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# The Role of Leisure Style in Maintaining the Health of Older Adults with Arthritis

Laura L. Payne
Department of Leisure Studies
University of Illinois, Urbana-Champaign
Andrew J. Mowen
Department of Recreation, Park and Tourism Management
The Pennsylvania State University
Julian Montoro-Rodriguez
School of Family and Consumer Studies
Kent State University

This study explores the role of leisure style in relation to the perceived physical and mental health of older adults with self-reported arthritis. A model of successful aging was used as a conceptual framework to examine the relationship between the type of leisure styles and physical and mental health. Altogether, 464 adults over the age of 50 completed a questionnaire that assessed perceived physical and mental health, health history, pain severity (a proxy for arthritis severity), leisure style, social interaction with friends, and socio-demographics. Results indicated that type of leisure style had a significant role in the relationship between arthritis severity and perceived physical health. The main effect, leisure repertoire size was positively related to perceived physical health. That is, the broader the leisure repertoire, the higher the reported health. In terms of mental health, frequency of social interaction with friends was positively related to perceived mental health. Results are discussed in terms of leisure as a buffer for the negative effects of arthritis on health.

KEYWORDS: *Leisure styles, aging, physical & mental health, arthritis severity.*

## Introduction

The older population has grown rapidly during the twentieth century, and although people are now living longer, the incidence of chronic illness is also rising for this population, threatening individual quality of life, and placing more demands on the health care system. Among the numerous chronic conditions that exist, arthritis is the most prevalent in the United States, affecting over 42 million people at an annual cost of $51.1 billion in direct costs. Almost half of older adults have arthritis, and projections indicate that by 2020, an estimated 60 million people (about 20% of the popu-

Address correspondence to: Laura L. Payne, Department of Leisure Studies, University of Illinois, 104 Huff Hall, 1206 South Fourth Street, Champaign, IL 61820. Phone: (217) 244-7038, Fax: (217) 244-1935. Email: Lpayne@uiuc.edu.

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lation) will have arthritis (Centers for Disease Control and Prevention, 2005). Therefore, understanding the factors that contribute to maintaining the health of older adults with arthritis is critical. Currently, behavioral factors (e.g., nutrition, physical activity) have been emphasized in the study of health/wellness, and are important for numerous reasons. Behavioral factors can contribute to enhanced quality of life, delay or prevent disability, and help contain healthcare costs. Based upon literature supporting the health benefits of leisure engagement, we propose that leisure styles are specific behaviors that older adults can engage in to ameliorate the effects of arthritis on their health and well-being. The concept of successful aging (Baltes & Baltes, 1990; Kahana & Kahana, 1996) suggests that older adults can utilize both cognitive and behavioral factors to optimize their health and adapt/compensate for change brought on by chronic illness in later life. According to Rowe and Kahn (1997), behavioral or lifestyle factors account for at least half of our health status. Thus, despite the common notion that aging is associated with decline, they asserted that older people could modify their behaviors or lifestyles in a way that promotes health and independence, and prevents/delays the deleterious effects of chronic illness and disability.

Leisure activity can be one important behavioral factor with the potential to help optimize the health and well-being of older adults with chronic illness. The growing body of literature on the relationship between leisure engagement and health suggests that leisure can, under certain conditions, contribute to the physical, mental, social and spiritual dimensions of health. Fewer studies, however, have examined the relationship between leisure and health among individuals with arthritis. Previous research has focused on two areas of inquiry: (1) changes in leisure participation (i.e., frequency of participation in various types of activity) associated with arthritis severity, and (2) the relationship between activity types (e.g., social, physical, solitary) and perceived physical health. Although these studies have begun to reveal the role of specific leisure activities in the relationship between arthritis severity and health, there is a need to understand how the general nature or character of one's overall leisure style might shape the relationship between arthritis severity and perceived physical and mental health. The purpose of this study was to investigate the role of leisure style (as measured by type of leisure style, size of leisure repertoire, and social leisure) in the relationship between arthritis severity and perceived physical and mental health. Since individuals with arthritis are the focus of this inquiry, a review of the causes and consequences of arthritis is warranted.

## Literature Review

### *Arthritis and Health*

*Arthritis type.* In general, arthritis is caused by a breakdown of articular cartilage. Articular cartilage is a "specialized material that covers the ends of all bones, facilitates motion, and can withstand a wide range of loading conditions for a lengthy period, even exceeding 80 years" (Gradisar & Porter-

field, 1989, p. 1). There are three types of arthritis: gouty arthritis, rheumatoid arthritis, and osteoarthritis. Gouty arthritis is the least common form of arthritis and is caused by a deposit of urate crystals around the joints that chemically react to degenerate the cartilage. Rheumatoid arthritis is the second most common form of arthritis and is an auto-immune process that is inflammatory in nature and causes a chemical degradation of the articular cartilage. Osteoarthritis is the most widespread form of arthritis and is widely known as "wear and tear" arthritis. Degeneration of the cartilage happens in two ways: fasciculation and fibrillation. Fasciculation is a process whereby cartilage begins to flake off into the joint space. When the full top layer of cartilage is sheared off by fasciculation, then the cartilage is weakened and fibrillation takes place. Fibrillation is the actual cracking of the articular cartilage. Once the cracks become large enough, symptoms of pain and stiffness set in. Eventually, the cartilage loses all elasticity and erodes, causing bone-to-bone contact, which causes swelling, pain, and restricted range of motion. The symptoms of severe degeneration of the cartilage include difficulty in performing activities of daily living (ADL's), depression resulting from restrictions and pain, reduced involvement in familial, work, and social roles, and an overall lowered quality of life (Keefe, Caldwell, Queen, Gil, Martinez, Crisson, et al., 1987; Revenson & Felton, 1989; Zimmer, Hickey, & Searle, 1995).

*Prevalence rates.* Arthritis is the most common chronic disease, affecting 47.6% of people in the 65 to 74 age category (National Center for Health Statistics, 1998). Hypertension affects 34.7% of this age cohort, followed by heart disease (28.1%), and diabetes (10.1%). Moreover, arthritis is the leading cause of disability in America (Morbidity & Mortality Weekly Report, 2001). According to Verbrugge and Jette (1994), the most common chronic conditions are nonfatal and most people have to live and cope with them, rather than die from them. Furthermore, the onset of arthritis causes significant distress due to the involuntary restrictions in one's lifestyle (Georgina, Blalock, DeVellis, DeVellis, Keefe, & Jordan, 1994). Research also suggests that the experience of arthritis operates as both a determinant and an outcome of stress (Huyser & Parker, 1998). In other words, stress can cause flare-ups in arthritis symptoms and arthritis symptom flare-ups can cause stress. Chronic stress associated with arthritis can also escalate into mental illness such as anxiety and/or depression. According to Rhee, Parker, Smarr, Petroski, Johnson, & Hewitt. (2000), pain and depression are significant problems for persons with arthritis.

*Stress and depression.* Depression is the most common functional disorder among older people (Harper, 1994). A significant proportion of individuals with arthritis also report major depression. It is estimated that 17-27% of individuals with arthritis have major depression, compared to 12 to 17% of the general older population. One study by Rhee et al. (2000) reported that 20% of individuals with rheumatoid arthritis have depression. Many events may trigger depression among older adults with arthritis including restrictions in daily activities, disability, and stress. Although the impact of

arthritis on quality of life is significant, many older people with arthritis successfully manage their disease, adapt well, and are able to maintain a sense of well-being. According to the U.S. Bureau of the Census (1998), 70% of older people (i.e., sixty plus) rated their health to be excellent, very good, or good, and only 30% rated their health as average or poor. While surprising, older people generally rate their health relative to others in their own age cohort. Moreover, positive self-reports of health are explained by a sense of pride and accomplishment for surviving to later life, and account for elders' perceptions of satisfaction with life circumstances (e.g., income, social support, etc.) (Johnson & Barer, 1997). Although chronic illness is prevalent among older adults, a number of behavioral strategies may be useful to manage and deal with chronic illness.

*Leisure and Health*

The study of leisure and health has developed significantly over the last 20 years (Payne, 2002). However, to date, most research has been correlational in nature and limited to cross-sectional studies. Thus, our understanding of cause and effect relationships has been limited by research design. Some of the early studies examined the role of leisure in shaping the broader concept of life satisfaction. For example, in her study of life satisfaction among older adults, Cutler Riddick (1985) found that leisure participation mediated the relationship between health status and life satisfaction. Those who reported health problems engaged less frequently in leisure activities. Consequently, their life satisfaction was negatively influenced by the indirect effect of health on leisure participation. A similar study that compared the health and life satisfaction of older African American and Caucasian women indicated that perceived health shaped leisure participation and the extent of active leisure planning (Cutler Riddick & Stewart, 1994). Overall, African American women were less healthy, less active in leisure, and less satisfied with life. These two studies are important because they acknowledge the reciprocal relationship between leisure and health. That is, it is plausible that participation in leisure activities enhances health. However, individuals in better health are also more likely to engage in leisure activities, than those in poor health who experience functional limitations. Since the relationship between leisure and health is complex, it is often difficult to establish cause and effect. Nevertheless, there is growing evidence that engaging in leisure can lead to beneficial physical, emotional, and spiritual health outcomes.

For example, Dupuis and Smale (1995) examined the effect of leisure activity on psychological well-being versus depression. Consistent with the World Health Organization definition of health/well-being, they asserted that health was not merely the absence of disease, but a continuum between poor and good health, where depression would be considered poor health. Their findings suggested that certain types of leisure activities were more strongly related to psychological well-being. Activities such as hobbies and crafts, visiting friends, and swimming were significantly related to higher rat-

ings of psychological well-being. In a similar study, Brown, Frankel, and Fennell (1991) surveyed 759 older adults and found that social, informal (e.g., talk on phone, shop, TV), household and outdoor activities were significantly related to enhanced well-being. Such studies have provided important insight into understanding what kinds of activities are associated with health. However, it is also important to examine the role of leisure activity in the stress coping process. Since the experience of arthritis is often associated with stress and stress-related mental illness, the literature in this area is relevant to the current study.

The role of leisure in stress coping and health has been examined from two perspectives: (1) stress coping as a buffer or moderator (Caltabiano, 1995; Coleman & Iso-Ahola, 1993; Coleman, 1993; Iso-Ahola & Park, 1995), and (2) stress coping as a mediator or process-oriented construct in the relationship between leisure and health (Iwasaki & Mannell, 2000). Caltabiano studied the main and buffering effects of leisure participation on stressful life events, distress, and illness symptoms. She found that outdoor physical activity (i.e., sports) had the strongest positive effect on health, regardless of stressful life events. Hobbies and social leisure were also found to significantly buffer the effect of stressful life events on perceived physical health. Surprisingly, results also indicated an inverse relationship between number of social activities and distress. Here, engaging in many social activities was associated with higher stress levels. However, Coleman & Iso-Ahola (1993) purported that leisure-based social support was important in reducing the impact of stress on health. Coleman (1993) tested this relationship based on a random sample of 104 men and women and found that perceived leisure health benefits were experienced primarily during periods of high stress, and that perceived freedom interacted with stress in its relationship to physical health. Higher perceived leisure freedom was associated with higher levels of physical health, when stress was high, but this relationship was not significant when stress was low. However, Coleman did not find significant associations between social support and physical health.

More recently, Iwasaki and Mannell (2000) suggested that stress coping research has not accounted for the role of leisure in alleviating stress. Using a leisure coping scale, Iwasaki (2002) examined the role of leisure participation and enjoyment on the relationship between stress, perceived health and immediate adaptational outcomes (i.e., perceived effectiveness of and satisfaction with stress coping) among emergency response professionals. He found that leisure travel, social leisure and cultural leisure (e.g., museums, ethnic visual, performing arts) interacted with stress in their impact on immediate adaptational outcomes. When stress levels were high, those who engaged in and enjoyed travel less had poorer immediate adaptational outcomes, whereas those who engaged in leisure more frequently and enjoyed leisure travel more had more favorable perceptions of adaptational outcomes despite high stress levels. The pattern was also consistent between social and cultural leisure. One interesting finding was that physically active leisure did not impact perceived health or adaptational outcomes. Iwasaki emphasized

that a variety of leisure experiences have an impact on stress, and leisure experiences with high levels of physical activity may not always be the most effective strategy for reducing stress. One common denominator of all of these studies is that leisure activities relate to health in different ways, with some activities being associated with better health and others with worse health, depending on the context of the study (e.g., how activities are defined and measured, characteristics of the sample).

While the work of Iwasaki and colleagues is important to understand leisure's role in coping with everyday hassles and normative challenges, Hutchinson, Loy, Kleiber, and Dattilo (2003) argued that, "the nature and extent of leisure's utility in the coping process following a life-altering event (e.g., traumatic injury or onset of chronic disease) is not well understood" (p. 144). Through a qualitative study of individuals with spinal cord injury and chronic disease, they found support for leisure as a stress buffer to cope with immediate issues related to their conditions and they found that leisure aided in the long-term adjustment process of learning to live with a disability. In terms of the buffering effect, they found that leisure served as a distraction and a way to escape from challenges associated with their daily life. Engaging in enjoyable and meaningful leisure activities also helped individuals recovering from a traumatic health event to connect with their past. For example, some subjects talked about how reading helped them feel normal and helped them to think about things from their past before the injury or illness happened. They also found that leisure engagement provided structure, purpose, belonging and acceptance and reported that leisure activities were important to maintaining physical and mental health. In a previous conceptual proposition paper, Kleiber, Hutchison, and Williams (2002) posited that leisure engagement provides an emotional uplift that helps one reappraise his/her situation.

In summary, there is a strong body of literature suggesting that leisure experiences are associated with improved health and well-being. However, there is limited knowledge of how leisure relates to health among individuals with various chronic illnesses. In fact, Coleman and Iso-Ahola (1993) stressed the importance of examining leisure and health among less healthy populations. Furthermore, prior studies have emphasized the role of specific leisure activities, rather than the general character of one's leisure style. Dupuis and Smale (1995) suggested that examining the nature of ones leisure style might provide important insight into the relationship between leisure and health.

### *Leisure Style and Health*

Leisure style has been operationalized in a variety of ways. For the purpose of this study, the breadth of one's leisure repertoire, the nature of one's leisure repertoire and frequency of social interaction with friends were used to operationalize leisure style. These concepts are further described below. The review of the literature on leisure styles indicates that a leisure repertoire

represents the number and types of activities that are a regular part of our every day lifestyle (Mobily, Lemke, & Gisin, 1991; Mobily, Lemke, Ostiguy, Woodard, Griffee, & Pickens, 1993). They asserted that our leisure repertoire encompasses activities that we do often and those we do well. Typically, the number of activities one engages in regularly is indicative of the breadth of one's leisure repertoire. Individuals who develop broad leisure repertoires might adapt better to age related changes in physical function, because they have more activities in their repertoire from which to choose. Previous research by Romsa, Bondy, and Blenman (1985) and Ragheb and Griffith (1982) suggested that the breadth of the leisure repertoire is a more important factor in maximizing well-being in later life than mere frequency of participation in specific activities within a category of leisure such as social activity or physical activity. In his study of leisure satisfaction, Guinn (1995) concluded that there is a positive relationship between leisure repertoire size and life satisfaction among a sample of older adults. Bevil, O'Connor, and Mattoon (1993) found that a wider leisure repertoire produced higher life satisfaction. Those most satisfied with life reported a wide variety of activities regularly participated in, and reported more reasons for doing the activities. Dupuis and Smale (1995) examined leisure repertoire relative to psychological well-being and depression. Results indicated that a broader repertoire was significantly and positively associated with psychological well-being and negatively associated with depression. These results were even more pronounced for adults over the age of 75.

Although size of leisure repertoire has been the focus of some research, it may also be useful to examine the general character of one's leisure style. For example, one's leisure style may be made up of mostly physical, sedentary, or cognitively demanding activities. The tendency to engage in mostly one form (e.g., mostly sedentary, physical, cognitive) of leisure provides a window into one's leisure style. Leisure style has been defined as the "overall patterns of leisure activity engagement and time usage" (Mannell & Kleiber, 1997, p. 59). Few researchers have attempted to examine the nature of one's leisure style. Heintzman and Mannell (2003) operationalized leisure style as having four-dimensions: (1) frequency of participation, (2) leisure motivation (i.e., intellectual, social, competence, stimulus-avoidance), (3) leisure time (i.e., how much time and satisfaction with leisure time), and (4) time pressure (i.e., feelings of being rushed). They examined the role of spiritual functions of leisure (i.e., sacrilization, repression avoidance, sense of place) in mediating the relationship between leisure style and spiritual well-being. People with leisure styles that included greater participation in cultural, outdoor and hobby activities were more likely to experience leisure for its spiritual functions. While early findings indicate support for leisure style having some influence on health, these models need further refinement and testing across a number of populations.

*Arthritis, Leisure and Health*

Despite the literature suggesting that leisure contributes to health, such relationships may be different among older adults with chronic illness. For

example, the onset of arthritis can cause changes in leisure participation that may also impact one's perception of health. A study by Zimmer, Hickey, and Searle (1997) suggested that many individuals with arthritis who are forced to give up leisure activities due to functional limitations are more likely to experience depression. They also noted that, when faced with the functional limitations of arthritis, those who are more adaptable/flexible and can readily substitute other leisure activities are better able to cope with the disease. A study conducted by Smith and Yoshioka (1992) supported Zimmer et al.'s conclusions. They found that individuals with arthritis who adopted a more sedentary leisure style as a result of their illness were more depressed than those who maintained their leisure life style. In a different investigation of activity involvement and well-being, Zimmer et al. (1995) found that adults with arthritis who maintained higher levels (i.e. more frequent interaction) of social leisure were less likely to experience a decline in well-being. They also concluded that social leisure was more important than physical and solitary activities (i.e., listening to music, radio, television) in optimizing the well-being of adults with arthritis.

*Purpose*

Based on the proposition that leisure experiences are valuable coping resources and a viable factor in the process of successful aging, we attempted to investigate the role of leisure (as measured by leisure style, size of leisure repertoire and frequency of social engagement), on the health of older adults with self-reported arthritis. While the literature implies that older adults with arthritis are likely to experience stress resulting from their condition, the current study is only focused on examining the relationship between leisure style and health among a sample of older adults with self-reported arthritis (i.e., osteoarthritis, rheumatoid arthritis). Furthermore, this research is intended to build upon previous research conducted by Zimmer et al. (1995, 1997) on the leisure experiences of individuals with arthritis. A model describing the relationships of interest is presented in Figure 1. In particular, we proposed the following four hypotheses: (1) there is a direct and inverse relationship between arthritis severity and perceived physical and mental health; (2) leisure style moderates the relationship between arthritis severity and perceived physical health; (3) the relationship between arthritis severity and perceived health is moderated by the size of one's leisure repertoire, (4) social leisure moderates the relationship between arthritis severity and perceived health.

## Methods and Procedures

The data for this study were obtained from a larger study that explored the relationship between park use and personal health. Participants completed a 16-page questionnaire that examined park use, general leisure behavior, demographic information, health history, health behavior, and psychosocial characteristics. Since relatively little is known about the effect of

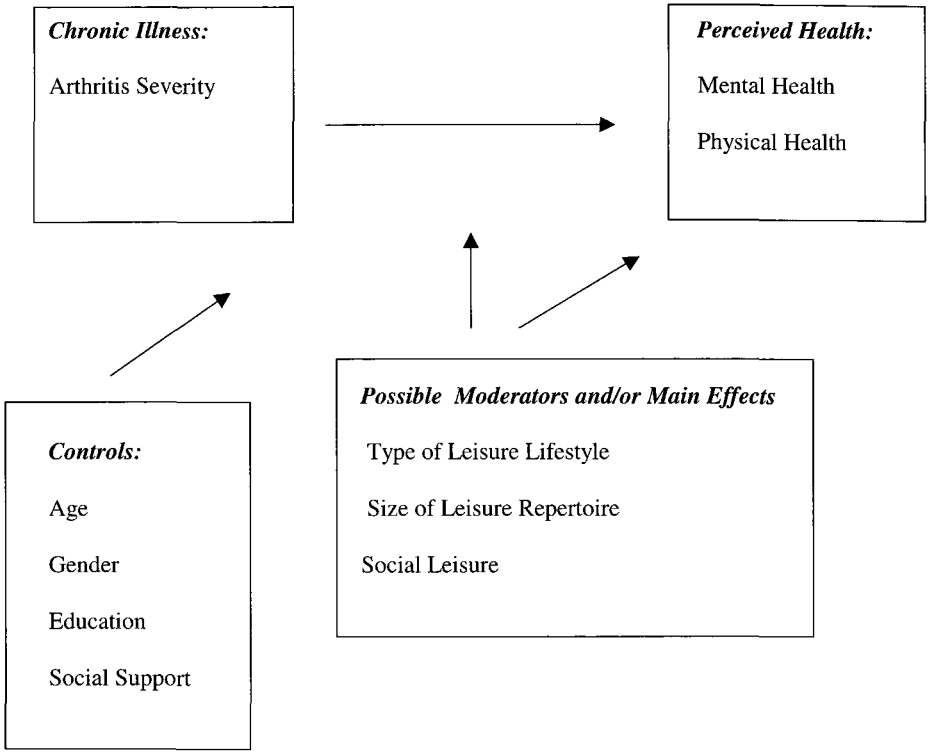


*Figure 1.* Leisure Style and Health Model

leisure style on the health of adults with arthritis, this investigation focused on the 464 respondents, ages 50 to 85, who reported having arthritis (i.e., osteoarthritis or rheumatoid arthritis).

*Procedures*

Trained interviewers distributed questionnaires six to seven days per week for three months in parks, grocery stores, shopping malls, and senior centers in a midwestern city. This was done to achieve a diverse sample of park and non-park users that more closely reflected the demographic profile of the metropolitan area. A total of 3,374 questionnaires were distributed during the data collection period, and 1,515 usable questionnaires were returned, resulting in a 45% response rate. Of those 1,515 usable questionnaires, 464 respondents reported having arthritis. Interviewers approached people who appeared to be 50 or over, asked a filter question to verify their age, and offered them a free blood pressure check and other incentives such as complimentary refreshments, and door prizes (i.e., dinner certificates, zoo & golf passes) to encourage participation. In the senior centers, the ques-

tionnaire was administered to groups of up to 30 people in conjunction with congregate meal programs. Center directors provided time for seniors to complete the entire survey packet on-site, although some took it home and returned it within two weeks to the center director.

*Measures*

There were two dependent variables in this investigation: Perceived physical health and perceived mental health. Both dependent variables used were sub-scales from the Rand Medical Outcomes Study Health Survey (MOS SF-20). Past use of the SF-20 indicated that it has a moderately high reliability ranging from .81 to .87 for the physical and mental health scales in older adults and general population studies (McDowell & Newell, 1996). In the present study, reliability analyses yielded a Chronbach's alpha of 0.78 for the physical health perceptions scale and a 0.75 for the mental health scale. In regard to *perceived physical health,* respondents were asked to describe the extent to which the following four statements were true: (1) "I am somewhat ill," (2) "I am as healthy as anybody I know," (3) "my health is excellent," (4) and "I have been feeling bad lately." Responses were coded on a five-point scale in which 1 = definitely true and 5 = definitely false. In accordance with the procedures outlined by McDowell and Newell, the scale was recoded to a 1 to 100 point scale where 1 = poorest health, and 100 = best health. Mean scores were then calculated for the four item scale. The mean perceived physical health score was 71 and the range was from 1 to 100. The dependent variable *perceived mental health* was measured with a six-item scale. Participants responded to six situations. For example, they were asked, "how much of the time during the past month: (1) has your health limited your social activities (like visiting with friends or close relatives), and (2) 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 to a 1 to 100 point scale. A mean score for each respondent was then calculated. The mean mental health score was 79 and scores ranged from 20 to 100.

The independent variable, arthritis severity, was measured with an ordinally scaled item that assessed pain severity over the last four weeks. Response categories were on a 6-point scale in which 0 = none and 5 = very severe. This measure also was a question within the Rand Medical Outcomes Study SF-20 scale, which is considered a reliable and valid health status instrument (McDowell & Newell, 1996). Moreover, pain severity has been used as a proxy for arthritis severity in past research studies (Zimmer et al., 1995, 1997). All respondents were asked to indicate whether they had a number of conditions such as allergies, arthritis, migraine headaches, diabetes, cardiovascular disease, cancer, high blood pressure, etc. Since the focus of this study was arthritis, researchers removed individuals from the sample who

reported conditions other than arthritis that are generally associated with chronic pain ($N = 270$). The remaining 464 respondents represented individuals with some reported very mild pain (25%), mild pain (31%), followed by moderate pain (27%), severe pain (5.8%), and very severe pain (2%). About 9% of the sample reported no pain at all.

Leisure style was measured with three variables: *social leisure, size of leisure repertoire, and type of leisure style. Social leisure* was chosen because of its known relationship to social support, which may buffer health (Coleman & Iso-Ahola, 1993; Krause, 1990). This variable was measured with a single item that assessed how often, on average, during the last month, respondents had interacted with friends, visited in each other's homes or gone out together. Responses were coded on a 3-point scale where 1 = once per week or more, 2 = one to three times per month, and 3 = less than one time per month. *Size of leisure repertoire* was constructed from the number of leisure activities reported in the general leisure behavior section of the survey packet. In this question, respondents were asked to list up to six leisure activities they enjoy doing regularly. While it is possible that more activities were a part of respondents' repertoires, this question was intended to measure leisure activities respondents engage in regularly that are considered a part of their life style. Based on the literature review and pilot testing of the instrument, it was determined that for this population, listing up to six activities would adequately represent the nature and breadth of their leisure repertoire. The list of activities was reviewed to eliminate any overlapping and non-leisure activities. A sum was calculated for each respondent. The size of leisure repertoire ranged from one to six activities, with a mean size of 4.06 activities. A larger number indicated a broader leisure repertoire. *Type of leisure style* was constructed to describe the nature of respondents' leisure style. Two phases of data reduction were required to construct the "type of leisure lifestyle" variable. First we reviewed the 50 or so leisure activities that were reported. The activities were then discussed among the research team and judgmentally grouped into the six categories (Figure 2). Several faculty and professionals in leisure services critiqued the coding system and modifications were made. Categories included: (1) sedentary, (2) social, (3) hobby, (4) low aerobic, (5) heavy aerobic, and (6) other. Figure 2 displays the placement of the specific activities into one of the six categories.

In the second phase of data reduction, we examined all of the activities that represented each respondent's leisure style (one to six leisure activities). Each person was categorized as having a (1) sedentary, (2) physically active, (3) cognitively stimulating, or (4) mixed leisure style. It should be noted that a "social" leisure style was excluded from this analysis since the interpretation and meaning of such activities can be subjective and differs from one person to the next. For instance, some people may think bridge is social, and others may argue it is a hobby. Some may say bingo is social, and others say it is a hobby. Thus, we chose to limit leisure style categories to ones that are less subjective and more mutually exclusive. A heuristic was developed and used to group people into one of the four categories listed above. If the majority of the respondent's activities were represented by one type of activity, such

as sedentary, then the participant's leisure lifestyle was labeled as sedentary. Respondents who had a fairly even mixture of leisure activities were labeled "mixed." In addition, a respondent had to report at least three different types of activities to be labeled "mixed" since this category was meant to represent those with diverse leisure repertoires. Those who reported four leisure activities sometimes had a "split" repertoire which meant they reported two activities in each of two categories of leisure. For example, a respondent may have reported television, spectator sports, cards, and model building. This individual's leisure repertoire is split between sedentary and hobby activities. However, overall, in choosing between the two categories, we judged that this leisure style was more sedentary, than cognitive in making a generalization. Again, several researchers were asked to comment on the categorization.

Several control variables (i.e., age, gender, education, social support) were included in the study since these variables are known to have an influence on the relationships of interest (Krause, 1990; Markides & Miranda, 1997). Age was asked in an open-ended format where respondents recorded their age in years. Gender was assessed with a closed ended question. Education was ordinally scaled, and responses were as follows: 1 = kindergarten through grade six, 2 = grades 7-12, 3 = high school graduate, 4 = some college, 5 = technical or vocational school, 6 = associate degree, 7 = bachelor's degree, and 8 = graduate degree. Level of social support was measured with the short form of the Social Support Questionnaire (SSQ) (Sarason, Sarason, & Shearin, 1987). This instrument was designed to measure the number of people available to provide social support to a respondent, and degree of satisfaction with social support. This investigation only considered the size of social support network because satisfaction with social support was rated consistently quite high and did not have an effect on the overall outcome. While there are several options for measuring social support, the SSQ is considered reliable and valid, and is widely used in behavioral health studies (McDowell & Newell, 1996). The SSQ measures level of social support by asking respondents on whom they can count for help in six situations such as: (a) Whom can you really count on to be dependable when you really need help, and (b) Whom can you count on to console you when you are very upset? For each type of support, respondents listed the relation of the individuals on which he or she can count for help. For example, for a given situation, a respondent may list spouse, brother, and friend as the individuals he or she can count on for support. Therefore, the size of this respondent's social support network for one situation is three. A mean social support network size is then calculated for each respondent. The mean size of respondents' social support networks was 2.38 persons, with a range of 0 to 7.

*Recoding and Computation of Interaction Terms*

Since the variable "type of leisure style" was measured categorically, it was recoded into three dummy variables (physical, cognitive and mixed),

with sedentary leisure style serving as the reference category. Given that the variable "social leisure" was also categorical, it was necessary to recode it into two dummy variables (once per week or more, 1 to 3 times per month) with less than once per month serving as the reference category. Since our model indicates that the leisure style variables would moderate the relationship between arthritis severity and perceived physical and mental health, it was necessary to compute interaction terms to test these relationships. Interaction terms were created by multiplying the arthritis severity variable with the leisure style variables (see Neter, Kutner, Nachtsheim and Wasserman (1996) for more information on procedures). The enter method of multiple regression analysis was used to analyze the relationships among our study variables. This technique allowed us to enter variables in order of their proposed relationships to one another. The control variables (age, gender, education, and social support) were blocked and entered together so their effects on the dependent variable were considered simultaneously. The enter selection method with Analysis of Variance subset tests was used. In this approach, variables can be blocked together and entered simultaneously into the multiple regression models.

The set of dummy variables that represented the moderator "type of leisure style" were also blocked to test the effects of the entire categorical variable on the dependent variable. An $R^2$ change statistic was calculated for each single or blocked group of independent, control, and/or moderator variables. Two summary tables are presented for all multiple regression models.

## Results

### *Descriptive Statistics*

The mean age of the sample was 68 years with a range between 50 and 84 years of age. The majority of the sample was female (72.5%) and married (57.1%). Twenty-seven percent were widowed, 11% divorced and 4.6% never married. Education levels varied considerably, with 32% who earned a high school diploma, 24% earned an associate's degree or higher, 28.9% attended technical/vocational school, and 14.7% did not earn a high school diploma. The sample was mostly white (88.4%) with about 10% African American, and the rest Hispanic, Asian and other racial/ethnic groups. In terms of perceived health, 56% responded they experience daily symptoms of their arthritis, 11% reported weekly symptoms, with the rest of the sample reporting symptoms monthly or less often. All respondents were asked about their daily physical activity habits. For this sub-sample of individuals with self reported arthritis, 28% stated they get a great deal of exercise, 43% stated they take opportunities to get exercise, by taking the stairs instead of elevator etc, and 29% reported their daily routine consists of mainly sitting or standing. Overall, 23% of the sample stated they believe they have a disability. The most common disability reported for this sample was joint problems associated with the knee, hand or hip areas. In terms of leisure style, 8% of the

sample had a leisure repertoire that consisted of mainly sedentary activities (e.g., passive activities such as television, mass media), 29% had a cognitive based leisure style (e.g., passive hobby type activities, reading, computers, knitting, sewing), 28% reported a leisure style accounted for by physically active pursuits (e.g., walking, jogging, swimming, biking, wood working, home improvement, gardening), and 35% reported a mixed leisure style that consisted of a more balanced combination of active, sedentary, and cognitive based leisure activities.

*Model Testing*

The first research question addressed the relationship between arthritis severity and perceived physical and mental health, while controlling for education, gender, age, and social support. Results indicated that arthritis severity was significantly related to perceived physical health, while controlling for education, gender, social support, and age. The independent variables in the model predicted 17% (Adj. $R^2$ = .17) of the variance in perceived physical health score (Table 1). Among the independent variables, arthritis severity had the strongest relationship to perceived physical health ($\beta$ = −.37; $p < .001$), indicating that more severe arthritis predicted lower ratings of perceived physical health. There also was a significant negative relationship between arthritis severity and perceived mental health, while controlling for the effects of education, gender, social support, and age. The overall regression model accounted for 8.0% (Adj. $R^2$ = .08) of the variance in perceived mental health score (Table 1).

*TABLE 1*
*Predicting Perceived Physical and Mental Health from Arthritis Severity, Controlling for Age, Gender, Education and Social Support*

| Independent Variables | Perceived Physical Health ($N$ = 464) Model I b (SE) B | Perceived Mental Health ($N$ = 464) Model I b (SE) B |
|---|---|---|
| *Control Variables* | | |
| Age | .01 (.13) .02* | .21 (.08) .13* |
| Gender | 4.0 (2.32) .08 | −.64 (1.3) −.02 |
| Education | 1.3 (.55) .11* | 1.0 (.33) .15* |
| Social Support | 1.6 (.69) .11* | 1.0 (.41) .12* |
| Arthritis Severity | −7.5 (.91) −.37* | −1.9 (.54) −.17* |
| *R-Squared* | | |
| **Adjusted R-Squared** | .18 | .08 |
| **F-Change** | .17 | .08 |
| | 17.94* | 7.75* |

(*$p < .05$)

*TABLE 2*
*Regression Analysis Predicting Arthritis Severity, Perceived Physical and Mental Health from Leisure Style, Controlling for Age, Gender, Education and Social Support*

| | Perceived Physical Health ($N$ = 330) | | Perceived Mental Health ($N$ = 332) | |
|---|---|---|---|---|
| Independent Variables | Model I b (SE) B | R-Square Change | Model II b (SE) B | R-Square Change |
| *Control Variables* | | | | |
| Age | .21 (.14) .07 | .018 | .16 (.09) .10 | .03* |
| Gender | 4.2 (2.5) .08 | | .53 (1.5) .02 | |
| Education | .70 (.56) .06 | | .79 (.34) .13* | |
| Social Support | 1.2 (.71) .09 | | .58 (.43) .07 | |
| Arthritis Severity | −7.0 (3.5) −.36 | .01* | −2.2 (.59) .20* | .04* |
| **Leisure Variables** | | | | |
| Leisure Style | | .01 | | .01 |
| Physical Lifestyle | 3.6 (8.9) .07 | | −1.3 (2.7) −.05 | |
| Cognitive Lifestyle | 4.4 (8.9) .09 | | −.40 (2.7) −.01 | |
| Mixed Lifestyle | −5.1 (8.6) .12 | | −1.6 (2.6) −.06 | |
| Social Leisure | | | | |
| 1-3 × per month | 4.3 (2.9) .09 | .17 | 6.1 (1.7) .24* | .04* |
| 1 per month | 5.4 (2.9) .12 | | 5.3 (1.7) .21* | |
| Size of Leisure Repertoire (LR) | 2.2 (.99) .12 | .02* | .00 (.60) .01 | |
| *Interaction Variables* | | | | |
| Leisure Style × Arthritis Severity | | .03* | — | — |
| Physical × Arthritis Severity | −1.5 (4.0) −.07 | | — | — |
| Cognitive × Arthritis Severity | −3.9 (3.9) −.20 | | — | — |
| Mixed × Arthritis Severity | 3.1 (3.8) .17 | | — | — |
| | | | — | — |
| *R-Squared* | .25 | | .14 | |
| **Adjusted R-Squared** | .22 | | .11 | |
| **F-Change** | 7.7* | | 4.7* | |

(*$p < .05$)

Support of the first research question prompted us to determine if the relationship between arthritis severity and perceived health (i.e., physical and mental) differed depending on the leisure style variables. Two regression models were developed to test these relationships. One model predicted perceived physical health from the leisure style and control variables, and the other predicted perceived mental health from the same set of leisure and control variables. Interactive effects were tested for the leisure style variables, and one interaction was statistically significant. The way arthritis severity re-

lates to perceived physical health differed depending on type of leisure style. The overall regression model accounted for 22% (Adjusted $R^2$ = .22) of the variance in perceived physical health (Table 2). The interaction explained the largest proportion of variance in perceived physical health ($R^2$ change = .03). Estimated mean physical health scores were used to interpret the nature of the interaction (Figure 2). For all respondents, as arthritis severity increased, perceived physical health scores decreased. However, the rate of decline in physical health scores differed depending on respondent's type of leisure style. While controlling for social support, gender, education, and age, with every one-unit increase in arthritis severity, those with a mixed leisure style showed only a slight decline in physical health score. However, this difference was much greater for those with sedentary, active or cognitive based leisure styles (Figure 2). For every one-unit increase in arthritis severity, perceived physical health scores of those with sedentary and active leisure style decreased about 7.5 points. Those with cognitive based leisure styles showed a larger 11.4-point decline in perceived physical health as arthritis severity increased.

Although there was only one significant interactive effect, several significant main effects were revealed. The main effect, size of leisure repertoire, was found to be significantly and positively related to perceived physical health scores ($R^2$-change = .02; Table 2). Among the leisure variables, leisure

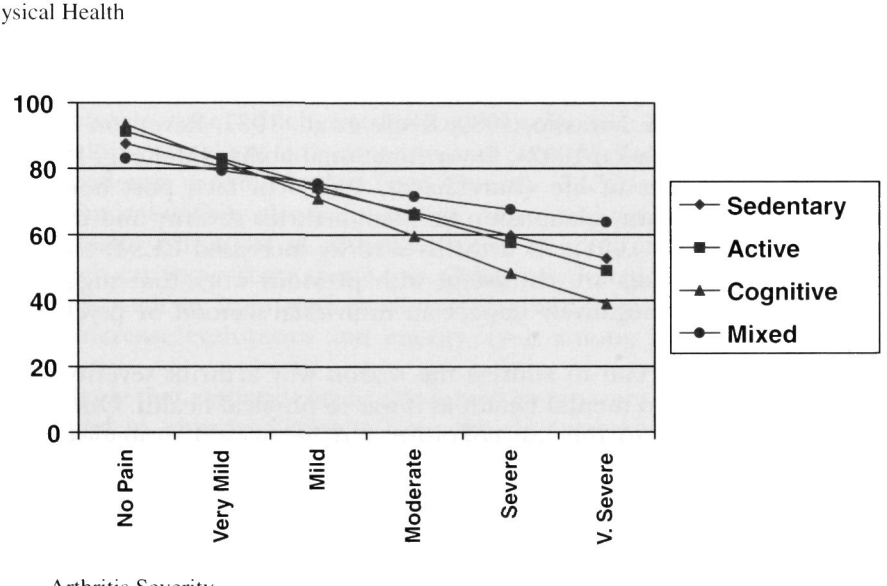


*Figure 2.* Estimation of Mean Physical Health Scores for the Arthritis Severity by Leisure Lifestyle Interaction

repertoire size was the second most important variable in explaining variance in perceived physical health score. Therefore, individuals with larger leisure repertoires also reported higher ratings of perceived health.

The next set of analyses addressed questions related to the role of leisure style in the relationship between arthritis severity and perceived mental health. The overall regression model explained 11% (Adj. $R^2$ = .11) of the variance in the dependent variable (Table 2). Results indicated a statistically significant and positive relationship between social leisure and perceived mental health ($R^2$ change = .04; Table 2). That is, individuals who get together with friends more often (i.e., 1 to 3 times per week and 1 to 3 times per month) scored higher on the perceived mental health scale than those who get together with friends less than once per month ($\beta$ = .24 and $\beta$ = .21 respectively).

## Discussion

### *The Relationship between Arthritis Severity and Perceived Health*

There was an inverse relationship between arthritis severity and perceived physical health. Among all of the independent variables, arthritis severity accounted for the most variance in perceived physical health. Results also indicated a significant negative relationship between arthritis severity and perceived mental health, while controlling for education, gender, social support, and age. However, the regression model explained only 7.7% of the variation in mental health score. Due to chronic pain, inflammation, and restricted range of motion, arthritis has been associated with depression (Brown, Wallston, & Nicassio, 1989; Keefe et al., 1987; Revenson & Felton, 1989; Smith & Yoshioka, 1992), lower functional ability (McKeag, 1992) and overall lower quality of life (Burckhardt, 1985). In fact, post hoc analysis indicated a significant relationship between arthritis severity and the CES-D score ($F$ = 4.3; $p < .001$). As arthritis severity increased CES-D scores also increased. Our results are consistent with previous work that suggests that arthritis pain may negatively impact an individual's mood or psychological state.

It is also important to address the reason why arthritis severity was not as strongly related to mental health as it was to physical health. One possible explanation relates to the use cognitive and behavioral strategies used to cope with the pain and inflammation associated with arthritis (Keefe et al., 1987). Use of these strategies may help individuals with arthritis maintain a positive outlook and good mood, despite painful and limiting symptoms. However, those who have severe arthritis may be more likely to experience depression than those with mild or moderate arthritis, due to limited mobility and excessive pain. In addition, only about 7% ($N$ = 34) of our study sample reported severe or very severe arthritis (as measured by level of pain).

*Type of Leisure Style and Perceived Health*

In our study, the way arthritis severity related to perceived physical health differed depending on type of leisure style. This interaction also had the largest net effect on the variance in the dependent variable perceived physical health. Not surprisingly, physical health scores for individuals whose leisure styles were characterized as mixed ($N$ = 126) (i.e., combination of physical, sedentary, and cognitive pursuits) decreased at a very small rate as arthritis severity increased. For each unit increase in arthritis severity, perceived physical health score only decreased an average of 3.8 points (Figure 2). This rate of decline in physical health score was twice as great for individuals whose leisure styles were characterized by mostly physical activities ($N$ = 101). Surprisingly, the 28 individuals with passive leisure styles (which were dominated by mass media activities such as television, movies, and videos) showed about a 7-point decrease in physical health score as arthritis severity increased. It was somewhat unexpected to find that individuals whose leisure styles are characterized by mostly cognitive activities ($N$ = 105) showed the largest drop in physical health. The level of physical activity reported by those with mixed leisure styles might explain the smaller rate of change in physical health within this group. As a part of their mixed leisure style, 70% of the "mixed" group was engaged in light to moderate walking. Research on the treatment and prevention of both osteoarthritis and rheumatoid arthritis suggests that light to moderate physical activity can: (1) increase muscle tone (McKeag, 1992), (2) decrease joint stiffness (Bell, Lineker, Wilkins, Goldsmith, & Badley, 1998), (3) decrease pain (Bautch, Malone, & Vailas, 1997), and 4) decrease and/or maintain weight (McKeag, 1992). Physical activities such as walking or bicycle riding, done routinely, improve muscle tone, which strengthens muscles that support the joints, thereby helping to relieve inflammation and pain (McKeag, 1992). This type of light/moderate activity also has been shown to decrease morning stiffness. Regular physical activity also helps reduce or control weight, which is essential to regulate symptoms of arthritis. Excess weight can add stress to the joints, which can exacerbate symptoms. Other physiological benefits of physical activity, such as improved cardiovascular and respiratory functioning, may also increase endurance and energy levels among individuals with arthritis.

It is likely that respondents in the mixed group were engaged in activity that resulted in improved muscle tone, which decreased the symptoms of their arthritis. It seems as if individuals with mixed leisure styles may utilize leisure in a way that helps them better maintain their perceived physical health than those with primarily physically active or cognitive leisure styles.

Although the physical health scores of those with sedentary leisure styles dropped at a higher rate (7.0 points) than those with mixed leisure styles (3.8), they still fared better than both the physically active and cognitively active respondents, whose physical health scores declined by 8.4 and 11.4

points respectively, with one unit increase in arthritis severity. What explains this unusual result? According to Zimmer et al. (1997), as arthritis severity increases, range of motion and pain also increases, causing individuals to replace more demanding (i.e., high impact or high load) activities (e.g., jogging, biking, weight lifting, hiking), with more sedentary activities. Therefore, it is possible that some sedentary respondents switched their leisure behavior to more passive activities to better match their abilities with the demands of the environment. Unfortunately, the cross-sectional nature of this study limits us to speculation about cause and effect. Another possible explanation is that mass media oriented activity provides an outlet for escape. Several scholars (e.g., Kleiber et al., 2002; Ornstein & Sobel, 1989) suggested that activities that are pleasurable contribute to health by providing a mechanism for escape and cognitive re-appraisal of a situation. Is it not possible that those individuals with arthritis may seek mass media as a method of escape or use it as a cognitive strategy to get their minds off the pain?

The theory of selective optimization with compensation (SOC) may also be useful in helping to interpret these results. Baltes (1997) asserted that older people use a variety of resources (e.g., motivational, social, physical, cognitive) to adapt or compensate for age related changes, such as physical limitations resulting from arthritis. While speculative, it may be that respondents' leisure style is a resource selected for optimization and compensation. Clearly, a mixed leisure style seems to buffer respondents from the potentially harmful effects of arthritis pain on perceived physical health. The sedentary leisure lifestyle may also indicate SOC, since perceived physical health score declined only about seven points as arthritis severity increased. Thus, elders who adopt a mixed or sedentary leisure style as arthritis severity increased, may be using leisure as an optimization and compensation strategy more successfully than those who maintain only a cognitive or physically active leisure style.

Nevertheless, it was unexpected to find that individuals with physically active leisure styles reporting a greater decline in physical health score as arthritis severity increased. However, it is plausible that this group engages in activities that place undue stress on the joints. In fact, the physically active group ($N = 101$) reported engaging in several of the following higher impact physical activities: jogging, bicycling, hiking, tennis, line dancing, exercise class, skating, lawn mowing. As mentioned, research indicates that light to moderate physical activity can be beneficial to reduce inflammation, improve muscle tone, reduce overweight/obesity, and improve morale (National Institute of Arthritis & Musculoskeletal & Skin Diseases, 1998). However, high impact exercises such as running or tennis may exacerbate inflammation and pain. In fact, osteoarthritis may be caused by overuse as well as wear and tear associated with exercises like running which involve constant high impact on the joint and cartilage which cushion the joints (McKeag, 1992). An activity like gardening that involves fine motor skills (e.g., hands, fingers) may exacerbate arthritis pain and inflammation. Over 30% of the "active" group reported moderate to severe pain. Therefore, perhaps physically active adults

with arthritis engage in physical activity that exacerbates their arthritis, rather than reducing symptoms. As Zimmer et al. (1997) point out, these individuals may need to replace high impact activities with lower impact activities such as walking and water aerobics, in order to match their abilities with the demands of the environment.

Finally, it was interesting to find that among all leisure style categories, those with cognitive based leisure styles showed the largest drop in physical health score (11.4 points per unit increase in arthritis severity) as arthritis severity increased. Most of the cognitive based activities were hobbies that involved the use of hands (e.g., knitting, sewing, wood-working, reading). Thus, although these activities may be enjoyable and provide an escape, they may also aggravate arthritis symptoms, and thereby negatively influence perceived physical health.

*Size of Leisure Repertoire and Perceived Health*

There was a statistically significant and positive relationship between leisure repertoire size and perceived physical health score. In fact, leisure repertoire size accounted for the second largest proportion of variance (the leisure style and arthritis severity interaction was the most important predictor) in perceived physical health. According to Mobily, Lemke, and Gisin (1991), leisure repertoire is "a collection of activities capable of producing perceptions of competence and psychological comfort" (p. 211). They asserted that people's leisure repertoires represent activities they enjoy, and do well, and therefore these activities are undertaken often. This finding seems somewhat consistent with the activity and continuity theories of successful aging. Activity theory suggests that life satisfaction and well-being are shaped by frequency of engagement in activities such as leisure (Havighurst & Albrecht, 1953). Proponents of activity theory suggest that activities in old age provide roles for people that have a positive impact on self-concept and life satisfaction. Kart and Manard (1981) argued that successful aging occurs for people who maintain active life styles (i.e., actively engaged, not physically active) and substitute new roles for those lost through the aging process. While it is intuitive to suggest that staying actively engaged in activities (e.g., social, volunteer, hobbies) during later life is related to well-being, findings on activity theory have been mixed, and Howe (1988) asserted that, "activity theory alone . . . lacked the substance to explain the richness and complexities of involvement in activities as well as the positive sense of well-being found as some people grow old" (p. 450). Continuity theory was introduced by Neugarten, Havighurst, and Tobin (1968) and was viewed as a more flexible theory that attempted to account for different trajectories of aging. According to Atchley (1993), continuity is based on the premise that "in making adaptive choices, middle-aged and older adults attempt to preserve and maintain existing psychological and social patterns by applying familiar knowledge, skills, and strategies" (p. 5). Unfortunately, the cross sectional nature of this study limits our ability to draw conclusions that fully explains

the relationship between size of leisure repertoire and physical health. However, it is plausible to speculate that those who establish a broad leisure repertoire during earlier stages of life, will continue their repertoire of leisure experiences they enjoy and feel competent doing. In later life, when faced with functional limitations associated with a chronic disease such as arthritis, a person with a broader leisure repertoire may still have more activities in their repertoire to choose from than a person with a narrow leisure repertoire. For example, one person might have a broad repertoire of ten low and high impact physical activities, passive hobbies, and social activities in her repertoire. With age, she might experience the physical limitation of arthritis of the knees, thus, she can no longer participate in tennis, or bicycling, however, walking, and swimming were still in her repertoire, and being lower impact, she can still engage in these activities. This example can apply to other limitations (i.e., cognitive, emotional) and activities. In essence, it may be important for people to establish broad leisure repertoires consisting of a variety (i.e., mixture) of different activities, which, during later life, may provide options as one experiences age related changes.

In addition, Mobily et al's (1991) conceptualization of leisure repertoire focuses on "a collection of activities capable of producing perceptions of competence and psychological comfort" (p. 211). This conceptualization suggests that self-efficacy is important to establish a leisure repertoire. The idea of perceived competence is closely related to the concept of self-efficacy. Perhaps a fruitful line of inquiry for future research is to determine how self-efficacy impacts how one establishes a leisure repertoire. Moreover, future research should more thoroughly consider the role of ones leisure repertoire in relation to health. For example, scholars have examined patterns of change and stability in leisure over time (e.g., Iso-Ahola, Jackson & Dunn, 1994; Searle, Mactavish, & Brayley, 1993). They have characterized individuals as adders, replacers, quitters, and continuers. Being placed into one of these four categories was based upon respondents checking off participation in up to a list of 60 or so activities. However, just because a person checks he/she participated in in-line skating once during the past year, doesn't mean it is an activity that person is likely to engage in regularly as a part of his/her leisure style. Thus, based upon Mobily's conceptualization of leisure style, examining a core of activities that respondents report doing regularly is a better method of characterizing one's leisure style than a summative check list of 60 activities. Kelly's (1983) work on the hidden core of leisure styles supports this assertion. He stated, "the concept of leisure style tends to overlook the core of activities that persist through the life course . . . leisure style begins with a common core of accessible and informal activities (pp. 335-336).

*Social Interaction with Friends and Health*

In this study, there was a statistically significant and positive relationship between frequency of social contact with friends and perceived mental

health. Those who reported socializing with friends once per week or more had the highest perceived mental health scores, followed by those who get together with friends one to three times per month. Respondents who get together with friends less than once per month had the lowest perceived mental health scores.

This finding is consistent with research that emphasizes the important role social support has in maintaining well-being (Coleman & Iso-Ahola, 1993; Larson, Mannell, & Zuzanek, 1986; Iso-Ahola & Park, 1995). Frequently, friendships are developed and maintained in the context of leisure activities such as going out for lunch, hanging out at a friend's house, talking on the phone, walking, cultural events, etc. Thus, the nature and frequency of social contact with friends may provide more opportunities to develop interpersonal relationships that offer not only social companionship, but also instrumental, emotional, and guidance/advice support.

The results of this study suggest that one's leisure style may play an important role in arthritis symptom management, and the character of one's leisure style can shape one's perception of physical and mental health. Furthermore, these findings support previous work that indicates a positive relationship between aspects of leisure style (i.e., social activity, size of leisure repertoire) and perceived health. Moreover, we found that a mixed leisure style was associated with better ratings of perceived health. Additionally, individuals in this study with broader leisure repertoires also reported better ratings of perceived health. While speculative, taken together, it is plausible that people who develop diverse and broad leisure repertoires may be better able to adjust and manage arthritis symptoms. Therefore, health and medical professionals (e.g., physicians, recreation therapists, physical therapists) should encourage individuals with arthritis to identify and engage in leisure activities within their existing repertoire that can serve to buffer the effects of arthritis on perceived health. Even more importantly, health professionals should work with their arthritis clients to help them identify lifelong leisure experiences that had to be dropped (e.g., jogging) due to the severity of the disease and facilitate the substitution of other leisure activities that provide some of the same or similar physical, social and psychological benefits.

Selective optimization with compensation may be a useful framework in which to couch future investigations of the role of leisure on the relationship between chronic disease severity and perceived health. Future studies should incorporate this theoretical perspective and do so within a repeated measures research design that includes multiple methods (i.e., qualitative and quantitative). This approach will be more useful in order to understand why and how leisure might serve to buffer the relationship between chronic disease severity and health. These types of studies can be very productive in revealing the types, frequency and intensity of activity that is necessary to manage certain chronic diseases. Moreover, they can help health and human service professionals understand the psychological and social issues related to adaptation, substitution (of leisure activities) and management of chronic disease in a way that optimizes health.

*Limitations*

This research contained several study limitations that should be considered in the interpretation of our results. One important limitation is the cross-sectional nature of the research designed, which prevented us from establishing causal inferences in the relationships between health and leisure variables. For example, it is unknown when respondents were diagnosed with arthritis. People who have had the disease longer may be coping with it differently, than people recently diagnosed, thereby influencing leisure behavior in different ways. In addition, the nature of these attitudinal and psychological variables makes it difficult to establish the proper causal model with regard to the directionality of the relationships between the dependent and the independent variables, i.e., perceived health and leisure. For example, an alternative model might state a reverse relationship, since it could be presumed that people in better health would be more likely to participate in leisure activities of all kinds. Another study limitation relates to the insufficient differentiation between type of arthritis, such as osteoarthritis that results from the breakdown of tissue inside the joints, and inflammatory or rheumatoid arthritis that results from the swelling in the joints and occurs more frequently in women. The measurement of relevant variables is another potential limitation that could have an impact attenuating the relationships among the variables, such as our use of a self-reported arthritis diagnosis instead of a medical diagnosis. Finally, other important predictors of perceived health are not addressed in this study such as stress and stress coping. Future research needs to address some of these limitations using representative samples and longitudinal research designs, so that the important order of the central variables could be better understood. The new empirical evidence would definitely help us to better examine the influence and the role of leisure activities on health among older adults with arthritis.

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