively impact attitude. Watching their significant others or peers perform PA would positively change ones intention to perform PA.

Limitations

There are several limitations to our study. All data were collected through mail out surveys. This not only resulted in a small sample size but the subjects were unable to clarify any questions that arose while answering the questions. In this study, many of the correlates might have been predictors of PA if we had a larger sample size. Secondly, the current study did not quantify physical activity using accelerometers or other such devices and relied on the self report PASE score. PASE measures PA over a week and is subject to recall bias while accelerometry is a more accurate measurement of PA. This study did not restrict

physical activity to just Leisure Time Physical Activity (LPTA) but included their occupation and caring for others as well. Lastly, in our effort to assess all the psychological constructs thoroughly the sheer volume of the survey could have resulted in a boredom factor impacting some of the answers.

In conclusion, apart from environmental factors/barriers, there exist significant difference in psychological, social, emotional and behavioral factors in rural and urban adults. Intention to exercise was the most significant predictor when both populations were considered together. Barrier Self Efficacy, depression and greater pros and cons remained significant predictors in rural older adults. Intention and education were predictors in urban adults. Any physical activity program targeting these two unique groups must be tailor made and focused on modifying these correlates to make it effective in the long term.

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APPENDIX

We at Stroke Detection Plus are very interested in helping you stay as healthy as possible. The screening you are receiving today is just one way of doing so. Regular exercise and physical activity can also help you live a healthier life. It will reduce your risk for diseases such as heart disease, diabetes, and high blood pressure. Physical activity can also help you remain in your home as long as possible by helping you to maintain muscle strength and healthy joints.

Unfortunately, it is sometimes difficult to be physically active. There are a lot of reasons why this may be the case. Researchers at Iowa State University, led by Dr. Warren Franke, are very interested in determining the factors that most influence participation in physical activity in older adults. Their goal is the same as ours – helping Iowans stay as healthy as possible. **We are asking you to please complete the attached survey and return it to Dr. Franke in the enclosed envelope.** Doing so will help him identify which factors most influence physical activity in older adults.

To compensate you for your time in completing this survey, you will receive a \$10 gift card to a local store. You will also receive a voucher good for \$10 off your next screening with Stroke Detection Plus.

Your participation in this study is completely voluntary and you may skip any questions on the survey that you do not feel comfortable answering. Your answers are completely confidential. Once you seal your survey in the envelope, it will be impossible for anyone – including Dr. Franke and us – to connect your answers to you. Dr. Franke will provide us with a summary report of the results of this study, but these steps to preserve your anonymity means he will not be able to give us any information about any particular person or persons.

While completing this survey will take just a few minutes, it will help older adults in the future.

If you'd like to talk to Dr. Franke, you can contact him at (515)-294-8257, at wfranke@iastate.edu or by mail at

Dr. Warren Franke
247 Forker Building
Department of Kinesiology
Iowa State University
Ames, IA 50011

Thank you for your assistance in this very important study!

The following questions relate to your physical activity pattern. Please circle the best response applicable to you. There is no right or wrong answer.

1. Over the past 7 days, how often did you participate in sitting activities such as reading, watching TV or doing handcrafts?

1. Never 2. Seldom (1-2 days) 3. Sometimes (3 – 4 days) 4. Often (5 -7 days)

↓
Go to Q. # 2

1a. What were these activities?

1b. On average, how many hours per day did you engage in these sitting activities (please circle one)?

Less than 1 hour 1 but less than 2 hours 2 - 4 hours More than 4 hours

2. Over the past 7 days, how often did you take a walk outside your home or yard for any reason? For example, for fun or exercise, walking to work, walking the dog, etc.?

1. Never 2. Seldom (1-2 days) 3. Sometimes (3 – 4 days) 4. Often (5 -7 days)

↓
Go to Q. # 3

2a. On average, how many hours per day did you spend walking (please circle one)?

Less than 1 hour 1 but less than 2 hours 2-4 hours More than 4 hours

3. Over the past 7 days, how often did you engage in light sport or recreational activities such as bowling, golf with a cart, shuffleboard, fishing from a boat or pier or other similar activities?

1. Never 2. Seldom (1-2 days) 3. Sometimes (3 – 4 days) 4. Often (5 -7 days)

↓
Go to Q. # 4

3a. What were these activities?

3b. On average, how many hours per day did you engage in these light sport or recreational activities?

Less than 1 hour 1 but less than 2 hours 2-4 hours More than 4 hours

4. Over the past 7 days, how often did you engage in moderate sport or recreational activities such as doubles tennis, ballroom dancing, hunting, ice skating, softball other similar activities?

1. Never 2. Seldom (1-2 days) 3. Sometimes (3 – 4 days) 4. Often (5 -7 days)

↓ ↓ ↓ ↓

Go to Q. # 5

4a. What were these activities?

4b. On average, how many hours per day did you engage in these moderate sport or recreational activities (please circle one)?

Less than 1 hour 1 but less than 2 hours 2-4 hours More than 4 hours

5. Over the past 7 days, how often did you engage in strenuous sport and recreational activities such as jogging, swimming, cycling, singles tennis, aerobic dance, skiing (downhill or cross-country) or other similar activities?

1. Never 2. Seldom (1-2 days) 3. Sometimes (3 – 4 days) 4. Often (5 -7 days)

↓ ↓ ↓ ↓

Go to Q. # 6

5a. What were these activities?

5b. On average, how many hours per day did you engage in these strenuous sport and recreational activities (please circle one)?

Less than 1 hour 1 but less than 2 hours 2-4 hours More than 4 hours

6. Over the past 7 days, how often did you do any exercises specifically to increase muscle strength and endurance, such as lifting weights or pushups, etc.?

1. Never 2. Seldom (1-2 days) 3. Sometimes (3 – 4 days) 4. Often (5 -7 days)

↓ ↓ ↓ ↓

Go to Q. # 7

6a. What were these activities?

6b. On average, how many hours per day did you engage in exercises to increase muscle strength and endurance (please circle one)?

Less than 1 hour 1 but less than 2 hours 2-4 hours More than 4 hours

7. During the past 7 days, have you done any light housework, such as dusting or washing dishes ?

1. No 2. Yes

8. During the past 7 days, have you done any heavy housework or chores, such as vacuuming, scrubbing floors, washing windows, or carrying wood?

1. No 2. Yes

9. During the past 7 days, did you engage in any of the following activities (please answer each)?

A	Home repairs like painting, wallpapering, electrical work etc.	No	Yes	<input type="checkbox"/>
B	Lawn work or yard care, including snow or leaf removal, wood chopping, etc.	No	Yes	<input type="checkbox"/>
C	Outdoor gardening	No	Yes	<input type="checkbox"/>
D	Caring for an other person, such as children, dependent spouse, or an adult	No	Yes	<input type="checkbox"/>

10. During the past 7 days, did you work for pay or as a volunteer?

1. No 2. Yes



10a. How many hours per week did your work for pay and/or as a volunteer

_____ hours

10b. Which of the following categories best describes the amount of physical activity required on your job and/or volunteer work (please circle one)?

1. Mainly sitting with slight arm movements. [Examples: Office worker, watchmaker, seated assembly line-worker, bus driver, etc.]
2. Sitting or standing with some walking. [Examples: cashier, general office worker, light tool and machinery worker.]
3. Walking with some handling of materials generally weighing less than 50 pounds. [Examples : Mailman, waiter/waitress, construction worker, heavy tool and machinery worker.]
4. Walking and heavy manual work often requiring handling of materials weighing over 50 pounds. [Examples: lumberjack, stone mason, farm or general laborer].

- A. We would like to find out more information about the way you perceive or think about your neighborhood. Please answer the following question about your neighborhood and yourself. Please answer as honestly and completely as possible and provide only one answer for each item. There are no right or wrong answers.

If any of these questions do not apply to you, please darken the NA circle.

A. Among the residences in your neighborhood		None	A few	Some	Most	All	NA
1	How common are <u>detached single-family</u> residences in your immediate neighborhood?	①	②	③	④	⑤	⑥
2	How common are <u>townhouses or row houses of 1 – 3 stories tall</u> in your immediate neighborhood?	①	②	③	④	⑤	⑥
3	How common are <u>apartments or condos 1 – 3 stories tall</u> in your immediate neighborhood?	①	②	③	④	⑤	⑥
4	How common are <u>apartments or condos 4 – 6 stories tall</u> in your immediate neighborhood?	①	②	③	④	⑤	⑥
5	How common are <u>apartments or condos 7 – 12 stories tall</u> in your immediate neighborhood?	①	②	③	④	⑤	⑥
6	How common are <u>apartments or condos more than 13 tall</u> in your immediate neighborhood?	①	②	③	④	⑤	⑥

B. About how long will it take to get from your home to the nearest business or facilities listed below if you walked to them? **If any of these questions do not apply to you, please darken the NA circle.**

Please circle only one for each business or facility.

		1 – 5 min	6 – 10 min	11 – 20 min	21 – 30 min	31 + min	Don't Know	NA
1	Convenience /small grocery store	①	②	③	④	⑤	⑥	⑦
2	Supermarket	①	②	③	④	⑤	⑥	⑦
3.	Hardware Store	①	②	③	④	⑤	⑥	⑦
4	Fruit/vegetable Market	①	②	③	④	⑤	⑥	⑦
5	Laundry/dry cleaners	①	②	③	④	⑤	⑥	⑦
6	Clothing Store	①	②	③	④	⑤	⑥	⑦
7	Post Office	①	②	③	④	⑤	⑥	⑦
8	Library	①	②	③	④	⑤	⑥	⑦
9	Elementary School	①	②	③	④	⑤	⑥	⑦
10	Other Schools	①	②	③	④	⑤	⑥	⑦
11	Book Store	①	②	③	④	⑤	⑥	⑦
12	Fast Food Restaurant	①	②	③	④	⑤	⑥	⑦
13	Coffee Place	①	②	③	④	⑤	⑥	⑦
14	Bank / Credit Union	①	②	③	④	⑤	⑥	⑦
15	Non-fast food restaurant	①	②	③	④	⑤	⑥	⑦
16	Video Store	①	②	③	④	⑤	⑥	⑦
17	Pharmacy / Drug Store	①	②	③	④	⑤	⑥	⑦
18	Salon / Barber Shop	①	②	③	④	⑤	⑥	⑦
19	Your job or school <i>Check here ____ if this doesn't apply to you.</i>	①	②	③	④	⑤	⑥	⑦
20	Bus or trolley Stop	①	②	③	④	⑤	⑥	⑦
21	Park	①	②	③	④	⑤	⑥	⑦
22	Recreation Center	①	②	③	④	⑤	⑥	⑦
23	Gym or fitness facility	①	②	③	④	⑤	⑥	⑦

C. Please circle the answer that best applies to you and your neighborhood. Both local and within walking distance mean within a 10 – 15 minute walk from your home. **If any of these questions do not apply to you, please darken the NA circle.**

		Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	NA
1.	I can do most of my shopping at local stores	①	②	③	④	⑤
2.	Stores are within easy walking distance of my home	①	②	③	④	⑤
3.	Parking is difficult in local shopping areas.	①	②	③	④	⑤
4.	There are many places to go within easy walking distance of my home	①	②	③	④	⑤
5.	It is easy to walk to a transit stop (bus, train) from my home	①	②	③	④	⑤
6.	The streets in my neighborhood are hilly, making my neighborhood difficult to walk in	①	②	③	④	⑤
7.	There are many canyons/hillsides in my neighborhood that limit the number of routes for getting from place to place.	①	②	③	④	⑤

D. Please circle the answer that best applies to you and your neighborhood. **If any of these questions do not apply to you, please darken the NA circle.**

		Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	NA
1	The streets in my neighborhood <u>do not</u> have many, or any, cul-de-sacs (dead-end streets)	①	②	③	④	⑤
2	There are walkways in my neighborhood that connect cul-de-sacs to streets, trails or other cul-de-sacs	①	②	③	④	⑤
3	The distance between intersections in my neighborhood is usually short (100 yards or less; the length of a football field or less)	①	②	③	④	⑤
4	There are many four-way intersections in my neighborhood	①	②	③	④	⑤
5	There are many alternative routes for getting from place to place in my neighborhood. (I don't have to go the same way every time.)	①	②	③	④	⑤

E. Please circle the answer that best applies to you and your neighborhood. If any of these questions do not apply to you, please darken the NA circle.

		Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	NA
1	There are sidewalks on most of the streets in my neighborhood.	①	②	③	④	⑤
2	The sidewalks in my neighborhood are well maintained (paved, even and not a lot of cracks).	①	②	③	④	⑤
3	There are bicycle or pedestrian trails in or near my neighborhood that are easy to get to.	①	②	③	④	⑤
4	Sidewalks are separated from the road/traffic in my neighborhood by parked cars.	①	②	③	④	⑤
5	There is a grass or dirt strip that separates the streets from the sidewalks in my neighborhood.	①	②	③	④	⑤

F. Please circle the answer that best applies to you and your neighborhood. If any of these questions do not apply to you, please darken the NA circle.

		Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	NA
1	There are trees along the streets in my neighborhood	①	②	③	④	⑤
2	Trees give shade for the sidewalks in my neighborhood.	①	②	③	④	⑤
3	There are many interesting things to look at while walking in my neighborhood.	①	②	③	④	⑤
4	My neighborhood is generally free from litter.	①	②	③	④	⑤
5	There are many attractive natural sights in my neighborhood (such as landscaping, views.)	①	②	③	④	⑤
6	There are attractive buildings/homes in my neighborhoods.	①	②	③	④	⑤

G. Please circle the answer that best applies to you and your neighborhood. If any of these questions do not apply to you, please darken the NA circle.

		Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree	NA
1	There is so much traffic along the street I live on that it makes it difficult or unpleasant to walk in my neighborhood	①	②	③	④	⑤
2	There is so much traffic along <u>nearby</u> streets that it difficult or unpleasant to walk in my neighborhood	①	②	③	④	⑤
3	The speed of traffic on the street I live on is usually slow (30 mph or less)	①	②	③	④	⑤
4	The speed of traffic on most nearby streets is usually slow (30 mph or less)	①	②	③	④	⑤
5	Most drivers exceed the posted speed limits while driving in my neighborhood	①	②	③	④	⑤
6	There are crosswalks and pedestrian signals to help walkers cross busy streets in my neighborhood	①	②	③	④	⑤
7	The crosswalks in my neighborhood help walkers feel safe crossing busy streets	①	②	③	④	⑤
8	When walking in my neighborhood, there are a lot of exhaust fumes(such as from cars, buses)	①	②	③	④	⑤
9	My neighborhood streets are well lit at night.	①	②	③	④	⑤
10	Walkers and bikers on the streets in my neighborhood can be easily seen by people in their homes.	①	②	③	④	⑤
11	I see and speak to other people when I am walking in my neighborhood.	①	②	③	④	⑤
12	There is a high crime rate in my neighborhood.	①	②	③	④	⑤
13	The crime rate in my neighborhood makes it unsafe to gon walks <u>during the day</u> .	①	②	③	④	⑤
14	The crime rate in my neighborhood makes it unsafe to go on walks <u>at night</u> .	①	②	③	④	⑤

I. Below are things about your neighborhood with which you may or may not be satisfied.

Using the 1 -5 scale below, indicate your satisfaction with each item by encircling the appropriate number. Please be open and honest in your responding. *If any of these questions do not apply to you, please darken the NA circle.*

		Strongly Dissatisfied	Somewhat Dissatisfied	Neither satisfied nor dissatisfied	Somewhat satisfied	Strongly Satisfied	NA
1	Highway access from your home	①	②	③	④	⑤	⑥
2	The access to public transportation in your neighborhood	①	②	③	④	⑤	⑥
3	Your commuting time to work/school	①	②	③	④	⑤	⑥
4	The access to shopping in your neighborhood	①	②	③	④	⑤	⑥
5	How many friends you have in your neighborhood	①	②	③	④	⑤	⑥
6	The number of people you know in you neighborhood	①	②	③	④	⑤	⑥
7	How easy and pleasant it is to walk in your neighborhood?	①	②	③	④	⑤	⑥
8	How easy and pleasant it is to bicycle in your neighborhood?	①	②	③	④	⑤	⑥
9	The quality of schools in your neighborhood	①	②	③	④	⑤	⑥
10	Access to entertainment in your neighborhood (restaurants, movies, clubs etc.)	①	②	③	④	⑤	⑥
11	The safety from threat of crime in your neighborhood?	①	②	③	④	⑤	⑥
12	The amount and speed of traffic in your neighborhood?	①	②	③	④	⑤	⑥
13	The noise from traffic in my neighborhood	①	②	③	④	⑤	⑥
14	The number and quality of food stores in your neighborhood?	①	②	③	④	⑤	⑥
15	The number and quality of restaurants in your neighborhood?	①	②	③	④	⑤	⑥
16	Your neighborhood as a god place to raise children?	①	②	③	④	⑤	⑥
17	Your neighborhood as a good place to live?	①	②	③	④	⑤	⑥

The following items reflect situations that are listed as common reasons for preventing individuals from participating in exercise sessions or, in some cases, dropping out.

Using the scales below please indicate how confident you are that you could exercise in the event that any of the following circumstances were to occur.

For example, in question #1 if you have complete confidence that you could exercise even if “the weather was very bad,” you would circle **100%**.

If, however, you had no confidence at all that you could exercise, if you failed to make or continue making progress (that is, you are confident you would not exercise), you would circle **0%**.

NOT AT ALL CONFIDENT						MODERATELY CONFIDENT						HIGHLY CONFIDENT
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%		

I believe that I could exercise 3 times per week for the next 3 months if . . .	Not at all Confident			Moderately Confident				Highly Confident			
The weather was very bad (hot, humid, rainy, cold)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I was bored by the program or activity.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I was on vacation.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I was not interested in the activity.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I felt pain or discomfort when exercising.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I had to exercise alone.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
It was not fun or enjoyable.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
It became difficult to get to the exercise location.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I didn't like the particular activity program that I was involved in.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
My schedule conflicted with my exercise session.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I felt self-conscious about my appearance when I exercised.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I was under personal stress of some kind.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Items listed below are designed to assess your beliefs in your ability to exercise on a **three times per week** basis at moderate intensities in the future. Moderate intensity activities are defined here as those that make you a little out of breath, such as a brisk walk.

Using the scales listed below please indicate how confident you are that you will exercise in the future.

As in the previous question, please mark your answer by circling a %.

During the next 4 weeks . . .	Not at all Confident	Moderately Confident	Highly Confident								
I am able to exercise three times per week at moderate intensity, for at least <u>10</u> minutes continuously without quitting.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I am able to exercise three times per week at moderate intensity, for at least <u>15</u> minutes continuously without quitting.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I am able to exercise three times per week at moderate intensity, for at least <u>20</u> minutes continuously without quitting.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I am able to exercise three times per week at moderate intensity, for at least <u>25</u> minutes continuously without quitting.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I am able to exercise three times per week at moderate intensity, for at least <u>30</u> minutes continuously without quitting.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I am able to exercise three times per week at moderate intensity, for at least <u>40</u> minutes continuously without quitting.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I am able to exercise three times per week at moderate intensity, for at least <u>50</u> minutes continuously without quitting.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
I am able to exercise three times per week at moderate intensity, for at least <u>60</u> minutes continuously without quitting.	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Some people define “Physical Activity” as moderate or vigorous activities performed for at least 30 minutes/day at least 3 days/ week. The activity could be accumulated throughout the day or 30 minutes all at once. Examples of moderate activities include walking, bowling, yard work, gardening or house work such as washing windows or vacuuming. Examples of vigorous activities include dancing, jogging, swimming or cycling.

What do you *feel* about the above mentioned activities? Please answer questions A – G (circle your answer)

A.	Useless -3	-2	-1	0	1	2	Useful 3
B.	Harmful -3	-2	-1	0	1	2	Beneficial 3
C.	Bad -3	-2	-1	0	1	2	Good 3
D.	Worthless -3	-2	-1	0	1	2	Valuable 3
E.	Unpleasant -3	-2	-1	0	1	2	Pleasant 3
F.	Boring -3	-2	-1	0	1	2	Interesting 3
G.	Unenjoyable -3	-2	-1	0	1	2	Enjoyable 3

Most people who are important to me think I should perform physical activity regularly

Strongly Do Not Agree 1	2	3	4	Strongly Agree 5
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Please rate the *ease* or *difficulty* you have in performing physical activity for 30 minutes, 3 days per week.

Very Difficult 1	2	3	4	Very Easy 5
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Please rate the *amount of control* you have over performing physical activity for 30 minutes, 3 days per week.

Absolutely No Control 1	2	3	4	Complete Control 5
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Please rate the *number of events that prevent* you from performing physical activity for 30 minutes, 3 days per week.

Numerous 1	2	3	4	Few 5
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Please rate the **likelihood you have** of being physically active for 30 minutes, 3 days per week.

Not Likely At All 1	2	3	4	Very Likely 5
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Do you **intend to perform** physical activity for 30 minutes, 3 days per week in the following 2 months?

Definitely Do Not 1	2	3	4	Definitely Do 5
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Please answer the following questions by circling either “yes” or “no.” Be honest with your answer.

1.	Are you basically satisfied with your life?	Yes	No
2.	Do you often get bored?	Yes	No
3.	Do you often feel helpless?	Yes	No
4.	Do you prefer to stay at home, rather than going out and doing new things?	Yes	No
5.	Do you feel pretty worthless the way you are now?	Yes	No

Below are five statements with which you may agree or disagree.

Using the 1-7 scale below, indicate your agreement with each item by circling the appropriate number. Please be open and honest in your response.

		Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree
1	In most ways my life is close to my ideal	①	②	③	④	⑤	⑥	⑦
2	The condition of my life are excellent	①	②	③	④	⑤	⑥	⑦
3.	I am satisfied with my life	①	②	③	④	⑤	⑥	⑦
4	So far, I have gotten the important things I want in life	①	②	③	④	⑤	⑥	⑦
5	If I could live my life over, I would change almost nothing	①	②	③	④	⑤	⑥	⑦

Questions below refer to reasons why people do or do not engage in physical activity for 30 minutes a day for 3 or more days per week.

*On a scale of 1 -5, indicate how important each of them
isto your engagement in physical activity*

**Not At All
Important**

**Extremely
Important**

1	I would have more energy for my family and friends if I exercised regularly.	①	②	③	④	⑤
2	Regular exercise would help me relieve tension.	①	②	③	④	⑤
3	I would feel more confident if I exercised regularly.	①	②	③	④	⑤
4	I would sleep more soundly if I exercised regularly.	①	②	③	④	⑤
5	I would feel good about myself if I kept my commitment to exercise regularly.	①	②	③	④	⑤
6	I would like my body better if I exercised regularly.	①	②	③	④	⑤
7	It should be easier for me to perform routine physical tasks if I exercised regularly.	①	②	③	④	⑤
8	I would feel less stressed if I exercised regularly.	①	②	③	④	⑤
9	I would feel more comfortable with my body if I exercised regularly.	①	②	③	④	⑤
10	Regular exercise would help me have a more positive outlook on life.	①	②	③	④	⑤
11	I think I would be too tired to do my daily work after exercising.	①	②	③	④	⑤
12	I would find it difficult to find an exercise activity that I enjoy that is not affected by bad weather.	①	②	③	④	⑤
13	I feel uncomfortable when I exercise because I get out of breath and my heart beats very fast.	①	②	③	④	⑤
14	Regular exercise can take too much of my time.	①	②	③	④	⑤
15	I would have less time for my family and friends if I exercised regularly.	①	②	③	④	⑤
16	At the end of the day, I am too exhausted to exercise.	①	②	③	④	⑤

For the following questions, think about how much FAMILY participation and involvement you have.

Mark the appropriate number between 1 and 5 depending on how much you agree with the question.

Not at all

Very Often

1	Exercises with me	①	②	③	④	⑤
2	Gives me encouragement to stick with my exercise program	①	②	③	④	⑤
3	Changed their schedule so we could exercise together	①	②	③	④	⑤
4	Offered to exercise with me	①	②	③	④	⑤
5	Has given me helpful reminders to exercise	①	②	③	④	⑤
6	Planned for exercise on recreational outings	①	②	③	④	⑤
7	Discusses exercise with me	①	②	③	④	⑤
8	Talks about how much they like to exercise	①	②	③	④	⑤
9	Helps to plan activities around my exercise	①	②	③	④	⑤
10	Asks me for ideas on how they can get more exercise	①	②	③	④	⑤
11	Took over chores so I have more time to exercise	①	②	③	④	⑤
12	Makes positive comments about my physical appearance	①	②	③	④	⑤
13	Gets angry at me for exercising	①	②	③	④	⑤
14	Criticizes me or makes fun of me for exercising	①	②	③	④	⑤
15	Has given me rewards for exercising	①	②	③	④	⑤
For the following questions, think about how much participation and involvement you have from your FRIENDS.						
1	Exercises with me	①	②	③	④	⑤
2	Offered to exercise with me	①	②	③	④	⑤
3	Has given helpful reminders to exercise	①	②	③	④	⑤
4	Gives me encouragement to stick with my exercise program	①	②	③	④	⑤
5	Changed their schedule so we could exercise together	①	②	③	④	⑤

The following is a list of reasons why people engage in physical activities, sports and exercise. Keeping in mind your primary physical activity, respond to each question (using the scale given), on the basis of how true that response is for you.

		Not at all true						Very True
1	Because I want to be physically fit	①	②	③	④	⑤	⑥	⑦
2	Because it's fun	①	②	③	④	⑤	⑥	⑦
3	Because I like engaging in activities which physically challenge me	①	②	③	④	⑤	⑥	⑦
4	Because I want to obtain new skills	①	②	③	④	⑤	⑥	⑦
5	Because I want to look or maintain weight so I look better	①	②	③	④	⑤	⑥	⑦
6	Because I want to be with my friends	①	②	③	④	⑤	⑥	⑦
7	Because I like to do this activity	①	②	③	④	⑤	⑥	⑦
8	Because I want to do this activity	①	②	③	④	⑤	⑥	⑦
9	Because I like the challenge	①	②	③	④	⑤	⑥	⑦
10	Because I want to define my muscles so I look better	①	②	③	④	⑤	⑥	⑦
11	Because it makes me happy	①	②	③	④	⑤	⑥	⑦
12	Because I want to keep up my current skill level	①	②	③	④	⑤	⑥	⑦
13	Because I want to have more energy	①	②	③	④	⑤	⑥	⑦
14	Because I like activities which are physically challenging	①	②	③	④	⑤	⑥	⑦
15	Because I like to be with others who are interested in this activity	①	②	③	④	⑤	⑥	⑦
16	Because I want to improve my cardiovascular fitness	①	②	③	④	⑤	⑥	⑦
17	Because I want to improve my appearance	①	②	③	④	⑤	⑥	⑦
18	Because I think it's interesting	①	②	③	④	⑤	⑥	⑦
19	Because I want to maintain my physical strength to live a healthy life	①	②	③	④	⑤	⑥	⑦
20	Because I want to be attractive to others	①	②	③	④	⑤	⑥	⑦
21	Because I want to meet new people	①	②	③	④	⑤	⑥	⑦
22	Because I enjoy this activity	①	②	③	④	⑤	⑥	⑦

The following are other reasons why people engage in physical activities, sports and exercise. Keeping in mind your primary physical activity, respond to each question (using the scale given), on the basis of how true that response is for you.

		Not at all True					Very True	
23	Because I want to maintain my physical health and well-being	①	②	③	④	⑤	⑥	⑦
24	Because I want to improve my body shape	①	②	③	④	⑤	⑥	⑦
25	Because I want to get better at my activity	①	②	③	④	⑤	⑥	⑦
26	Because I find this activity stimulating	①	②	③	④	⑤	⑥	⑦
27	Because I will feel physically unattractive if I don't	①	②	③	④	⑤	⑥	⑦
28	Because my friends want me to	①	②	③	④	⑤	⑥	⑦
29	Because I like the excitement of participation	①	②	③	④	⑤	⑥	⑦
30	Because I enjoy spending time with others doing this activity.	①	②	③	④	⑤	⑥	⑦

Now, we'd like to know a little bit about you.

1. What was your year of birth? _____
2. What is your gender? _____ Female _____ Male
3. Which county do you live in? _____
4. What is the town or city nearest to where you currently live?

5. How far away is this town or city? _____ miles
6. What is your highest level of education achieved?
 Some high school
 High school diploma
 Trade school or vocational degree
 Some college
 Associate Arts degree
 College degree
 Some post-graduate education
 Graduate degree
 Professional degree

8. What is your marital status?
 Never married
 Married
 Divorced
 Separated
 Widowed
9. How would you rate your overall health at this time?
 Excellent
 Good
 Fair
 Poor
10. How is your health compared to what it was like five years ago?
 Better
 About the same
 Worse
11. How much do your health troubles stand in the way of doing the things you want to do?
 Not at all
 A little or some
 A great deal
12. What is your weight? _____ pounds
13. What is your height? _____ ft _____ in.

Thank you so much for your willingness to complete this survey. Your efforts will enable us to develop safe, effective activity programs for older adults!