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Assessment of Children's Physical Self-Perceptions

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ABSTRACT

Two studies are reported on the use of Fox and Corbin's (1989) Physical Self-Perception Profile (PSPP) modified for use with children (PSPP-C). The current studies used British children of 12 and 15 years of age. Study I found that after factor analysis the proposed four subdomains of physical self-worth (sport competence, body attractiveness, perceived strength and physical condition) were not clearly represented, although some similarities emerged. However, the subscales showed adequate internal reliability for the younger sample, but less so for the adolescents, and no association with a measure of social desirability was found. Correlations between subdomains and a measure of physical self-worth (PSW) were moderate and similar to those reported in other research with American children. Finally, a small group of 12 year-old boys took part in Study II. They completed the PSPP-C and also performed an endurance run task. Performance was associated with scores on sport competence, physical condition and PSW. Results are explained in terms of the different ways that people may view physical aspects of their selves, and in particular developmental issues are noted. The PSPP-C is recommended for use in research, but with caution and further psychometric assessment. Further phenomenological work on British children's physical self-perceptions is also required.

The possession of positive feelings of self-worth or high self-esteem, has traditionally been considered of importance not only

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as an index of mental well-being, but also as a mediator of behaviour (Fox, 1988). The importance of self-esteem in physical education and exercise programmes has recently been stressed. The Department of Education and Science (DES) in the UK (DES, 1989) has stated that one of the eleven aims of school physical education is to 'foster self-esteem' (p. 2). Similarly, the document outlining the proposals for Physical Education in the National Curriculum (DES and Welsh Office, 1991) states that physical education 'helps to establish self-esteem through the development of physical confidence' (p. 5).

In addition, the mental health benefits of physical activity have recently received a great deal of attention in the psychology literature. A consensus has emerged that exercise is associated with improvements in mental health and well-being (Biddle and Mutrie, 1991; Morgan and Goldston, 1987). It is likely that such changes are largely mediated by perceptions held about the physical aspects of the self.

Recently, there has been great interest in the nature and level of physical activity engaged in by children and whether or not childhood activity habits persist into adulthood (Armstrong and Biddle, 1992). Competence motivation theory (Fox, 1992; Harter and Connell, 1984) would suggest that the perceptions children hold of themselves may be important motivational influences for current and future physical activity. In this respect, the study of physical self-perception may yield important findings for the motivational determinants of children's physical activity (Biddle and Armstrong, 1992; Fox, 1991, 1992).

Recent research has investigated a hierarchical structure of self-esteem (Fox and Corbin, 1989; Harter, 1985; Shavelson, Hubner and Stanton, 1976). It is hypothesised that this hierarchy consists of global self-esteem and is underpinned by differentiated aspects of the self, such as physical or social self-worth. The subdomains, in turn, are linked to increasingly differentiated self-perceptions. For example, Fox and co-workers (Fox, 1988; Fox and Corbin, 1989) contend that the physical subdomain of self-esteem consists of several specific subdomains, such as sport competence and physical appearance.

A hierarchical model is appealing when attempting to explain exercise behaviours and their relationship with self-esteem. Such a model infers a possible pathway whereby regular experiences at more specific levels of the hierarchy might modify more enduring and global elements of self-esteem.

These changes in the conceptualisation of the nature and structure of self-esteem have been paralleled by changes in measurement procedures. To acknowledge the multi-dimen-

sionality of self-esteem, inventories assessing global self-esteem alone have been replaced by a profile approach in order that each aspect of the self can be assessed independently.

The Physical Self Perception Profile (PSPP), developed by Fox and Corbin (1989), has enabled the physical component of self-esteem to be examined in more detail. The PSPP was developed through the use of open-ended interviews to assess the physical self-perceptions of a college-age population in the United States. Reasons identified as important to the individual's physical self were grouped into categories. Based on this, four subdomains were identified and labelled as sport competence, physical strength, body attractiveness and physical conditioning. In order to assess specific aspects of each subdomain, questionnaire items were written to measure the *product*, *process* and *reported confidence* of the individual. Examples are provided from the sport competence subscale as follows:

- (a) 'some people are very good at most sports' (product);
- (b) 'some people seem to learn sport skills very slowly' (process);
- (c) 'some people feel very confident when it comes to playing sports' (perceived confidence).

Initial support for the scale with American students has now also been found with British students (Page, Ashford, Fox and Biddle, in press) and older American adults (Chase and Corbin, 1992). The PSPP, therefore, provides a theoretical base from which to study the physical self-perceptions of children. However, although self-perception profiles have been developed in educational contexts (Harter, 1985), the physical domain has lacked such specific attention. For example, Harter's (1985) Self-Perception Profile for Children has only two subscales assessing physical aspects of the self (athletic competence and physical appearance).

To correct these shortcomings, the PSPP has been modified for use with children through the work of Whitehead (1991; Whitehead and Corbin, 1988) with American schoolchildren. Specifically, Whitehead and Corbin (1988) administered the PSPP, appropriately reworded for 12-13 year olds. Content and construct validity were demonstrated and the proposed four factor structure was supported, although this was clearer for the sport and strength subscales than for those assessing body attractiveness and physical condition.

A follow-up study (Whitehead, 1991) used a modification of the PSPP for children, modified on the basis of the results from Whitehead and Corbin (1988). The four factor structure was supported and further evidence of construct validity was found.

The following two studies, therefore, are preliminary attempts to investigate the PSPP, modified for children (PSPP-C), but with British children.

STUDY I

The purposes of this study were to investigate the psychometric properties of the PSPP-C with both children and adolescents. Specifically, the following were studied: (i) internal reliability of the proposed subscales; (ii) the factorial structure of the scale; (iii) the relationship between subscale scores and social desirability; (iv) the existence of the proposed hierarchical structure of global self-esteem, physical self-worth (PSW), and the four subdomains of the PSPP-C, and (v) the construct validity of the scale.

METHOD

Subjects

Two groups of subjects were studied. Sample A was comprised of boys ($N = 70$) and girls ($N = 60$) from the final year cohort of two middle schools in a city in the south-west of England. Their average age was 12.2 years ($SD 0.30$) and all pupils in attendance on the day in question took part. Parental consent was also sought and given. The schools are believed to be broadly representative of the socio-economic structure of the city. Sample B was comprised of teenage males ($N = 164$) and females ($N = 158$) from the fourth and fifth year cohort of three secondary schools, two in the north of England and one in the south-west. Average age was 14.88 years ($SD 0.50$).

Instruments

The PSPP-C was administered in quiet classroom conditions. The PSPP-C contains six items for each of the four subdomains of sport competence, body attractiveness, physical condition, and physical strength. The sport competence subscale was taken from Harter's (1985) Self-Perception Profile for Children (SPPC). In addition, six items were included on general physical self-worth, a proposed higher order construct in the self-esteem hierarchy. Finally, the questionnaire comprised a measure of global self-esteem, also from Harter's SPPC.

The PSPP-C uses a structured alternative format whereby two

alternatives are presented to the children. For example, question one states:

some kids do very well at all kinds of sports BUT other kids *don't* feel that they are very good when it comes to sports

The subjects then have to choose which statement applies to them and tick the appropriate box indicating whether it is 'really true for me' or 'sort of true for me'. Each subdomain, as well as physical self-worth and global self-esteem, has a range from one to four, with the midpoint at 2.5.

In addition to the PSPP-C, the children in Sample A completed the Junior Eysenck Personality Questionnaire (JEPQ: Eysenck & Eysenck, 1975). The lie scale was then used as a measure of the tendency to answer in a socially desirable way.

Results and Discussion

Table 1 shows the descriptive statistics for the four PSPP-C subdomains, physical self-worth, and global self-esteem. Significant gender differences were found on all four subdomains for both samples. For Sample A, a stepwise discriminant analysis showed that PSPP-C scores could discriminate between boys and girls (Wilks' lambda = 0.86, chi-square = 17.7, $p < 0.0005$). Specifically, boys had higher scores on sport, strength and body attractiveness. A cross-classification analysis correctly classified 65.3% of cases. Similarly, boys had a higher score on physical self-worth than girls [$t = 3.16$, $p < 0.002$], but there was no difference in global self-esteem scores ($p > 0.05$). For Sample B, a stepwise discriminant analysis also showed that PSPP-C scores could discriminate boys from girls (Wilks' lambda = 0.94, chi-square = 19.47, $p < 0.0001$). Specifically, boys had higher scores on strength and body attractiveness. A cross-classification analysis correctly classified 61.9% of cases. As for Sample A, boys in Sample B had a higher score on physical self-worth than girls [$t = 5.12$, $p < 0.0001$], but there was no difference in global self-esteem scores ($p > 0.05$).

Internal Reliability and Factor Structure

Internal reliability of each PSPP-C subdomain was assessed with Cronbach's alpha. For Sample A, each scale had adequate internal reliability, but figures were less satisfactory for Sample B: sport (A = 0.81; B = 0.65), physical condition (0.81; 0.63), body attractiveness (0.77; 0.72), and strength (0.87; 0.64).

TABLE 1

Descriptive statistics for global self-esteem, physical self-worth, and PSPP-C subdomains (Study 1)

	Sample A				Sample B			
	BOYS		GIRLS		BOYS		GIRLS	
	M	SD	M	SD	M	SD	M	SD
Global self-esteem	3.18	0.60	3.07	0.63	2.78	0.69	2.68	0.60
Physical self-worth	3.09	0.54	2.76	0.66	2.71	0.46	2.45	0.48
<i>Subdomains</i>								
Sport	3.07	0.67	2.72	0.58	2.57	0.56	2.41	0.52
Condition	3.15	0.53	2.81	0.61	2.67	0.55	2.51	0.46
Body	2.83	0.56	2.49	0.62	2.51	0.58	2.27	0.54
Strength	2.88	0.69	2.47	0.57	2.61	0.47	2.43	0.42

Items from the four PSPP-C subdomains were subjected to an exploratory factor analysis with oblique rotation ($\delta = 0$). Given the significant gender differences reported in these samples, factor analyses were computed for boys and girls separately and are presented in Tables 2 and 3 for Sample A and 4 and 5 for Sample B.

Table 2 shows that six factors were derived for boys which had eigenvalues greater than 1.0, although only four explained more than 5% of the variance. Factors representing strength, physical condition, appearance and sport were represented. However, the sport items split and partly combined with physical condition/fitness items. Also, a number of items did not load on their intended factor, and several items loaded across more than one factor. In short, only partial support was found for the hypothesised factor structure of the PSPP-C subdomains with boys.

Table 3 shows the results of the factor analysis for girls from Sample A. Seven factors with eigenvalues greater than 1.0 accounted for 74.4% of the variance. The four hypothesised factors were evident, but as for the boys, many items loaded across more than one factor.

For both males and females in Sample B, seven factors emerged with eigenvalues greater than 1 and accounting for more than 5% of the variance. These factors were not clearly interpretable and contained numerous cross-loadings. A four-factor solution was then forced to see if a clearer picture would emerge. These results are shown in Tables 4 and 5. For both males and females, two factors emerged representing a mix of both sport and condition

TABLE 2

Factor structure of PSPP-C subdomain items for boys
in Sample A (Study I)

Items	FACTORS & FACTOR LOADINGS					
	1	2	3	4	5	6
SPORT	1	.56				
	2	.49				
	3	.76				
	4	.74				
	5			.67		
	6	.40		.57	-.40	
CONDITION	1				.61	
	2				.58	
	3			.49		
	4			.76		
	5	.41				.48
	6	.53				
BODY	1				.76	
	2				.79	
	3			.76	.58	
	4					.61
	5					.50
	6					
STRENGTH	1		.85			
	2		.85			
	3		.77			
	4		.58			
	5		.85			
	6		.68			
Eigenvalue	7.75	2.84	2.08	1.34	1.12	1.04
% variance	32.30	11.80	8.70	5.60	4.70	4.30
cumulative						
% variance	32.30	44.10	52.90	58.10	62.90	67.20

[only loadings > 0.4 shown]

Factor labels: 1. Sport competence and fitness; 2. Strength; 3. Sport interest and fitness; 4. Body image and shape; 5. Physical condition; 6. Appearance.

items, similar to the boys in Sample A. The body factor was partly confirmed, but not the strength factor. The results for both sexes are very similar in terms of the sport/condition overlap. Factor 1 ('sport and exercise participation') combines sports competence with participation in exercise, whereas Factor 2 ('sport and fitness') is more associated with sports competence and physical fitness. This suggests that these adolescents find it difficult to differentiate sport from fitness and exercise, but may be thinking

TABLE 3

Factor structure of PSPP-C subdomain items for girls in Sample A (Study I)

Items	FACTORS & FACTOR LOADINGS						
	1	2	3	4	5	6	7
SPORT	1			.75			
	2			.88			
	3			.79			
	4			.69			
	5	.47					
	6					.58	
CONDITION	1	.77					
	2			.40		.55	
	3	.61					
	4	.72					
	5	.50					
	6						.85
BODY	1					.55	
	2				.42		
	3					.77	
	4		.76				
	5		.48				
	6		.78				
STRENGTH	1		.64				
	2		.73				
	3		.80				
	4						.67
	5			.72			
	6					.58	
Eigenvalue	8.66	2.16	1.90	1.59	1.30	1.23	1.04
% variance	36.10	9.00	7.90	6.60	5.40	5.10	4.30
cumulative % variance	36.10	45.10	53.00	59.60	65.00	70.10	74.40

[only loadings > 0.4 shown]

Factor labels: 1. Physical condition; 2. Appearance satisfaction; 3. Perceived strength; 4. Sport competence and energy; 5. Physical competence; 6. Outward appearance; 7. Physical capacity.

more in terms of sport in association with either participation (a 'process' orientation) or with physical fitness (a 'product' or 'outcome' orientation).

Whitehead and Corbin's (1988) analyses with the PSPP-C, combined for boys and girls, found support for sport and strength

TABLE 4

Factor structure of PSPP-C subdomain items for males in Sample B (Study I) when four factors were forced

Items	FACTOR & FACTOR LOADINGS				
		1	2	3	4
SPORT	1	.83			
	2		.48		
	3	.73			
	4	.45			
	5	.76			
	6		.75		
CONDITION	1		.81		
	2	.85			
	3		.78		
	4	.86			
	5		.90		
	6	.71			
BODY	1			-.78	
	2				
	3			-.76	
	4			-.50	
	5			-.87	
	6				.61
STRENGTH	1				.58
	2				
	3		.45		
	4			-.57	
	5				.81
	6				
Eigenvalue		6.30	3.76	2.09	1.68
% variance		26.20	15.60	8.70	7.00
cumulative					
% variance		26.20	41.90	50.60	57.60

[only loadings > 0.4 shown]

factors but less so for body attractiveness and not at all for physical condition. However, subsequent research by Whitehead (1991) has confirmed a clear four-factor solution on the PSPP-C.

TABLE 5

Factor structure of PSPP-C subdomain items for females in
Sample B (Study I) when four factors were forced

Items	FACTOR & FACTOR LOADINGS				
		1	2	3	4
SPORT	1	.78			
	2				
	3	.67		-.53	
	4				.45
	5	.83			
	6		.59		
CONDITION	1		.61		
	2	.44			
	3		.75		
	4	.67			
	5		.78		
	6	.53			
BODY	1			.69	
	2				.76
	3			.51	
	4		.47		
	5			.54	
	6				.73
STRENGTH	1				
	2	.64			
	3				
	4			.55	
	5			-.49	
	6	.52			
Eigenvalue		4.27	2.83	2.23	1.89
% variance		17.80	11.80	9.30	7.90
cumulative					
% variance		17.80	29.60	38.90	46.80

[only loadings > 0.4 shown]

Social Desirability

The PSPP-C subdomains, physical self-worth, and general self-esteem were correlated with scores on the JEPQ lie scale for Sample A. Correlation coefficients ranged between 0.03 and -0.13 (all $p > 0.05$) suggesting that social desirability was not a problem for this sample on the PSPP-C.

Subscale Intercorrelations

Fox (1990) has proposed that the subdomains of the PSPP underpin the higher order domain of physical self-worth, itself a subdomain of global self-esteem. The correlations shown in Table 6 support this notion with strong relationships between the PSPP-C subdomains and physical self-worth, between physical self-worth and global self-esteem, and weaker correlations between the four subdomains and global self-esteem, the latter particularly being the case for the older subjects. PSPP-C subdomains were also intercorrelated (range between 0.51 to 0.70 for Sample A and 0.41 to 0.61 for Sample B). The figures for Sample A tended to be higher than those reported by Fox (1990) for American college students and by Page et al. (in press) for British students, suggesting either that the younger British children are less effective at discriminating between subdomains or that the subdomains are not differentiated in the same way by these children compared with the college age students or British adolescents.

To investigate the proposed hierarchical structure of physical self-perceptions for Sample B (Fox, 1990), partial correlation coefficients were compared between PSPP-C subdomains and global self-esteem, partialling out the effects of physical self-worth. The significant correlations between the four subdomains and global self-esteem shown for Sample B in Table 6 were reduced to almost zero by this procedure. Only the partial correlation between self-esteem and strength remained significant (partial $r = 0.14$, $p < 0.05$). These results suggest that PSW acts as a superordinate construct mediating between the four subdomains and self-esteem.

In addition, multiple regression analyses revealed that PSW for boys in Sample B was predicted by all four PSPP-C subdomains, with 44.9% of the variance being explained by physical condition scores. Perceived strength accounted for an extra 8.6% of the variance, body attractiveness 3.1% and sport competence 2.4%. For girls, sport competence did not predict physical self-worth. Body attractiveness accounted for 39.4% of the variance, whereas

TABLE 6

Intercorrelations between PSPP-C subdomains, physical self-worth and global self-esteem for Sample A (first line) and Sample B (second line) (Study I)

	2	3	4	5	6
1. Global self-esteem	.52 .25	.37 .18	.34 .21	.42 .18	.26 .25
2. Physical self-worth		.70 .58	.71 .66	.68 .62	.54 .58
3. Sport			.70 .61	.59 .41	.52 .44
4. Physical condition				.66 .45	.53 .45
5. Body attractiveness					.51 .47
6. Physical strength					

all $p < 0.003$ for Sample A

all $p < 0.001$ for Sample B

physical condition and perceived strength accounted for 18.2% and 4.6% respectively.

Construct validity

As a test of construct validity, the physical education teacher of a sub-sample from Sample B ($N = 125$) placed each subject into one of three groups for each of the four PSPP-C subscales. The groups were 'high', 'medium' and 'low'. For the purposes of analyses, only the two extreme groups were used. Comparisons between these two groups were made in terms of their PSPP-C subscale scores. T-tests showed that the two groups, as rated by the teacher, did not differ in their physical self-perceptions for sport competence, physical condition, or strength. However, the group rated highest on body attractiveness had significantly higher scores on this PSPP-C subscale than the lowest rated group ($p < 0.005$). One might have predicted that at least the sport competence subdomain would have been validated. Overall, therefore, evidence was not found for 'known groups' construct validity of the PSPP-C.

In summary, Study I has shown that the PSPP-C has adequate internal reliability, and is unaffected by social desirability. However, although the four subdomains could be detected, the factorial structure for both samples does not provide evidence of a clear four-factor solution. There appears to be less differentiation between the proposed sport competence and physical condition domains than would be predicted from previous research. Construct validity of the subdomains was not demonstrated.

STUDY II

This study investigated the use of the PSPP-C with a small group of British children in a school physical education setting. Specifically, the study investigated the relationship between PSPP-C scores and performance on an endurance run task as a measure of criterion-related validity of the PSPP-C.

Method

Subjects

Subjects were 24 boys, aged 12 years, from an independent single-sex school in a city in the south-west of England. All subjects were studied within an intact class attending a physical education lesson as part of a course on aerobic physical fitness. The class was representative of this age cohort in the school, although the school itself is representative of middle to upper socio-economic status.

Instrumentation

At the beginning of a physical education lesson, the children completed the PSPP-C as outlined in the previous study. Subjects then participated in a standardised test of endurance running performance—the 20 metre progressive shuttle run (Brewer, Ramsbottom and Williams, 1988). Subjects ran between two lines 20 m apart. The pace was dictated by a cassette tape emitting tones at prescribed intervals. The speed was set at 2.2 m/sec^{-1} for the first minute (very slow jog) and increased after each minute. Subjects ran at the prescribed speed until they no longer were able to reach the line. The first running speed is 'level 1', and subsequent increases are labelled accordingly. The number of levels and completed 20 m laps within each level was the score recorded.

RESULTS AND DISCUSSION

Table 7 shows the descriptive statistics for the PSPP-C for children in Study II. These tend to be lower than Sample A but comparable to Sample B.

TABLE 7

Descriptive statistics for global self-esteem, physical self-worth and PSPP-C subdomains (Study II)

	Mean	SD
Global self-esteem	3.10	0.66
Physical self-worth	2.82	0.68
<i>Subdomains</i>		
Sport	2.69	0.62
Condition	2.73	0.73
Appearance	2.43	0.65
Strength	2.56	0.59

Criterion-Related Validity

As a test of criterion-related validity, performance on the 20m progressive shuttle run was correlated with scores on the PSPP-C subdomains. Performance was positively and significantly correlated with sport competence ($r = 0.68$, $p < 0.001$), physical condition ($r = 0.75$, $p < 0.001$, and physical self-worth ($r = 0.48$, $p < 0.05$). Body attractiveness and perceived strength were not related to run performance ($p > 0.05$). These results provide support for the validity of the profile. Body attractiveness would not be expected to correlate with this aspect of physical performance, although perceived strength might be expected in some cases. However, one would expect activities requiring predominantly muscular strength and endurance, rather than aerobic fitness, to relate to perceived strength.

GENERAL DISCUSSION

The purpose of this research was to investigate the use of the Physical Self-Perception Profile, modified for children, with a British sample. The results from 486 children and adolescents

from two geographical locations and six schools, do not provide support for the four subdomains of physical self-worth proposed by Fox and Corbin (1989) and substantiated by Page et al. (in press) with British students and Whitehead (1991) and Whitehead and Corbin (1988) with American children. Cultural differences in the way the Americans and British children view aspects of their physical selves, and the ways in which physical fitness, sports and body attractiveness are portrayed in the two countries, may influence these results. However, given the support with British students reported by Page et al. (in press), it appears that only British children and youth do not fit the proposed profile model compared with other groups. This suggests that cultural and developmental factors may be interacting.

Children would be expected to hold less differentiated beliefs about their global 'self' and their physical self than adults. These reasons may explain why the proposed factor structure of the PSPP-C was not confirmed in a clear way. The results showed an inability of the children to clearly differentiate subdomains of physical self-worth. Although it was found that a reasonably large amount of variance in PSW scores was explained by the scores on the subdomains, only two PSPP-C subscale scores accounted for significant amounts of this variance. This suggests that other factors, notably body attractiveness and sport competence for boys, and perceived strength and sport competence for girls, were not strongly predictive of PSW in these cohorts of British children. These may appear surprising results, particularly the one concerning sports competence in boys. However, it does suggest that further work is required to determine the normative content of the physical self for British children.

Despite the lack of agreement over the factor structure of the questionnaire, some support for the psychometric properties of the PSPP-C was found. The proposed subdomains possessed adequate internal reliability in Sample A, although these figures were less in Sample B, and scores were unaffected by social desirability. The hierarchical structure of physical self-perception was also supported. In addition, performance on a physical task was related in a meaningful way to scores on the PSPP-C. Specifically, sport competence and physical condition subdomains were related to endurance run performance, whereas perceived strength and body attractiveness were not. These results provide some support for the scale in an ecologically valid setting.

In conclusion, the studies reported here, do not support a clear four-factor structure of physical self-worth in British school-children. However, evidence of other psychometric properties of the PSPP-C suggests that further work on refinement of the scale

may be worthwhile. In particular, it is important that work includes interview assessment of children to ascertain their beliefs about physical self-worth and underlying dimensions of this construct. It is emerging that British children are less sophisticated in their differentiation of aspects of their physical selves, and that physical constructs are less centrally important to them, than their American counterparts. This requires further investigation and is recommended.

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