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Trajectories of change in self-esteem in older adults: exercise intervention effects

Neha P. Gothe,
Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, 906 S. Goodwin Avenue, Urbana, IL 61801, USA

Sean P. Mullen,
Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, 906 S. Goodwin Avenue, Urbana, IL 61801, USA

Thomas R. Wójcicki,
Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, 906 S. Goodwin Avenue, Urbana, IL 61801, USA

Emily L. Mailey,
Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, 906 S. Goodwin Avenue, Urbana, IL 61801, USA

Siobhan M. White,
Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, 906 S. Goodwin Avenue, Urbana, IL 61801, USA

Erin A. Olson,
Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, 906 S. Goodwin Avenue, Urbana, IL 61801, USA

Amanda N. Szabo,
Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, 906 S. Goodwin Avenue, Urbana, IL 61801, USA

Arthur F. Kramer, and
Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign, 405 North Mathews Avenue, Urbana, IL 61801, USA

Edward McAuley
Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, 906 S. Goodwin Avenue, Urbana, IL 61801, USA

Edward McAuley: emcauley@illinois.edu

Abstract

This 12-month, 2 arm, single blind randomized controlled exercise trial examined relationships among changes in multidimensional self-esteem as a function of intervention mode (i.e., walking vs. flexibility-toning-balance). Data were collected on three equidistant occasions (baseline, 6 and 12 months). One-hundred seventy-nine older adults (M_{age} = 66.38) began the study and 145 completed assessments at all time points. Participants completed measures of physical and global self-esteem as well as demographic information. There were no significant group differences at

Correspondence to: Edward McAuley, emcauley@illinois.edu.

baseline on these demographic indicators or esteem variables. Data were analyzed using linear and parallel process growth modeling procedures. Results supported the position that across both groups, domain-level (i.e., physical self-worth) was dependent upon sub-domain-level (i.e., perceived attractiveness, strength, and condition) esteem change. Furthermore, greater improvements were observed in the flexibility-toning-balance group, in terms of perceived strength and attractiveness esteem, compared to the walking group. Our findings support theoretically-based predictions and extend the literature showing unique psychological responses conditional on specific types of physical activities.

Keywords

Self perceptions; Physical activity; Growth models; Modes of exercise

Introduction

In the US, the 65 and older population is projected to double by 2030 from 35 to 71 million (Yan et al. 2004). Aging is associated with decreased functional capacity which can contribute to loss of independence and reduced quality of life (CDC 2009). Self-esteem, a key component of psychological well-being and life satisfaction (Rosenberg 1965) and determinant of quality of life (Diener and Diener 1995), also declines with age (Robins et al. 2002). Physical activity has been demonstrated to be effective in enhancing quality of life (Atlantis et al. 2004) and global self esteem in older adults (Li et al. 2002; McAuley et al. 2005; Opdenacker et al. 2009). However, Spence et al. (2005) have suggested that global self-esteem varies little as a function of physical activity. Therefore, it may be more important that older adults have more favorable domain-specific self-perceptions, such as those pertaining to their health and physical condition that can motivate physical activity behavior, irrespective of global self-esteem (Schutzer and Graves 2004). Understanding the mechanisms that enhance and maintain physical activity-related self-perceptions in late life therefore is both practically and theoretically important.

Extensive research suggests that self-esteem is both multidimensional and hierarchical (Byrne 1996; Marsh and Shavelson 1985) and such a framework is the basis of Sonstroem and Morgan’s (1989) Exercise Self-Esteem Model. This model specifies that changes in physical activity brought about by exercise interventions influence the self-esteem sub-domains of perceived body attractiveness, perceived strength, and perceived physical condition esteem. In turn, changes in these subdomains bring about changes in physical self-worth, leading to further changes in global self-esteem.

The Exercise Self-Esteem Model has been well-validated in cross-sectional and intervention studies (Alfermann and Stoll 2000; Caruso and Gill 1992; Elavsky and McAuley 2007; Li et al. 2002; McAuley et al. 2000, 2005; Opdenacker et al. 2009). For example, Li et al. (2002) examined the effects of a 6-month Tai Chi exercise program on older adults’ global self-esteem and physical self-worth, and found changes in these higher-order constructs were mediated by attractiveness, strength, and condition. More recently, Opdenacker et al. (2009) conducted an 11-month randomized controlled trial testing the Exercise Self-Esteem Model with three older adult groups: lifestyle physical activity intervention, structured exercise intervention, and control. The lifestyle group showed significant improvements in physical condition, sport competence, body attractiveness as well as physical self worth, whereas the structured group only showed improvements physical condition and sport competence. However, the intervention groups received both endurance and strength training simultaneously which prevented researchers from exploring the unique effects of exercise mode on the esteem dimensions. Furthermore, they were unable to evaluate whether or not

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the basic structure of the Exercise Self-Esteem Model was invariant across groups due to sample size constraints.

Although there is merit in investigating the differences between structured/class-based physical activity versus lifestyle/home-based programs (Opdenacker et al. 2009; Perri et al. 1997; Mills et al. 1997), much needs to be done to understand the implications of exercise type on self-esteem across the lifespan. To date, no published studies have explored invariance of the Exercise Self-Esteem Model pathways across different modes of exercise in older adults. From a practical perspective, it is important to determine if one may experience similar esteem benefits regardless of their preferred type of exercise activity. From a theoretical perspective, it is important to determine the generalizability of the Exercise Self-Esteem Model across groups and contexts. Moreover, few studies have examined the trajectory or growth curves of elements of esteem across time.

The present study had several objectives. First, we were interested in comparing the relative effects of two structured exercise interventions [i.e. walking and flexing-toning-balance] on the trajectories of multidimensional self-esteem across a 12-month intervention period. In doing so, we used the Exercise Self-Esteem Model as a guiding theoretical framework focusing on the basic self-esteem structure (see Fig. 1) to evaluate group invariance of linear growth models and parallel process models. Specifically, we hypothesized that walking and flexing-toning-balance participants would show significant changes over time in esteem variables. We also hypothesized that variables most relevant to outcomes of strength training (e.g., strength esteem) would show more favorable temporal change as a function of being in the flexing-toning-balance group. Additionally, we hypothesized that the theorized hierarchical relationships among the self-esteem constructs would be invariant across groups.

Method

Participants & procedure

Participants were community-dwelling older adults who volunteered to participate in a 12-month exercise program designed to examine intervention effects on the primary outcomes of brain structure and function (see Voss et al. 2010) and secondary outcomes of physical and psychosocial function. McAuley et al. (2010) have previously reported sample characteristics, participant flow (i.e., CONSORT) and inclusionary/exclusionary criteria. Briefly, participants were predominantly female ($N = 179$, males = 62, females = 117; age range 58–81 years) with a mean age at baseline of 66.43 years. Most of the sample were White (88.3%; 3.4% were Asian, 8.4% were African-American); about half (48.6%) had at least a college degree and 59.8% were married. To participate in the exercise program, participants were required to be physically inactive (i.e., previous 6 months), without medical conditions exacerbated by exercise, and willing to be randomized into either a walking or flexing-toning-balance program. In response to multiple media advertisements, participants contacted us by phone and subsequently completed a pre-screening interview to determine whether they met inclusion criteria. Physician consent was obtained for participation in the program.

Intervention

Both the walking and flexing-toning-balance groups were led by trained exercise leaders. The groups met three times per week for approximately 50 min, starting and ending with 5 min of warm-up and cool-down stretches. Participants were encouraged to exercise at a prescribed intensity of 13–15 on the Borg (1998) RPE scale, completed exercise logs at each session and received personalized feedback, for each of the 12 months of the intervention.

The monthly feedback forms were similar for the two groups and included information about participant's attendance, duration, and average RPE and enjoyment ratings for the month.

Walking group—Participants wore heart rate monitors for these sessions and were encouraged to walk in their target heart rate zone set at 50–60% of the maximum heart rate reserve during weeks one through seven and 60–75% for the remainder of the 12-month program. Participants progressed in increments of 5 min from 10 min of walking during week one until they reached 40 min during week seven. They continued to walk for 40 min for the remainder of the program.

Flexing-toning-balance group—These participants engaged in four muscle toning exercises utilizing dumbbells or resistance bands, two exercises designed to improve balance, one yoga sequence, and one exercise of their choice. To maintain interest, new exercises were introduced every 3 weeks. During the first week of each three week cycle, participants became familiar with the new exercises, and were encouraged to increase the intensity, by using more weight or adding repetitions, over the following weeks.

Measures

Demographics—Demographic information was collected including participants' age, gender, race, and education.

Physical parameters—*Aerobic fitness* (VO2 peak) was assessed on a motor-driven treadmill employing a modified Balke protocol (ACSM 1995). Respiration, heart rate and blood pressure were continuously monitored by a cardiologist and nurse. The highest oxygen uptake (VO2) value in ml/kg was used in these analyses. Height and weight was recorded using a Seca electronic scale and stadiometer (Model 7631321139) with participants wearing light clothing and no shoes. *Body mass index* (BMI) was calculated using the standard formula of weight (kg)/[height (m)]^2. *Physical activity level* was assessed using the leisure time activity component of the Physical Activity Scale for the Elderly (Washburn et al. 1993).

Global self-esteem—Rosenberg's Self-Esteem Scale (Rosenberg 1965), a 10-item assessment has been widely used as a global index of self-esteem in several research domains, including physical activity (Fox 1999). Participants respond on a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). Responses were summed to yield a total score ranging from 10 to 50. Internal consistency in the present study was .87 and .89 at baseline and month 12, respectively.

Physical self-worth and self-esteem sub domains—Fox and Corbin's (1989) Physical Self-Perception Profile is a 30-item Likert instrument used to assess self-esteem relative to several domains of physical functioning in a hierarchical, multidimensional fashion. We used only the general 6-item physical self-worth subscale and three 6-item sub-domain scales (i.e., physical condition, attractive body, and strength; 1 = not at all true, 4 = completely true). Each subscale has a range of 6–24. Consistent with previous reports (Fox and Corbin 1989), internal consistencies for the Physical Self Perception Profile subscales ranged from .78 to .89 across the 12-month period.

Data analytic strategy

Data were analyzed using *Mplus* (*version* 6.0; Muthén and Muthén 1998–2007). We adopted a latent curve modeling framework that allows for a systematic examination of baseline levels and rates of esteem change across time and groups (Bollen and Curran 2006). Data were collected at three time points (baseline, 6 and 12 months) and a fixed loading pattern was used for the first two time points (0, 1) with the third time point freely estimated for all models. Slope variances were initially fixed to zero for all models to allow for identical model comparisons, and residual variances were constrained to be equal. Two growth processes were then estimated simultaneously such that slopes for higher-order esteem constructs were regressed on the slopes of lower-level esteem constructs. Goodness of fit tests for all models reported herein included the chi-square statistic, Root Mean Square Error of the Approximation (RMSEA), and Comparative Fit Index (CFI). Chi square *P* values at or above .05, RMSEA below .08, and CFI above .95 indicated good model-data fit (Bollen 1989; Hu and Bentler 1999). Prior to the main analyses, measures were examined for outliers and normality. Data distributions were mostly normal with the exception of global self-esteem scores which were negatively skewed. Attempts to reduce skewness through transformations were unsuccessful. Subsequently, maximum likelihood robust estimators were used for missing data to avoid violation of the multivariate normality assumption.

Results

Preliminary analyses

Participants were equally adherent (80.2% vs. 76.7% for the walking and flexing-toning-balance conditions, respectively) and 144 participants completed all three assessments (80.4% retention). Study “dropouts” showed no significant differences at baseline in esteem constructs relative to “completers”. Also, no significant differences were present at baseline when comparing walking and flexing-toning-balance groups, across Exercise Self-Esteem Model variables (*P*s ≥ .07) and demographic measures (i.e., age, gender, education, *P*s ≥ .14).

Correlations

Table 1 shows all bivariate correlations. Overall, the correlations support the hierarchical series of relationships expected with stronger relations exhibited among proximal variables than distal variables at both time points. Table 2 shows intercorrelations among standardized difference scores by group. Consistent with Exercise Self-Esteem Model predictions, changes in all subdomains (i.e., attractiveness, strength, condition) were positively correlated with changes in physical self-worth in both groups. However, changes in physical self-worth were not correlated with changes in global self-esteem in either group. Interestingly, the magnitude of change in physical self-worth more strongly covaried with change in sub-domains for the flexing-toning-balance group relative to the walking group.

Linear growth models (LGMs)

Table 3 shows the means and standard deviations of each intervention group on the study variables. Figure 2 is a graphical representation of the mean level change in the two groups over the course of this intervention.

The *attractive body esteem model* fit the data well (χ^2 = 14.01 (10), *P* = .17, CFI = .98, RMSEA = .07 (90% CI = .00–.14), and the flexing-toning-balance group’s positive slope (1.38) was approximately double that of the walking group (.67); essentially, both groups viewed themselves to have more attractive bodies as function of their participation. As for the *strength esteem model*, it also provided a good fit to the data (χ^2 = 13.77 (10), *P* = .18, CFI = .99, RMSEA = .07 (90% CI = .00–.14). As predicted, the flexing-toning-balance group showed almost a threefold increase (2.19) in perceived strength esteem, relative to the walking group (.67). The *physical condition model* did not provide an adequate fit to the data (χ^2 = 24.55 (10), *P* = .01, CFI = .93, RMSEA = .13 (90% CI = .06–.19) and no attempts to modify the model improved fit indices; thus, findings should be interpreted with caution:

slopes for the flexing-toning-balance and walking groups were both positive and significant (3.01 and 2.17, respectively), suggesting that participation in both activity modes led to an increase in perceived physical condition esteem. Similarly, the *physical self-worth model* provided an adequate fit to the data, with the exception of RMSEA (χ^2 = 16.53(10), P = .09, CFI = .97, RMSEA = .09 (90% CI = .00–.16). Allowing slope variances to vary across group provided a better-fitting model (χ^2 = 3.57(6), P = .73, CFI = 1.00, RMSEA = .00 (90% CI = .00–.10), and again, the flexing-toning-balance group showed a positive linear rate of change (2.69) which was approximately twice that exhibited by the walking group (1.35). Finally, the *global self-esteem model* fit the data well (χ^2 = 4.00 (10), P = .95, CFI = 1.00, RMSEA = 0.00 (90% CI = .00–.01), but the slopes were not significant for the walking (.46, P = .39) or the flexing-toning-balance group (−.09, P = .48), indicating no change in either group at the end of the 12 month period.

Parallel process models

To test the Exercise Self-Esteem Model -based predictions that changes in higher-order esteem are dependent upon lower-order esteem changes, and that change pathways should be consistent regardless of exercise mode, we next examined group-invariant, parallel growth models whereby two change processes were simultaneously estimated. In addition, structural relationships were tested that involved regressing the slope for domain-level physical self-worth on slopes for esteem sub domains, and the slope for the highest-order global esteem on physical self-worth. The trajectories of change between groups across time can be seen in Fig. 3.

The *attractive body esteem → physical self-worth model* provided a reasonable fit to the data (χ^2 = 65.557 (28), P < .001,CFI = .946,RMSEA = .123 (90%CI = .084–.162), with the exception of RMSEA. The slope of physical self-worth was significantly predicted by both the intercept (β = −.154, P < .05), and slope (β = 1.039, P < .001) of perceived attractiveness. Specifically, lower scores at baseline, and a steeper incline in perceived attractiveness had an accelerated effect on the slope of physical self-worth. The *strength esteem → physical self-worth model* also provided a good fit to the data (χ^2 = 44.866 (28), P = .023, CFI = .975, RMSEA = .082 (90% CI = .031–.125), and change in physical self-worth was significantly predicted by change in strength slope (β = 1.07, P < .001), but not strength intercept (β = −.019, P = .778). Given that the linear model for condition was not stable (possibly due to a non-linear, quadratic growth process that could not be captured by our study’s design), it was not appropriate to examine a *physical condition esteem → physical self-worth model*; however, readers are directed to Table 2 which displays a significant slope-to-slope correlation between condition and physical self-worth, and to Fig. 3 for a visual inspection of the means that appear to co-vary similarly for each group across time. *Physical self-worth → global self-esteem model* provided an excellent fit (χ^2 = 20.202 (28), P = .857, CFI = 1.000, RMSEA = 0.000 (90% CI = .000–.046), but neither the intercept (β = .028, P = .575) or slope (β = −.076, P = .605) of physical self-worth appeared to have any effect on the trajectory of global esteem over the duration of the intervention.

Exploratory analyses

The Exercise Self-Esteem Model has hypothesized that changes in physical parameters are responsible for changes in esteem relationships across time. Although not the central focus of this report, we tested this hypothesis by adding BMI, fitness level, and self-reported physical activity change (baseline to 12 month) scores to the parallel process models. Analyses revealed marginally significant paths from physical activity change to perceived condition and attractiveness change (P = .055 and .061, respectively) and non-significant relationships for the BMI and fitness change scores. It was also of interest to know whether a bidirectional relationship might exist among higher and lower esteem change dimensions.

Therefore, we tested both hypothesized “bottom-up” and exploratory “top-down” pathways and found that physical self-worth’s slope positively predicted the attractiveness slope. No other significant relationships were found.

In summary, linear change was found across domain and subdomain esteem levels, with the exception of perceived physical condition and global esteem. Greater improvements were observed in the flexing-toning-balance condition relative to the walking condition. It was also demonstrated that change in the higher-order esteem component, physical self-worth, was largely dependent on the lower-order esteem components of perceived body attractiveness and perceived strength esteem. These in turn, appear to be influenced by physical activity, although more conventional physical parameters which parallel those used in previous work (e.g., McAuley et al. 2000; Opdenacker et al. 2009) did not drive the observed esteem change.

Discussion

The purpose of this study was twofold. First, we were interested in determining whether there were differential effects of two physical activity modes on multidimensional esteem components across a 12-month intervention. Second, we examined the invariance of proposed hierarchical esteem relationships across the two conditions. Although there were differences across groups in rates of change in esteem variables, the models fit the data remarkably well for both groups, supporting Exercise Self-Esteem Model predictions. As hypothesized, significant positive changes in all esteem constructs, except global esteem, were observed. In addition, flexing-toning-balance participants showed more favorable changes in strength and attractiveness esteem. Given that participants in this condition regularly engaged in toning exercises using resistance equipment, and most likely changed their muscular strength, it is not surprising for this to be reflected in their self-perceptions of worth. Participants in the walking condition also demonstrated increases in strength esteem, possibly as a result of lower extremity strength improvements due to regular walking.

As for condition esteem, improvements were similar for both groups. Physical condition can be broadly interpreted, and regardless of the mode of activity, it appears participants’ perceived improvements in some aspect of their conditioning. The flexing-toning-balance training protocol included a combination of other anaerobic exercises besides toning, such as flexibility (e.g., stretching, Yoga movements) and balance (e.g., proprioceptive and stability exercises) and it is possible that these activities may have translated into perceived improvements in daily functioning. Fatouros et al. (2002) reported that resistance training increased the range of motion of a number of joints in a sample of inactive older individuals possibly due to an improvement in muscle strength. In fact, changes in perceived condition *and* strength may in part be attributed to participants’ perceived ease of carrying out daily activities (i.e., less stiffness). Similarly, participants in the walking condition may have improved their flexibility from warm-up and cool-down exercises (i.e., stretching major muscle groups), in addition to the nature of walking (e.g., increased blood flow). Interestingly, participants in the flexing-toning-balance group showed a much greater rate of change, relative to the walking condition, in attractive body esteem. Again, this could be due to real, tangible changes in physique, or to changes in the salience of body composition for any number of reasons including body-specific instructional cues or positive informal feedback provided by the exercise leader, other group members, or significant others.

Global self-esteem levels did not change as a result of participation in either activity, which may be expected as the interventions targeted domain-specific perceptions. However, Li et al. (2002) found that a six-month Tai Chi program led to an increase in participants’ global self-esteem. Findings from Opdenacker et al. (2009) lifestyle intervention also showed that changes in physical self-worth were positively related to changes in global self-esteem. It is possible that these types of interventions (i.e., mind–body and home-based) are more successful at fully integrating physical activity into the daily lives of older adults, providing greater impetus for change in overall sense of self. In a quantitative review of 113 studies, Spence et al. (Spence et al. 2005) found that exercise participation was associated with only a small change in global self-esteem ($d = .23$) and changes in fitness and type of program were significant moderators of the effects of exercise on global self-esteem. However, both of our groups showed a relatively flat global self-esteem trajectory across 12 months. It should be noted that the intervention was designed for low active older adults, and the participants started exercising gradually and worked towards attaining the prescribed ACSM-grounded guidelines for intensity (RPE = 13–15) and duration (40 min) by 6 months. Hence, lack of fluctuation in scores after 6 months may be due to the intervention's focus on maintenance rather than continual and incremental challenges that could potentially induce greater physiological changes and in turn, greater esteem change. Although some changes in the global self-esteem trajectory have been found across the lifespan (Spence et al. 2005), it is considered a relatively stable theoretical construct (Robins et al. 2002). From an intervention perspective, lower sub domain levels of esteem are clearly easier to target and modify than an individual's overall sense of self. It is also possible that our global self-esteem means reflect a ceiling effect, and previous studies with similar-aged exercise participants (Li et al. 2002), who did not undergo cognitive screening yielded lower mean values (ranging from 32 to 35) than ours (42–43).

We believe that this study has several strengths. First, this was the first structured, supervised, exercise intervention lasting a year to investigate changes in multiple elements of esteem. Moreover, this is the first attempt to test invariance of the basic Exercise Self-Esteem Model structure across qualitatively different groups; something that Sonstroem and Morgan (1989) proposed but has until now remained empirically unexamined. To our knowledge, this is one of the few studies to incorporate parallel process modeling in the study of physical activity and to incorporate growth trajectories of Exercise Self-Esteem Model constructs (Li et al. 2002). One of the advantages of growth modeling techniques is the additional statistical power they afford due to the incorporation of inter-individual and intra-individual change, and the ability to account for measurement error (Duncan et al. 2006).

Although our findings provide further validation for the multidimensional and hierarchical nature of self-esteem, subsequent research should test the model on a broader spectrum of the population. Our study is limited by a sample of primarily white, well-educated, high functioning older adults. Virtually no research exists on processes of esteem change in older adult minority populations. Also, due to the nature of our design, we were unable to test the possibility of non-linear fluctuation in esteem across the course of the intervention. Upon visual inspection of the means, particularly the plot for condition, it would appear that participants experienced an initial boost in esteem levels that leveled off or were attenuated somewhat beyond the study's midpoint. An additional follow-up assessment would reveal more about the nature of change in esteem, as participants are faced with having to exercise on their own following the cessation of the supervised exercise program. Additionally, it is possible that differences in social interaction existed due to the structure of the classes (e.g., flexing-toning-balance group worked together through the exercises, whereas walking participants walked at their own pace). However, we would counter this by noting that participants in the walking condition always walked with each other and both groups engaged in group warm-up and cool-down activities.

Future research directions should examine subgroups of individuals that might vary in the extent to which their esteem levels change across the course of an intervention. Also, comparing the unique effects of traditional physical activity interventions with mind–body interventions like yoga and Tai Chi should be considered, as they may be more practical and modifiable alternatives for some special populations (e.g., adults with chronic diseases and disabilities). There may also be additional benefits of learning new skills in late-life that cannot be acquired via common activities like walking and strength training. Combining interventions may also be a fruitful area for research, as Atlantis et al. (2004) found that a 24-week multi-modal program (aerobic combined with strength training) caused an increase in satisfaction with life.

In conclusion, we believe that our findings make a significant contribution to the literature in terms of its theoretical and practical implications. Self-esteem continues to be an important construct in the field, and this study suggests that older adults can enhance domain-specific self-esteem through participation in multiple modes of exercise. Although domain-level perceptions are theoretically the most difficult to change, this study suggests a straightforward bottom-up approach to changing older adults' sense of self-worth by engaging in two modes of exercise. Our preliminary findings suggest that adults may garner the greatest esteem gains from activities that involve flexing, toning, and balance, as opposed to simply walking. Future research which investigates the unique effects of various modes of exercise on self esteem domains in older adults as well as other populations is warranted.

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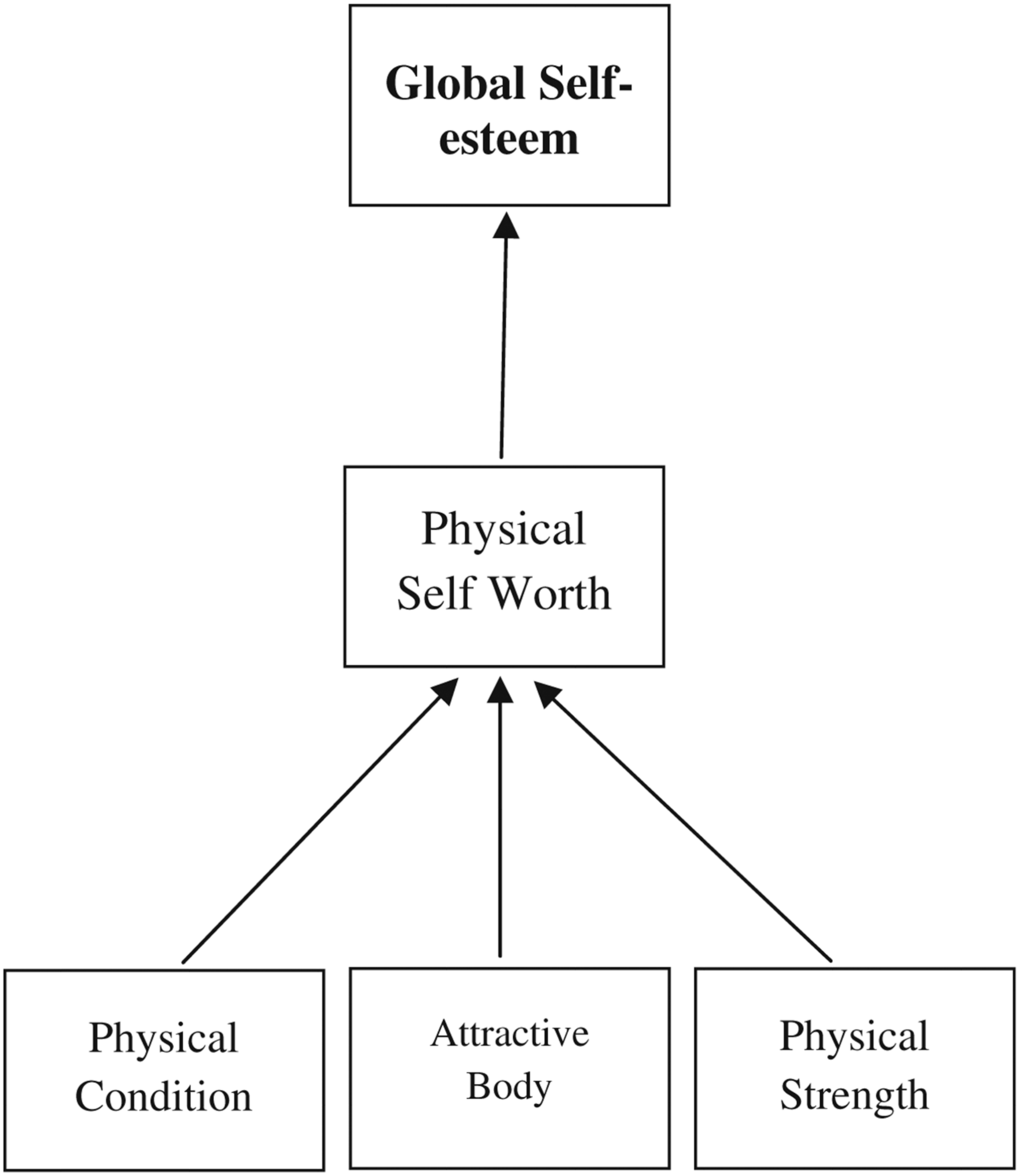

Fig. 1.
The theoretical structure of self-esteem

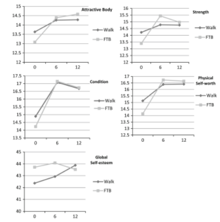

Fig. 2.

Mean plots of esteem variables for walking and FTB groups across time. *Walk* walking group; *FTB* flexing-toning-balance group

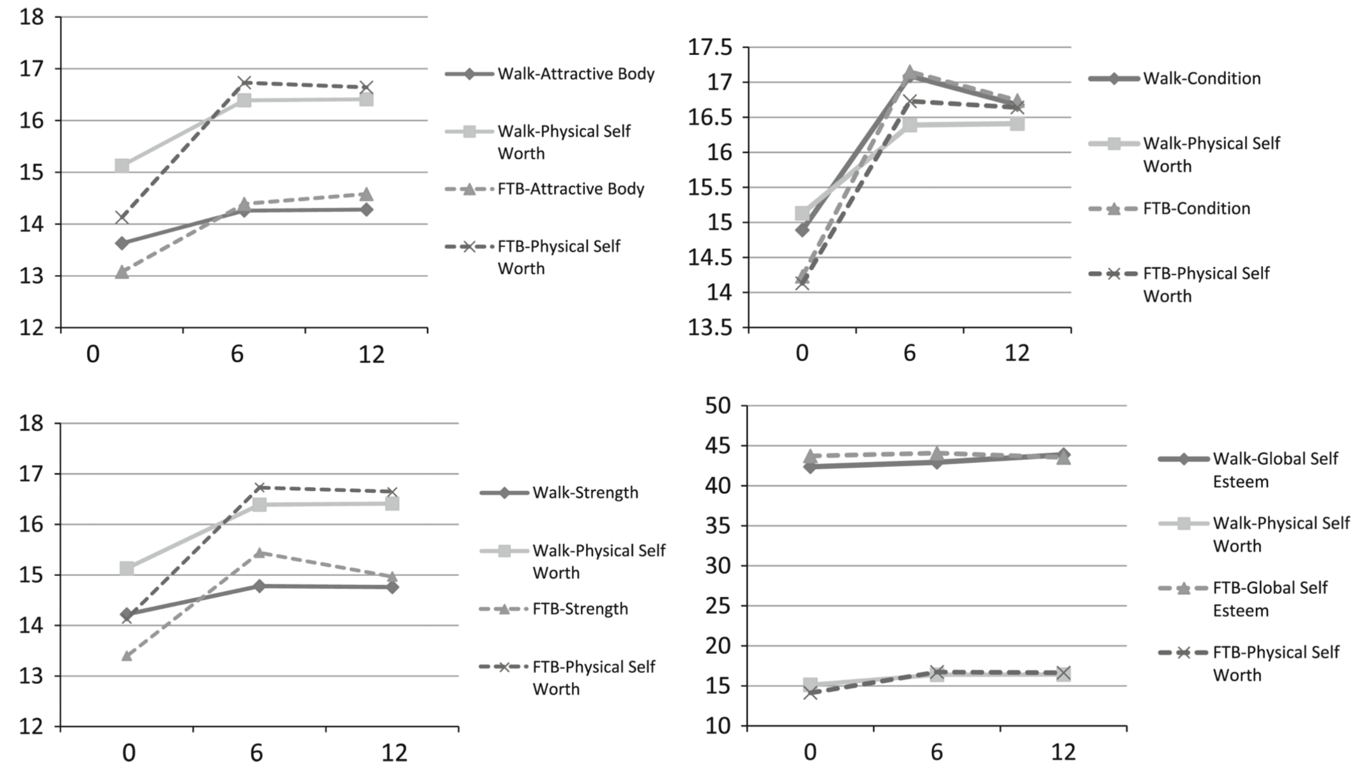

Fig. 3.

Mean plots of parallel processes for walking and FTB groups across time. *Walk* walking group; *FTB* flexing-toning-balance group

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Table 1

Bivariate correlations among multidimensional esteem variables at baseline and 12 months

	1	2	3	4	5	6	7	8	9	10
1. Physical condition (M0)	1									
2. Attractive body (M0)	.60	1								
3. Strength (M0)	.57	.49	1							
4. Physical self worth (M0)	.71	.74	.68	1						
5. Global esteem (M0)	.23	.22	.22	.28	1					
6. Physical condition (M12)	.65	.46	.38	.51	.23	1				
7. Attractive body (M12)	.54	.76	.38	.64	.27	.66	1			
8. Strength (M12)	.45	.41	.72	.55	.26	.60	.51	1		
9. Physical self worth (M12)	.59	.58	.43	.69	.30	.75	.73	.61	1	
10. Global esteem (M12)	.23	.32	.26	.33	.72	.26	.34	.35	.33	1

All correlations are significant at $P < .05$. *M0* baseline, *M12* month 12

Table 2

Intercorrelations among standardized difference scores for all esteem constructs

	1	2	3	4	5
1. Attractive body	–	.22±	**.44**	**.40**	−.12
2. Strength	**.39**	–	**.40**	**.28**	.05
3. Physical condition	**.32**	**.52**	–	**.50**	.13
4. Physical self-worth	**.46**	**.56**	**.56**	–	.00
5. Global self-esteem	.09	.07	.05	−.10	–

Bolded values are significant ($P < .05$) and ± indicates marginal significance (.06); correlations below the diagonal represent relationships for the flexing-toning-balance group; correlations above the diagonal represent the relationships for the walking group

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Table 3

Means and standard deviations for all esteem constructs

	Time (month)	Overall sample		Walking		FTB	
		M	SD	M	SD	M	SD
Attractive body	0	13.35	3.85	13.63	3.71	13.08	3.99
	6	14.32	3.89	14.26	3.55	14.39	4.21
	12	14.43	3.87	14.28	3.90	14.58	3.85
Physical condition	0	14.56	3.5	14.89	3.57	14.23	3.42
	6	17.12	3.25	17.09	2.85	17.15	3.63
	12	16.71	3.29	16.68	3.27	16.74	3.33
Perceived strength	0	13.81	4.02	14.22	4.19	13.40	3.82
	6	15.11	3.50	14.78	3.49	15.44	3.50
	12	14.87	3.7	14.76	3.62	14.97	3.80
Physical self-worth	0	14.63	3.72	15.13	3.86	14.13	3.53
	6	16.56	3.33	16.39	3.31	16.73	3.36
	12	16.53	3.46	16.41	3.65	16.64	3.28
Global self-esteem	0	43.05	5.26	42.37	5.36	43.72	5.26
	6	43.51	5.07	42.93	4.90	44.08	5.21
	12	43.71	5.15	43.88	4.90	43.53	5.15