

The Role of Social Support and Self-Efficacy in Shaping the Leisure Time Physical Activity of Older Adults

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Lack of social support and low self-efficacy are important barriers to regular exercise and physical activity. However, it is unclear whether these resources contribute significantly to CDC recommended physical activity levels *and* which of these factors (and their associated sub-domains) are more robust in relating to leisure time physical activity (LTPA) among older adults. This study examines the role of social support and self-efficacy in shaping recommended levels of older adult LTPA from five cities across the United States. Results indicated that social support provided by friends (rather than family) and the self-efficacy domain of perceived physical ability were significantly related to LTPA as measured through Metabolic Equivalents (METs). Consistent with prior research, age and health were also significantly related to LTPA. Findings suggest that inter-personal resources and intra-personal resources both play an equal role in shaping LTPA of older adults. Suggestions for promoting LTPA of older adults are discussed.

KEYWORDS: *Health, leisure time physical activity, social support, self-efficacy, older adults.*

Introduction

At a time when the proportion of older adults in the U.S. population is growing rapidly, the need for older adult services and geriatric health care

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has increased considerably (Himes, 2001). Escalating health care costs have placed pressure on U.S. public finances (Kingson & Williamson, 2001) and the benefits associated with older adult physical activity have drawn increased attention. However, about a quarter of the adult population still reports achieving no leisure time physical activity (LTPA) during the past month (Centers for Disease Control and Prevention, 2005). A growing volume of research is documenting the health-related benefits (e.g., exercise, stress relief) of physical activity participation (Blair, Kohl, Barlow, Paffenbarger, Gibbons, & Macera, 1995; Hull & Michael, 1995; McAuley & Rudolph, 1995; Orsega-Smith, Mowen, Payne, & Godbey, 2004; Orsega-Smith, Payne, & Godbey, 2003; Pate et al., 1995; Penedo & Dahn, 2005; Raymore & Scott, 1998). According to these studies, parks and recreation services provide low-cost and accessible opportunities for increasing LTPA among older adults.

Since leisure is defined and redefined by succeeding cultures, it is natural that the subject matter of such research also evolves. In current society, rapid declines in the level of physical activity required in paid work, housework and personal care have made leisure a more salient arena for physical activity. The contributions of leisure behavior to active living are beginning to be documented and recognized by the medical and health community (c.f., Godbey, Caldwell, Floyd, & Payne, 2005). Thus, leisure research is being influenced by societal trends such as problems associated with sedentary lifestyles. As this happens, leisure and health researchers are collaborating in transdisciplinary efforts. Increasingly these efforts are recognized and leisure behaviors have been incorporated as part of the physical activity milieu.

Although the provision of leisure time physical activity programs and environments is a viable means to promote health and prevent disease, people commonly report constraints or barriers that limit their participation in LTPA (Arnold & Shinenew, 1998; Bialeschki & Henderson, 1988; Jackson, 1983; Jackson, 1994; Mowen, Payne, & Scott, 2005; Scott & Munson, 1994; Walker & Virden, 2005). Furthermore, certain segments of the population (e.g., older adults) are more likely to be influenced by such constraints (Booth, Bauman, & Owen, 2002; Schutzer & Graves, 2004; Scott & Jackson, 1996). For these populations, special attention is now being devoted to understanding the intra-personal, inter-personal, and structural resources that can help them facilitate LTPA.

For example, a number of studies from the public health literature have found that self-efficacy and social support are important determinants of exercise and home-based physical activity (Dishman & Sallis, 1994). These concepts have been examined separately across a variety of contexts such as group exercise and home based physical activity programs. However, less is known about the collective effectiveness of these resources in influencing LTPA behaviors and whether such resources are important determinants of recommended LTPA levels for older adults. Therefore, the purpose of this study is to examine social support and self-efficacy in its relationship to leisure time physical activity.

Literature Review

Leisure Constraints and Constraint Negotiation

Leisure constraints and physical activity barriers have been examined in both the leisure studies and in the public health literature.¹ With regard to leisure time physical activity (e.g., bowling, walking, exercise), a number of constraints (labeled as barriers in the public health literature) have been found to impact older adults' physical activity. Generally, these barriers have been categorized as personal and environmental (Clark, 1999; Sallis et al., 1989). Overall, personal barriers include safety concerns, poor health, lack of time, motivation and energy, as well as lack of skill. Environmental barriers have included lack of available places to engage in physical activity, no places to sit and rest during a walk, quality and availability of sidewalks, and inclement weather. However, the leisure studies literature has labeled such barriers as leisure constraints. According to Jackson, leisure constraints are "factors that inhibit people's ability to participate in leisure activities, to spend more time doing so, to take advantage of leisure services or to achieve a desired level of satisfaction" (Jackson, 1988, p. 203). Constraints are generally categorized into three groups based on a conceptual framework posited by Crawford, Jackson, and Godbey (1991). First, intra-personal constraints are psychological conditions that are internal to the individual (such as personality factors, attitudes, and self-efficacy). Second, inter-personal constraints arise from social interaction with and support from others (such as family members, friends, and co-workers). Finally, structural constraints include such factors as the lack of opportunities, access, or cost of activities that arise from external conditions in the environment.

In addition to understanding leisure non-participation, constraints have been studied with respect to leisure activities/experiences (Buchanan & Allen, 1983; Jackson, 1983; Jackson, 1994; McCarville & Smale, 1993; Searle & Jackson 1985) and leisure environments such as parks (Arnold & Shinew, 1998; Kerstetter, Zinn, Graefe, & Chen, 2002; Mowen et al., 2005; Scott & Munson, 1994; Scott & Jackson 1996). Much of this work, however, has focused on structural rather than inter-personal and intra-personal constraints and has focused on how such constraints are experienced differently across populations and time periods. For example, Scott and Jackson (1996) found that older women were more likely to be constrained in their park use due to lack of park companionship, poor health, fear of crime, and having no way to get to parks. Using a replication of Scott and Jackson's study in the same study area, Mowen et al. examined constraint trends and changes in

¹ Given the volume of leisure constraints and physical activity barrier literature, our intent was to provide an overview of the constraints framework and review those studies that have examined intra-personal and inter-personal constraints and constraint negotiation strategies. A more thorough discussion of leisure constraints, constraint negotiation, constraint research critiques is discussed in Jackson (2005).

how demographic characteristics related to park use constraints over time. Consistent with earlier constraint studies, they found that lack of time, lack of available companions, and poor health were reported as key constraints to the frequency of park use. However, during both time periods (1991 and 2001), older adults were more likely than younger adults to indicate that having no one with whom to visit parks and poor health were constraints in their use of parks. In a study of former users and non-users of state parks, Kerstetter et al. found that while the lack of time was cited as the most important constraint, lack of knowledge and lack of friends/family with whom to visit state parks were also salient. Findings from both the leisure studies and public health literatures suggest that intra-personal and inter-personal conditions can influence the frequency and enjoyment of older adults' LTPA. In a 2000 study, Wilcox, Castro, King, Housemann, and Brownson found that perceived barriers were influential factors in shaping LTPA patterns of older, ethnically diverse rural and urban women. Alexandris, Barkoukis, Tsorbatzoudis, and Grouios (2003) described a pattern of constraints similar to the leisure theory of constraints described by Crawford et al. (1991). In a population of older adults in Greece, they found that psychological/intra-personal constraints as most important in predicting their physical activity. In light of these findings, Jackson (2000) noted that additional research, investigating intra-personal and inter-personal constraint negotiation strategies, is needed.

As a complement to the constraints literature, Raymore (2002) emphasized the importance of examining resources that enable or promote participation. She suggested that constraints represent a "cup half empty" approach to lack of participation and encouraged researchers to adopt a complementary "cup half full" approach to examine conditions that facilitate engagement. She also asserted that social support and self-efficacy are important facilitators of leisure since they are affected by outcome expectations (i.e., the expectation of being able to perform the desired activity) and one's environment. Therefore, in this study, we frame social support and self-efficacy as potential facilitators of LTPA, while acknowledging they might be perceived by individuals as constraints. Mannell and Loucks-Atkinson (2005) hinted at facilitators when they suggested that future research focus on strategies to enhance self-efficacy and social support resources as a way to mitigate leisure constraints/barriers and thereby facilitate participation in LTPA. A discussion of social support and self-efficacy literature is thus warranted.

Social Support and Self-efficacy as Resources to Negotiate LTPA Constraints

Self-efficacy and social support are considered to be important predictive characteristics of exercise and physical activity (Dishman & Sallis, 1994). Improving one's self-efficacy can be accomplished by starting with small steps, observing others successfully perform the physical activity, and obtaining verbal feedback and persuasion from family members, peers, and leaders (Bandura, 1977). Likewise, social support is an active and cost-effective ap-

proach to increase physical activity, and can be provided at an individual level by family, friends, or others who provide encouragement to strengthen an individual's motives to be physically active. We purport that both social support and self-efficacy are important correlates of older adults' LTPA.

Social support. The meaning of social support varies greatly, from frequency of interpersonal contact, family size, to living arrangements (Strain & Payne, 1992). For the purpose of the present study, social support is defined as those activities performed by one individual that assist another person toward a desired goal (Caplan, Robinson, French, Caldwell, & Shinn, 1976). House (1981) integrated the views of social support in previous work and divided the construct into four types: instrumental support, informational support, emotional support, and appraisal support. Berkman (1995) further illustrated these four sources of support in terms of support-related exercise behavior: instrumental support (e.g., giving a friend a ride to an exercise class), informational support (e.g., sharing information about exercise classes or programs with a friend), emotional support (e.g., calling a friend to see how his/her exercise program is going), and appraisal support (e.g., providing encouragement for exercise or learning a new activity).

A growing volume of literature is documenting the importance of social support to exercise behavior for older adults as well as for other age groups. One study assessed types of social support as determinants of exercise adherence for both men and women ages 50 to 65 (Oka, King, & Young, 1995). Social support was an important predictor of exercise adherence among the sample and the authors concluded that social support specific to exercise was an even better predictor than general social support measures. Similarly, in a survey that explored the origins of social support for later life experiences among older women, O'Brien Cousins (1995) suggested that having active friends and/or being encouraged by at least one person were the most influential forces for these women to participate in active types of activities. In a study that examined the relationship between general social support and levels of physical activity of 29,135 individuals from the 1990 Ontario Health Survey, Spanier and Allison (2001) concluded that general social support, in terms of quality and frequency was significantly associated with higher levels of physical activity. Those who had more friends and family members that were contacted frequently also participated in higher levels of physical activity (i.e., frequency or intensity of exercise).

In a 2000 study, Wilcox and colleagues found that social support was an influential factor in shaping the leisure-time physical activity patterns of older, ethnically diverse rural and urban women. In addition, a study of 1803 healthy workers and home-makers aged 18-59 years living in Western Australia also reinforced the importance of social support for increasing levels of physical activity (Giles-Corti & Donovan, 2002). This study examined the influence of individual, social environmental, and physical environmental factors on physical activity. Results of this study demonstrated that the influence of physical environmental determinants to be secondary to individual and social environmental determinants. Respondents with exercise partners

or those who were members of sport or recreational clubs were more likely to achieve recommended levels of physical activity than those without such resources. This study reinforced the notion that social support has an important role in facilitating physical activity especially in the domain of LTPA. However, a number of studies are also noting that self-efficacy may also be an important determinant of physical activity.

Self-efficacy. Social cognitive theory is a framework designed to examine human behavior as a reciprocal interaction between interpersonal factors, behavior, and the external environment (Bandura, 1977). Within social cognitive theory, there are several components that are thought to explain an individual's regulation and motivation in social, cognitive, and behavioral skills. Self-efficacy is one construct in social cognitive theory that is based on the premise that people can self-regulate their own motivations and behaviors (Bandura). Self-efficacy can be defined as the belief in one's ability to perform a specific task despite obstacles and aversive experiences. An individual with high self-efficacy tends to expend more effort, attempt more challenging tasks, and continue to persist to achieve these tasks in the face of obstacles than an individual with low self-efficacy (Bandura). For example, with respect to physical activity, a person who has high exercise self-efficacy is more likely to attempt to continue to increase minutes of daily physical activity towards achieving 30 minutes per day despite, for example, inclement weather or the loss of an exercise partner.

Self-efficacy has been shown to be a predictor of adoption and adherence to health behaviors in a variety of settings across multiple populations. In healthy adults, self-efficacy has been demonstrated to be a predictor of the adoption and maintenance of dietary health habits in office staff personnel (Sheeshka, Woolcott, & MacKinnon, 1993), the management of weight loss (Weinberg, Hughes, Critelli, England, & Jackson, 1984), the management of diabetes through adherence to diet and exercise (Kavanaugh, Gooley & Wilson, 1993), and of adherence to exercise prescription following coronary angioplasty (Jensen, Banwart, Vehaus, Popkess-Vawter, & Perkins, 1993).

Self-efficacy has been examined in a variety of exercise settings as both a predictor and as an outcome of exercise. However, it has seldom been examined in the context of leisure. Specifically, it has been studied as a predictor of acute single bouts of exercise such as a graded exercise stress test (Ewart, Taylor, Reese, DeBusk, 1983; Rejeski, Craven, Ettinger, McFarlane, & Shumaker, 1996) and in chronic exercise such as an exercise program (Garcia & King, 1991; McAuley & Jacobson, 1991; McAuley, 1993; McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003; Sallis, Haskell, Fortman, Vranizan, Taylor, & Solomon, 1986). Self-efficacy has also been studied as an outcome of participation in exercise interventions or programs (Kaplan, Atkins, Timms, Reinsch, & Lofback, 1984; McAuley, Courneya, & Lettunich, 1991; Oldridge & Rogowski, 1990). Moreover, self-efficacy has been examined as a mediator between activity and social support (Duncan & McAuley,

1993) and between past exercise behavior and social cognitive theory components (Conn, 1998).

In the area of physical activity promotion, self-efficacy has also been examined in a variety of populations including women and older adults. In a study of African American women and leisure-time physical activity, self-efficacy was a significant predictor of the duration of leisure time physical activity (Sharma, Sargent, & Stacy, 2005). Researchers determined that self-efficacy had a stronger association with physical activity more so than walking in a sample of adults from Queensland, Australia (Duncan & Mummery, 2005). Self-efficacy was also a significant predictor of moderate to vigorous physical activity in a population of randomly selected 50-65 year olds from Ghent, Belgium (De Bourdeaudhuij & Sallis, 2002). Despite the growing evidence that social support and self-efficacy are important resources in shaping physical activity, few studies have examined their collective influence on leisure time physical activity and whether they are related to recommended levels of physical activity.

Study Purpose

Collectively, leisure studies and public health scholars have attempted to understand the role of constraints (or barriers) in shaping physical activity, leisure experiences, and the use of activity environments (e.g., public parks). While the foci of these studies have varied across disciplines, there is a general consensus that additional research is needed to document the role of individual (intra-personal) and social (inter-personal) resources in negotiating leisure constraints and in shaping leisure time physical activity behaviors. Numerous studies have examined the role of intra-personal (e.g., self-efficacy) and inter-personal (e.g., social support) resources in shaping leisure behavior, exercise, and physical activity (Giles-Corti & Donovan, 2002; Spanier & Allison, 2001; Sharma et al., 2005; Wilcox et al., 2000). However, fewer investigations have examined the collective influence of both kinds of resources in shaping LTPA among our growing older adult population. Such analyses could yield insights into whether social support, self-efficacy, or both contribute significantly to meeting recommended levels of LTPA among older adults. Given these gaps, the present research sought to address the following research questions.

- (1) What is the level of social support, self-efficacy, leisure time physical activity, and perceived health across a sample of older adults from five cities across the United States?
- (2) What is the relative contribution of age, health, social support, and self-efficacy in shaping the level of leisure time physical activity (LTPA) of older adults?
- (3) Are there significant differences in the levels of perceived health, social support, and self-efficacy reported by older adults who meet

the recommended LTPA guidelines (as determined by the Centers for Disease Control) vs. those who do not meet these guidelines?

Study findings should provide insights into the level and type of social resources and self-efficacy that may be required to overcome social support constraints and stimulate increased LTPA among older adults.

Methods

Study Setting

The data from which this study was derived was part of a larger study that examined the relationship between use of local government park and recreation services (GPRS) and personal health among adults age 50 and over at five cities across the United States. The selection criteria for choosing the study cities were based on city population size, the percentage of the population that consists of ethnic/racial minorities, and climate. Since our objective was to generalize the results as much as possible from studying five cities, we selected one city with a high percentage of ethnic minorities (40% or over), a large population (250,000 or more) and a moderate (non-cold) climate; a second city with a low percentage of ethnic minorities (15% or less), a moderate population and a moderate (non-cold) climate; a third city with a high percentage of ethnic minorities and a small population (under 100,000); a fourth city with a low percentage of ethnic minorities and a small population; and a fifth city was selected specifically because it was a cold climate. Study sites included Minneapolis, Minnesota; Arlington, Virginia; Houston, Texas; San Diego, California; and Peoria, Illinois. Based on the data from this larger study, the current investigation focused on selected concepts from the questionnaire including constructs that measured older adults' age, health, leisure time physical activity, social support from family and friends, and their self-efficacy.

Data Collection

A systematic sampling technique was utilized for approaching every other group or person who appeared to be 50 and over entering the sampling area. While this selection method was non-intrusive, it may have also skewed the data towards older participants. If the contact initially agreed to participate, research assistants continued the interview process. This systematic sampling strategy was used to increase the chance that the sample could be representative of the population (Frankfort-Nachmias & Nachmias, 1996). For the present study, the sample consisted of survey respondents who were 50 years of age and older (e.g., if a respondent reported being under 50 years of age on the mail-back questionnaire, they were eliminated from subsequent analysis).

Data collection was conducted in two phases. First, a pilot study was conducted in Peoria, Illinois from June to August 2002. During this pilot,

data collection procedures were tested and refined. Following the pilot, the survey instrument was slightly revised. However, the data used in this study included only those measures that were identical in both the pilot study questionnaire and the final questionnaire. Data were collected in the other four cities from June to August 2003. Data collection occurred both at public parks and other public places (i.e., supermarkets, shopping centers, malls) where a broad cross section of older adults could be encountered. Sampling occurred three or four days a week during six-hour time intervals, including one weekend day each week. The data collection sites were selected following consultation with each city's park and recreation agency in order to achieve a sample of both park and non-park users and to closely reflect the demographic profile of the area. Criteria used for park and non-park site selection included: ethnic distribution of the community, type of facilities and programs offered, socioeconomic status of users/residents, and location of the facilities. The research staff invited each participant to sit for a free blood pressure check, which was used as a strategy to invite participation in the study. In addition, other incentives, such as free products (e.g., bottled water and snacks) and door prizes (e.g., gift certificates) sponsored by local grocery stores and shopping centers were also utilized to encourage participation. Participants were then given the questionnaire to take home and complete. A postcard reminder was sent out seven days after the questionnaire was distributed. A follow-up phone call was then made to non-respondents 10 days after the postcard was mailed (Dillman, 1983).

Based on this sampling procedure, a total of 5,500 surveys were distributed (1,500 in the Peoria pilot study and 1,000 each of other four sites). Refusal rates were determined by calculating the potential participants who refused to be included in the study either at the point of intercept/invitation or at the point when, asked to take a survey home to complete, they refused. Refusal rates varied from 19.8% (Arlington) to 28.9% (Peoria). A total of 1,900 questionnaires were returned, yielding a 34% response rate (Site response rates ranged between 18% and 49%, depending on the city). Lower response rates were due to over-sampling efforts in lower income and racially diverse neighborhoods where the likelihood of non-response was higher than general population surveys. While the initial contacts were more consistent with the neighborhood characteristics, the responses from the mail return survey were skewed to more educated individuals.

Measures

Self-efficacy. Self-efficacy was measured by the physical self-efficacy scale (Ryckmann, Robbins, Thorton, & Cantrell, 1982). Respondents indicated the degree to which they agreed with 21 statements about their physical self-efficacy on a 6-point Likert scale with responses of 1 = "strongly disagree" to 6 = "strongly agree." This self-efficacy scale included two sub-domains, Perceived Physical Ability (SE-PPA) and Physical Self-presentation Confidence (SE-PPSC). Examples of statements referring to SE-PPA include "My

physique is rather strong" and "I can run fast." Examples of SE-PSPC include "I am embarrassed about my voice" and "I sometimes hold up well under stress." A composite score was calculated by summing answers for each subscale. This scale has been used extensively in physical activity and exercise behavior research (McAuley, Blissmer, Katula, Duncan & Mihalko, 2000; McAuley, Katula, Mihalko, Blissmer, Duncan, Pena, 1999; Rishel, 2001; Williams & Cash, 2000) and has demonstrated satisfactory internal consistencies (Ryckmann et al., 1982).

Social support. Social support was measured with the social support for exercise behaviors scale (Sallis, Grossman, Pinski, Patterson, & Nader, 1987). Participants were asked to rate 12 support questions on a 6-point Likert scale (1 = "none" to 5 = "very often," and 6 = "does not apply") for both family and friends. To aid in interpreting the influence of social support, the item "does not apply" was treated as missing data in the present study (represents 8.1% of the total sample). In this social support scale, "family" referred to anyone living in the household, and "friends" included acquaintances and co-workers. Examples of questions included during the past month, how often has your family and/or friends "exercised with you?," "given you encouragement to stick with your exercise program?," and "changed their schedule so you can exercise together?" Various types of social support; instrumental, informational, emotional, and appraisal are incorporated into the overall measure. Sallis et al. reported that both reliability ($r = .77-.79$) and internal consistency ($\alpha = .84-.91$) were moderately high in their study of perceived social support specific to health-related exercise behaviors.

Social demographics and perceived health. The respondents' demographic information collected in the larger study included age, gender, educational attainment (grades 7-12, high school graduate, vocational/technical school, associates degree, bachelor's degree, graduate degree), and marital status (married, widow, divorced, single). These descriptive data are presented in the results section to allow the reader to understand the profile of the sample. Three of these measures, perceived physical health, perceived mental health, and age also served as independent variables in the ANCOVA and multiple regression analyses.

The respondents' health risk factors were measured by questions associated with self-rated health and health-protective behaviors. Perceived physical health and perceived mental health were derived from sub-scales of the Rand Medical Outcomes Study Health Survey (MOS SF-20). Past use of the SF-20 indicates that it has a moderately high reliability ranging from .81 to .87 for the physical and mental health scales in older adult and general population studies (McDowell & Newell, 1996). In regard to perceived physical health, respondents were asked to describe the extent to which the following four statements were true: (a) "I am somewhat ill," (b) "I am as healthy as anybody I know," (c) "my health is excellent," (d) and "I have been feeling bad lately." Responses were coded on a five-point scale in which 1 = definitely true and 5 = definitely false. Following the procedures outlined by the scoring manual, we converted this five-point scale into a 100

point scale where 1 = poorest health, and 100 = best health. A mean score was then calculated from the four-item scale. Reliability analysis yielded an acceptable Chronbach's alpha score of .89. Perceived mental health was measured with a ten-item scale. Participants were asked to respond to ten situations. For example, they were asked, "how much of the time during the past month: (a) has your health limited your social activities (like visiting with friends or close relatives)? and (b) have you been a very nervous person?" Responses were coded on a six-point scale in which 0 = all of the time, 1 = most of the time, 2 = a good bit of the time, 3 = some of the time, 4 = a little of the time, and 5 = none of the time. Again, following the published protocol (McDowell & Newell, 1996), this scale was also recoded into intervals of 20 (from 0-100) where 0 = 1, 2 = 20, 3 = 40, 4 = 60, 5 = 80 and 6 = 100. A composite score was then computed by averaging the six individual items. The Chronbach's alpha for this scale was moderately high at .92.

Leisure time physical activity. The dependent variable of Leisure Time Physical Activity (LTPA) was calculated based on total METS values (metabolic equivalents) from reported leisure activities reported by study participants. METS represent the energy expenditure whereas 1 MET is associated with energy expended at rest. Participants were asked to list up to 6 leisure time physical activities in which they participated in regularly along with the frequency per week of participation. Each of the six individual leisure activities was assigned a MET level according to the compendium of physical activities by Ainsworth et al., 2000 (i.e., if one reported square dancing it was given a value of 4.5 METS, gardening was 4 METS, general walking was 3.5 METS, playing bridge as 1.5 METS). If there was no specified intensity, then the general level of that activity was assigned (i.e., general walking as 3.5 METS). Then a total of METS for all reported leisure activities was calculated representing the total LTPA level of activity. In addition, calculations were completed to determine if the individual was meeting the CDC recommended level of daily physical activity by examining both the MET level and the frequency of the activity. Both the MET levels and frequencies of reported leisure activity for each individual were then examined. Those who participated in activities of a minimum of 3 METS (at least moderate level of activity) for a minimum of five days were categorized as meeting the CDC recommended level of physical activity (Pate et al., 1995). Those who participated in activities less than 3 METS and/or in moderate-vigorous activities (>3 METS) for less than 5 days per week were classified as not meeting the CDC recommendations.

Analyses

Frequencies and descriptives were used to determine participant characteristics (e.g., age, perceived physical and mental health, social support, self-efficacy, and LTPA). Correlation analysis was completed to examine the relationships between the independent variables. Regression analysis was used to determine the significance and relative strength of age, health, social

support, and self-efficacy dimensions in predicting LTPA. Finally, Analysis of Co-Variance (ANCOVA) was used to examine health, social support, and self-efficacy differences based on meeting or not meeting CDC recommended levels of physical activity. The covariates in this analysis included age and physical health as previous research indicates age and health impact leisure time physical activity (CDC, 2004).

Results

Descriptive Findings

The mean age of the sample was 67.7 years old; 61.5% were females and 38.5% were males. Most participants were White (89.2%), over one-half of them were married (59.1%), and 18.5% were widowed. About one-fifth (29.9%) of the participants were high school graduates or less, and about half earned a bachelor's degree or higher (50.4%). The demographic profile of the sample was skewed toward White, educated female individuals compared to that of the population for those cities surveyed. Specifically, the United States population is 75.1% White and 47.7% are high school graduates or less. In comparing our data collected at each specific site with census demographics of the cities, the data under-represents the Hispanic population found in San Diego (26.8% compared to our 4.8%) and Houston (32% compared to our 13.7%) and the Black populations in Minneapolis (18% compared to our 11.9%), Peoria (26% compared to our 2%), and Arlington (10.3% compared to our 2.6%). Similarly, we had a sample from each site that was slightly higher educated than the census data reports. In examining the percentages of the population having a high school degree or less, our sample under represented those at a lower education level, Arlington (23.9% compared to our 9.1%), Houston (45.4% compared to our 22%), Peoria (36.7% compared to our 29.3%), and San Diego (34.2% compared to our 19.4%). The Minneapolis sample, however, was more representative of the education level of the population (27% compared to our 29.8%).

With respect to health, about one-third of respondents (31.5%, $n = 588$) rated their health as good (Table 1). The average perceived physical health

TABLE 1
Means and Standard Deviations of Study Constructs

Variable	Mean	SD
Age (years)	67.71	6.86
Physical health	76.65	20.50
Mental health	74.30	13.50
Self-efficacy—Perceived Physical Ability	35.49	11.26
Self-efficacy—Perceived Self Presentation Confidence	44.17	12.17
Family social support	2.38	1.08
Friend social support	2.17	1.03
LTPA (METS)	9.80	6.86

score was 76.65 ($SD = \pm 20.50$) on a scale of 0-100 and the average perceived mental health score was 74.30 ($SD = \pm 13.50$) on a scale of 0-100. Compared to published norms, the mean physical health score was higher than the published norm while the mental health scores were the same as the published norms (Ware, Snow, Kosinski, & Gandek, 1993). The mean self-efficacy construct of perceived physical ability (PPA) was 35.49 ($SD = \pm 11.26$) and mean self-efficacy construct of perceived self-presentation confidence (PSPC) was 44.17 ($SD = \pm 12.17$). In terms of social support received from family members, the average value was 2.38 ($SD = \pm 1.08$) meaning that family members provided support for exercise between rarely and a few times. Social support from friends was reported as a mean score of 2.17 ($SD = \pm 1.02$) meaning that most felt friends rarely provided social support. The average daily total METS was 9.80. Approximately 54.3% of the sample met the CDC recommended levels of physical activity participation.

Correlations between the independent variables were completed as a check for multi-collinearity. The multicollinearity statistics were at recommended thresholds. The variance inflation factor (VIF) statistics ranged between 1.05 and 1.84 (Table 3). Based on these initial results, the authors decided to maintain the initial survey measures as independent predictors in the subsequent regression analyses.

Preliminary analyses of the data through scatter plots allowed the assumption of normality. Multiple regression analyses (simultaneous entry procedure) were conducted to determine how social support, self-efficacy, health and age explained the variance in participation in physically active recreation (Leisure Time Physical Activity). This analysis revealed that the overall model was significantly related physically active recreation participation ($R^2_{adj} = .160$, $F(7, 1219) = 34.53$, $p < .0001$). While significant, this model only accounted for about 16% of the variation in physically active recreation participation suggesting model under-specification. Indeed, there are likely other demographic factors (i.e. gender, education, income), psycho-social

TABLE 2
Correlation Matrix of the Independent Constructs (and their Sub-Domains)

Variable	1.	2.	3.	4.	5.	6.	7.	8.
1. Age (years)	1							
2. Physical health	-.07**	1						
3. Mental health	.05*	.64**	1					
4. Self-efficacy—Perceived Physical Ability	-.19**	.37**	.34**	1				
5. Self-efficacy—Perceived Self Presentation Confidence	-.14**	.26**	.24**	.78**	1			
6. Family social support	-.14**	.15**	.19**	.20**	.11**	1		
7. Friends social support	-.06*	.16**	.16**	.19**	.12**	.44**	1	
8. LTPA (METS)	-.29**	.22**	.16**	.31**	.24**	.19**	.20**	1

* $p < 0.05$. ** $p < 0.001$.

predictors (i.e. self-esteem), and environmental characteristics (i.e. distance to facilities) that should be considered in future analyses. Nevertheless, the analyses did reveal which of the social support and self-efficacy sub-domains were more robust in shaping LTPA. Beta weights indicated that physical health, age, the self-efficacy domain of perceived physical ability (SE-PPA), and social support provided by friends and family significantly contributed to the model. Of these variables, SE-PPA and social support provided by friends were the strongest predictors with Beta weights of .124 and .113, respectively. Age was the highest negative predictor of physical activity having a Beta weight of $-.266$. A summary of the model along with regression coefficients is presented in Table 3.

Differences between Those Who Meet CDC Physical Activity Recommendations and Those Who Do Not

Analysis of Covariance (ANCOVA) was used to examine the group differences between older adults who met/did not meet CDC recommendations in regards to perceived health, self-efficacy, and social support. Table 4 presents the means and adjusted (covaried) means. The ANCOVAs were the health ($p < 0.001$), self-efficacy ($p < 0.0001$), and social support constructs ($p < 0.01$). Individuals who met or exceeded the CDC recommendations of moderate to vigorous leisure time physical activity at least 5 days/week, reported significantly higher levels of perceived mental and physical health, self-efficacy, and friend and family social support compared to those who did not meet the guidelines in terms of physical activity participation. Partial eta squared was used to calculate the variance in the dependent variable explained by each independent variable, adjusting for the effects of the other independent variables. Although the effect sizes were relatively small, they did reveal that activity level (i.e., meeting or not meeting CDC requirements) explained more variance in the sub-domain of SE-PPA than SE-PPSPC.

Discussion

The principle aim of the study was to document and examine the collective contribution of social support and self-efficacy in relationship to leisure time physical activity among older adults. Respondents from the five cities reported relatively similar levels of social support and self-efficacy compared with prior epidemiological research (Sallis et al., 1987). Not surprisingly, given that some respondents were surveyed in park environments, perceived mental and physical health was slightly higher than previous general population surveys (Ware et al., 1993). Nevertheless, relationships between psycho-social variables and socio-demographic characteristics were consistent with a number of prior investigations in the public health and leisure studies disciplines (Dishman & Sallis, 1994; Wilcox et al., 2000).

When examining two of the psychological determinants of physical activity (e.g. social support and self-efficacy), we found modest relationships.

TABLE 3
Regression Analysis: Leisure Time Physical Activity Regressed Against Social Support, Self-Efficacy, Health, and Age

Variable	Beta	Adj Beta	<i>t</i>	<i>p</i>	Bivariate <i>r</i>	Partial <i>r</i>	VIF
Physical Health	.035	.109	3.096	.002	.219	.088	1.806
Mental Health	.008	.016	.438	.662	.167	.013	1.836
Self Efficacy—Perceived Physical Ability	.087	.124	3.600	<.0001	.265	.103	1.723
Self Efficacy—Perceived Self-Presentation Confidence	.010	.024	.414	.679	.171	.012	1.509
Family Social Support	.437	.072	2.436	<.05	.204	.070	1.292
Friend Social Support	.717	.113	3.816	<.0001	.215	.109	1.272
Age	-.150	-.226	-8.305	<.0001	-.288	-.231	1.085

$$R^2_{adj} = .160, F(7, 1219) = 34.53, p < .0001$$

TABLE 4
A Comparison of Health, Age, Self-Efficacy, and Social Support among Those Older Adults Meeting CDC LTPA Guidelines Compared to Those Who Did Not Meet These Guidelines

Variable	Group	Unadjusted Mean	Adjusted Mean	<i>F(df)</i>	Sig	Partial Eta ²
Perceived Mental Health	Recommended level	76.06	76.18 ^a	21.89 (1,1461)	$p < 0.0001$.02
	Below recommended level	73.05	72.92 ^a			
Perceived Physical Health	Recommended level	79.91	^b	23.56 (1,1412)	$p < 0.0001$.02
	Below recommended level	74.46	^b			
Self-efficacy—Perceived Physical Ability	Recommended level	38.24	38.08 ^a	30.22 (1,1475)	$p < 0.0001$.02
	Below recommended level	35.08	36.27 ^a			
Self-efficacy—Perceived Self Presentation Confidence	Recommended level	46.31	46.19 ^a	5.27 (1,1475)	$p < 0.05$.004
	Below recommended level	44.86	45.00 ^a			
Family Social Support	Recommended level	2.51	2.50 ^a	10.51 (1,1239)	$p < 0.001$.01
	Below recommended level	2.28	2.30 ^a			
Friend Social Support	Recommended level	2.28	2.27 ^a	8.85 (1,1292)	$p < 0.01$.01
	Below recommended level	2.09	2.10 ^a			

^aadjusted for covariate of age.

^bcovariate not significant.

As expected, age (a control variable) was also a significant predictor of physical activity. This is consistent with previous literature that shows that, as age increases, there is a decline in LTPA (CDC, 2004). In the exercise and physical activity literature, social support from both friends and family has been shown to be significant predictors of physical activity in adult populations (Bopp, Wilcox, Oberrecht, Kammermann, & McElmurray, 2004; Stahl et al., 2001). In addition, there has been evidence of the impact of self-efficacy on LTPA (Duncan & Mummery, 2005; Sharma et al., 2005). Consistent with prior research, both age and perceived physical health contributed significantly to LTPA (Plotnikoff, Mayhew, Birkett, Loucaides, & Fodor, 2004).

Given that the self-efficacy domain of PPA was significantly related to LTPA, strategies should be identified to help older adults increase their physical self-efficacy, which in turn may increase physical activity participation. These strategies can be used by leisure service organizations target the various sources of efficacy; mastery experience, vicarious experiences, and verbal persuasion (Bandura, 1977). For example, as people are exposed to and are successful at a task, they will likely have a heightened sense of self-efficacy for that task. If an older adult is exposed to an enjoyable leisure activity setting or program *and* he is with the company of supportive friends, he will likely be more efficacious participating in that activity than someone who never has done so in the past or who has no-one with whom to do those activities. Vicarious experiences can be enhanced by observations of others' actions in an event and result in the idea that "if he can do it, so can I." For example, if an older adult observes someone else of similar age, race, and body type successfully walking along a park trail (either in person or in a promotional brochure), then the individual will likely be more efficacious in his ability to complete a half-mile trail walk.

Finally, verbal persuasion can be enhanced by verbal encouragement from someone else (i.e., friends). It can be accomplished through a strong social support system in which friends or family members encourage the individual to continue in their leisure time physical activity participation. Further support could be provided if the friends or family members set time aside to actually engage in the activity with the individual. Leisure service programmers should consider these prompts to encourage program attendance and leisure activity adherence among older adults.

Since occasional support from family and friends played a significant role in affecting older adults' physical activity participation, it is logical to reason that increases in social support will further increase the frequency of LTPA among older adults, especially as they age. Ways to create and promote social support that increase older adults' use of local park and recreation services for LTPA, therefore, should be considered and institutionalized in the older adult environmental planning and programming mix. For example, local communities and park and recreation agencies can seek to increase family support and joint participation in park and recreation use by older adults through public service announcements, television and print advertisements. Appeals should be made to families to encourage and support those

they care about to use parks for physical activity and to help them accomplish that goal. In addition, park and recreation agencies can offer couple or partner programs at reduced rates, provide ways for multi-generations (i.e. grandparents and grandchildren) to participate in physically active recreation through programs, and promote special events (e.g. jazz along park trails, art in the park) that may bring together older adults and their friends via common cultural interests and hence possibly providing a means for those to develop social support.

Various types of social support can also be created or enhanced via positive approaches. Sallis and colleagues (1998) proposed a variety of environmental and policy interventions to promote physical activity that have implications for local park use and leisure participation. Increasing funding to develop facilities and programs used for exercise purposes is an example. More specifically, local park and recreation agencies could provide interventions, such as provision of evidence based programs and activities and the creation of walking trails specifically for older adults. These initiatives can encourage and facilitate their participation in physically active recreation in order to make connections among older adults. Other interventions could also be provided to encourage physically active leisure participation for older adults in both park settings as well as at specific recreation facilities. These may include Senior Olympics, dance lessons, various team games, and field trips.

Study Limitations and Future Research Directions

Although this study uncovered several significant findings and provided an assessment of both social support and self-efficacy, there are inherent study limitations for the reader to consider when interpreting results. First, our sample was somewhat limited in regards to the ratio of non-park users to park users who were surveyed during the summer months. There were more users of the parks than non-users in this sample, despite efforts to obtain non-participants at local malls and grocery stores. In addition, there may be some non-response bias in this study. Refusal rates varied across study sites (between 19.8% and 29.8%) and those who refused may have different characteristics than those included in the study.

The overall study was designed as a cross-sectional national survey and, thus, it is difficult to establish a cause and effect relationship. In this case either direction is possible. It may be that increases in self-efficacy and social support may lead to increases in LTPA. In contrast, it is possible that increased participation in LTPA in specific programs can lead to the development of a new social support network and enhanced self-efficacy.

In the future, longitudinal studies can add to the body of knowledge. Such studies, which examine the changes in self-efficacy and social support over time in older adults and how those changes affect their use of local parks and recreation may provide additional insight. In addition, future studies of LTPA could incorporate objective measures of activity (i.e. accelerometers). The present study provides important data suggesting that social

support and self-efficacy are salient factors in correlating with older adults' level of leisure time physical activity. More importantly, these constructs are key distinguishing psycho-social characteristics between older adults who meet the recommended guidelines for physical activity and those who do not. Future research should extend our analyses by assessing the role of structural resources (such as proximity, access, and quality of leisure activity environments) along with these intra and inter-personal resources in their relationship to LTPA. As the nation's older adult population continues to expand, a better understanding of how intra-personal, inter-personal, and structural resources relate to age-appropriate leisure-time physical activity is warranted.

References

- Ainsworth, B., Haskell, W., Whitt, M., Irwin, M., Swartz, A., Strah, S., O'Brien, W., Bassett, D., Schmitz, K., Emplaincourt, P., Jacobs, D., & Leon, A. (2000). Compendium of physical activities: an update of activity codes and MET intensities. *Medicine and Science in Sports and Exercise*, 33(9), S498-S516.
- Alexandris, K., Barkoukis, V., Tsozbatzoudis, H., & Grouios, G. (2003). A study of perceived constraints on a community-based physical activity program for the elderly in Greece. *Journal of Aging and Physical Activity*, 11, 305-318.
- Arnold, M. L. & Shinen, K. J. (1998). The role of gender, race and income on park use constraints. *Journal of Park and Recreation Administration*, 16, 39-56.
- Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavior change. *Psychological Review*, 84, 191-215.
- Berkman, L. (1995). The role of social relations in health promotion. *Psychosomatic Medicine*, 57, 245-254.
- Bialeschki, M. & Henderson, K. (1988). Constraints to trail use. *Journal of Park and Recreation Administration*, 6, 20-28.
- Blair, S., Kohl, H., Barlow, C., Paffenbarger, R., Gibbons, L., & Macera, C. (1995). Changes in physical fitness and all-cause mortality: a prospective study of healthy and unhealthy men. *Journal of American Medical Association*, 273, 1093-1098.
- Booth, M., Bauman, A., & Owen, N. (2002). Perceived barriers to physical activity among older Australians. *Journal of Aging and Physical Activity*, 10, 271-280.
- Bopp, M., Wilcox, S., Oberrecht, L., Kammermann, S., & McElmurray, C. (2004). Correlates of strength training in older rural African American and Caucasian women. *Women and Health*, 40(1), 1-20.
- Buchanan, T. & Allen, L. (1983). *Barriers to participation among the urban elderly*. Paper presented at the 1983 Society of Park and Recreation Educators Leisure Research Symposium, Kansas City, MO.
- Caplan, G., Robinson, E. A. R., French, J. R. P., Caldwell, J. R., & Shinn, M. (1976). *Adhering to medical regimens*. Ann Arbor, MI: Institute for Social Research.
- Centers for Disease Control and Prevention (CDC). (2004). Prevalence of no leisure-time physical activity—35 states and the District of Columbia, 1988-2002. *MMWR Morbidity and mortality weekly report*, 53(4), 82-86.
- Centers for Disease Control and Prevention. (2005). *Behavioral Risk Factor Surveillance System*. Retrieved on August 1, 2005 from: <http://www.cdc.gov/brfss/>.
- Clark, D. O. (1999). Identifying psychological, physiological, and environmental barriers and facilitators to exercise among older low income adults. *Journal of Clinical Geropsychology*, 5, 51-62.

- Conn, V. S. (1998). Older adults and exercise: Path analysis of self-efficacy related constructs. *Nursing Research, 4*, 180-189.
- Crawford, D. W., Jackson, E. L., & Godbey, G. (1991). A hierarchical model of leisure constraints. *Leisure Sciences, 13*, 309-320.
- De Bourdeauhuij, I. & Sallis, J. (2002). Relative contribution of psychosocial variables to the explanation of physical activity in three population-based adult samples. *Preventive Medicine: An International Journal Devoted to Practice and Theory, 34*, 279-288.
- Dillman, D. (1983). Mail and other self-administered questionnaires. In P. H. Rossi, J. D. Wright & A. B. Anderson (Eds.). *Handbook of Survey Research* (pp. 359-377), New York: Academic Press.
- Dishman, R. K., & Sallis, J. F. (1994). Determinants and interventions of physical activity and exercise. In C. Bouchard, R. J. Shephard, & T. Stevens (Eds.). *Physical activity, fitness, and health: International proceedings and consensus statement* (Vol. 1, pp. 214-238). Champaign, IL: Human Kinetics.
- Duncan, T., & McAuley, E. (1993). Social support and efficacy cognitions in exercise adherence: a latent growth curve analysis. *Journal of Behavioral Medicine, 16*, 199-218.
- Duncan, T. & Mummery, K. (2005). Psychosocial and environmental factors associated with physical among city dwellers in regional Queensland. *Preventive Medicine: An International Journal Devoted to Practice and Theory, 40*, 363-372.
- Ewart, C. K., Taylor, C. B., Reese, L. B., & DeBusk, R. F. (1983). Effects of early postmyocardial infarction exercise testing on self-perception and subsequent physical activity. *American Journal of Cardiology, 51*, 1076-1080.
- Frankfort-Nachmias, C., & Nachmias, D. (1996). *Research methods in the social sciences* (5th ed.). New York: St. Martin's Press.
- Garcia, A. W., & King, A. C. (1991). Predicting long-term adherence to aerobic exercise: a comparison of two models. *Journal of Sport and Exercise Psychology, 13*, 394-410.
- Giles-Corti, B., & Donovan, R. J. (2002). The relative influence of individual, social and physical environment determinants of physical activity. *Social Science & Medicine, 54*, 1793-1812.
- Godbey, G., Caldwell, L., Floyd, M., & Payne, L. (2005). Implications from leisure studies and recreation and park management research for active living. *American Journal of Preventive Medicine, 28*(2S2), 150-158.
- Himes, C. L. (2001). Elderly Americans. *Population Bulletin, 56*(4). Washington, DC: Population Reference Bureau.
- House, J. S. (1981). *Work stress and social support*. Reading, MA: Addison-Wesley.
- Hull, R. B., & Michael, S. E. (1995). Nature-based recreation, mood change, and stress restoration. *Leisure Sciences, 17*, 1-14.
- Jackson, E. L. (1983). Activity-specific barriers to recreation participation. *Leisure Sciences, 6*, 47-60.
- Jackson, E. L. (1988). Leisure constraints: A survey of past research. *Leisure Sciences, 10*, 203-215.
- Jackson, E. L. (1994). Activity-specific constraints on leisure. *Journal of Park and Recreation Administration, 12*, 33-49.
- Jackson, E. L. (2000). Will research on leisure constraints still be relevant in the 21st Century? *Journal of Leisure Research, 32*, 62-68.
- Jackson, E. L. (2005). Leisure constraints research: Overview of a developing theme in leisure studies. In E. L. Jackson (Ed), *Constraints to Leisure* (pp. 3-19). State College, PA: Venture Publishing, Inc.
- Jensen, K., Banwart, L., Vehaus, R., Popkess-Vawter, S., & Perkins, S. (1993). Advanced rehabilitating nursing care of coronary angioplasty patients using self-efficacy theory. *Journal of Advanced Nursing, 18*, 926-931.

- Kaplan, R. M., Atkins, C. J., Timms, R. M., Reinsch, S., & Lofback, K. (1984). Behavioral exercise programs in the management of chronic obstructive pulmonary disease. *Journal of Consulting and Clinical Psychology*, 52, 591-603.
- Kavanagh, D. J., Gooley, S., & Wilson, P. H. (1993). Prediction of adherence and control in diabetes. *Journal of Behavioral Medicine*, 16, 509-522.
- Kerstetter, D. L., Zinn, H. C., Graefe, A. R., & Chen, P. (2002). Perceived constraints to state park visitation: A comparison of former users and non-users. *Journal of Park and Recreation Administration*, 20, 39-56.
- Kingson, E. R., & Williamson, J. B. (2001). Economic security policies. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (pp. 369-386). Academic Press.
- Mannell, R. C., & Loucks-Atkinson, A. (2005). Why don't people do what's "good" for them? Cross fertilization among the psychologies of nonparticipation in leisure, health, and exercise behaviors. In E. L. Jackson (Ed), *Constraints to Leisure* (pp. 221-232). State College, PA: Venture Publishing Inc.
- McAuley, E. (1993). Self-efficacy and the maintenance of exercise participation in older adults. *Journal of Behavioral Medicine*, 16, 103-113.
- McAuley, E., Blissmer, B., Katula, J., Duncan, T., & Mihalko, S. (2000). Physical activity, self-esteem, & self-efficacy relationships in older adults: a randomized control trial. *Annals of Behavioral Medicine*, 22, 131-139.
- McAuley, E., Courneya, K. S., & Lettunich, J. (1991). Effects of acute and long-term exercise on self-efficacy responses in sedentary, middle-aged males and females. *The Gerontologist*, 31, 534-542.
- McAuley, E., & Jacobson, L. (1991). Self-efficacy and exercise participation in sedentary adult females. *American Journal of Health Promotion*, 5, 185-191.
- McAuley, E., Jerome, G., Elavsky, S., Marquez, D., & Ramsey, S. (2003). Predicting long-term maintenance of physical activity in older adults. *Preventive Medicine*, 37, 110-118.
- McAuley, E., Katula, J., Mihalko, S. L., Blissmer, B., Duncan, T. E., & Pena, M. (1999). Mode of physical activity and self-efficacy in older adults: A latent growth curve analysis. *Journals of Gerontology: Series B: Psychological Sciences and Social Sciences*, 54B, 283-292.
- McAuley, E., & Rudolph, D. (1995). Physical activity, aging, and psychological well-being. *Journal of Aging and Physical Activity*, 3, 67-96.
- McCarville, R. E., & Smale, B. J. A. (1993). Perceived constraints to leisure participation within five activity domains. *Journal of Park and Recreation Administration*, 11(2), 31-40.
- McDowell, I., & Newell, C. (1996). *Measuring health: A guide to rating scales and questionnaires* (2nd ed.). London: Oxford University Press.
- Mowen, A., Payne, L., & Scott, D. (2005). Change and Stability in Leisure Constraints Revisited: A 10-Year Comparison of Perceived Park Use Constraints and Desired Constraint Reduction Strategies. *Leisure Sciences*, 27, 191-204.
- O'Brien Cousins, S. (1995). Social support for exercise among elderly women in Canada. *Health Promotion International*, 10, 273-282.
- Oka, R. K., King, A. C., & Young, D. R. (1995). Sources of social support as predictors of exercise adherence in women and men ages 50 to 65 years. *Women's Health: Research on Gender, Behavior, and Policy*, 1, 161-175.
- Oldridge, N. B. & Rogowski, B. L. (1990). Self-efficacy and in-patient cardiac rehabilitation. *American Journal of Cardiology*, 66, 362-365.
- Orsega-Smith, E., Mowen, A. J., Payne, L. L., & Godbey, G. (2004). The interaction of stress and park use on psycho-physiological health in older adults. *Journal of Leisure Research*, 36, 232-256.
- Orsega-Smith, E., Payne, L., & Godbey, G. (2003). Physical and psychosocial characteristics of older adults who participate in a community-based exercise program. *Journal of Aging and Physical Activity*, 11, 516-531.

- Pate, R., Pratt, M., Blair, S., Haskell, W., Macera, C., Bouchard, C., et al. (1995). Physical activity and public health: recommendation from the Centres for Disease Control and Prevention and the American College of Sports Medicine. *JAMA*, 273, 402-407.
- Penedo, F., & Dahn, J. (2005). Exercise and well-being: A review of mental and physical health benefits associated with physical activity. *Current Opinion in Psychiatry*, 18, 189-193.
- Plotnikoff, R., Mathew, A., Birkett, N., Loucaides, C. & Fodor, G. (2004). Age, gender, and urban-rural differences in the correlates of physical activity. *Preventive Medicine*, 39, 1115-1125.
- Raymore, L. (2002). Facilitators to Leisure. *Journal of Leisure Research*, 34, 37-51.
- Raymore, L., & Scott, D. (1998). The characteristics and activities of older visitors to a metropolitan park district. *Journal of Park and Recreation Administration*, 16(4), 1-21.
- Rejeski, W. J., Craven, T., McFarlane, M., & Shumaker, S. (1996). Self-efficacy and pain in disability with osteoarthritis of the knee. *Journal of Gerontology Series B: Psychological Sciences and Social Sciences*, 51, 24-29.
- Ryckman, R., Robbins, M., Thorton, B., & Cantrell, P. (1982). Development and validation of a physical self-efficacy scale. *Journal of Personality and Social Psychology*, 42, 891-900.
- Sallis, J. F., Grossman, R. M., Pinski, R. B., Patterson, T. L., & Nader, P. R. (1987). The development of scales to measure social support for diet and exercise behaviors. *Preventive Medicine*, 16, 825-836.
- Sallis, J. F., Haskell, W. L., Fortman, S. P., Vranizan, K. M., Taylor, C. B., & Solomon, D. S. (1986). Predictors of adoption and maintenance of physical activity in a community sample. *Preventive Medicine*, 15, 331-41.
- Sallis, J. F., Hovell, M. F., Hofstetter, C. R., Faucher, P., Elder, J., Blanchard, J., et al. (1989). A multivariate study of determinants of vigorous exercise in a community sample. *Preventive Medicine*, 18, 20-34.
- Schutzer, K. & Graves, S. (2004). Barriers and motivators to exercise in older adults. *Preventive Medicine*, 39, 1056-1061.
- Scott, D. & Jackson, E. (1996). Factors that limit and strategies that might encourage people's use of public parks. *Journal of Park and Recreation Administration*, 14, 1-17.
- Scott, D. & Munson, W. (1994). Perceived constraints to park usage among individuals with low incomes. *Journal of Park and Recreation Administration*, 12, 52-69.
- Searle, M. S. & Jackson, E. L. (1985). Recreation nonparticipation and barriers to participation: Considerations for the management of recreation delivery systems. *Journal of Park and Recreation Administration*, 3, 23-36.
- Sharma, M., Sargent, L., & Stacy, R. (2005). Predictors of Leisure-time physical activity among African American Women. *American Journal of Health Behavior*, 29(4), 352-359.
- Sheeska, J. D., Woolcott, D. M., & MacKinnon, N. J. (1993). Social and cognitive theory as a framework to explain intentions to practice healthy eating behaviors. *Journal of Applied Social Psychology*, 23, 1547-1573.
- Spanier, P. A., & Allison, K. R. (2001). General social support and physical activity: An analysis of the Ontario health survey. *Canadian Journal of Public Health*, 92, 210-213.
- Stahl, T., Rutten, A., Nutbeam, D., Bauman, A., Kannas, L., Abel, T., Luchen, G., Rodriquez, D., Vinck, J., & van der Zee, J. (2001). The importance of the social environment for physically active lifestyle—results from an international study. *Social Science and Medicine*, 52, 1-10.
- Strain, L. A., & Payne, B. J. (1992). Social networks and patterns of social interaction among ever-single and separated//divorced elderly Canadians. *Canadian Journal on Aging*, 11, 31-53.
- Walker, G. J. & Virden, R. J. (2005). Constraints on outdoor recreation. In E. Jackson (Ed.), *Constraints to Leisure*. (pp. 201-219). State College, PA: Venture.
- Ware, J. E. Jr., Snow, K. K., Kosinski, M., & Gandek, B. (1993). *SF-36 health survey: Manual and interpretation guide*. Boston, MA: The Health Institute, New England Medical Center.

-
- Weinberg, R. S., Hughes H. H., Critelli J. W., England R., & Jackson A. (1984). The effect of preexisting and manipulative self-efficacy on weight loss in a self-control program. *Journal of Research Personality, 18*, 352-358.
- Wilcox, S., Castro, C., King, A. C., Housemann, R., & Brownson, R. C. (2000). Determinants of leisure time physical activity in rural compared with urban older and ethnically diverse women in the United States. *Journal of Epidemiology & Community Health, 54*, 667-672.
- Williams, P. A., & Cash, T. F. (2001). Effects of a circuit weight training program on the body images of college students. *International Journal of Eating Disorders, 30*, 75-82.