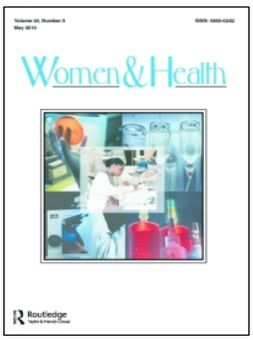

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Association of health-related behaviors, attitudes, and appraisals to leisure-time physical activity in middle-aged and older women

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ABSTRACT

Physical activity carries immediate and long-term benefits for middle-aged and older women; however, physical activity decreases in adulthood and aging in women. In this study, the authors investigate the relation of health behaviors, health attitudes, and health appraisals to leisure-time physical activity among middle-aged and older women in a cross-sectional analysis of the second wave of the Study of Midlife Development in the United States (MIDUS2) conducted during the period from 2004 to 2006. The sample consisted of 829 women, ranging in age from 40 to 75 years of age (*Mean* = 56 years). In multiple logistic regression analyses, controlling for socio-demographic factors and functional restrictions, most of the psychosocial variables examined showed unique associations with physical activity, including health behaviors of having a routine checkup and not smoking, health attitudes involving commitment to health and valuing physical fitness and strength, and the health appraisal that one's health is better compared to others of the same age. Older women (aged 61–75 years) were less active, but reported greater health commitment than middle-aged women (aged 40–60 years). Neither health commitment nor any other psychosocial variable interacted with age in relation to physical activity. Understanding characteristics of middle-aged and older women who are physically active is essential in tailoring interventions to this population.

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Physical activity carries both immediate and long-term benefits for women in midlife and aging (USDHHS 2008); however, physical activity decreases over adulthood in women, and continues to decrease in aging (Schiller et al. 2014; Shaw et al. 2010). Recent estimates of women's physical activity based on self-report showed that less than half (48.9%) of women between 25 and 64 years of age and 40.3% of women between the ages of 65 and 74 years met federal physical activity guidelines for aerobic activity through leisure-time

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activity in 2014 (Schiller et al. 2014). Men were more likely to meet federal guidelines than were women. In the present study the authors examine the relation of health behaviors, health attitudes, and health appraisals to regular leisure-time activity in a national sample of middle-aged and older women drawn from the second wave of the Study of Midlife Development in the United States (MIDUS2).

Longitudinal studies have shown that physical activity is predictive of better functioning in older persons (Cotter and Lachman 2010b; McAuley et al. 2006) and that physical activity plays a role in the prevention of numerous chronic diseases, including heart disease and diabetes, as well as colon and breast cancer (USDHHS 2008). In addition to its relation to physical functioning (Hillsdon et al. 2005), physical activity in middle-aged women has been related to health risk factors, such as weight maintenance, waist circumference, and abdominal fat (Bailey et al. 2007; Choi et al. 2012; Davidson, Tucker, and Peterson 2010; Dugan et al. 2010), in addition to cardiovascular risk factors involving blood pressure, lipids, endothelial function, and inflammatory systems (Bassuck and Manson 2010). Women in the Nurses' Health Study who engaged in physical activity in midlife were more likely to survive to the age of 70 years without significant chronic diseases, physical or cognitive impairment, or mental health problems (Sun et al. 2010). Both moderate and vigorous activity are beneficial for health (CDC 2015), although current recommendations stress moderate-intensity activity for older adults because of the increased risk of injury from vigorous activity (Nelson et al. 2007).

Health behaviors tend to cluster together (Heroux et al. 2012). For example, a recent study of health behaviors in older adults found that health behaviors clustered within individuals (Shankar, McMunn, and Steptoe 2010). Smoking was noteworthy in that it was most likely to be associated with other health risk behaviors, such as physical inactivity.

In addition, health attitudes are integral to regular participation in leisure-time physical activity. Several health behavior models, such as the theories of reasoned action and planned behavior (Montano and Kasprzyk 2008) and the transtheoretical model (Prochaska, Redding, and Evers 2008) stress feelings of control or efficacy, intentions, and expectancies concerning behavioral outcomes. Social-cognitive theory (McAlister, Perry, and Parcel 2008), to which these constructs are central, is noteworthy for its use in the study of numerous health behaviors, including exercise (Janssen et al. 2014; McAuley et al. 2006).

Health appraisals may also be related to participation in physical activity. Individuals often make appraisals of their health compared to their own past health and their health compared to similar persons (Jylha 2009). Perceived health has been shown to be an important predictor of morbidity and mortality (DeSalvo et al. 2005; Jylha 2009). While perceived health reflects information about the state of a person's health, it may also reflect present

engagement in health behaviors and predict future engagement in health behaviors (Benyamini 2011; Jylha 2009).

Finally, previous research has shown a relationship between socio-demographic factors and physical activity. In addition to age as noted above, racial/ethnic differences in physical activity have been found among women, with participation in physical activity among African American women lower than that of non-Hispanic White women (CDC 2007; Lee and Im 2010; Marshall et al. 2007). Education has also been positively related to health behavior, including physical activity (Hughes, McDowell, and Brody 2008). Being married is generally related to participation in leisure-time physical activity (Hughes, McDowell, and Brody 2008; Sobal and Hanson 2010).

The present study

Establishing and maintaining leisure-time physical activity is an essential component in sustaining health. Yet, women in midlife and beyond are at risk of declines in physical activity. More information is needed on the characteristics of women in midlife and older who engage in physical activity to provide a foundation for interventions with this large and important population. In the present study the authors examine the relation of health behaviors, health attitudes, and health appraisals to leisure-time physical activity in middle-aged and older women.

The present sample consisted of 829 participants in the second wave of the Study of Midlife Development in the United States (MIDUS2; Ryff et al. 2006) who were between the ages of 40 and 75 years. Active leisure-time activity was defined as participation in either moderate or vigorous leisure-time physical activity several times a week in both summer and winter. This categorization is similar to the U.S. recommendations for regular physical activity for adults, which call for at least 5 days of moderate activity or 3 days of vigorous activity per week (CDC 2015).

First, we examined the association of each of the study variables with leisure-time physical activity. We then examined the behavioral, attitudinal, and appraisal variables simultaneously, controlling for socio-demographic factors and functional restrictions. Next, age differences in physical activity and each study variable were examined. Finally, interactions with age were explored to determine whether the behavioral, attitudinal, and appraisal variables operated similarly for middle-aged and older women in their association with leisure-time physical activity.

Methods

The study was conducted as a secondary analysis of data from the core sample of the second wave of the National Survey of Midlife Development

in the United States (MIDUS2). The second wave of the MIDUS was conducted in 2004–2006 and was funded by the National Institute on Aging. Data were obtained from a phone interview and self-administered questionnaires (Ryff et al. 2006). MIDUS1 (MIDMAC 2006) was sponsored by the MacArthur Foundation Research Network on Successful Midlife Development and was conducted and approved through Harvard Medical School. Respondents in the first wave of the project (MIDUS1) were selected using a nationwide random-digit-dialing procedure to identify non-institutionalized, English-speaking adults, using working telephone banks in the coterminous United States. MIDUS1 data were collected in 1995–1996. Households were selected randomly, and a random respondent was selected from a household list of persons aged 25–74 years, obtained from the contact person in the household. Oversampling from five metropolitan areas in the United States was also conducted. The telephone response rate for the main random-digit-dialing sample was 70%, and the response rate for the self-administered questionnaires was 87% (MIDMAC 2006). For MIDUS2, the investigators attempted to contact and recruit all of the original MIDUS1 respondents. In the MIDUS2 data collection, participants were contacted by telephone, and oral consent for participation was obtained by telephone because the first contact for the data collection was by telephone. The overall response rate for the telephone interview in MIDUS2 was 75%, and the overall response rate for the self-administered questionnaires was 81%. The present study did not require institutional review board approval because the data were accessed through a publicly available de-identified dataset.

Measures

Leisure-time physical activity

A composite measure of leisure-time physical activity was constructed from four items that asked respondents to indicate how often they engaged in both moderate (e.g., brisk walking, slow swimming, or low impact aerobics) and vigorous (e.g., running, vigorous swimming, or high intensity aerobics) physical activity during their leisure or free time in the summer and winter. For the present study, participants who answered never, less than once a month, or once a month for both moderate and vigorous activity during either summer or winter were coded as 0 (n = 535, 64.5%) for being physically inactive. Participants who answered several times per week or more for either moderate or vigorous activity during both summer and winter were coded as 1 for physically active (n = 294, 35.5%). See Holahan, Holahan, and Li (2015) for previous use of this measure and Cotter and Lachman (2010a) for a similar measure. A score of physical inactivity reflected a failure to meet established U.S. Center for Disease Control and Prevention guidelines (CDC 2015).

Socio-demographic factors

Age was measured as a continuous variable. In age-group comparisons, participants between the ages of 40 and 60 years were classified as middle-aged, and participants between the ages of 61 and 75 years were classified as older. Marital status was coded as married and unmarried, with unmarried the reference category. Partnered women who were not married were not identified as a separate category in the original data collection. Education was coded into two levels: high school graduate or less and at least some college, with high school graduate or less as the reference category. Race was dummy coded as Black and other racial background as one category, with White as the reference category.

Functional restrictions

Functional restrictions to physical activity were measured by a scale composed of four items from the Medical Outcomes Study (Brazier et al. 1992; Grzywacz and Marks 2001). The scale asked respondents how much their health limited: walking several blocks; walking one block; vigorous activity, such as running or lifting heavy objects; and moderate activity, such as bowling or vacuuming. Items were coded as 1 = *a lot*, 2 = *some*, 3 = *a little*, and 4 = *not at all* (reverse-scored), and responses to the four items were averaged (Cronbach's α for the present sample = 0.89).

Health behaviors

Participants were asked about their current smoking status, height and weight for the computation of body mass index (BMI, kg/m^2), and routine physical check-ups.

Current smoking status. Participants were asked, "Do you smoke cigarettes regularly NOW?" Regularly was defined as "at least a few cigarettes every day." Affirmative responses were coded as 1, and negative responses were coded as 0.

Obesity. Obesity was defined as a BMI of 30 or higher and coded as 1 for obese and 0 for not obese.

Routine physical checkup. Respondents were asked to indicate how many times in the past 12 months they saw a doctor, hospital, or clinic for a routine physical check-up or gynecological exam. None was coded as 0, and 1 or more times was coded as 1.

Health attitudes

Participants reported perceived control over their health, their health commitment, and their endorsement of the attitude that physical fitness and strength were essential for a good life.

Control over health. Control over health was measured by three items used previously by Grzywacz and Marks (2001) and adapted from Marmot et al. (1991). These items were: "Keeping healthy depends on things that I can do," "There are certain things I can do for myself to reduce the risk of heart attack," and "There are certain things I can do for myself to reduce the risk of getting cancer." The items were scored on a 7-point scale from 1 = *strongly disagree* to 7 = *strongly agree* and responses to the three items were average (Cronbach's α for the present sample = 0.70).

Health commitment. A composite measure of health commitment was developed using two items. Respondents were asked their level of endorsement of the statement, "I work hard at trying to stay healthy," scaled from 1 = *strongly agree* to 7 = *disagree*, which was reverse-scored. In addition, respondents were asked their level of endorsement of their "thought and effort put into health," scaled from 0 to 10, where 0 = *no thought or effort* and 10 = *very much thought and effort*. Health commitment was indexed as the mean of the two items (standardized: Cronbach's α for the present sample = 0.73).

Value of physical fitness and strength. Respondents were asked to select 5 items from a list of 17 items that they feel are the most important for "living a good life." Selecting "physical fitness and strength" was coded as 1, and not selecting the item was coded as 0.

Comparative health appraisals

Respondents were asked to compare their present health to that of others and to their own health 5 years ago.

Health compared to others. Respondents were asked to rate their overall health compared to other people their age on a scale from 1 = *excellent* to 5 = *poor* (reverse-scored).

Health compared to 5 years ago. Respondents were asked to rate themselves today compared to 5 years ago on: energy level, physical fitness, physique/figure, and weight. Responses were labeled from 1 = *improved a lot* to 5 = *gotten a lot worse*. These items were reverse-scored and averaged to indicate health compared to 5 years ago (Cronbach's α for the present sample = 0.87).

Data analysis

We utilized *t*-tests and chi square tests (for categorical variables) to examine the association of health behaviors, health attitudes, health appraisals, socio-demographic variables, and functional restrictions with

leisure-time physical activity. A multiple logistic regression analysis was conducted to examine the unique association of each of the behavioral, attitudinal, and appraisal variables with physically active status, controlling for socio-demographic variables and functional restrictions. Potential confounding variables (socio-demographic factors and functional restrictions) were retained in the multiple logistic regression analysis and in examining possible interactions if they were significant ($\alpha = 0.05$) in the univariate analyses examining either physical activity level or age. Model fit was assessed by examining estimated versus observed outcomes in active and inactive groups using the Hosmer-Lemeshow goodness-of-fit test. Age group comparisons on the full set of variables were undertaken using *t*-tests and chi square tests (for categorical variables), with middle age defined as age 40–60 years and older age defined as age 61–75 years. Possible interactions between age and each of the behavioral, attitudinal, and appraisal variables were examined in multiple logistic regression analyses, controlling for socio-demographic factors and functional restrictions.

Results

Participants

The participants in the present study were 829 middle-aged and older women ranging in age from 40 to 75. The sample comprised 755 (91.1%) Whites, 42 (5.1%) Blacks, and 32 (3.9%) individuals reporting other racial backgrounds. The majority of participants ($n = 521$, 62.8%) were married, and had received education beyond high school ($n = 541$, 65.3%).

Activity status comparisons

Of the total sample, 35.5% of participants were classified as active. Age was negatively associated with leisure-time physical activity (Table 1). Respondents with at least some college education were more highly represented than were respondents with no college education in the active compared to the inactive group. Black respondents were less highly represented than were White respondents in the active compared to the inactive group. Marital status did not differ significantly between the active and inactive groups. Respondents with fewer functional restrictions were more likely to be active.

With respect to health behaviors, active respondents were less likely to smoke or to be obese and were more likely to report at least one routine check-up in the last 12 months. With respect to health attitudes, active participants reported greater control over their health. Active participants

Table 1. Comparison of inactive and active women (N = 829) on socio-demographic factors, functional restrictions, health behaviors, health attitudes, and health appraisals.

Variable	Inactive (n = 535) Mean (SD) (%)	Active (n = 294) Mean (SD) (%)	Statistical p test
Sociodemographic factors			
Age, years	57.13 (9.73)	55.16 (9.56)	t = 2.82 .005
Race			
Black (%)	6.7	2.0	χ^2 = 8.67 .003
Other (%)	3.9	3.7	χ^2 = 0.017 .895
Education (% above high school)	59.4	75.9	χ^2 = 22.54 < .001
Marital status (% married)	61.5	65.3	χ^2 = 1.18 .277
Functional restrictions	2.01 (0.95)	1.55 (0.73)	t = 7.94 < .001
Health behaviors			
Current smoking (%)	18.7	8.2	χ^2 = 16.53 < .001
Obese, BMI ≥30 (%)	34.8	26.9	χ^2 = 5.44 .020
Regular check-ups (%)	86.0	92.5	χ^2 = 7.84 .005
Health attitudes			
Control over health	6.21 (0.84)	6.40 (0.74)	t = 3.06 .002
Health commitment	−0.07 (0.92)	0.31 (0.69)	t = 6.69 < .001
Physical fitness and strength important (%)	18.1	35.0	χ^2 = 29.62 < .001
Health appraisals			
Health compared to others	3.43 (0.99)	3.97 (0.84)	t = 8.27 < .001
Health compared to 5 years ago	2.55 (0.83)	2.91 (0.93)	t = 5.63 < .001

Note. Means, standard deviations, and t-tests are reported for the continuous variables; percentages and chi square tests are reported for categorical variables. For t-test, df = 827; for χ^2, df = 1. Control over health is scored from 1 = *strongly disagree* to 7 = *strongly agree*; health commitment is a standardized scale; health compared to others is scored from 1 = *poor* to 5 = *excellent*; health compared to 5 years ago is scored from 1 = *gotten a lot worse* to 5 = *improved a lot*.

also reported greater health commitment and were more likely to indicate that physical fitness and strength were important for a good life.

With respect to health appraisals, the mean rating of active participants compared to individuals who were inactive was higher for health compared with others of the same age. The average rating of comparisons of four aspects of health (energy level, physical fitness, physique/figure, and weight) compared to 5 years ago was also higher for active participants compared to individuals who were inactive. The results for each of the four components (energy level, physical fitness, physique/figure, and weight) showed a similar pattern.

Multivariable analysis

Next, we conducted a multiple logistic regression analysis to examine the unique association of each of the psychosocial variables with physically active status, controlling for one another as well as for socio-demographic variables and functional restrictions. Among the control variables, Black race was uniquely associated (negatively) with being physically active, as were a higher level of education and functional restrictions (negatively; Table 2). Among

health behaviors, not smoking and having at least one check-up in the last 12 months were uniquely associated with greater physical activity. Among health attitudes, being committed to health promotion and having a belief in the importance of physical activity and strength were also uniquely associated with active status. In addition, the perception of more favorable health compared to others was uniquely associated with physical activity. The accuracy of the model was excellent in terms of the difference between observed and estimated outcomes (Hosmer-Lemeshow goodness of fit test, $\chi^2 = 6.29$, $df = 8$, $p = .61$)

Age group comparisons

Next, age group comparisons were examined. For these, middle age was defined as age 40–60 years, and older age was defined as age 61–75 years. Less than a third of the older group was classified as active, compared with almost 40% of the middle-aged group (Table 3). The middle-aged group was more highly educated than the older group, and middle-aged participants were more likely to be married. Neither the proportion of Black participants nor individuals of other racial/ethnic groups differed by age group. The middle-aged group had fewer functional restrictions.

With respect to health behaviors, a significant difference was observed in smoking status between the two age groups, with twice as many of the middle-aged participants reporting current smoking. However, no

Table 2. Multiple logistic regression analysis results of the association of socio-demographic factors, functional restrictions, health behaviors, health attitudes, and health appraisals with physically active status among middle-aged and older women ($N = 829$).

Variables	Odds ratios	95% C.I.
Sociodemographic factors		
Age, per year	0.97	(0.95, 0.99)
Race[a]		
Black	0.18	(0.07, 0.48)
Other	0.68	(0.30, 1.55)
Education (*high school or less* = 0, *at least some college* = 1)	1.71	(1.20, 2.45)
Marital status (*not married* = 0, *married* = 1)	0.88	(0.63, 1.24)
Functional restrictions	0.71	(0.56, 0.91)
Health behaviors		
Current smoking (*no* = 0, *yes* = 1)	0.53	(0.32, 0.90)
Obesity, BMI ≥30 (*no* = 0, *yes* = 1)	1.37	(0.94, 1.98)
Regular check-up (*no* = 0, *yes* = 1)	1.77	(1.02, 3.06)
Health attitudes		
Control over health	0.87	(0.70, 1.10)
Health commitment	1.70	(1.32, 2.19)
Fitness and strength important (*no* = 0, *yes* = 1)	2.01	(1.40, 2.89)
Health appraisals		
Current health compared to others	1.29	(1.03, 1.61)
Health compared to 5 years ago	1.15	(0.94, 1.41)

[a]White was the reference category.

Table 3. Comparison of middle-aged (40–60 years) and older (61–75 years) women ($N = 829$) on physical activity status, socio-demographic factors, functional restrictions, health behaviors, health attitudes, and health appraisals.

	Middle-aged	Older	
	($n = 521$)	($n = 308$)	
Variable	Mean (*SD*) (%)	Mean (*SD*) (%)	Statistical *p* test
Physical activity status (% active)	38.6	30.2	$\chi^2 = 5.95$ .015
Sociodemographic factors			
Age, years	50.20 (5.99)	66.97 (4.02)	$t = 48.15 < .001$
Race			
Black (%)	4.8	5.5	$\chi^2 = 0.21$ .647
Other (%)	4.8	2.3	$\chi^2 = 3.33$ .068
Education (% above high school)	67.8	61.0	$\chi^2 = 3.85$ .050
Marital status (% married)	65.8	57.8	$\chi^2 = 5.36$ .021
Functional restrictions	1.68 (.83)	2.13 (.95)	$t = 6.90 < .001$
Health behaviors			
Current smoking (%)	18.4	9.1	$\chi^2 = 13.26 < .001$
Obese (%), BMI ≥30 (*no* = 0, *yes* = 1)	31.1	33.4	$\chi^2 = 0.49$ .484
Regular check-ups (%)	87.1	90.3	$\chi^2 = 1.82$ .177
Health attitudes			
Control over health	6.29 (0.84)	6.26 (0.76)	$t = 0.62$ .535
Health commitment	−0.10 (0.92)	0.34 (0.67)	$t = 8.00 < .001$
Physical fitness and strength important (%)	23.6	25.0	$\chi^2 = 0$ .21 .651
Health appraisals			
Health compared to others	3.60 (0.99)	3.65 (0.96)	$t = 0.64$ .525
Health compared to 5 years ago	2.65 (0.92)	2.73 (0.82)	$t = 1.26$ .221

Note. Means, standard deviations, and *t*-tests are reported for continuous variables; percentages and chi square tests are reported for categorical variables. For *t*-test, $df = 827$; for χ^2, $df = 1$. Control over health is scored from 1 = *strongly disagree* to 7 = *strongly agree*; health commitment is a standardized scale; health compared to others is scored from 1 = *poor* to 5 = *excellent*; health compared to 5 years ago is scored from 1 = *gotten a lot worse* to 5 = *improved a lot*.

significant difference was observed in the presence of obesity or in routine visits to a doctor in the previous 12 months between the two age groups. With respect to health attitudes, no significant difference was observed in perceived control over health between the two age groups; however, the older group reported significantly higher health commitment. The level of endorsement of physical activity and strength as essential for a good life did not differ between the two age groups. Finally, neither the measure of health appraisal compared to others of the same age nor the composite measure of average health now compared to 5 years ago was significantly different between the middle-aged and older groups.

Moderation analyses

Possible interactions between age and each of the behavioral, attitudinal, and appraisal variables were examined in multiple logistic regression analyses, controlling for socio-demographic factors and functional restrictions. No

interactions were statistically significant, indicating that the associations of the psychosocial variables with activity level did not differ across age groups.

Discussion

Compared to physically inactive women, active women were somewhat younger, less likely to be Black, more likely to have education beyond high school, and reported fewer functional restrictions to physical activity. Active women were less likely to smoke or to be obese and more likely to have had a regular check-up in the previous 12 months. Active participants also had attitudes that facilitated physical activity, including greater perceived control over health, a greater commitment to health promotion, and a greater belief in the importance of physical fitness and strength for a good life. The comparative health appraisals of active women were more favorable both with respect to others of their own age and to their own health 5 years previously. In a multivariable analysis controlling for socio-demographic factors and functional restrictions, most of the psychosocial variables examined were independently related to physical activity, including health behaviors of having a routine check-up and not smoking, health attitudes involving commitment to health and valuing physical fitness and strength, and the health appraisal that one's health is better compared to others of the same age.

Our findings that other health behaviors were associated with activity level are consistent with evidence that health behaviors cluster within individuals (Heroux et al. 2012). As expected, smoking was associated with an unhealthy lifestyle (Shankar, McMunn, and Steptoe 2010). The association of routine medical check-ups with a physically active lifestyle may be an indicator of greater health commitment. In addition, some health providers encourage participation in physical activity (Hebert, Caughy, and Shuval 2012).

Our findings through the present study show health attitudes are central to an active lifestyle and are consistent with several health behavior models that emphasize perceptions of control, health commitment, and outcome expectancies, including theories of reasoned action and planned behavior (Montano and Kasprzyk 2008), the transtheoretical model (Prochaska, Redding, and Evers 2008), and social-cognitive theory (McAlister, Perry, and Parcel 2008; Schwarzer et al. 2008). Commitment to health is an important factor in women's physical activity due to women's multiple life demands (Im et al. 2011; McArthur et al. 2014; Seger, Eccles, and Richardson 2008). Intrinsic motives, such as goals of achieving fitness and stress reduction, have been shown to be particularly important in physical activity adherence in women (Seger, Eccles, and Richardson 2008).

Our results underscoring the role of health appraisals in physical activity are important in several respects. Self-ratings of health have been shown to

predict mortality (DeSalvo et al. 2005; Schnittker and Bacak 2014). Such ratings may reflect present health behavior and may also be predictive of future behavior (Benyamini 2011; Jylha 2009). In addition, positive self-ratings of health may produce incentives and motivation for further engagement in health-promotive physical activity.

In the present study, we also identified differences between middle-aged and older women in activity level and underlying socio-demographic and psychosocial factors linked to physical activity. In comparison to older participants, more middle-aged participants were active. In addition, middle-aged participants had more education, were more likely to be married, and reported fewer functional restrictions. Middle-aged participants were also more likely to smoke. However, older women reported higher health commitment, consistent with literature showing that health becomes more salient to individuals as they age and that older persons are more active in pursuing health goals (Frazier and Hooker 2006). However, none of the psychosocial variables interacted with age in examining activity status, indicating that psychosocial variables underlying a more active lifestyle operate in a similar manner for middle-aged and older women. Interestingly, the average appraisal of present health compared to others of the same age was nearly identical for the two age groups. This finding may indicate continuing adjustments in self-evaluations of health in the context of increasing infirmities with age (Jylha 2009).

This study had several limitations. The data were cross-sectional, and thus causality cannot be inferred. Longitudinal analyses would help to understand better the underlying causal nature of the relationships among the study variables. In addition, the data were self-reported and thus may be subject to recall bias. Moreover, self-reported physical activity may be higher than activity measured objectively (although potentially imperfectly) by an accelerometer (Tucker, Welk, and Beyler 2011). Additionally, the overall participation rate was modest and may have reduced representativeness of the sample and thus generalizability of results. Also, members of minority groups were underrepresented in the MIDUS, and inferences regarding race should be made with caution. Further, as often occurs in large survey studies (Trzesniewski et al. 2011), a small number of items were available to measure constructs, such as control over health and health commitment. However, these items have been used successfully in the large body of research on the MIDUS sample.

Our findings in the present study provide an integrative picture of middle-aged and older women who engage in leisure-time physical activity. The findings suggest that active women tend to engage in other positive health behaviors, while refraining from negative behaviors, such as smoking. More active women are dedicated to health promotion and are aware of and value the contribution of physical activity to their lives. Physically active women

also feel more healthy compared to the previous 5 years and compare their health more favorably to other women their age. These associations were consistent across middle-aged and older groups.

Despite the fact that physical activity is beneficial to both current and future health for middle-aged and older women, physical activity in women decreases throughout adulthood. Interventions to lesson this decline have important implications for women's health. The present findings highlight several factors that are applicable to interventions to promote women's physical activity. Some of the variables identified here may operate as facilitators of physical activity, such as perceptions of control, commitment to health, and appreciation of the value of physical activity for health. To promote women's initial participation, physical activity interventions should include an educational component to enhance awareness of the importance of physical fitness to quality of life. In turn, fostering positive appraisals of comparative health may help to maintain women's continued participation in a physical activity intervention. Other variables reflecting an unhealthy lifestyle, including smoking, may operate as barriers to physical activity engagement through both associated unhealthy attitudes and reduced capacity to exercise. Because health behaviors cluster in mutually reinforcing ways, interventions to increase physical activity among women need to take account of multiple health habits, especially smoking. In addition, the results showed that, although age differences were apparent in the level of some psychosocial variables, the mechanisms of action appeared to be consistent across age groups, suggesting that similar interventions may be effective for women in middle and later adulthood.

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