

Purposiveness and Leisure-Time Physical Activity in Women in Early Midlife

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Physical activity in early midlife has important implications for women's health. The present cross-sectional study investigated the relation of purposiveness to leisure-time physical activity, as mediated by health investment, in a sample of women in early midlife. Participants were 211 women between the ages of 35 and 45 years (mean 40.55 years, SD = 3.11) who responded to the second wave of the study of Midlife Development in the United States. Participants were originally selected by means of a nationally representative random-digit-dialing procedure. A structural equation analysis of data with latent variables was conducted with MPLUS.

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The data for this study were obtained from the Inter-university Consortium for Political and Social Research (ICPSR). The data are drawn from the core sample of MIDUS2: Ryff, Carol, Almeida, D. M., Ayanian, J. S., Carr, D. S., Cleary, P. D., Coe, C., Davison, R., Krueger, R. F., Lachman, M. E., Marks, N. F., Mroczek, D. K., Seeman, T., Seltzer, M. M., Singer, B. H., Sican, R. P., Tun, P. A., Weinstein, M., and Williams, D. (2006). MIDLIFE DEVELOPMENT IN THE UNITED STATES (MIDUS2), 2004–2006 [Computer file]. ICPSR04652-v1. Madison, WI: University of Wisconsin, Survey Center [producer], 2006. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2007-03-22.

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Purposiveness was indexed by measures of purpose in life, personal growth, and future planning. Health investment was indexed by thought and effort committed to health and the extent to which individuals worked hard to stay healthy. Leisure-time physical activity was indexed by both moderate and vigorous leisure-time activity. Results, controlling for sociodemographic factors, showed that purposiveness was associated with more physical activity and that the relation between purposiveness and leisure-time physical activity was fully mediated by health investment. These results suggest that women with a sense of purpose may be better able to achieve acceptable levels of physical activity.

KEYWORDS *physical activity, women's health, midlife*

INTRODUCTION

The importance of physical activity across the lifespan has been well-established (USDHHS, 2011; Haskell et al., 2007). Despite considerable evidence concerning its benefits, many women fail to participate in regular physical activity. Motivational processes in leisure-time physical activity in women in early midlife play a key role in achieving immediate health benefits as well as in laying the foundation for later physical activity and health (Britton et al., 2008; USDHHS 2011). The purpose of the authors in the present study was to investigate the cross-sectional relation of purposiveness to leisure-time physical activity in a sample of women in early midlife drawn from the second wave of the National Survey of Midlife Development in the United States (MIDUS, 2011; Ryff et al., 2006).

Leisure-time physical activities include physical activities or exercise such as running, calisthenics, golf, gardening, or walking (CDC, 2007). Both moderate and vigorous leisure activity have positive health benefits (Haskell et al., 2007). Many women fall short of accepted guidelines for physical activity, with women less active than men (Haskell et al., 2007; Kruger, Ham, & Kohl, 2005). In 2004, the prevalence of leisure-time physical inactivity was 26% for women, compared with 21% for men (Kruger, Ham, & Kohl, 2005). Trends in leisure-time physical activity over time indicate that women have consistently engaged in less leisure-time physical activity than men (Haskell et al., 2007). Physical activity becomes particularly important as women approach the menopausal transition, when women experience increasing health risks (Owens et al., 2003; Pinkerton & Stovall, 2010). The early midlife period, when women are relatively healthy (Cleary, Zaboriski, & Ayanian, 2004), is an important time to maintain a commitment to regular physical activity.

The establishment and maintenance of leisure-time physical activity is an important means of sustaining health. Physical activity has been associated with reduced risk of numerous diseases, and physical inactivity is an important health risk (Mokdad et al., 2004; Mokdad et al., 2005; Schroeder, 2007; USDHHS, 2011). Women face increased cardiovascular risk in midlife from menopausal changes (Owens et al., 2003; Pinkerton & Stovall, 2010), as well as increased future morbidity associated with aging, which may be mitigated by physical activity. Inactivity in midlife is related to mortality and the occurrence of future disability (Fries, 2002), as well as decline in perceived health (Malmberg et al., 2005), while midlife physical activity is associated with successful aging (Britton et al., 2008). However, as women age, their participation in leisure-time physical activity declines (Haskell et al., 2007). At the same time, however, later participation in physical activity is related to earlier participation (Evenson et al., 2002; Hirvensalo, Lintunen, & Retanen, 2000; Holahan & Suzuki, 2004), and understanding motivational factors in earlier participation may help provide a foundation for better health for women in later life.

Individuals play an active role in producing their own development through their sense of purpose and their investment in self-developmental goals (Brandstadter & Lerner, 1999). Goals are organized hierarchically, such that those at a higher level of abstraction are realized through the commitment to and attainment of subordinate goals (Emmons, 1999). Orientation to the future through a sense of purpose in life, personal growth, and planning may be channeled into subordinate goals, such as health investment, that have implications for individuals' health. One explanatory mechanism for the relation of purposiveness to positive health may be the commitment to and engagement in positive health behavior. For example, Ryff & Singer (1998) proposed that purpose in life and personal growth can play an important role in establishing and maintaining positive health behaviors. Engagement in positive health behaviors, in turn, promotes better health (Schroeder, 2007).

Purposiveness is comprised of several related facets, including purpose in life, personal growth, and future planning. Several studies have demonstrated positive relations of these and closely related motivational constructs with health behavior and health outcomes. For example, having a sense of purpose, meaning and commitment was related to positive physical and psychological health and life satisfaction (Bronk et al., 2009; Keyes, Shmotkin, & Ryff, 2002; Ryff & Singer, 1998). Life engagement reflecting a commitment to valued goals was related to general health as well as to a number of other indices of quality of life in a community sample of middle-aged women (Scheier et al., 2006). Purpose and meaning in life have been linked to lower risk for mortality in older persons (Boyle et al., 2009; Krause, 2009). Further, impaired personal growth was related to increased risk for depression in middle-aged and older adults (Wood & Joseph, 2010). Moreover, future-

oriented planning and goals were associated with greater life satisfaction in adults (Prenda & Lachman, 2001) and less decline in exercising with aging (Kahana, Kahana, & Zhang, 2005), and achieving personal goals has been shown to be complex and to involve the management of time and resources (Gollwitzer & Oettingen, 2011).

Research and theory in health behavior and health promotion have stressed the importance of an individual's personal commitment and investment in their own health to initiating and sustaining beneficial health behavior (Rimer, 2008). The intention to perform a behavior is seen as central to the enactment of desirable health behavior in the integrated behavioral model (Montano & Kasprzyk, 2008). The widely employed stages of change model stresses the importance of intentions as individuals move through preparatory stages to taking action to engage in desirable health behavior (Prochaska, Redding, & Evers, 2008). Moreover, social cognitive models of health behavior change stress the importance of behavioral intentions in health actions (Renner & Schwarzer, 2003).

Several sociodemographic variables have been shown to relate to women's physical activity. Women's multiple role demands, such as marriage and parenthood, have been reported as barriers to engagement in leisure-time physical activity (Bell & Lee, 2005; King et al., 2000; Kowal & Fortier, 2007; Wilcox et al., 2000). Socioeconomic status is related to health and health behavior (Marmot & Fuhrer, 2004), as is age (Haskell et al., 2007). Moreover, purpose in life and personal growth have been shown to be related to education and to show decrements with age (Ryff, Keyes, & Hughes, 2004).

The purpose of the present study was to examine the relation of purposiveness to leisure-time physical activity in early midlife women. The participants for this study were women between the ages of 35 and 45 years who responded to the second wave of the National Survey of Midlife Development in the United States (MIDUS2) (Ryff et al., 2006). The authors hypothesized that: (1) purposiveness would be related to leisure-time activity in women in early midlife and (2) the relation between purposiveness and leisure-time physical activity would be mediated by health investment, when controlling for important sociodemographic factors.

METHOD

Participants

The participants in the present study were 211 women in early midlife between the ages of 35 and 45 years who responded to the second wave of the National Survey of Midlife Development in the United States (MIDUS II) and who completed all measures of interest. The second wave of the MIDUS

was used in the present study because the scales for purpose in life, personal growth, and leisure-time physical activity were enhanced in the second wave of data collection, providing better measurement of these constructs.

MIDUS II was the second wave of the study of Midlife Development in the United States, initially undertaken to study behavioral, psychological and social factors in mental and physical health. MIDUS II was funded by the National Institute on Aging and was conducted in 2004–2006. At the time of the second wave of data collection, the respondents ranged in age from 35 to 86 years (MIDUS, 2011). The present study was a secondary data analysis of a de-identified dataset (Ryff et al., 2006) provided by the Inter-university Consortium for Political and Social Research at the University of Michigan. The data analyzed were collected via a phone interview and follow-up self-administered questionnaires from women in early midlife in the core sample of MIDUS II (Ryff et al., 2006). Respondents in the first wave of the project (MIDUS I) were obtained from a nationally representative random-digit-dialing procedure which was used to obtain a sample of non-institutionalized, English-speaking adults, aged 25 to 74 years, randomly selected from working telephone banks in the coterminous United States. MIDUS I data were collected in 1995. Households were selected randomly, and a random respondent was selected from a household list of persons aged 25 to 74 years obtained from the contact person in the household (MIDMAC, 2006). For MIDUS II, the investigators attempted to contact and recruit all of the original MIDUS I respondents. In the MIDUS II data collection, participants were contacted by phone, and oral consent for participation was obtained by telephone because the first contact for the data collection was by phone. The overall response rate for the phone interview in MIDUS II was 75%, and the overall response rate for the self-administered questionnaires was 81%. IRB approval to conduct the secondary data analysis of the de-identified MIDUS II dataset used in the present study was given by the current investigators' university.

Measures

Purposiveness. Purposiveness was measured by three scales: Purpose in Life, Personal Growth, and Future Planning. Purpose in Life consisted of seven items drawn from the measure developed by Ryff (1989). This scale included items such as *"I live life one day at a time and don't really think about the future,"* and *"I have a sense of direction and purpose in life."* Personal growth consisted of seven items from the Ryff (1989) measure. This scale includes items such as, *"I am not interested in activities that will expand my horizons,"* and *"For me, life has been a continuous process of learning, changing, and growth."* Items on the Purpose in Life and Personal Growth scales were coded on a 7-point scale labeled from 1 (*strongly agree*) to 7 (*strongly disagree*), with the midpoint labeled neither agree nor disagree.

The scales were constructed by calculating the sum of each set of items and scored in the positive direction. The third scale, Future Planning (Prenda & Lachman, 2001), consisted of five items: "I like to make plans for the future," "I find it helpful to set goals for the near future," "I live one day at a time," "I have too many things to think about today to think about tomorrow," and "I believe there is no sense planning too far ahead because so many things can change." The responses were coded 1 (*a lot*), 2 (*some*), 3 (*a little*), and 4 (*not at all*) and were scored in the direction of more future planning, with the scale score representing the average of the five items. The Cronbach's alphas for the three scales in the core sample in MIDUS2 were .71 for Purpose in Life, .75 for Personal Growth, and .62 for Future Planning.

Health investment. Health investment was measured by two items: (1) "Using a 0 to 10 scale in which 0 meant 'no thought or effort' and 10 meant 'very much thought and effort,' how much thought and effort do you put into your health these days?" and (2) an item scaled from 1 (*strongly agree*) to 7 (*disagree*), "I work hard at trying to stay healthy" (reverse-scored).

Leisure-time physical activity. Moderate and vigorous leisure-time physical activity were measured to assess leisure-time physical activity that might contribute to meeting guidelines for physical activity. Respondents were asked how often they engage in "moderate physical activity that is not physically exhausting but it causes your heart rate to increase slightly and you typically work up a sweat? (Examples: leisurely sports like light tennis, slow or light swimming, low impact aerobics, or golfing without a power cart; brisk walking, mowing the lawn with a walking lawnmower)." For vigorous activity, respondents were asked how often they engage in "vigorous physical activity that causes your heart to beat so rapidly that you can feel it in your chest and you perform the activity long enough to work up a good sweat and are breathing heavily? (Examples: competitive sports like running, vigorous swimming, or high intensity aerobics; digging in the garden, or lifting heavy objects)." Respondents were asked to indicate how often they engaged in such activity during their leisure or free time in the summer and the winter. Responses were scaled from 1 (*several times a week*) to 6 (*never*) and scored in the direction of more physical activity. Responses for summer and winter were summed for moderate and vigorous activity, respectively, to form a moderate and vigorous physical activity score.

Sociodemographic variables. Several sociodemographic variables were used as covariates in the structural equation analysis. These included age, marital status (unmarried, married), education (high school education or less, more than a high school education), parental status (nonparent, parent), and total annual household income, which was based on wage, pension, Supplemental Security Income, and government assistance, and imputed by the MIDUS research staff when income data were missing. Partnered but not

married women were not identified as a separate category in the original data collection.

Data Analysis

Descriptive statistics including means, standard deviation, and proportions with associated chi squares were computed to summarize the demographic characteristics of the sample and the psychological and behavioral variables of interest in the study. All potential confounding sociodemographic variables identified from the literature were controlled in the multivariable analyses.

A structural equation analysis was conducted with three latent variables: purposiveness, health investment, and physical activity. For the structural equation analysis, residualized variables were created to adjust for the potential confounding effects of age, marital status, education, income, and parenthood. Correlations among the residualized variables were computed and used to test the hypothesized models using MPLUS. Variance-covariance matrices were used in the MPLUS analyses, with listwise deletion of missing values ($N = 211$). Goodness of model fit was determined by the examination of several fit indices and their criteria: Chi-Square test of model fit, $p < .10$; CFI $> .96$; SRMR $< .10$, and RMSEA $< .06$.

RESULTS

The mean age of the 211 study participants was 40.55 years ($SD = 3.11$ years). Mean total annual household income was \$81,912 ($SD = \$56,726$). Among participants, 148 (70.1%) were married, 182 (86.3%) were parents, and 148 (70.1%) had more than a high school education. Chi square goodness of fit tests were conducted for the three categorical sociodemographic variables and all were significant ($p < .001$), indicating that the respondents were significantly more likely to be married, parents, and to have had more than a high school education.

The participants scored above the midpoint of the possible range of scores on all three scales used to index purposiveness—purpose in life, personal growth, and future planning (Table 1). The average level of thought and effort put into health was fairly high (7.24 on a scale with a possible range of 0 to 10). The mean level of response to the item concerning working hard at trying to stay healthy was also fairly high (5.27 on a scale with a possible range of 1 to 7). The mean score for the sum of the items for summer and winter moderate physical activity represented an average frequency of between several times a month and once a week during the two seasons. The mean score for the sum of the items for summer and winter vigorous activity was slightly lower than that for moderate activity

TABLE 1 Means and Standard Deviations of Study Variables ($N = 211$)

	Mean	SD	Range
Purpose in life	38.19	7.52	7-49
Personal growth	38.23	7.17	7-49
Future planning	2.84	0.53	1-4
Thought and effort put into health	7.24	1.96	0-10
Work hard at trying to stay healthy	5.27	1.49	1-7
Moderate leisure-time physical activity	8.68	3.34	2-12
Vigorous leisure-time physical activity	7.15	3.68	2-12

and represented an average frequency of between several times a month and once a month.

A structural equation analysis was conducted using MPLUS with a variance-covariance matrix constructed from residualized variables created to adjust for the potential confounding effects of age, marital status, education, income, and parenthood. The correlational patterns for the residualized variables showed moderate intercorrelations among the variables indexing each latent construct—purpose in life, personal growth, and planning for purposiveness, thought and effort and trying hard to be healthy for health investment, and moderate and vigorous leisure-time physical activity for physical activity (Table 2). All of the upstream variables were significantly correlated with moderate and vigorous physical activity.

Before testing the structural equation model, the measurement model was tested. On the basis of examination of the modification indices for the initial measurement model, a parameter reflecting correlation between the unique variances for the measures of Personal Growth and Future Planning was included. Including this parameter in the model improved model fit without altering the significance of any of the paths. All paths from the three latent variables to their respective indicators were significant at the $p = .01$

TABLE 2 Correlations Among the Study Variables, Controlling for Age, Education, Marital Status, and Parenthood (listwise deletion of missing data; $n = 211$)

Variable	1	2	3	4	5	6	7
1. Purpose in life	—	0.74***	0.56***	0.28***	0.27**	0.24**	0.14*
2. Personal growth	—		0.39***	0.30***	0.31***	0.22**	0.16*
3. Planning			—	0.24**	0.15*	0.23**	0.26***
4. Thought and effort put into health				—	0.52***	0.26***	0.28***
5. Try hard to be healthy					—	0.35***	0.30***
6. Moderate activity						—	0.64***
7. Vigorous activity							—

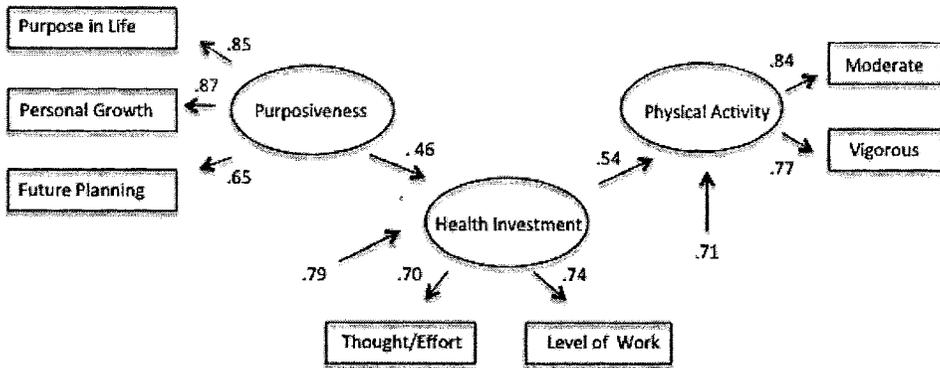


FIGURE 1 Results of the MPLUS test (standardized estimates) of the structural equation and measurement models for a model showing the relation of purposiveness and health investment to engagement in moderate and vigorous leisure-time physical activity. Latent constructs are shown with ellipses, and observed variables are shown with rectangles. All paths in the measurement and structural model are significant at $P < .01$.

level, and the measurement model fit the data well (overall χ^2 (10, $N = 211$) = 16.44, $P = .088$; CFI = .987; SRMR = 0.033; RMSEA = 0.055 [90% confidence interval = 0.00; 0.101]).

To address the first hypothesis, a direct model was tested to determine if purposiveness was significantly related to leisure-time physical activity without the proposed mediator, health investment, in the model. The parameter in the structural model showing a direct link between purposiveness and physical activity was significant at the $p = .01$ level ($B = .31$). Thus, the first hypothesis that purposiveness would be related to leisure-time physical activity was not rejected. The authors then tested the hypothesized mediational model in which the relation between purposiveness and physical activity was mediated by health investment. The hypothesized model provided a good fit to the data (overall χ^2 [11, $N = 211$] = 17.84, $p = .085$; CFI = .986; SRMR = .039; RMSEA = 0.054 [90% confidence interval = 0.0; 0.098]). All parameter estimates in the measurement and structural models were significant at the $p = .01$ level (see Figure 1). The second hypothesis that the relation between purposiveness and leisure-time physical activity would be mediated by health investment was therefore also not rejected.

The hypothesized mediational model was compared to an alternative *full* model that added a parameter reflecting a direct path between purposiveness and physical activity in addition to the indirect path through health investment. Consistent with the proposed mediational model, the full model did not significantly improve model fit, and the hypothesized mediational paths through health investment remained significant at the $p = .01$ level. The hypothesized model was not rejected because it was more parsimonious.

DISCUSSION

In the present study the authors examined the relationship between purposiveness and leisure-time physical activity in a sample of 211 women in early midlife, between the ages of 35 and 45 years. As hypothesized, after accounting for the effects of relevant sociodemographic variables, purposiveness, indexed by purpose in life, personal growth, and future planning, was positively related to leisure-time physical activity. Also as hypothesized, this relationship was mediated by health investment, indexed by the level of thought and effort committed to health, and the extent to which individuals worked hard to stay healthy.

The establishment and maintenance of leisure-time physical activity is an important means of sustaining health, and the present results contribute to an understanding of motivational factors in promoting women's health in early midlife. Physical inactivity becomes an increasing health threat for women as they age because it is implicated in the development of numerous chronic diseases (USDHHS, 2011). Leisure-time physical activity is an important health behavior for women at midlife, when they face increased cardiovascular risk, as well as increased risks for other sources of morbidity (Fries, 2002; Owens et al., 2003).

The present findings were consistent with the literature on goal-related constructs in life-span development and health promotion demonstrating links between broader purposive goals and exercise and health (Bronk et al., 2009; Kahana et al., 2005; Keyes et al., 2002; Scheier et al., 2006). After accounting for key demographic variables, purposiveness was significantly related to physical activity. The present findings agreed with intentional self-development theory (Brandstadter & Lerner, 1999), which stressed the possibilities for individuals to contribute to their own development, and they reinforced the notion of women taking an active role in promoting their own health. Moreover, the present findings indicated that the link between purposiveness and physical activity was mediated by investment in health. Thus, the findings showed that a broader, higher-level goal (Emmons, 1999) of a purposeful life may be channeled into a specific goal to care for oneself.

The present results were broadly consistent with results of research showing that women's continued exercise in midlife is related to intrinsic motivation for exercise, such as enhancing well-being or stress reduction. Women whose exercise motives emphasized extrinsic motives, interpreted as stemming from social and cultural influences and defined by the authors as weight-loss, weight maintenance/toning, and exercising primarily for health benefits, were less likely to adhere (Segar, Eccles, & Richardson, 2008). Wray (2007) also noted that health promotion messages framed in terms of health alone may be perceived by women as external pressures. However, the results of Segar and colleagues (2008) and Wray (2007) do not conflict with

the idea that personally meaningful higher-level goals, which may enhance well-being, may facilitate involvement in physical activity for women.

The present results concerning purposiveness and health investment were consistent with evidence that active planning to increase exercise is more important for women than for men due to women's pressure from the demands of multiple roles (Hankonen et al., 2010). In addition, in a study of future-oriented self-perceptions of middle-aged women (Whaley, 2003), self-regulatory mechanisms, such as the importance placed on exercise and self-efficacy with related to exercise, differentiated women who were long-term exercisers from those who did not exercise.

The sample for the present study was comprised of women in early midlife. It is likely that effective exercise motivations may vary for women across the life cycle. For example, in a study of women ranging in age from 50 to over 75 participating in community exercise programs, the most important motives for participation were fitness, activity enjoyment, and social rewards (Kirby et al., 1999). The oldest women in their sample placed more emphasis on social motives and less emphasis on personal fulfillment compared to the younger participants.

Contemporary positive psychology is searching for ways to enhance the human experience (Aspinwall & Staudinger, 2003; Snyder & Lopez, 2002). Positive psychology, in its investigation of human strengths, has made considerable contributions to health psychology, including an understanding of how positive beliefs, such as optimism and self-affirmation, can foster better health behaviors (Taylor & Sherman, 2004). This study builds on previous research by investigating the link between an indicator of positive psychological functioning—purposiveness—and a specific, positive health behavior—leisure-time physical activity.

Examining motivational factors related to physical activity among women in early midlife has potentially significant implications for women's health, not only because exercise has positive health benefits, but also because women report significant barriers to exercise. Societal and cultural norms discourage exercise in women (Vrazel, Saunders, & Wilcox, 2008), and women's multiple role demands present challenges to their engagement in leisure-time physical activity (Bell & Lee, 2005; King et al., 2000; Kowal & Fortier, 2007; Vrazel, Saunders, & Wilcox, 2008; Wilcox et al., 2000). However, current thinking on women's multiple roles follows a role expansion, or role enhancement paradigm, where women's multiple roles complement and enhance each other and have positive benefits for women's mental health (Barnett & Hyde, 2001). Multiple roles are sources of identity and meaning (Simon, 1997) and women benefit from multiple role involvement, qualified by role quality and upper limits on demands (Barnett & Hyde, 2001). Encouraging women's recognition of the sources of meaning in their lives and the ways that physical activity may facilitate reaching their personal goals may help women persevere in the face of obstacles to physical activity.

Some limitations of the present analyses should be noted in interpreting these results. These data were cross-sectional in nature, and although the structural equation results were consistent with a causal link between purposiveness and physical activity, an experimental design would help to establish causality. In addition, self-reported measures are subject to potential misclassification and recall bias. As frequently occurs in secondary data analyses of large survey studies (Trzesniewski, Donnellan, & Lucas, 2011), a small number of items were available to index constructs for health investment and leisure-time physical activity, for which psychometric data were not available. However, the performance of these measures in the structural equation measurement model for this study supported their construct validity. In addition, future research is needed to examine causality in the relationships of purposiveness and health investment and physical activity using a prospective design. For example, developing an intervention for boosting purposiveness and associated planning, linking them to health goals and testing outcomes at subsequent time points could be an informative direction for future research.

Our findings broaden an increasing awareness of the link between positive psychological characteristics and physical health. Previous research has demonstrated the health-promoting benefits of exercise (USDHHS, 2011), and the present findings relating to the correlates of and mechanisms underlying physical activity shed further light on improving health. Moreover, by studying a group who engage in relatively less physical activity at a life stage when they are facing increased barriers to exercise, the present study contributes to the study of life-span development and health.

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