

Investigating general and self-expectations regarding aging in a physical activity context

CASSANDRA R. SPARKS*, BRAD A. MEISNER**, and BRADLEY W. YOUNG*

(**)University of Ottawa, Canada*

(***) Ryerson University, Canada*

Considering how low overall aging expectations constrain various other health-promoting behaviours in adults (Levy, 2003), we examined whether general aging expectations and aging self-expectations differentially influence physical activity (PA). In a cross-sectional design, 167 moderately physically active adults aged 45-74 years completed ERA-38 (Sarkisian, Hays, & Mangione, 2002) and GLTEQ (Godin & Shephard, 1985) surveys. Separate factor analyses examined the validity of general aging expectation (GAE) and aging self-expectation (ASE) items, and multivariate analyses examined their associations with PA. Results indicated the emergence of three GAE (Satisfaction/Contentment, Physical Function, Cognitive Function) and three ASE sub-factors (Functional Health, Social Health, Sexual Function). More active adults had higher Cognitive Function ($p < .05$) and Satisfaction/Contentment ($p = .06$) expectations than less active adults. Regression analyses by age group (45-54; 55-64; 65-74) showed Physical Function ($\beta = .36$) and Satisfaction/Contentment ($\beta = .30$) explained current PA only for 45-54 year-olds. Findings endorse and expand upon ERA-38 trends in the context of PA by showing that certain negative aging expectations constrain current weekly PA among adults.

KEY WORDS: Adults, Age stereotypes, Aging expectations, Exercise, Physical activity.

Despite widespread research supporting the benefits of physical activity for middle aged and older adults, an age-associated decline in physical activity persists and great challenges remain in motivating older adults to attain and/or sustain active lifestyles (Ory, Hoffman, Hawkins, Sanner, & Mockenhaupt, 2003; Warburton, Nicol, & Bredin, 2006). To better understand psychological conditions for aging adults' low activity levels, it is important to

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Correspondence to Bradley W. Young, PhD at the Faculty of Health Sciences, University of Ottawa, Ottawa, ON Canada K1N 6N5. Tel: (613) 562-5800 x.4252

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consider self-perceptions and self-expectations, because these cognitions have significant influence on how middle-aged or older adults approach physical activity behavior (Brawley, Rejeski, & King, 2003; Lachman et al., 1997). For example, constructs such as physical self-efficacy (e.g., McAuley, Jerome, Marquez, Elavsky, & Blissmer, 2003) and outcome expectations about the benefits of physical activity (e.g., Resnick, Zimmerman, Orwig, Furstenberg, & Magaziner, 2000), among others, are consistently and proximally associated with aging adults' efforts at physical activity. An additional cognitive variable that may have an impact on physical activity behavior relates to people's expectations for how the aging process will impact on various aspects of their self and how they anticipate their functioning during the aging process. Although age has been identified in descriptive research as a barrier (e.g., Booth, Bauman, & Owen, 2002) or possible stigma (e.g., Grant, 2001) to physical activity, very little research has examined these more global aging expectations as a specific construct that can be used to predict physical activity, or to distinguish between physically active and less active cohorts. Actual physical activity may be restricted among adults due to overall lowered expectations for personal, social, mental and physical functioning as one ages.

Very little research has quantitatively examined aging expectations as they relate to physical activity. Of the studies that have addressed the topic, various researchers have used the Attitude Towards Own Aging subscale of the Philadelphia Geriatric Center Morale Scale (Singh, Clements & Fiatarone, 1997), and the Expectations Regarding Aging (Meisner, Weir, & Baker, 2010; Sarkisian, Prohaska, Wong, Hirsch, & Mangione, 2005) survey. As there appears to be no accepted inventory that might be employed to study aging expectations in a physical activity setting, we have chosen to examine 'expectations regarding aging' because this construct has been recently proved to successfully predict variance in other health-seeking behaviors besides physical activity. Expectations regarding aging are expectations pertaining to the "achievement and maintenance of high levels of physical and mental functioning with aging, which indicates the expectations of achieving healthy aging for *self* and *others*" (Kim, 2009, p.85). The literature associated with quantitative aging expectation research appears to characterize healthy aging by maintained levels of cognitive and physical functioning, and life satisfaction, along with connotations of positive independent living with minimal risks of dependency, loneliness, and age-related disability. The literature also assumes that aging individuals have some capacity to select various behaviors, including leisure activities, which can contribute to personal well-being. The Expectations Regarding Aging

survey (ERA-38; Sarkisian, Hays, Berry, & Mangione, 2002) has been used recently in clinical or rehabilitative settings to study why aging individuals engage or disengage in preventative health behaviours, or adhere to rehabilitative intervention regimes (Kim; Levy & Myers, 2004; Levy, Slade, May, & Caracciolo, 2006; Sarkisian, Hays, & Mangione, 2002). The common trends among these studies have been that having low ERA scores (i.e., lower expectations for achievement and maintained functioning) is associated with lower health behavior levels, and having higher ERA scores is associated with current engagement in health promoting behaviors.

As physical activity is acknowledged by the majority of adults as a health-promoting behaviour (Ory et al., 2003), the ERA-38 may hold similar promise for explaining engagement in this context. To date, however, only two studies have specifically examined the relationship between ERA and physical activity levels of adults. Among community residing older adults who were generally less physically active, Sarkisian et al. (2005) found that ERA for subscales relating to general health, functional independence, pain and fatigue, and appearance were independently associated with low physical activity levels. Using the shorter ERA-12 survey in a sample of community-dwelling Canadian adults ($M = 71$ yrs), Meisner, Weir, et al. (2010) revealed small positive correlations (all $r_s < .19$) between overall ERA and participation in overall physical activity, lawn work or yard care, and sport activity. Results showed that the physical health ERA subscale was significantly associated with light housework, as well as light and moderate sport activities (all $r_s < .16$). Although findings were correlational in nature, and effects were small, these results were the first to demonstrate how expectations of decline with age, namely declines in physical health, are associated with decreased reports of participation in various modes of physical activity.

The definition of expectations regarding aging relates to both self and others, respectively comprising aging self-expectations and general aging expectations. Individuals' expectations are derived greatly from the social environment, based on an accumulation of influences from the dominant attitudes, beliefs, and norms towards aging perpetuated by family, friends, institutional settings (e.g., health care) and society as a whole (Levy, 2003). Aging persons' exposure to predominantly negative aging social stereotypes lowers their expectations related to the aging process, which in turn can compromise a variety of health-oriented behaviors among older adults (Levy & Langer, 1994), including physical activity (Horton, Baker, Côté, & Deakin, 2010).

In the ERA-38, survey items appear to distinguish between assessments for expectations that are held for most people (e.g., social norms), compared

to self-perceptions of what can be expected of oneself (e.g., self-perceptions) during the aging process. Some items are distinctively phrased in relation to the aging process in general (e.g., ‘When people grow older...’, ‘Part of aging is...’) and others in relation to oneself (e.g., ‘I expect that as I get older...’, ‘When I get older...’). Asking about self- vs. social-level perceptions is consistent with construct distinctions in psychological theories examining how people plan to engage in certain behaviors, for instance, the concepts of individual *attitudes* (i.e., evaluation of a phenomenon by an individual) and *social norms* (i.e., broader social expectations relating to the phenomenon) of the theory of planned behavior (Ajzen, 1985). Moreover, asking about self- vs. social-level perceptions is consistent with symbolic interactionists’ distinction between processes related to self-schemata and role expectations engendered by a social structure (Stryker & Burke, 2002). Research also shows how negative stereotyped information about ‘old age’ influences general perceptions about other older adults, yet self-perceptions about one’s own aging can remain uninfluenced by such messages or may even change positively following experimental presentation of such messages (Pinquart, 2002). In sum, although general and self beliefs are related, there is conceptual and empirical precedent for their distinction. Although prior ERA-38 research has analyzed a collapsed pool of the items to assess overall ERA, and subscales have merged both general- and self-ERA, the current study elected to distinguish between self-expectations and general aging expectations to investigate their independent relationships with physical activity in adults.

The overriding purpose of the current study was to explore the suitability of general and self-expectation items of the ERA-38 to understanding the relationships between aging expectations and physical activity. To ensure validity, we first identified emergent sub-factors within both general aging expectation (GAE) and aging self-expectation (ASE) item pools, and further ensured the internal consistency reliability of these sub-factors. Next, we explored the relationships between the emergent GAE and ASE sub-factors with physical activity. Analyses determined if relationships existed between (a) *general* aging expectation sub-factors, age group (i.e., 45-54, 55-64, 65-74 years), and physical activity status (i.e., less active, more active), and between (b) aging *self*-expectation sub-factors, age group and physical activity status. Exploring such relationships as a function of age may help to pinpoint periods when expectations for declining function are particularly constraining for physical activity, and may afford a discussion of how anticipated expectations relating to the aging process might depend on whether individuals are chronologically early (45-54), progressing (55-64), or relatively later (65-74 yrs) in the aging process. Due to very limited available literature relating to a

physical activity context, we drew from literature pertaining to other health-seeking behaviours to hypothesize that lower (i.e., poorer, or less optimistic) age expectations would be related to decreased levels/lower status of physical activity participation; however, we refrained from further postulations due to the novel application of ERA-38 items to a physical activity context.

Methods

PARTICIPANTS

Participants included 167 adults aged 45 to 74 years (101 f; 66 m; M age = 59.46, SD = 8.18) selected from various locations and organizations in one large-sized and one medium-sized metropolitan center in Ontario, Canada. Data for community residing individuals were collected from various adult physical recreational (e.g., bowling leagues, mall walking groups) and sport programs (e.g., seniors sport jamborees), from non-physically active community organizations (e.g., bingo halls), and from staff at secondary schools (targeted because they contained adults of varying physical activity levels). Participants were recruited using a convenience sampling method. Permission and consent to gather data from an organization was obtained from an associate representative, and informed consent was obtained before participation. All procedures were approved by the ethics review board at the affiliated university.

SURVEY ITEMS

All participants completed a questionnaire comprising two key components: the Godin Leisure Time Exercise Questionnaire (Godin & Shephard, 1985) and the ERA-38 (Sarkisian et al., 2002). Participants were also asked a number of demographic questions and provided their current age. Thirty-six percent of surveys were completed on-site and returned to investigators, 13% were distributed on-site with return by post, and 51% were completed and submitted using an on-line survey format.

GODIN LEISURE TIME EXERCISE QUESTIONNAIRE (GLTEQ). This self-administered questionnaire measures current levels of physical activity in metabolic equivalents (METs) by asking participants to reflect on the number of times during an average week, and the intensity, one engages in exercise behaviors (Godin & Shephard, 1985). A cut-point of 24 METs units is recommended to dichotomize between less active participants and participants considered sufficiently active to meet public health recommendations and achieve health benefits (Godin, 2011; see Pereira et al., 1997, for a review of reliability and validity measures relating to the GLTEQ). Twenty-four METs is the equivalent of one strenuous session of exercise and three moderate exercise sessions, each of minimal 15 minutes duration, per week.

EXPECTATIONS REGARDING AGING SURVEY. This is a 38-item self-administered survey that measures general and self-expectations for age relating to general health, cognitive function, mental health, functional independence, sexual function, pain, urinary incontinence, sleep, fatigue and appearance (Sarkisian et al., 2002). Participants report how they feel about

18 statements concerning aging self-expectations (ASE) and 20 statements regarding general aging expectations (GAE). Items pertaining to the self-perceptions of the participant are framed through a personal lens (e.g., “I expect that as I grow older I will become less attractive”). GAE items focus on the general experiences that older people may experience (e.g., “Forgetfulness is a natural occurrence just from growing old”). On a 4-point Likert scale, participants rate how they feel about each item using ‘definitely true’ (anchored at ‘1’), ‘somewhat true’, ‘somewhat false’ and ‘definitely false’ (anchored at ‘4’). Higher values on the ERA-38 indicate more positive expectation scores.

PLANNED ANALYSES

Firstly, we conducted two exploratory factor analyses with varimax rotation (one for items reflecting GAE and a separate analysis for items representing ASE) to assess the underlying structure of the item pool. These analyses served to identify valid sub-factors for a) GAE, and b) ASE. We also conducted further analyses to test the internal consistency reliability of each resultant sub-factor scale. Next, we divided participants into groups based on GLTEQ scores for current physical activity (active, less active) and age (45-54, 55-64, 65-74 years). A 2 (physical activity group) X 3 (age group) MANOVA was performed to test whether mean differences existed between active and less active groups and between 45-54, 55-64 and 65-74 year-old age groups on the GAE sub-factors generated from the exploratory factor analysis. Subsequently, a 2 (physical activity group) X 3 (age group) MANOVA was conducted to test whether mean differences existed between active and less active groups and 45-54, 55-64 and 65-74 year-old age groups on the ASE sub-factors. Finally, we used hierarchical regressions to examine whether the aging expectation sub-factors could explain variance in current physical activity levels, after controlling for variance in age. Hierarchical regressions were performed separately for GAE and ASE sub-factors, and were done for each of 45-54, 55-64, and 65-74 year-old cohorts to explore differences in the predictive power of the independent variables at various ages.

Results

PRELIMINARY ANALYSES

Descriptive statistics relating to the entire sample showed the overall mean score for GLTEQ was 27.97 ($SD = 20.97$) METS, demonstrating a moderate amount of current physical activity per week. The mean for the active group was 41.54 ($n = 95$; $SD = 17.07$, range = 24-106) while the mean score for the less active group was 10.07 ($n = 72$; $SD = 8.39$, range = 0-23). With respect to age group, the mean GLTEQ scores were 30.44 ($n = 54$; $SD = 24.75$), 26.33 ($n = 61$; $SD = 18.14$) and 27.33 ($n = 52$; $SD = 19.92$) for the younger (45-54 years), middle-aged (55-64 years) and older (65-74 years) groups, respectively. A one-way ANOVA showed no significant difference among the age groups with respect to mean MET values ($p = .56$).

FACTOR ANALYSES FOR GENERAL AGING EXPECTATIONS AND SELF-PERCEPTIONS OF AGING

Data for all participants were employed in separate analyses for the 20 GAE items and the 18 ASE items. For each pool of items, we conducted exploratory factor analyses using the principal extraction method to identify underlying factors. We used recognized criteria for determining factorability (Costello & Osborne, 2005), including minimal correlation levels of $r = .30$ for each item with at least one other item, the Kaiser-Meyer-Olkin test of sampling adequacy (both values $> .87$), Bartlett's test of sphericity (both $\chi^2 > 1147.6$, $ps < .05$), inspection of the diagonals of the anti-image correlation matrix (all values $> .50$) and inspection of communalities (all values $> .42$). Eigenvalues > 1.0 were used to retain factors in the initial solution and at recursive steps towards the final solution. Using varimax rotation, a recursive process was used to delete items to arrive at a final solution: at each step, items were deleted if they failed to reach a primary factor loading of 0.40, or if the difference between the primary loading and the cross-loaded value for an item was less than .20. These steps were performed systematically with additional consideration given to the conceptual relatedness of items loading on the same factor.

GENERAL AGING EXPECTATIONS. Eight items failed to load parsimoniously: 'Decreased energy in older people is just part of nature taking its course'; 'As people get older they worry more'; 'It's a normal part of aging that older people have trouble sleeping'; 'Old age is a time to enjoy life'; 'When people get older, they need to lower their expectations of how healthy they can be'; 'Having more aches and pains is an accepted part of aging'; 'Every year that people age, their energy levels go down a little more'; 'Needing to use adult diapers is just an expected part of getting old'. Of the remaining items, the final solution produced three distinct factors which explained 69.7% of the variance (see Table I for factor matrix and internal consistency reliability values). We assigned titles to each sub-factor based on the common theme among items within the group. Factor 1 was labeled as 'Satisfaction/Contentment with Aging' and included four items relating to the quality of life throughout the aging process. Factor 2 was labeled as 'Physical Function with Aging' and included five items pertaining to the functionality of the body throughout the aging process. Factor 3 was labeled 'Cognitive Function with Aging' and included three items relating to memory and cognition throughout the aging process. In all cases, cross-loading values for retained items were less than 0.39. Cronbach alpha values for the three factor scales were each $> .83$.

TABLE I
Factor Loadings for Retained General Aging Expectation Items from the ERA-38 (N = 167) Based on a Principle Component Analysis with Varimax Rotation

Item	M	SD	Satisfaction/ Contentment	Physical Function	Cognitive Function	Communalities
Being lonely is just something that happens when people get old.	3.25	.76	.84			.73
Becoming more lonely is a natural part of the aging process.	3.32	.73	.85			.77
Quality of life declines as people age.	2.90	.84	.71			.59
It's normal to be depressed when you get older.	2.38	.67	.74			.60
When people grow older, one thing or another is going to go wrong with their body.	1.73	.63		.84		.84
Part of aging is different parts of you breaking down.	1.82	.71		.89		.89
There isn't any way to escape the physical deterioration of aging.	2.40	.89		.55		.55
Age slows people down.	2.15	.74		.64		.64
The human body is like a car: when it gets old, it gets worn out.	2.22	.79		.58		.58
It's an accepted part of aging to have trouble remembering names.	2.30	.85			.86	.81
Forgetfulness is a natural occurrence just from growing old.	2.37	.85			.88	.85
It is impossible to escape the mental slowness that happens with age.	2.69	.81			.74	.73
Variance			46.66	13.65	9.40	
Cronbach Alpha			.84	.84	.88	

Note. Items were presented on a 4-point Likert scale where items anchored at "1" represented negative expectations and items anchored at "4" represented positive expectations.

AGING SELF-EXPECTATIONS. Eight items failed to load parsimoniously: ‘When I get older I expect I will be able to do everything I want to’; ‘I expect that as I get older I will enjoy my life’; ‘I expect that as I get older I will become more dependent on others’; ‘I expect that as I get older my quality of life will decrease’; ‘I expect that as I get older I will get depressed’; ‘I expect that as I get older I will always be able to take care of myself’; ‘I expect that as I get older I will become less attractive’; ‘When I get older I expect I will have more trouble sleeping’. Of the remaining items, the final solution produced three distinct factors which explained 67.3% of the total variance (see Table II for factor matrix and internal consistency reliability values). Factor 1 was labeled ‘Self-Perceived Functional Health with Aging’ and included five items relating to one’s general functioning throughout the aging process. Factor 2 was titled ‘Self-Perceived Social Health with Aging’ and included three items pertaining to the social relationships one may experience throughout the aging process. Factor 3 was labeled ‘Self-Perceived Sexual Function with Aging’ and included 2 items relating to one’s sexuality during aging. In all cases, cross-loading values for retained items were less than 0.30. Cronbach alpha values for the three factor scales were each $> .77$.

DESCRIPTIVE STATISTICS FOR SUB-FACTOR SCALES. Descriptive statistics for three GAE and three ASE sub-factor variables are presented in Table III. These are mean scores based on each of the underlying items which had their primary loadings on each sub-factor. Higher scores indicated more positive expectations. An approximate normal distribution was evident for all sub-factor scores, thus data were well suited for parametric statistical analyses.

MULTIVARIATE ANALYSES OF VARIANCE

First, we conducted a 2 physical activity group (less active; active) X 3 age group (45-54; 55-64; 65-74 yrs) MANOVA for the three GAE dependent variables - Satisfaction/Contentment, Physical Function, and Cognitive Function. The multivariate test of between group differences revealed a marginally significant result for the main effect of physical activity group, Wilk’s Lambda = 0.95, $p = 0.05$. Post-hoc examination found differences between physical activity groups for Cognitive Function, $F(1,141) = 1.64$, $p < 0.05$, partial $\eta^2 = 0.04$, and for Satisfaction/Contentment, $F(1,141) = 3.54$, $p = 0.06$, partial $\eta^2 = 0.01$. Pairwise comparisons depicted that the active group reported higher general expectations for maintained cognitive function with

TABLE II
 Factor Loadings for Retained Aging Self-expectation Items from the ERA-38 (N = 166) Based on a Principle Component Analysis with Varimax Rotation

Item	M	SD	Functional Health	Social Health	Sexual Function	Communalities
I expect that as I get older I will become more forgetful.	1.93	.66	.57			.39
I expect that as I get older it will become more difficult to do my daily activities.	2.19	.62	.70			.60
I expect that as I get older I will have more aches and pains.	1.75	.69	.76			.60
I expect that as I get older I will not be able to work as well as I do now.	1.90	.69	.79			.69
I expect that as I get older I will get tired more quickly.	1.78	.61	.78			.68
I expect that as I get older I will spend more time alone.	2.51	.86		.87		.78
I expect that as I get older I will spend less time with friends and family.	2.93	.80		.82		.69
I expect that as I get older I will become lonelier.	2.79	.80		.75		.71
I expect that as I get older my sexual desire will decrease.	2.19	.80			.88	.83
I expect that as I get older my body's ability to have sex will decrease.	2.28	.84			.80	.77
Variance			39.98	16.73	10.55	
Cronbach Alpha			.80	.79	.78	

Note: Items were presented on a 4-point Likert scale where items anchored at "1" represented negative expectations and items anchored at "4" represented positive expectations.

TABLE III
 Descriptive Statistics for the General Aging Expectation and Aging Self-expectation Variables

Factor Variable	M	SD	Skewness	Kurtosis
<i>General Aging Expectations variables</i>				
Satisfaction/Contentment	3.08	.63	-.41	-.40
Physical Function	2.07	.59	.23	-.37
Cognitive Function	2.45	.75	.21	-.28
<i>Aging Self-expectation variables</i>				
Self-Perceived Functional Health	1.91	.49	.25	-.19
Self-Perceived Social Health	2.74	.69	.09	-.46
Self-Perceived Sexual Function	2.24	.74	.48	-.02

advancing age ($M = 2.56, SD = 0.68$) than less active ($M = 2.31, SD = 0.51$) participants, and that the active group reported higher expectations for satisfaction and contentment with advancing age ($M = 3.19, SD = 0.58$) than less active ($M = 3.01, SD = 0.57$) participants. No other main effects or interactions were significant.

Next, we performed a similar MANOVA for the three ASE dependent variables – Self-Perceived Functional Health with Aging, Self-Perceived Social Health, and Self-Perceived Sexual Function. Results for the multivariate test of between group differences were non-significant for age, physical activity group, and the interaction between the two, all Wilk’s Lambdas $> .94, ps > .09$.

REGRESSING CURRENT PHYSICAL ACTIVITY ON AGE AND GENERAL EXPECTATION SUB-FACTORS

For each of the 45-54, 55-64, and 65-74 year groups, we conducted a hierarchical regression analysis to explain variance in current weekly levels of physical activity with two steps. First, we entered Age as a scaled variable alone, and at the second step, we entered Satisfaction/Contentment, Physical Function, and Cognitive Function variables together to determine whether general expectations would explain additional variance above and beyond age. Results showed that neither models for Age alone, nor second step models, approached significance in the two older cohorts, all $F_s < 0.90$, all $ps > .46$. Results for the 45-54 year old group indicated a non-significant model based on age alone, $F(1,51) = 0.41, p = .52$; however, the model at step two

was significant, $R^2 = 17.8\%$, $F(4,48) = 2.60$, $p = .04$, p of $F\Delta = .02$. Standardized beta values indicated that higher general aging expectations for Physical Function with advancing age ($\beta = .36$, $p = .05$) were positively associated with current levels of physical activity, and higher expectations for Satisfaction/Contentment with advancing age ($\beta = .30$, $p = .05$) were positively related to current physical activity levels.

REGRESSING CURRENT PHYSICAL ACTIVITY ON AGE AND SELF-EXPECTATION SUB-FACTORS

Similarly, we conducted two-step hierarchical regression analyses for each of the age cohorts to explain variance in current weekly levels of physical activity as a function of the scaled variable for Age and the three aging self-expectation variables together (Self-Perceived Functional Health, Self-Perceived Social Health, and Self-Perceived Sexual Function). None of the models approached significance, all F s < 1.87 , all p s $> .13$.

Discussion

VALIDITY AND RELIABILITY OF SUB-FACTORS FOR GENERAL AND SELF-EXPECTATIONS REGARDING AGING

We first investigated the underlying factor structure of the ERA-38 after separating item pools pertaining to GAE and ASE constructs. Unlike prior work by Sarkisian et al. (2002), which indicated ten separable subscales for all items pertaining to the ERA-38, the present findings should be interpreted while noting our distinction between general expectations and self-expectations. We applied this distinction based on face validity (i.e., semantics of the items) and in accordance with prevailing psychological perspectives relating to the self and other social influences. Results revealed three valid and internally reliable general aging expectation sub-factors. Satisfaction and Contentment expectations related to the prospect of loneliness, depression, and to decline in quality of life that many older people may experience. Items comprising our Cognitive Function variable concerned the expected forgetfulness, mental slowing and decline in memory that may accompany the aging process, essentially confirming the same general expectation items from Sarkisian and colleague's subscale of the same name. Of our Physical Function expectation items, four items pertained to the antici-

pation of bodily wear and tear, and general physical deterioration with age. In our sample, the notion of age slowing people down also loaded onto our Physical Function sub-factor, unlike prior work where it loaded on a subscale related to Fatigue (Sarkisian et al., 2002). Unlike prior ERA-38 researchers, we found one particular sub-factor for Physical Function expectations that specifically and uniquely addressed the physical condition and capacity of the body during the aging process, which may be a consequence of analyzing separate pools of items and may be of particular use for future study within the physical activity context (Meisner, Weir, et al., 2010).

Within the aging self-expectation items, Functional Health, Social Health, and Sexual Function emerged as sub-factors. Five items reflecting the forgetfulness, aches and pains, tiredness and decline in functional independence that one personally expects throughout the aging process coalesced on our Functional Health sub-factor. Three Social Health items pertained to the personal relationships with friends and family, and anticipated personal time spent alone while aging; we find that this emergent sub-factor focuses very much on self-expectations relating to relationships and loneliness. Sexual Function items concerned one's expectations regarding sexual ability and libido while aging, exactly replicating Sarkisian and colleague's (2002) subscale.

RELATIONSHIPS AMONG AGING EXPECTATIONS, AGE, AND PHYSICAL ACTIVITY

Following validation of the sub-factors, we examined the relationships between general- and self-aging expectations, age, and physical activity. Results indicated that less active 45-74 year-olds reported significantly lower expectations for cognitive function than more active individuals, meaning that on average, expectations to have trouble remembering and to experience mental slowing throughout the aging process are highest among less physically active people. One possibility is that strongly held expectations for mental slowing and cognitive impairment act as a barrier to physical activity amongst aging populations, causing them to disengage from forms of physical activity necessary to meet public health recommendations. Although the directionality or reciprocal nature of relationships cannot be discerned from our cross-sectional study, it may also be possible that physically active individuals experience the cognitive health benefits that are proposed to arise when public health recommendations for physical activity are met (Angevaren, Aufdemkampe, Verhaar, Aleman, & Vanhees, 2008). As a result, these individuals may not experience symptoms of mental slowing like their

physically inactive peers, and may therefore resist accepting general aging expectations for declining cognitive function. Higher aging expectations for mental capacity may also create a sense of control throughout the aging process, and because of such control beliefs (Lachman et al., 1997), individuals may feel they still have the capacity to be physically active. Another possible interpretation is that adults who maintain a high physical activity status do so as a strategy for denying, or not noticing, the cognitive decline that many people generally expect in older age.

Physically inactive 45-74 year-olds reported significantly lower expectations for satisfaction and contentment, meaning that, on average, less active individuals expect to be lonelier, more depressed, and less content with their quality of life as they age. One explanation may be that strongly held aging expectations for discontent and loneliness may discourage aging adults from recognizing opportunities to be active, effectively serving as a constraint to physical activity. Failure to sufficiently engage in physical activities, which often offer opportunities for 'successful aging' (Rowe & Khan, 1997) by providing social connectedness and continued engagement in personally productive activities (Meisner, Dogra, Logan, Baker, & Weir, 2010), help prevent depressive symptoms (Brosse, Sheets, Lett, & Blumenthal, 2002), and facilitate quality of life (Spirduso & Cronin, 2001), may alternatively explain these lower aging expectations. Physically active people, at least compared to less active people, may not simply accept or expect that a normal part of growing older encompasses a decline in quality of life and may continue to use physical engagement pursuits to remain content and to maintain social opportunities as they age. While it is impossible to determine causality in this cross-sectional design, these findings support our hypothesis that holding certain low age expectations may act as a barrier to physical activity, and conversely, that high age expectations may bolster physical activity levels among moderately active 45-74 year-old adults.

In the absence of physical activity by age interactions in our between-group multivariate analyses, regression analyses allowed us to better explore the effects of aging expectations as a function of age group, because intra-individual regressions use the full variability of within-subject data within each age strata. Results showed that, uniquely among 45-54 year-olds, increasingly positive general aging expectations about physical function and increasingly positive expectations for satisfaction and contentment with aging were each related to greater current physical activity. These findings held true even after controlling for the unique effects of age on current physical activity. Thus, middle-aged adults' increasing beliefs that growing older does not necessarily include expectations for bodily break-down, physical

slowing and wearing were positively associated with current physical activity. Thus, the current physical activity levels of individuals who were 45-54 years old benefitted from optimistic physical function expectations for an aging process that they were just entering. Although these individuals are relatively early in the aging process (compared to the two older groups in our study), optimistic physical function expectations for an aging process that are perhaps distally anticipated in later decades did explain higher present day physical activity levels among 45-54 year-olds. On the other hand, we speculate that lower physical function aging expectations may work in a defeatist manner for inactive 45-54 year-olds (e.g., 'Break-down and slowing down will happen anyways as I progressively age, so why should I do it now') as evidenced by their association with lower current activity levels.

In terms of satisfaction and contentment, 45-54 year-old adults' increasing expectations that growing older does not necessarily include loneliness, poorer quality of life and depression were positively associated with current activity. Alternatively, having stronger aging expectations for discontent and dissatisfaction with life constrained current activity. While it is not possible for us to determine the degree to which 45-54 year-olds' aging expectations are related to aging symptoms/experiences now, or to anticipated symptoms/experiences in future, the regression results do support our hypotheses that holding certain low age expectations may act as a barrier to current physical activity, and this was the case particularly amongst middle-aged adults. Although not examined in our study, expectations are linked to future intentions for physical activity (Courneya & McAuley, 1996); thus, those adults in the youngest group who are currently active and who also have higher expectations for aging may continue to be active throughout life due to optimistic future expectancies.

In sum, we were able to distinguish physical activity groups and explain current physical activity using our emergent ERA sub-factors. Although effect sizes were small in the multivariate tests, almost 18% of variance in current physical activity could be explained in the regressions using general aging expectation variables relating to physical function, and satisfaction/content. This is noteworthy considering that general aging expectations are more global cognitions and are therefore more distal predictors of adults' current physical activity than constructs such as physical self-efficacy (McAuley et al., 2003) and expectancy outcomes for exercise (Resnick et al., 2000), for which effects are typically larger.

Still, certain non-significant findings in the current study were surprising. First, the absence of significant findings for aging self-expectations is unexpected, given that the effects of broader social norms/expectations on

behavior are often mediated by self-perceptions (i.e., effects that depend on internalization to the self). One possible explanation is that moderately physically active samples of adults may be less likely to acknowledge a relationship between physical activity and the aging self-expectations derived from the ERA-38. It may be that other aging self-perception measures, such as the Attitude Toward Own Aging subscale of the Philadelphia Geriatric Center Morale Scale (see Goodwin, Black, & Satish, 1999; Levy, Hausdorff, Hencke, & Wei, 2000) or the Subjective Aging Perception Scale (Blanco, Olmo, Arbonès, & Bosch, 2004) may be more sensitive to these relationships. Establishing convergent validity with other aging self-perception measures may be an important next step with respect to self-expectation items from the ERA-38. Second, non-significant findings among the two older cohorts were also surprising, especially when one considers evidence for increasingly negative attitudes and views towards the aging process with advancing age (Levy, 2003). Finally, unlike our multivariate analyses in which we found main effects for cognitive aging expectations, the Cognitive Function expectations sub-factor did not explain current physical activity levels on a within-age group basis in the regressions. Future research needs to determine whether the aforementioned instances of non-significance are anomalies for our current sample which had moderately active adults in the 55-64 and 65-74 year-old cohorts that were no less active than the 45-54 year-olds. Future work may also investigate whether aging expectations indeed have less influence on the relatively older groups in a physical activity context, or whether the division of the ERA-38 into general and self items limits its capacity to measure the full effects of aging expectations on physical activity behavior. The relationship between aging expectations and the physical activity levels for some older adults is possibly not direct but moderated by other control variables, for instance, optimism (Steptoe, Wright, Kunz-Ebrecht, & Iliffe, 2006) or locus of control (Lachman et al., 1997), and future research might consider an investigation of such moderators.

The use of a self-report instrument alone to measure physical activity levels represents a major limitation of this study. Thus, prospective research might explore actual rather than self-reported behavioral outcomes that arise from certain aging expectations, but particularly satisfaction/contentment with life, physical function and cognitive function expectations. Although the GLTEQ has been extensively corroborated using objective measures of activity among younger adults (Pereira et al., 1997), future research should consider pedometer, accelerometer, or other technologies to concurrently validate self-report measures, especially among the oldest cohort. Reflecting upon our current GLTEQ data, we caution that the present findings can only

be generalized to a moderately active sample of adults between the ages of 45-74 years. The overall mean ($M = 27.9$) GLTEQ level for our sample was above the identified cut point (≥ 24) identified by Godin (2011) as active enough to receive health benefits. Twenty-seven METS is the weekly equivalent of three strenuous sessions (e.g., running, cross-country skiing, swimming) of minimal 15 minutes duration each. Twenty-nine METS, for example, could be achieved in a given week by completing one strenuous sessions and four moderate exercise bouts (e.g., fast walking, tennis, dancing, easy cycling), each of minimal 15 minutes duration. Many individuals in our two oldest cohorts who were recruited from community events, and who were on average no less active than the youngest cohort, were possibly not experiencing deleterious aging effects as would have been the case in prior ERA-38 samples derived from clinical or rehabilitative settings; without such impaired experiences, our two older cohorts' attitudes towards aging may have been less robust in explaining their current activity levels.

Finally, it is worth noting that our efforts to recruit from social events/organizations in the community may have resulted in a sample of participants who find various means to be socially engaged, participate in activities that defer cognitive decline or engage in activities that ensure a degree of contentment which potentially lead to optimistic feelings towards the aging process irrespective of whether they are physically active or not. Although we have prominently discussed how poorer cognitive aging expectations relate to lower status of physical activity participation due to our understanding of the protective benefits of physical activity for aging cognitive health, we recognize that some aging adults possibly choose more sedentary activities to potentially counteract mental decline that they expect in old age. For example, individuals who hold lower aging expectations for cognitive function may place more importance in engaging in activities (e.g., cryptic cross-words, working on the computer, reading) that they believe help to retain their mental faculties for fear of losing them, rather than investing in physical activity as a protective measure toward cognitive health. Such a perspective is consistent with the view that people find various means to be engaged in different forms of activity, including cognitively-oriented, problem-based, or socially affiliated activity and not simply physical pursuits, which can serve to promote successful aging (Rowe & Khan, 1997).

In conclusion, the present study examined the ERA-38 among a sample of adults over 45 years of age, recruited from events/programs within the community, who demonstrated a range of physical activity but who were overall moderately physically active. Our findings do not disconfirm earlier ERA-38 sub-factors, which were derived for much less physically active pop-

ulations on account that they had been recruited from clinical or rehabilitative settings (Sarkisian, Hays, Berry, & Mangione, 2001; Sarkisian et al., 2002). Rather, we have offered insight into which aspects of ERA-38 age expectations might be considered reliable and valid for studying adults in an aging and physical activity context, in particular, the three general- and three self-aging expectation sub-factors. Results support the common theme arising from ERA-38 research in non-physical activity contexts, in that negative aging expectations have a constraining influence on engagement in preventive health behaviors (Sarkisian et al., 2001; 2005; 2006), but in our study, results pertain specifically to physical activity. Our findings show that harbouring positive aging expectations in relation to Satisfaction and Contentment, Cognitive Function and Physical Function may facilitate current physical activity, and this may especially be the case among middle-aged adults. Future research is required to affirm the validity of these constructs in samples of less active adults, and to discern whether these constructs are indeed limited to middle-aged adults in a physical activity context. Considering how negative attitudes toward aging increase as people grow older (Levy et al., 2002) and the tendency of older individuals to view aging as inevitably negative (Goodwin, Black, & Satish, 1999; Meisner, 2011), the present findings might encourage researchers and practitioners to scrutinize popularly overlooked ageist stereotypes and pessimistic aging expectations that work to curtail middle-aged and older adults' efforts to be physical active.

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