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ARTICLE

Motivations for participation in physical activity across the lifespan

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Abstract: This investigation explored motivations for engaging in physical activity and how they varied across the lifespan. A total of 1,885 individuals completed a comprehensive questionnaire concerning personal style, activity interests, motives for exercising, and biosocial information as part of an initiative to improve physical activity advisement and programming. The first part of the research called for an exploratory factor analysis (EFA) of a 20-item measure of both intrinsic and extrinsic motivations related to participation in exercise, while the second was based in an analysis of differences on the EFA factor scores across five age groups: teens, 20s, 30s, 40s, and 50s+. EFA results suggested a four-factor (oblique rotation) solution that appeared to provide an adequate and generalizable map of intrinsic and extrinsic motivations for exercise. The factors were labeled as follows: *mental toughness, toned and fit, fun and friends*, and *stress reduction.* Not surprisingly, mean scores on *toned and fit* were the highest of the four factor means across all age groups. Univariate ANOVAs of age group differences were statistically significant for each of the four factors; moreover, all four factors showed statistically significant linear trends. Two factors, *toned and fit* and *stress reduction,* revealed higher motivation scores with increasing age, while the remaining two, *mental toughness* and *fun and friends,* exhibited declining scores with increasing age. These findings taken in the context of previous research on age-related motivational differences offered insights into current challenges for enhancing exercise participation, particularly for older individuals.

Keywords: lifespan, age differences, physical activity, exercise motivation, exploratory factor analysis

1. Motivations for participation in physical activity across the lifespan

It is widely acknowledged that participating in regular physical activity (PA) is highly beneficial for both physical health and psychological wellbeing (Centers for Disease Control and Prevention [CDC], 2011a; Ford et al., 2012; U.S. Department of Health and Human Services, 2008). Yet, sedentary lifestyles are increasingly the norm among North Americans (Brownson, Boehmer, & Luke, 2005). Only 20.6% of the adult American population meets basic PA guidelines for aerobic and muscle-strengthening physical activity (Centers for Disease Control and Prevention [CDC], 2011b), while Canada shows a similarly low rate of PA participation of only 15% who satisfied the recommended PA guidelines of 150 minutes of moderate-to-vigorous physical activity per week (Colley et al., 2011). Low levels of PA have been associated with a number of life-threatening health problems, including coronary heart disease, adult onset diabetes, hypertension, and depression (CDC, 2011a; Rangul, Bauman, Lingaas Holmen, & Midthjell, 2012). Research further indicates that PA participation levels decrease with age (Baker,

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Fraser-Thomas, Dionigi, & Horton, 2010; Human Resources and Skills Development Canada, 2013); this trend portends poorly for a world where lengthening lifespans are likely to be associated with dramatic increases in health care costs and related social issues (Breyer, Costa-Font, & Felder, 2010; Janssen, 2012). Given the personal and societal costs of inactivity, the need to integrate regular PA participation into modern lifestyles seems paramount (Breyer et al., 2010; Trujillo, Brougham, & Walsh, 2004).

Understanding motivations to pursue active lifestyles can be key to decreasing the proportion of sedentary individuals in society (Hagger, 2012; Trujillo et al., 2004). Indeed research on exercise motivation is extensive, with much of it grounded in Deci and Ryan's self-determination theory (SDT; see Deci & Ryan, 1985; Hagger & Chatzisarantis, 2007; Teixeira, Carraça, Markland, Silva, & Ryan, 2012; Vallerand, Donahue, & Lafrenière, 2012). Deci and Ryan's (1985) theory proposes that motivation to exercise varies along a continuum from intrinsic to extrinsic. Being intrinsically motivated means carrying out an activity for the inherent satisfaction and enjoyment that it provides (Deci, 1975), while extrinsic motivation refers to engaging in an activity for its instrumental purpose or to gain something outside of the activity itself (Deci & Ryan, 1985). As Vallerand (2008) observes, a fundamental distinction between intrinsic and extrinsic motivation is a lack of liking for the activity itself.

Extrinsic motivators, such as wanting to increase physical attractiveness, seem most effective in initiating exercise initiatives (Dishman, 1987; Lim, Ting, Loh, Loo, & Shaikh, 2013; McAuley, Wraith, & Duncan, 1991; Morgan, Shephard, & Finucane, 1984), while it is thought that long-term maintenance of exercise behaviors depends more on intrinsic motivation (Gallagher & Updegraff, 2011; McAuley et al., 1991; Wankel, 1985, 1988, 1993). Nonetheless, a common perspective is that intrinsic motivation alone cannot sustain a physically active lifestyle (Edmunds, Ntoumanis, & Duda, 2006; Mullan & Markland, 1997). Ryan, Williams, Patrick, and Deci (2009) assert, "most people maintain their exercise activities not because the activities are inherently interesting or enjoyable to them but because they have something to gain in it" (p.111). These authors go on to argue that extrinsic motivations are essential in the realm of physical activity, especially when individuals do not experience adequate challenge and autonomy in their programs (Deci & Ryan, 1985; Ryan, Koestner & Deci, 1991).

Our research was concerned with how intrinsic and extrinsic motivations related to PA might vary across the lifespan (Brunet & Sabiston, 2011; Trujillo et al., 2004). We anticipated that findings of this nature would be invaluable for guiding activity-promoting interventions (Conn, Hafdahl & Mehr, 2011; Frederick-Recascino, 2002; Hobbs et al., 2013; Schieffer & Thomas, 2012).

1.1 Investigations involving multiple age groups

In a broad perspective, motivation to engage in physical activity seems to decrease with age (Biddle, 2007; Brunet & Sabiston, 2011; Koslow, 1988; Prochaska, Leventhal, Leventhal, & Keller, 1985; Ransford & Pailisi, 1996; Seippel, 2006; Trujillo et al., 2004). However, not all motives show declines. In Ashford, Biddle and Goudas's (1993) study of 15 key motives for sports participation, older adults (45+) were found to be more motivated than young (16-24) and mature (25-44) adults by factors such as mental health and socio-psychological wellbeing. Similarly, Seippel (2006) notes in his study of 1,400 Norwegian participants aged 13 and older that the only dimension where a higher score was found for older compared to younger study participants was one reflecting involvement in PA as a mental recreation; otherwise, younger individuals consistently reported more reasons for exercising.

Another study (Trujillo et al., 2004) involving 461 adult participants aged 18 to 86 described an inverse linear trend between age and the importance of physical appearance consequences of

PA. Moreover, Koslow's (1988) study of 300 individuals grouped into three categories (18-30, 31-40, and 41-50) indicated that the 31-40 and 41-50 groups placed greater emphasis on health benefits of exercise than did the 18-30 group.

1.2 Studies of single age groups

Studies of exercise motivation within particular age cohorts also have bearing on our research though it was difficult to assess whether the central motives identified in these investigations were more or less salient than at other periods of life. For instance, a prevalent motivator for participation among adolescents (age 11-19) was described as enjoyment of what they were doing (Biddle, Wang, Chatzisarantis & Spray, 2003); other studies identified health benefits as relevant sources of motivation for this age cohort (Gavin, Mcbrearty & Harvey, 2013). In a study of middle-aged adults (mean age 40), health, fitness, and physical appearance were found to be high PA motivators (Ingledew & Markland, 2008). Among older adults (62-91) perceived functional independence, competition, self-care, and social involvement were identified as contributors to exercise motivation (Miller & Iris, 2002).

1.3 Framework for investigation

Our investigation represents one of a limited number of studies focusing on age-related motivational differences across the lifespan (Brunet & Sabiston, 2011; Martín-Albo, Núñez, Domínguez, León, & Tomás, 2012; Netz & Raviv, 2004; Seippel, 2006). Uniquely, our study compared five age groupings ranging from teens to 50 and over. As an initial step in our research, we examined the factor structure of a 20-item exercise motivation measure both to understand how various intrinsic and extrinsic motives were aligned and also to facilitate a concise understanding of age group differences. We envisioned that information from our research would contribute to theoretical understanding, while also having pragmatic value through informing initiatives promoting active lifestyles for different age groups (Edmunds et al., 2006; Mullan & Markland, 1997).

2. Methods

2.1 Measurements

A comprehensive questionnaire regarding personal style, activity interests, motives for exercising, and biosocial information was created for a series of investigations related to individuals' engagement in sports and physical activity (Gavin, 2004; Gavin, Mcbrearty & Harvey, 2010). Pertinent to this study, 20 potential sources of motivation were listed in one section of the questionnaire. These included such motivators as becoming fit, reducing stress, having fun, and making friends. Many of these motives have been represented in other studies of physical activity motivation (Ashford et al., 1993; Gallagher & Updegraff, 2011; Lim et al., 2013). The questionnaire required individuals to indicate on a 3-point scale whether each item was a reason why they exercised; the response choices were "yes", "?", and "no." Analysis of the 20-item questionnaire was integral to this investigation, and is described in the results section.

Respondents' age was requested in a section of the questionnaire pertaining to biosocial information. Given the large number of participants in this investigation, age groupings were created from participants' reported actual ages; more information about this is presented in the description of participants below.

2.2 Data collection

Data were collected in eight branches of the Montreal, Quebec YMCA, which was piloting a project to better advise members regarding activity choices and their requirements (Gavin, 2006). In approving this project, the Montreal YMCA reviewed all processes of the questionnaire and related activities for ethical compliance. The comprehensive questionnaire referred to above was presented through single usage touchscreen computers located in the lobbies and training areas of the branches; these computers were dedicated to the project and served no other purpose than that of presenting the questionnaire for members to complete. Participants were invited through signage and other promotional information to access the questionnaires on the touchscreen computers; questionnaire completion took approximately 25 minutes. Once an individual advanced beyond the opening screen of the program, a consent page was presented wherein individuals learned that the questionnaire was completely anonymous and that a record of their responses would be kept on the computer for future analysis of aggregated data. No names or membership information were required to log in to the computer; moreover, participants could skip the biosocial questions reflecting some identifying information such as age if they wished. Participants had the option of discontinuing the questionnaire at any point in the process of its completion, and thereby having all their responses deleted from the hard drive. After finishing, participants were offered a summary report based on their responses. They were further invited to have this report reviewed in a confidential session with a YMCA fitness specialist who would help them better appreciate how to initiate or maintain rewarding patterns of physical exercise.

Periodically, designated YMCA staff members copied the data files from the computers' hard drives and sent them to the researchers. Data on the hard drives were then erased.

2.3 Participants

The number of questionnaire responses obtained from the touchscreen computers was 2,041. Whenever individuals chose to terminate questionnaire completion prior to the last question, all their responses were deleted. Thus, it was impossible for us to determine how many individuals may have commenced but not completed the questionnaire. However, it was possible for individuals to skip questions in some sections of the questionnaire. For this reason, the number of usable questionnaires for this research was reduced from 2,041to 1,885; 156 participants had incomplete data sets pertaining to either age or the motivation questions.

Participants' self-assessed activity levels ranged from inactive to highly active, though the sample as a whole appeared to be proportionately more active than the general population: 27.8% reported exercising at most 1-2 times per month, another 24.3% described exercising 1-2 times per week, and the remaining 47.9% indicated exercising 3 or more times weekly. This variation from expected population percentages (Centers for Disease Control and Prevention, 2011b; Colley et al., 2011) could be anticipated given the setting for the research. Findings, therefore, need to be understood to be descriptive of a more active segment of the population.

For the purpose of the analyses reported in the results section, participants were grouped into five decade-defined categories; these categories and the related numbers of participants were as follows: Teens (n=180), 20-29 (n=846), 30-39 (n=431), 40-49 (n=256), 50 and over (n=172). The decision to group participants by age decades was based, in part, on age and stage theories that describe life progression according to periods of life (cf. Erikson, 1980, 1982; Kegan, 1982, 1994; Levinson, 1978, 1996). We thought this would be more meaningful than using the unique age distribution of this sample to determine subgroups. There were marginally significant age group differences in positive attitudes toward physical activity ($F_{4, 1880} = 2.38$, $p = .05$, $\eta^2 = .005$) and in self-reported participation rates ($F_{4, 1880} = 2.38$, $p = .05$, $\eta^2 = .005$); however, the linear trend

across groups was non-statistically significant ($F_{1, 1880}$ = .14, p = .71) for attitude toward physical activity and marginally significant for participation ($F_{1, 1880}$ = 3.75, p = .05) with the older groups reporting modestly more weekly activity rates.

2.4 Data screening and analytic plan

Analyses for the current study proceeded in two stages: First, an exploratory factor analysis (EFA) was conducted in Mplus version 2.12 (Muthen & Muthen, 2002). The EFA was conducted on the 20-item motivations scale. According to Kline (2013), a minimum of 10 cases per observed variable in a factor analysis is needed to have adequate power. The total sample size in the present study was N = 1885, thereby providing us with ample power to conduct the EFA. Given that the factors were derived from item level data that used a three-point response scale, a Weighted Least Squares (WLS) estimation method was used. Items that use response scales that have fewer than five options should be treated as categorical data (Kline, 1998). An EFA with such items is considered problematic because the estimated correlations between categorical observed variables are typically lower than the correlations for underlying continuous latent variables (O'Connor, Colder, & Hawk, 2004). The WLS estimation method adjusts the covariance matrix as if the variables were continuous. Second, composite subscale means were created for the factors based on the pattern of primary factor loadings. These subscales were used in a series of univariate ANOVAs to investigate age differences in motivations for exercise.

Before conducting the analyses, the data were screened according to the recommendations of Wilkinson (1999) and Kline (2009). There was no systematic loss of data based on this screening. All continuous variables were normally distributed and scores greater than 3 *SDs* were replaced with the highest acceptable value within the specified range (Kline, 2009). The data did not violate the homogeneity of variance assumption in ANOVA, as the ratio between the largest and smallest group variances was less than 3.0 (Kline, 2009).

3. Results

3.1 Exploratory factor analysis

The EFA was conducted using the full 20-item measure. The extraction method was principle axis factoring with an oblique rotation method. An oblique rotation was preferred in this case because this method allows the factors to correlate (Meyers, Gamst, & Guarino, 2013). Given that this is one of a limited number of studies (e.g., Ashford et al., 1993; Kasser & Ryan, 1996) to investigate the factor structure of exercise-related motivations, we decided against specifying the number of factors *a priori.* We determined the number of retained factors based on Kaiser's (1960) Eigenvalue-greater-than-one rule. In addition, items with primary factor loadings of less than .32 (Tabachnick & Fidell, 2013) were trimmed, and the EFA was re-run.

The eigenvalue-greater-than-one suggested a four-factor solution. When the factor loadings were inspected, we found that 2-items had small correlations with their respective underlying factor (i.e., r <.32); therefore, these items were trimmed from the analysis. The final retained EFA is presented in Table 1 (below).

Table 1. Final EFA solution for the motivations scale

Item	F1	F2	F3	F4
1. Develop mental toughness	**.68**	.10	.43	.26
2. Become more assertive	**.60**	.11	.36	.25
3. Build self-esteem	**.61**	.16	.21	.35
4. Reduce negative habits	**.48**	.21	.07	.30
5. Create opportunities for personal achievement	**.63**	.15	.34	.26
6. Develop greater focus & concentration	**.64**	.18	.31	.39
7. Learn new skills for life	**.66**	.11	.43	.31
8. Prevent future health problems	.11	**.40**	-.01	.31
9. Shape my body & increase physical attractiveness	.09	**.55**	.08	.25
10. Improve endurance	.17	**.52**	.20	.34
11. Be physically fit	.17	**.66**	.06	.28
12. Be with friends or make new friends	.30	.04	**.47**	.17
13. Have fun	.20	.32	**.46**	.30
14. Enjoy the challenge and excitement of competition	.26	.04	**.57**	.02
15. Live more adventurously	.49	.04	**.56**	.18
16. Reduce stress & release tension	.26	.41	.15	**.68**
17. Deal with moods and anxiety	.37	.18	.18	**.56**
18. Increase feelings of relaxation	.36	.27	.16	**.54**
Eigenvalues	4.5	2.0	1.3	1.1

Note: F1 = mental toughness; F2 = toned and fit; F3 = fun and friends; F4 = stress reduction.
The primary factor loadings are in bold font.

Factor 1 contained items that reflected mental toughness motives and Factor 2 represented motives centered on staying toned and fit. Factor 3 captured motives of having fun and being with friends, while Factor 4 reflected motivations to exercise for stress reduction. The internal consistencies for the factors were as follows: Factor 1: mental toughness (α = .81), Factor 2: toned and fit (α = .70), Factor 3: fun and friends (α = .70), Factor 4: stress reduction (α = .71). Given the adequate to good internal consistencies of these factors, composite subscale means were created based on the primary factor loadings of the items. The bivariate correlations and descriptive statistics for these subscales are presented in Table 2.

Table 2. Correlations and descriptive statistics for motivations subscales

	1	2	3	4
Mental toughness	-	.21**	.45**	.44**
Toned and fit		-	.10**	.33**
Fun and friends			-	.24**
Stress reduction				-
M	2.36	2.88	2.17	2.60
SD	.62	.27	.61	.58

** p <.001

3.2 Univariate ANOVAs

Having found few studies of exercise-related motivations across age groups (Ashford et al., 1993; Koslow, 1988; Seippel, 2006; Trujillo et al., 2004), we believed there to be insufficient evidence to

articulate *a priori* hypotheses about expected group differences. Thus, we conducted a series of univariate ANOVAs, followed by polynomial trend analyses (i.e., linear, quadratic, cubic) to examine the nature of age group differences on motivations. The main purpose of these trend analyses was exploratory. Based on the five age groups of interest (teens, 20s, 30s, 40s, and 50s+), we explored group differences on the four motivations subscales indicated by the EFA results.

The results of the ANOVAs and linear trend analyses are summarized in Table 3.

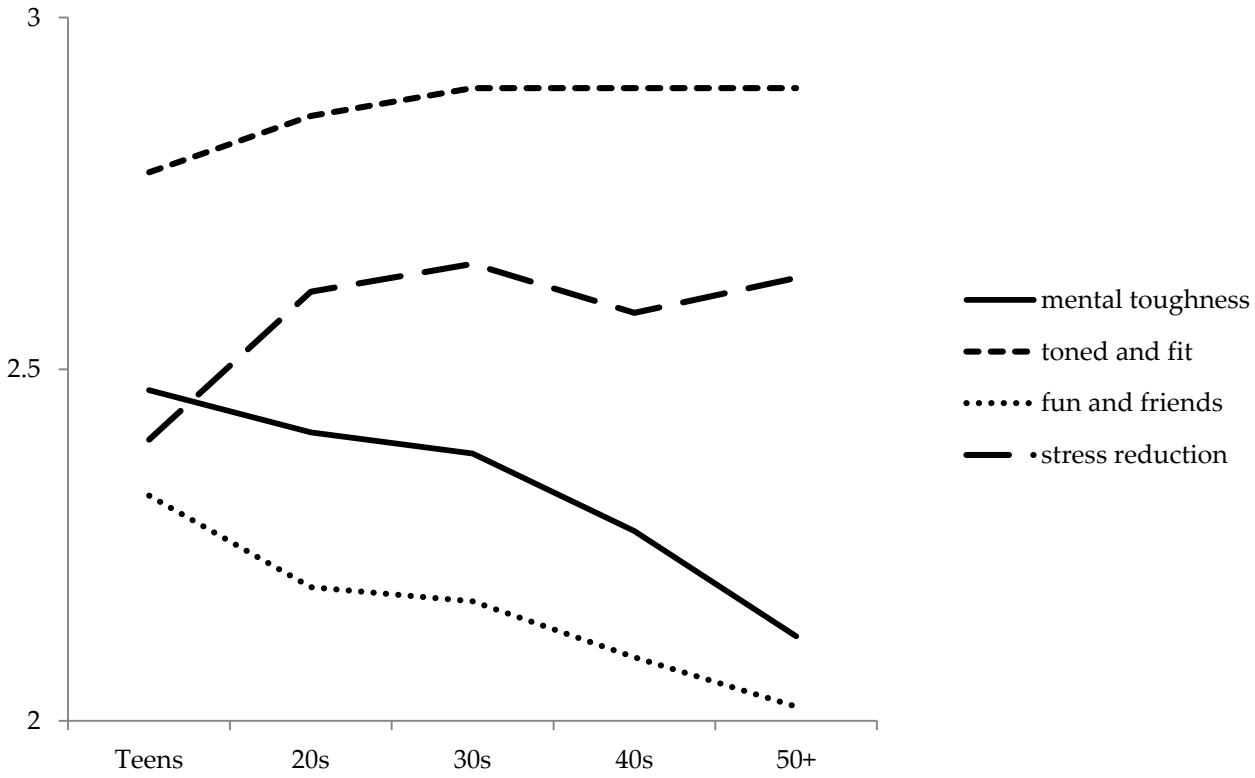
Table 3. Summary of ANOVA analyses for group differences in motivations

Source	SS	df	MS	F	p
Factor 1: Mental toughness					
Age Group	16.15	4	4.04	10.73	<.001
Linear	14.33	1	14.33	38.11	<.001
Quadratic	1.36	1	1.36	3.61	.06
Cubic	.23	1	.23	.61	.43
Error	707.32	1880	.38		
Total	723.47	1884			
Factor 2: Toned and fit					
Age Group	2.41	4	.60	8.70	<.001
Linear	1.64	1	1.64	23.79	<.001
Quadratic	.70	1	.70	10.04	<.01
Cubic	.07	1	.07	.98	.32
Error	130.29	1880	.07		
Total	132.70	1884			
Factor 3: Fun and friends					
Age Group	9.74	4	2.43	6.67	<.001
Linear	8.86	1	8.86	24.31	<.001
Quadratic	.05	1	.05	.15	.69
Cubic	.51	1	.50	1.41	.23
Error	685.27	1880	.37		
Total	695.00	1884			
Factor 4: Stress reduction					
Age Group	8.60	4	2.15	6.56	<.001
Linear	1.76	1	1.76	5.37	<.001
Quadratic	3.82	1	3.82	11.68	<.001
Cubic	2.95	1	2.95	9.02	<.001
Error	6.84	1880	.33		
Total	615.70	1884			

First, there was a statistically significant group difference on *mental toughness* ($F_{4, 1880} = 10.73$, $p < .001$, $\eta^2 = .02$), and these differences followed a linear trend ($F_{1, 1880} = 38.11$, $p < .001$, $\eta^2 = .02$). As seen in Figure 1 (below), *mental toughness* motives decreased steadily with age. Second, there was a significant group difference in motives included in the *toned and fit* factor ($F_{4, 1880} = 8.70$, $p < .001$,

η^2 = .02). Trend analyses revealed significant linear ($F_{1, 1880}$ = 23.79, p < .001, η^2 = .01) and quadratic ($F_{1, 1880}$ = 10.04, p < .01, η^2 = .005) trends; however the linear trend accounted for the greatest proportion of variance in the group effect. As depicted in Figure 1, there is a steady increase with age with respect to motives encompassed in *toned and fit*. Third, there was a statistically significant group difference on the factor of *fun and friends* ($F_{4, 1880}$ = 6.67, p < .001, η^2 = .01), and these motives decreased linearly with age ($F_{1, 1880}$ = 24.31, p < .001, η^2 = .01). Lastly, *stress reduction* motives differed by group ($F_{4, 1880}$ = 6.56, p < .001, η^2 = .01) and all trends were statistically significant (see Table 3). The quadratic trend accounted for the largest proportion of variance in stress reduction motives; however, this corresponded to a relatively small effect size (.06% of the variance).

Figure 1. Group means on motivations subscales



4. Discussion

The EFA revealed four motivational factors: *mental toughness, toned and fit, fun and friends,* and *stress reduction.* These factors seemed to have reasonable internal consistency, and suggested a simplified framework for appreciating motivations for exercise. Especially when attempting to design promotional campaigns or activity programming, having a more concise portrayal of age group differences – such as the one permitted by this four-factor solution – may facilitate understanding and planning.

A closer examination of our EFA raised an important theoretical issue deriving from the seeming mix of intrinsic and extrinsic elements in certain factors. If we consider, for example, the *toned and fit* (F2) factor, there were items referring to future health, being fit, improving endurance, body shaping, and increasing physical attractiveness. As Ryan et al. (2009) commented, intrinsic PA motives pertain to goals of becoming healthy and fit, while extrinsic

motives are derived more from a desire for physical attractiveness. This argument was thought to be supported by factor analytic results reported by Kasser and Ryan (1996) wherein items pertaining to health loaded on factors with intrinsic motivational items, while items concerning physical attractiveness loaded on factors containing items related to monetary goals or fame (extrinsic rewards). In our study, the motive of increasing physical attractiveness loaded on the same factor as items pertaining to fitness and health. One way of reconciling this apparent difference in factorial structures relies on arguments taken from organismic integration theory (OIT; see Deci & Ryan, 1985; Ryan & Deci, 2000), a sub-theory of SDT. OIT suggests a continuum of autonomy underpinning extrinsic motivation. Motives that are more autonomous are likely to be integrated into and internalized in the self. As such, they would approximate intrinsic motives in their capacity to support sustained involvement (Ryan et al., 2009). In this perspective, our finding that intrinsic motives related to health and fitness loaded on the same factor as a seemingly extrinsic motive of physical attractiveness makes sense, especially if the latter was considered to be internalized and integrated into the self. A similar argument could be made for motives comprising the *stress reduction* (F4) factor, where items varied from ones concerning anxiety and mood management to those pertaining to increasing relaxation and reducing tension.

In relation to the principal focus of our investigation, namely, the comparison of exercise-related motivations across the lifespan, the EFA results can be seen as providing a simple framework of four factors for comparison. Variance in the four motivational factors across the lifespan is captured graphically in Figure 1, and detailed in the univariate ANOVA results and related polynomial trend analyses displayed in Table 3. Assuming that the EFA-identified factors adequately map dominant categories of exercise motivation, Figure 1 largely describes two patterns: One suggests an increase in the salience of certain motives over the lifespan, while the second depicts a declining basis for exercise motivation as individuals age. The first pattern was evident for the factors of *stress reduction* and *toned and fit,* while the second seemed to characterize the motivational factors of *mental toughness* and *fun and friends.* Though quadratic trends were evident for the factors of *stress reduction* and *toned and fit,* linear trends were significant for all four of the factors; it is these linear trends that we would like to emphasize in our discussion.

Apparently, as individuals age, they express progressively less motivation to exercise based on a desire to enhance aspects of *mental toughness*. Connaughton, Hanton, and Jones (2010) argued in their study of elite athletes that mental toughness was indeed an important outcome that could be nurtured through sport and activity participation. However, it appears from our research that this becomes less relevant with increasing age. Bear in mind that our *mental toughness* factor was comprised of items that extended beyond narrower definitions of this construct (Madrigal, Hamill, & Gill, 2013; Nicholls, Polman, Levy, & Backhouse 2009). Exercise motives that loaded significantly on this factor reflected interest in developing assertiveness, creating opportunities for achievement, building self-esteem, generating new life skills, and becoming mentally tougher. The trend line for this composite of motivations for exercising drops off right after the teen years and continues its decline into and beyond the 50s. While research supports the notion that elements of the *mental toughness* factor, for instance, self-esteem and experiencing mastery, can be favorably impacted through exercise participation (Hawker, 2012; Spence, McGannon, & Poon, 2005; Springer, Lamborn, & Pollard, 2013), the fact that older individuals appear to be less motivated to exercise for such reasons might suggest that either these concerns are less relevant to their lives (e.g., self-esteem is reasonably well-established; see Wagner, Gerstorf, Hoppmann, & Luszcz, 2013) or that exercising has stronger connections to other personal goals.

Similarly, according to our findings being with friends, having fun, living adventurously, and enjoying competitive challenges become less potent motivators for exercise as one ages. The high importance of fun in PA has been noted in a single cohort study of 14-18 year olds (Pano & Markola, 2012), but this result provides only partial insight into the meaning of *fun and friends* across the lifespan. Fortunately, Seippel's (2006) study of over 1,400 Norwegian recreational athletes provides greater contrast for our research. To begin, this study identified joy/fun as the most meaningful reason for exercising, while in our investigation the *fun and friends* factor had the lowest mean scores in all age groups. Of course, our factor consisted of items beyond just having fun. In regard to age comparisons, the Norwegian study corroborated our trends in its documentation of the declining importance of joy/fun, social relations, and competitive achievements with age. Another variable included in the Norwegian study was the importance of personal expression through sports, which similarly showed a decline with age; this variable may bear some relationship to our item of living more adventurously, which loaded on the *fun and friends* factor. While the relative importance of joy/fun as a motive for exercise cannot be accurately compared due to the different methodologies of the two studies, the similarities between the two studies in age declines in fun, social relations, achievements, and self-expression or living adventurously raises concern about a diminished potency of PA to excite interest among individuals as they age.

Trends in our investigation where higher interest levels corresponded with increasing age seemed to represent a more pragmatic emphasis in exercising. While motivations related to being *toned and fit* evidenced the highest mean scores across all age groups, the significant linear trend for this factor documents how it becomes more central as a motivator with increasing age. Perhaps we can identify in this trend a growing awareness of one's mortality and the need to counter the effects of aging. The *toned and fit* factor included items pertaining to the prevention of future health problems as well as a current emphasis on body shaping and overall fitness levels. Health may be more taken for granted at a younger age, whereas aging tends to bring home the fragility of our lives (Andrews, 1999; Blum-Lehmann, 2008). Baltes's (1987, 1993, 1997) lifespan model of selective optimization with compensation gives great emphasis to age-related losses in human capacities and our need to address these losses through the selection of other goals and compensatory behaviors, which could include more instrumental ways of engaging in physical activity.

Stress reduction was another motive that seemed to increase in relevance with age. The items captured by this factor referred to reducing stress, releasing tension, increasing relaxation, and addressing mood fluctuations. Evidence pertaining to these kinds of benefits of exercise has been widely documented (Edenfield & Blumenthal, 2011; Gerber & Pühse, 2009). Perhaps individuals learn over time the importance of 'time out' from stressful daily events and recognize how regular physical activity can provide a reliable means of stress reduction. A parallel finding might be seen in Seippel's (2006) study, where mental recreation was found to gain increasing importance with age.

In an overall perspective, our investigation offers insights into the reasons for individual involvement in PA across the lifespan, as well as affording a fresh outlook regarding the structure of exercise motivations. We noted in our discussion of the EFA results that our factors seemed to be complexly constructed with items that could be seen as a mix of intrinsic and extrinsic exercise-related motivations. For instance, it seemed noteworthy that an item reflecting the goal of increasing physical attractiveness loaded on the same factor as items concerning health and physical fitness, which have been assumed to reflect intrinsic motivation (Kasser & Ryan, 1996; Ryan et al., 2009). Certainly, the importance of organismic integration theory (Deci & Ryan, 1985;

Ryan & Deci, 2000) in describing a continuum of motivations ranging from those that are highly controlled to ones that are autonomously pursued allows us to appreciate how extrinsic motives may be closely linked to intrinsic ones. We also argued that our EFA results provided a reasonable map of exercise motives that could facilitate comprehension of differences across various types of groupings, including our own contrasts based on age.

When considering motives across the lifespan, two summary perspectives can be offered: The first can be seen in the relative scores of the factors across age groups (Figure 1), wherein we find that the more instrumental purposes of exercise to be *toned and fit* rank highest for all age groups while the seemingly more personal and intrinsic purposes of *fun and friends* rank lowest for all age groups. The second perspective, also depicted in Figure 1, pertains to the types of motives that decline with age vs. those that grow. In this regard, pragmatic or instrumental concerns seem to trump ones that might be more personally uplifting.

In reflecting on these global impressions, we saw linkages to the pioneering work of Vallerand (2008, 2012) and his colleagues (Vallerand, Donahue, & Lafrenière, 2012) regarding the construct of passion. Vallerand (2012) identifies passion as "a special relationship with an activity that one loves" (p.47). Particularly in regard to what is described as harmonious passion, there seems to be a strong element of choice and openness to participation that facilitates positive experiences. Moreover, harmonious passion also incorporates a sense of deep meaning and personal identification with what one is doing. Such passionate engagements have been related to positive states of wellbeing, life satisfaction, vitality, and the relative absence of states of illbeing. In brief, Vallerand (2012) asserts that passion is highly connected to the experience of a meaningful life.

Sport and exercise participation remains at low levels in North America, and it may be too much of a stretch to aspire for passionate engagement in PA within the population at large. Yet, as Vallerand (2012) remarks, motivation matters in regard to living a meaningful life and, moreover, people engage with their worlds in order to grow. When we think of aging as a phenomenon where one becomes more instrumental about what one does and where challenge, joy, excitement, and the desire for achievement diminish in their motivational relevance with passing years, we feel deep concern. We could easily translate our results into prescriptive recommendations for marketing fitness or for program planning, but we prefer to ask a question which unfortunately our current research cannot answer: What will it take to increase passionate relationships with physical pursuits at all ages of the lifespan? Or, perhaps as a more modest goal, what needs to happen for individuals to maintain their view of the world of sports and exercise as a place where they can be nourished in mind, body and spirit?

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