

Multidimensional Physical Self-Concept of Athletes With Physical Disabilities

Deborah R. Shapiro
Georgia State University

Jeffrey J. Martin
Wayne State University

The purposes of this investigation were first to predict reported PA (physical activity) behavior and self-esteem using a multidimensional physical self-concept model and second to describe perceptions of multidimensional physical self-concept (e.g., strength, endurance, sport competence) among athletes with physical disabilities. Athletes ($N = 36$, M age = 16.11, SD age = 2.8) completed the Physical Self-Description Questionnaire. Participants reported mostly positive perceptions of self-esteem, global physical self-concept, endurance, body fat, sport competence, strength, flexibility, and physical activity (M s ranging from 3.9 to 5.6 out of 6). Correlations indicated a number of significant relationships among self-esteem and reported PA and various dimensions of physical self-concept. Using physical self-concept, strength, endurance, and flexibility in the first regression equation and sport competence and endurance simultaneously in the second equation, 47 and 31% of the variance was accounted for in self-esteem and reported PA, respectively. The findings support the value of examining multidimensional physical self-concept as different aspects of the physical self appear to have different influences on reported PA engagement versus self-esteem.

Disability and Physical Activity

The inclusion movement and legal mandates like the Individuals with Disabilities Education Improvement Act (2004 Amendment) has led to approximately 35% of students with orthopedic impairments, 40% of students with other health impairments, and 45% of students with visual impairments being served primarily in regular classes with their peers without disabilities (www.infohouse.com/disabilitydata/disaibility/4-6.php?print=yes, retrieved March 26, 2009). Despite this positive progression in the acceptance and inclusion of children with physical disabilities, they

Deborah Shapiro is with the Department of Kinesiology and Health at Georgia State University in Atlanta. Jeffrey Martin is with the Division of Kinesiology, Health, and Sport Studies at Wayne State University in Detroit, Michigan.

are not given the same opportunities as their able bodied peers to engage in physical activity (PA; Longmuir & Bar-Or, 2000).

Disability significantly influences habitual PA levels, perceived participation limits, and perceived fitness relative to peers without disabilities (Dishman, Washburn, & Heath, 2004). Children with physical disabilities are often not encouraged to lead active lives and in fact tend to lead sedentary lives with greater health problems and have more physical activity barriers (Longmuir & Bar-Or, 2000; Rimmer, Riley, Wang, & Rauworth, 2005). Youth with physical disabilities and visual impairments have significantly lower activity levels (26% and 27%, respectively) than peers with hearing impairments and chronic medical conditions (53% and 47%, respectively). Among youth with cerebral palsy and muscular dystrophy, 54% and 67%, respectively, reported being less fit than their peers. This same group of youth with physical disabilities (78%) and visual impairments (84%) reported being limited in PA participation. Of youth with physical disabilities, those with cerebral palsy, spina bifida, and muscular dystrophy (82%, 85%, and 87%, respectively) were more likely than those with other physical disabilities (e.g., head injury, cystic fibrosis) to state that they were limited in PA participation (Longmuir & Bar-Or, 2000).

Disability is viewed as a multidimensional identity mediated by the multiple roles, expectancies, aspirations, and perceptions that each individual incorporates into the self (Ferreira & Fox, 2008). People's reactions to individuals with disabilities are sometimes viewed as forms of social oppression, which can lead to an undermining of their psycho-emotional well-being. People with disabilities are a risk group for mental health disorders like depression, anxiety, stress, frustration, lack of motivation, and social withdrawal (Ferreira & Fox, 2008). Individuals with congenital disabilities generally report higher trait anxiety, lower mastery, self-esteem, and psychological well-being than those with acquired disabilities (Campbell, 1995; Skordilis, Skafida, Chrysagis, & Nikitaras, 2006). The preponderance of research examining psychological implications of exercise and sport on individuals with disabilities, however, tends to focus on comparisons of self-esteem, for example, between categorical variables (e.g., participants vs. nonparticipants, team vs. individual sports, disability classification) rather than age of onset of disability. Blinde and McClung (1997) found that participation in recreational activities among adults with physical disabilities resulted in enhanced perceptions of both the physical and social self, including increased perceptions of confidence to pursue physical activities. Youth with physical disabilities also obtain various psychosocial benefits from engaging in sport and PA. These psychosocial benefits span the areas of increased social support (Martin & Mushett, 1996), increased friendship (Martin & Smith, 2002), increased enjoyment (Martin, 2006), empowerment (Martin, 1999), and decreased depression (DePaoli & Sweeney, 2000).

Individuals with physical disabilities can clearly benefit from an active lifestyle. PA not only reduces the risk for health concerns and susceptibility to secondary health conditions, but PA also can influence all levels of functioning (U.S. Department of Health and Human Services, 2000; van der Ploeg, van der Beek, van der Woude, & van Mechelen, 2004). Secondary health and functioning problems in people with a physical disability that can be prevented or reduced by participation in PA include heart disease, diabetes, osteoporosis, osteoarthritis, high blood pressure, decreased balance, strength, flexibility and endurance,

increased spasticity, weight problems, bladder infections, and psychosocial considerations, including depression, reduced self-esteem, decreased social interactions, and greater dependence on significant others and/or caretakers (van der Ploeg et al., 2004). A physically active lifestyle is equally if not more important for persons with a physical disability than their peers without disabilities. Programs that focus on improving functioning across a spectrum of diagnoses and range of age groups are effective in reducing secondary conditions and outpatient physical visits among people with physical disabilities. Given that activity levels in adulthood are usually lower than during childhood, sport and PA patterns established during childhood form a foundation for lifelong PA and subsequent health (Longmuir & Bar-Or, 2000; U.S. Department of Health and Human Services, 2000). Gains achieved through PA and sports are critical when it comes to the prevention or attenuation of secondary conditions or disabilities. A focus on improving muscle tone, flexibility, and strength can accrue benefits for people with mobility impairments who use wheelchairs (U.S. Department of Health, 2000). Children with physical disabilities who exercise can increase strength, bone mineral density, vital capacity, and mobility. PA is thought to reduce depression, improve perceptions of physical competence and self-efficacy in wheelchair mobility, and contribute to an overall increased quality of life (Tasiemski, Kennedy, Gardner, & Blaikley, 2004).

Despite the promotion of health benefits of PA for persons with a physical disability, reduced participation levels may be due to a number of barriers such as architectural barriers, lack of access to appropriate sporting wheelchairs, organizational policies and practices, discrimination, and social attitudes (Rimmer et al., 2005). Given the value of PA for individuals with physical disabilities, research emphasizing psychological constructs such as self-concept have been cited as a national priority as a means to increasing PA (Marsh, Papaioannou, & Theodorakis, 2006; Rimmer, Braddock, & Pitetti, 1996). Researchers are beginning to amass a significant body of knowledge examining the determinants of PA. Although multidimensional self-concept models have received extensive support in research with individuals without disabilities (e.g., Marsh & Craven, 2006; Marsh et al., 2006), there is no research to our knowledge employing multidimensional self-concept models to examine youth and older adolescent athletes with physical disabilities and only two studies on adults with physical disabilities (Ferreira & Fox, 2008; Martin, 2007).

Multidimensional Self-Concept

In physical education, sport, and exercise settings, physical self-concept is considered a significant mediating variable facilitating the attainment of desired outcomes, including exercise behavior, adherence, or health-related physical fitness (Marsh et al., 2006). The study of physical self-perceptions has become highly developed, reflecting both a multidimensional and hierarchical organizational structure along with corresponding instruments, including the Physical Self-Perception Profile (Fox & Corbin, 1989) and the Physical Self-Description Questionnaire (Marsh, Richards, Johnson, Roche, & Tremayne, 1994). An important feature of any multidimensional self-concept model is the recognition that people do not feel equally competent in every skill domain and that people have discrete self-concepts across various

domains (i.e., academic, social, emotional, social). Harter (1982), for example, identified 5 domains in the Self-Perception Profile for Children, 8 domains for adolescents, and 11 for adults that meaningfully represent the construct of self-esteem (Fox & Corbin 1989). From age 8, children are increasingly able to judge themselves differently across various domains as well as being able to construct a view of their general self-worth as a person over and above domain specific competence judgments (Harter, 1982). The addition of domains with age highlights both the increasingly differentiated structure of self-concept with cognitive maturity as well as the hierarchical nature of the self-evaluative process (Fox, 1988; Harter, 1982).

Hierarchical organization of self-concept within contemporary self-esteem theory has resulted in general or global self-concept at the apex followed by competence judgments in the academic, social, emotional, and physical domains, representing lower order evaluative dimensions (Harter, 1982). Each of these lower level domains are assessed by subdomain self-perceptions, such as perceived math or reading ability in the academic domain and perceived sport competence, body attractiveness, and physical strength, for example, in the physical domain with further levels made up of perceptions of increasing specificity (Fox, 1988; Fox & Corbin, 1989; Shavelson, Hubner, & Stanton, 1976). Within a given domain, people who perceive themselves as more confident, effective, and competent accomplish more than people with less positive self-perceptions (Marsh & Craven, 2006). The value of this contemporary multidimensional view of self-concept is best illustrated by the conflicting results of two recent major reviews of self-esteem by prominent researchers. When self-esteem is viewed as a unidimensional construct, the benefits typically attributed to it are viewed as largely mythical and limited to feelings of pleasure (Baumeister, Campbell, Krueger, & Vohs, 2003). In contrast, when the multidimensional nature of self-concept is considered, the benefits of self-esteem are far ranging and include academic, exercise, and sport related outcomes (Marsh & Craven, 2006).

Within the physical self-concept domain, individuals recognize that they have different capabilities across the dimensions of endurance, strength, coordination, etc. The hierarchical nature of multidimensional self-concept is also recognized such that perceptions across the domains of endurance, strength, coordination, flexibility, sport competence, health, appearance, and body fat are all thought to contribute to a higher level "global physical self-concept." In turn, a global physical self-concept influences overall self-esteem at the highest level of the model. Although multidimensional physical self-concept has not been used with youth and older adolescent athletes with physical disabilities, Martin (2007) successfully employed it to predict PA in adults with physical disabilities, and Ferreira and Fox (2008) used it to examine self-perceptions in adult male wheelchair basketball athletes. Martin found that global physical self-concept and strength self-concept cumulatively accounted for 41% of the variance in exercise behavior in adults with various disabilities. Similarly, Ferreira and Fox found that physical confidence, body, and strength together accounted for 44% of the variance in physical self-worth. The smaller percentage of variance in physical self-worth and global self-esteem explained by the subdomains of physical confidence, body strength, and condition for athletes with disabilities, compared with groups without disabilities, is in part attributed to differences in dealing and living with a physical disability (Ferreira & Fox, 2008).

Motivation toward participation in physical activity is associated with competence perceptions. Youth with disabilities need positive physical self-concepts to feel competent enough to participate in common games and sports (Shapiro & Dummer, 1998). Children who possess both an adequate sense of competence in their physical capabilities and internal control have been found to derive pleasure, demonstrate low anxiety, have an increase in motivation to participate in sport and physical activity, and experience increased sport commitment (Biddle, Treasure, & Wang, 2008; Martin, 2006). Children and adolescents who have doubts about their physical ability tend to report weaker participation motivation (Martin, 2006). Children who experience movement difficulties due to a disability are generally expected to have lower physical self-perceptions, leading to a reduction in movement confidence and increased risk of avoidance of or withdrawal from mastery attempts in physical activity settings (Causgrove Dunn & Goodwin, 2008). Such negative effects of low competence perceptions often extend beyond the athletic domain. For example, sport is a primary socializing environment for teaching children with disabilities interpersonal skills and physical competencies (Shapiro & Martin, 2010). If a child with a disability is unable to excel in sport or physical activity, opportunities to gain peer acceptance may be reduced further, deterring that child from participating (Causgrove Dunn & Goodwin, 2008) and potentially resulting in adverse psychosocial consequences (e.g., loneliness and depression; Bouchard & Tetrault, 2000).

Understanding the determinants of PA is necessary given the important physiological and psychosocial benefits associated with PA for youth and older adolescent athletes with physical disabilities. As illustrated above, however, understanding the precursors of a healthy sense of self-esteem is also of value. Researchers have often noted that youth with physical disabilities lack competence in PA; however, researchers have not provided a comprehensive depiction of how some dimensions (e.g., coordination) relative to other dimensions (e.g., endurance) are evaluated by youth and older adolescent athletes with physical disabilities. The purposes of the current study was first to describe the various physical self-concept dimensions of youth and older adolescent athletes with physical disabilities and second to predict reported PA behavior and global self-esteem using a multidimensional physical self-concept model.

Method

Participants

Participants included 36 youth (ages 12–17 years) and older adolescent (18–21 years) athletes with physical disabilities (female = 9, males = 27; M age = 16, SD = 2.8). Participants' disabilities included cerebral palsy (n = 18), spina bifida (n = 9), traumatic brain injury (n = 3), muscular dystrophy (n = 2), heart condition (n = 1), hip condition (n = 1), and two participants whose disability was unidentified. Participants represented four distinct racial groups: African American (n = 16), Caucasian American (n = 16), Hispanic American (n = 2), and Asian American (n = 2).

Participants were athletes in the American Association of Adapted Sports Programs (AAASP). AAASP works in cooperation and partnership with education agencies in the U.S. to establish interscholastic adapted sports programs for students

with physical disabilities or visual impairments. The primary eligibility requirement for participation in AAASP includes an orthopedic impairment (e.g., cerebral palsy, traumatic brain injury, stroke, spinal cord injury, spina bifida, muscular dystrophy) or visual impairment. Students with a physical impairment that prevents participation in able-bodied sport also are eligible to participate. Athletes with cognitive impairments (i.e., impairments that limit or prevent their understanding of game strategy or IQs below 75) are not eligible to participate in AAASP. Athletes in the current study had no associated cognitive impairments that would limit the validity of the instrumentation used in this study.

Participants were recruited from AAASP wheelchair basketball and wheelchair football teams. While wheelchair basketball is played only by athletes using manual chairs, athletes in wheelchair football include both manual and power chair users. Across the two sports, a total of 25 participants competed in manual chairs while 11 participants competed in power wheelchairs. Sixteen athletes were ambulatory while 20 athletes used wheelchairs (either manual or power) for activities of daily living. To ensure teams have enough players, all teams in AAASP are coed and cross disability. As a result, our sample was heterogeneous (e.g., gender, disability, age ethnicity, mode of ambulation); however, all participants had similar experiences unique to the AAASP philosophy. In addition, given the small numbers of participants in various subsamples (e.g., females, $n = 9$), comparisons among these groups would be highly sample specific and lack generalizability, hence our analyses are based on the total sample.

Instruments

Participants were first asked to report categorical demographic information such as their gender, age, ethnic background, and an open ended question soliciting disability type. Respondents then completed a questionnaire assessing multidimensional physical self-concept.

Physical Self-Description Questionnaire (PSDQ). The PSDQ was developed by Marsh, Richards, Johnson, Roche, and Tremayne (1994). It is a 70-item instrument that measures physical self-perceptions across 9 elements of the physical domain: strength (e.g., "I am a physically strong person"), body fat (e.g., "I am too fat"), physical activity (e.g., "Several times a week I exercise or play hard enough to breathe hard, to huff and puff"), endurance/fitness (e.g., "I can run a long way without stopping"), sports competence (e.g., "Other people think I am good at sports"), coordination (e.g., "I feel confident when doing coordinated movements"), appearance (e.g., "I am attractive for my age"), flexibility (e.g., "I am quite good at bending, twisting, and turning my body"), and health (e.g., "When I get sick I feel so bad that I cannot even get out of bed"). The tenth subscale reflects global physical self-concept (e.g., "I am satisfied with the kind of person I am physically"), which is assumed to reflect the cumulative judgments across the prior 9 dimensions. Finally, the last subscale assesses the highest dimension, global self-esteem (e.g., "Overall, most things I do turn out well"). The inclusion of the phrase "push my wheelchair" (e.g., "I do physically active things like jogging, pushing my wheelchair, bicycling, swimming . . ." "I think I can run or push my wheelchair a long way") was added to questions referencing walking, jogging, running to better reflect the type of physical activity engaged in by participants

in the current study. No other modifications were made to the PSDQ. Each scale is represented by six or eight items. Each item is a simple declarative statement. Items are presented in a 6-point Likert type format true or false scale with 1 = *false* and 6 = *true*.

When compared with other multidimensional physical self-concept measures such as the Physical Self-Perception Profile (Fox & Corbin, 1989), the PSDQ is a more comprehensive instrument in that it measures a much broader range of physical self-concept components (Marsh et al., 1994). Marsh's Self-Description Questionnaire instruments have been evaluated to be among the best multidimensional instruments in terms of psychometric properties and construct validation research (Marsh et al., 1994). Instrument validation of the PSDQ has been previously reported and a large body of research using multitrait-multimethod analytic techniques has established the psychometric properties of the PSDQ (Marsh et al., 1994; Marsh & Redmayne, 1994; Marsh, Ascii, & Thomas, 2002). Internal reliability (alphas) for the subscales ranged from a low 0.83 to a high of 0.93 (Marsh et al., 2002). Median internal consistency (alpha) was 0.81 and the median test-retest correlation was 0.58 (Marsh, Papaioannou, & Theodorakis, 2006). All PSDQ items have loaded strongly (i.e., no loadings under 0.42) on their respective factors. The PSDQ factor structure has been validated cross culturally and is appropriate for adolescent males and females as young as 13 years of age (Marsh et al., 1994; Marsh & Redmayne, 1994; Marsh et al., 2002).

Procedures

Approval was first obtained from the university institutional review board, followed by AAASP, coaches, parent/guardian consent, and athlete assent. Participants completed questionnaires individually with the help of the primary investigator or a trained research assistant during the team's weekly practice. Questions were read out loud to each participant to ensure understanding of the questions. Participants were encouraged to respond honestly and told that there were no right or wrong answers. They were also reassured that their responses would remain confidential (i.e., parents, coaches, or AAASP administrators would not see their answers) and that any written reports would be based on group data with no individual names revealed. Athletes who needed assistance recording their answers because of their disability (i.e., spasticity) had their answers recorded for them. Completion of the questionnaire took approximately 20 min. The treatment of all participants was in accordance with the ethical standards of the APA.

Data Analysis

Descriptive statistics, coefficient alphas and correlations were calculated for each of the 11 subscales on the PSDQ. A Bonferroni correction from the traditional (i.e., $p < .05$) significance level to a more stringent one ($p < .004$) was used to account for any multiple correlations. Two multiple regression analyses were used to predict self-esteem and PA. Significant correlations were used as the predictor variables for each regression equation with the variables with the largest correlations entered first. By restricting the predictor variables to four or less, it was possible to maintain a reasonable subject to variable ratio (i.e., 18 and 9–1) falling within the criteria (i.e., 10–1 subject to variable ratio) recommended by most statisticians (e.g., Tabachnick & Fidell, 1989).

Results

Internal Consistency

Coefficient alphas (Cronbach, 1951) for eight of the eleven PSDQ subscales were considered adequate ($\alpha = 0.64\text{--}0.85$); however, because the health, coordination, and appearance subscales had poor internal consistency (e.g., $\alpha = 0.52$), they were dropped from further analyses.

Descriptive Statistics

Means, standard deviations, and coefficient alphas for the 8 PSDQ subscales can be found in Table 1. Participants had moderate to strong self-concept scores as they ranged from slightly under 4 to over 5 on the 6-point scale. A visual examination indicates that participants had the lowest score for how much perceived PA they engaged in (i.e., 3.9) and the highest score for body fat (i.e., 5.6).

Table 1 Descriptive Statistics and Reliability Coefficients for PSDQ Subscales

Subscale	Mean	SD	α
Physical activity	3.9	1.4	0.85
Body fat	5.6	0.52	0.84
Sport competence	4.9	0.88	0.73
Global physical	5.3	0.65	0.68
Strength	4.8	0.94	0.75
Endurance	4.1	1.3	0.81
Esteem	5.5	0.41	0.64
Flexibility	3.6	1.1	0.74

Correlations

The correlations among the PSDQ subscales can be found in Table 2. Six of the twelve potential correlations were significant. Four physical self-concept dimension predictors were related to self-esteem, whereas only two were associated with reported PA. Endurance was the only predictor variable related to both self-esteem and reported PA.

Table 2 Correlations Among PSDQ Subscales

	Physical Activity	Self-Esteem
Body fat	-.24	0.22
Sport competence	0.49*	0.39
Global physical	0.08	0.57*
Strength	0.31	0.48*
Endurance	0.48*	0.47*
Flexibility	0.19	0.54*

Note. An asterisk denotes correlations significant at a $p < .004$ level.

Multiple Regression Results

The data were first examined for evidence of multicollinearity. Variance inflation factors (VIF: 1.33–1.64) and tolerance figures (0.61–0.75) were both reflective of a lack of multicollinearity given that they were not above 10 or below 0.10, respectively, for VIF and tolerance cutoffs (Cohen, Cohen, West, & Aiken, 2003). Data from the two multiple regression analyses to predict self-esteem and PA are found on Tables 3 and 4. For self-esteem, we first entered global physical self-concept in block one because it is considered a primary determinant of overall self-esteem. Next, to determine if any of the three significant lower level physical self-concept dimensions contributed to predicting additional variance, we entered strength, endurance, and flexibility as a second block. For the second equation, we simultaneously entered the two significant lower level physical self-concept dimensions of sport competence and endurance. As Table 3 illustrates, global physical self-concept accounted for 32% of the variance in self-esteem. Next, the combination of endurance, strength, and flexibility significantly added another 15% of the variance for a total of 47%. Table 4 indicates that sport competence and endurance jointly accounted for 31% of the variance in reported PA.

Table 3 Multiple Regression Results Predicting Self-Esteem

Step	Variable	R	R ²	R ²	df	p <	ΔR ²	B at Entry	p at Entry
1	GPSC	0.57	0.32	16.1	1,34	0.001	0.32	0.57	0.001
2	END							0.22	0.17
2	STR							0.11	0.50
2	FLX	0.68	0.47	6.7	4,31	0.05	0.15	0.22	0.20

Note. GPSC = Global Physical Self-Concept, END = Endurance, STR = Strength, and FLX = Flexibility

Table 4 Multiple Regression Results Predicting PA

Step	Variable	R	R ²	F	df	p <	ΔR ²	B at Entry	p at Entry
1	SPC							0.31	0.07
1	END	0.56	0.31	7.5	2,33	0.002	0.31	0.34	0.05

Note. SPC = Sport Competence and END = Endurance

Discussion

The purposes of this investigation were to describe participants' perceptions of their multidimensional physical self-concept and predict reported PA behavior and self-esteem using a multidimensional physical self-concept model. Visual examination of the means indicates, in general, moderate to strong perceptions of physical self-concept; however, it is worth noting that the lowest and highest means were PA and body fat. Hence, relative to the other dimensions, participants with physical disabilities viewed themselves as less active and possessing more body

fat. Out of all of the remaining dimensions, another tentative pattern also appeared. Compared with global physical self-concept, strength, and sport competence (Ms ranging from 4.8 to 5.3), participants seem to report having less endurance ($M = 4.1$). This finding is similar to that of Martin (2007) in which adults with physical disabilities who, like the participants in the current study, also scored low on the PSDQ subscale of endurance relative to other subscales. This finding also can be linked to actual findings in endurance reported for individuals with intellectual disabilities (Frey, Stanish, & Temple, 2008), cerebral palsy (Winnick, 2005), spinal cord injuries (Winnick, 2005), and visual impairments (Lieberman & McHugh, 2001). It is plausible that individuals with physical disabilities lack the opportunity and means to engage in extended periods of aerobic activity, with moderate to high heart rates, which is conducive to developing cardiovascular endurance (Heath & Fentem, 1997; Rimmer et al., 1996; Rimmer, Rubin, & Braddock, 2000; Rimmer, Riley, Wang, & Rauworth, 2005). Researchers have suggested that youth and older adolescents with physical disabilities 13–17 years of age can improve their physical fitness through regular participation in aerobic activity 3–5 days/week for 20–60 min per day at an intensity ranging from 55 to 90% of maximum heart rate (Winnick, 2005). Among the goals of physical education in schools is to reinforce student participation in health-related PA outside of school and to help students develop lifelong healthy lifestyles (Marsh, Papaioannou, & Theodorakis, 2006). The lower self-reported levels of activity and endurance and the increased perceptions of obesity, in isolation and compounded, can decrease domain specific self-perceptions of competence and self-worth and subsequent participant motivation (Causgrove Dunn & Goodwin, 2008), further deteriorating future health status, functional capacity, and quality of life (Kalnins et al., 1999). The perceptions of athletes with physical disabilities as less active, having lower endurance, and possessing more body fat may be changed and reversed with appropriate interventions including regular involvement in appropriately organized adapted sport.

An examination of the correlations indicates that four physical self-concepts were related to self-esteem (i.e., global physical self-concept, strength, endurance, and flexibility), whereas only endurance and sport competence were associated with reported PA. One interesting difference among variables correlated with reported PA and self-esteem stands out. Although global physical self-concept is the most strongly related variable to self-esteem ($r = 0.57$), it is the most weakly linked variable to reported PA ($r = 0.08$). In brief, perceptions of global physical self-concept appear to play an important role in mental health (i.e., self-esteem) and no role in physical health (i.e., reported PA). Participation in interscholastic adapted sports may have helped athletes realize not only that the prevailing stereotypes surrounding disability are not accurate representations of their abilities or potentials but that participation in adapted sports affords them the opportunity to redefine their physical capabilities enhancing perceptions of their physical self (Groff & Kleiber, 2001). The lack of a relationship between global physical self-perceptions and reported PA is understandable, given that society generally does not perceive individuals with disabilities, specifically youth and older adolescents with physical disabilities, as athletes (Groff & Kleiber, 2001; Shapiro & Martin, 2010).

The multiple regression results provide additional illumination on the variables most important in predicting PA and self-esteem. For self-esteem, global physical self-concept accounted for the most variance (i.e., 32%), but individual

assessments of physical self-concept in the areas of flexibility, endurance, and strength were also important as they cumulatively added another 15% to predicting self-esteem. These findings indicate that participants' perceptions of their "physical" self-concept account for almost half of their overall sense of self-esteem. This presumably leaves approximately another 50% of the variance in overall self-esteem attributable to areas including, but not limited to, academic, emotional, and social self-concept, although clearly, these constructs were not assessed in the present investigation. Nevertheless, very specific appraisals of abilities in the areas of flexibility, strength, and endurance are important cognitions over and above perceptions focused on physical self-concept in general. In short, participants reporting strong perceptions of overall self-concept, strength, endurance, and flexibility reported more favorable self-esteem compared with individuals expressing weaker self-perceptions in the four noted predictor variables.

The findings in regard to predicting PA contrast with those for self-esteem, even given the different set of predictors used. Less variance was accounted for (31% compared with 47%), and both perceptions of sport competence and endurance had relatively similar standardized beta weights and significance levels, suggesting their relative importance was similar in nature. Given that the participants in the current study were enrolled in an adapted sport program, it is plausible that much of their PA was derived from sport. Hence, perceptions of sport competence and endurance, important attributes for competitive athletes, were also important in predicting PA. Athletes in the current study holding strong beliefs in their sport competence and endurance capabilities reported engaging in more PA compared with athletes with physical disabilities lacking competence in sport and endurance conditioning. The implications to practitioners clearly indicates the need to work together to increase opportunities for youth and older adolescents with physical disabilities to participate in sport in the least restrictive environment (i.e., fully segregated to fully integrated; Groff & Kleiber, 2001).

In summary, the findings support the value of examining multidimensional physical self-concept as different aspects of the physical self appear to have different influences on reported PA engagement versus self-esteem in our sample. One-dimensional models of global self-esteem or even two dimensional models of self-esteem (i.e., overall self-esteem and physical self-esteem) would not have been adequate in revealing the differential pattern of results that were unearthed. While global physical self-concept seems to be a significant influence on self-esteem, it has no impact on PA. Perceptions of endurance were important for both reported PA and self-esteem.

Limitations

Although the p value for multiple correlations were corrected and maintained, a reasonable subject-to-variable ratio in the regression equations, the sample size was still, in absolute terms, somewhat small with a reasonably large age range. Hence, the results should be generalized cautiously and best considered sample specific. In addition, there was no objective measurement of physical activity. Nonetheless, this study is one of the first research efforts to examine multidimensional physical self-concept with youth and older adolescent athletes with physical disabilities. Given the substantial amount of research conducted by Marsh and colleagues (e.g.,

Marsh & Craven, 2006; Marsh & Redmayne, 1994; Marsh et al., 1994) with able bodied exercisers and athletes, it is surprising that similar research with athletes with physical disabilities appears to have been neglected with few exceptions (e.g., Ferreira & Fox, 2008; Martin, 2007). This initial exploratory research effort highlights and promotes the importance of this theoretical line of inquiry with individuals with physical disabilities.

Directions for Future Research

There are two suggested directions for future research. First, researchers could examine the degree to which different contexts (i.e., sport, physical education class, neighborhood) afford youth and older adolescents with physical disabilities the opportunity to engage in PA at the recommended levels of frequency and intensity to improve cardiovascular endurance. Involvement in physical activity could be examined beyond reported PA, using objective measurements including accelerometers, heart rate monitors, or cyclometers. Second, researchers could examine variables, such as perceptions of athletic identity and social support, that might act as mediating variables in understanding the relationship between global physical self-concept and reported PA.

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