



Psychometric properties of the short form of the Physical Self-Description Questionnaire in a French adolescent sample

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ABSTRACT

Recently, Marsh, Martin, and Jackson (2010) developed a short form of the Physical Self-Description Questionnaire (PSDQ-S). The objective of this study was to examine the construct validity and reliability of the PSDQ-S in a French adolescent sample. The sample used in this study included 587 adolescents (247 boys, 340 girls, $M_{age} = 14.62$). Confirmatory factor analyses (CFA) provided support for the factor validity, reliability, and convergent validity of the French version of the PSDQ-S, and the strict measurement invariance of PSDQ-S across sex, age, body mass index, and involvement or not in sport practice. However, the latent means of the PSDQ-S did not prove to be invariant across sex, body mass index, and involvement or not in sport practice. Our findings suggest that the French version of the PSDQ-S presents acceptable psychometric properties and may be confidently used in research or practice to assess the physical self-conceptions of French adolescents.

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Introduction

In their seminal work, Fox and Corbin (1989) adapted Shavelson, Hubner, and Stanton's (1976) multidimensional and hierarchical self-concept model to the physical self-concept area. In this model, the higher level is occupied by the global self-concept (i.e., overall positive or negative perception and/or assessment of oneself). The intermediate "domain" level is occupied by a global construct representing the global physical self-concept (i.e., positive or negative perception and/or assessment of oneself in the global physical area). Finally, the lower "subdomain" level is occupied by constructs representing more specific components of physical self-conceptions, such as sport competence, physical condition, physical strength, flexibility, coordination, and physical appearance.

To operationalize this model, Marsh, Richards, Johnson, Roche, and Tremayne (1994) developed and validated the Physical Self-Description Questionnaire (PSDQ). The PSDQ was initially developed for adolescents and included a total of 70 items assessing

11 dimensions: activity, appearance, body fat, endurance, coordination, flexibility, health, sport competence, strength, global physical self-concept, and global self-esteem. Confirmatory factor analyses (CFA) conducted on a sample of 710 Australian high school students supported the factorial validity and measurement invariance of the PSDQ across male and female students, as well as the convergent and discriminant validity of the PSDQ with other physical self-concepts instruments (Marsh et al., 1994). Subsequent analyses demonstrated that the subscales showed satisfactory scale score reliability coefficients ranging from $\alpha = .82$ to $.96$ across samples, and had sex-based mean-level differences, with boys tending to have higher scores on most PSDQ subscales compared to girls (Marsh et al., 1994). Additional studies conducted among three Australian adolescent samples revealed: (a) good convergent and discriminant validity of the PSDQ with external criteria (e.g., body composition, physical fitness tests; Marsh & Redmayne, 1994; Marsh, 1996b), and; (b) good test-retest stability of the 11 scales (with test-retest correlations ranging from $r = .70$ to $.89$ over a 3-month period, and between $r = .31$ and $.82$ over a 14-month period; Marsh, 1996a).

Although other instruments are currently available for the assessment of physical self-conceptions among young persons, the PSDQ remains by far the most comprehensive (covering 11 dimensions versus 6–7 for the other instruments) and the most widely validated instrument available to date (for reviews see Marsh & Cheng, 2012; Sypsa & Simons, 2008). Indeed, the psychometric

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properties of the PSDQ (i.e., factor validity and reliability, convergent and discriminant validity) have been extensively documented (for a meta-analysis see Schipke & Freund, 2012) across: (a) language versions (French, Dutch, German, Hebrew, Italian, Spanish, Turkish, etc.), (b) age groups (children, adolescents, adults, elderly), (c) type of sample (normal, psychiatric, athletes, bodily handicapped, etc.), and (d) context (research, diagnostic, counseling, etc.).

Among its few downsides, the PSDQ is much longer (70 items versus 12–35 items) than alternatives, especially when used in conjunction with multiple other instruments in the context of comprehensive studies (Marsh, Martin, et al., 2010). This limitation led Marsh, Martin, et al. (2010) to develop and validate a 40-item short form of the PSDQ (PSDQ-S), balancing brevity and psychometric strength. The PSDQ-S was developed and validated using a normative archival sample ($N=1605$) of Australian high school students (12–18 years old) and was cross-validated among five additional samples of Australian students ($N=708$), Australian elite adolescent athletes ($N=349$), Spanish adolescents ($N=986$), Israeli university students ($N=395$), and Australian older adults ($N=760$). The PSDQ-S covers all subscales included in the original PSDQ, each of which is assessed using either three (Appearance, body fat, endurance, flexibility, global physical self-concept, sport competence, strength), four (Activity) or five (Coordination, global self-esteem, and health) items. A series of CFAs provided support for the (a) factorial validity and measurement invariance of the PSDQ-S across samples, sex-groups, age-groups, and versions (PSDQ versus PSDQ-S); (b) convergent and discriminant validity of the PSDQ-S among samples of Australian adolescents ($N=322$) and Israeli university students ($N=395$); and (c) sex- and age-based differences, showing that boys and adolescents tend to present higher scores on most PSDQ subscales when compared with girls and older adults, respectively. Subsequent analyses demonstrated satisfactory scale score reliability ($\alpha=.77\text{--}.94$, across the six samples) and test-retest reliability ($r=.57\text{--}.90$ over 1-year among 212 Australian adolescents and 553 older adults, respectively) of the 11 subscales.

Adaptations to Other Languages

To date, several studies have provided tentative support to the psychometric properties of various linguistic adaptations of the PSDQ-S. For instance, Agarwal, Bhalla, Kaur, and Babbar (2013) adapted the PSDQ-S for Indian university students and reported acceptable levels of scale score reliability for the various subscales (α ranging from .77 to .97). Likewise, starting from the German adaptation of the full PSDQ (Stiller & Alfermann, 2007), Jones and Stumbrys (2014) created a short form using the same items as Marsh, Martin, et al. (2010), and administered it to a sample of 72 university students. Although these authors do not report information about the scale score reliability or factor validity of the PSDQ-S, their results revealed significant associations between these subscales, psychological well-being, and the frequency of lucid dreaming. In a more extensive study, Papaioannou et al. (2013; also see Duda et al., 2013) administered the global self-esteem subscale of the PSDQ-S to a total of 7789 early adolescent soccer players from France, Greece, Norway, Spain, and England. Across countries/languages, their results revealed modest-to-acceptable scale score reliability estimates for this subscale (α ranging from .51 to .73) and significant relationships with subjective vitality and moderate vigorous physical activity. Similarly, Castonguay, Sabiston, Crocker, and Mack (2014) used two subscales (i.e., appearance and body fat) of the PSDQ-S among a mixed sample of 435 English- and French-speaking Canadian adults. Their results reveal that both subscales had acceptable scale score reliability ($\alpha=.86$ and .92) and were significantly related to

subscales of the Body and Appearance-related self-conscious Emotions Scale.

Although promising, these studies remain preliminary, as no study has yet systematically examined the psychometric properties of these linguistic adaptations. Thus, apart from initial attempts by Marsh, Martin, et al. (2010) to validate the PSDQ-S among samples of Spanish and Israeli students, the cross-cultural generalizability of the PSDQ-S among samples of non-English adolescents remains an open question that must be addressed before the PSDQ-S can be confidently used in the context of cross-cultural comparison studies. In this study, we focus on the French version of the PSDQ-S.

Currently, two self-report questionnaires are available to measure the physical self-concept among French-speaking young persons: the long form of the PSDQ (Guérin, Marsh, & Famose, 2004) and the short and very short forms of the Physical Self-Inventory (PSI-S & PSI-VS; Maïano et al., 2008; Morin & Maïano, 2011a,b). Despite the numerous advantages of the PSI scales (see Marsh & Cheng, 2012), their reduced length also makes them less comprehensive than the PSDQ. In turn, the length of the PSDQ makes it unwieldy in many research contexts where the number of items needs to be limited for practical reasons. Consequently, the validation of a French version of the PSDQ-S will fill an important gap in providing a reasonably short, yet comprehensive, measure of the physical self-concept for the French-speaking research community. However, the usefulness of such a French version goes well beyond the French community in providing a valuable instrument on which to anchor cross-cultural comparison studies (Tomás, Marsh, González-Romá, Valls, & Nagengast, 2014). In this regard, the availability of a validated French version is particularly important given that French is the official or co-official language in 29 countries and territories worldwide and one of the most commonly used language in North Africa.

Measurement Invariance and Latent Means Differences

A critical issue in the assessment of the psychometric properties of any measurement instrument is whether it can be used with individuals coming from different segments of the population and whether comparisons conducted across these subpopulations will be meaningful or reflect measurement biases. Measurement biases occur when an instrument behaves differently across distinct subgroups from the population and leads to the impossibility of comparing scores obtained on the instrument across these distinct subgroups. In practice, this verification is conducted via a sequence of tests of measurement invariance (e.g., Meredith, 1993; Millsap, 2011) where equality constraints are progressively added to different parameters from a measurement model (i.e., loadings, intercepts, and uniqueness) across subgroups of participants to systematically test whether these constraint hold in practice. The non-invariance of the factor loadings suggests that the instrument does not measure the same constructs across subgroups, and precludes any form of group-based comparison. The non-invariance of items' intercepts rather suggests that participants presenting the same true score on the construct of interest (e.g., physical self-conceptions) will still tend to score higher or lower on the measurement scales as a result of their membership in specific subgroups. Evidence of invariance of the factor loadings and item intercept is an important pre-requisite to validate group-based mean-level comparisons. The non-invariance of the items' uniqueness finally suggests that the measurement errors differ as a function of group membership, and thus that the constructs are assessed with different levels of precision.

Although Marsh, Martin, et al. (2010) reported evidence of measurement invariance across subsamples of boys and girls, adolescents and older adults, and typical adolescents versus elite athletes, they did not examine the measurement invariance of the

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