

# Reliability and Validity of Self-Concept Scores in Secondary School Students in Trinidad and Tobago

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**ABSTRACT** In this study we examined the reliability and validity of global, mathematics and English self-concept scores from the Self-Description Questionnaire II (SDQ-II, Marsh, 1990b) in a random sample of 870 secondary school students in Trinidad and Tobago. The results provided strong evidence for the structural validity of the scores and yielded reliability estimates in the moderate to high range. There were no differences across gender and ethnic subgroups and a single grade level difference was found. The authors concluded that SDQ-II scores are useful for screening purposes, and in some cases individual decision making, in this population and recommended that the scores be examined for convergent and discriminant validity.

**KEY WORDS:** reliability; secondary school; self-concept; Trinidad and Tobago; validity

## Introduction

Self-concept has received considerable attention in the educational and psychological literature on children and youth (Byrne, 1996; Crain and Bracken, 1994) for several decades, and searches using the term 'self-concept' in the PsycINFO and ERIC databases yield results in the tens of thousands. Indeed, Worrell (2000) argued that self-esteem or global self-concept was often included in research studies simply as a variable that should be examined, even if self-concept was not the major focus of the study. In the 1980s, researchers consistently began to differentiate between global and domain-specific self-concepts (e.g. Bracken, 1992;

Byrne and Shavelson, 1986; Harter, 1982, 1988; Marsh, 1990a, 1991), and there is a growing consensus that these two aspects of self-concept are related to different types of constructs (Harter et al., 1998; Marsh and Hau, 2004; Rosenberg et al., 1995; Worrell, 2000).

*Unidimensional versus multidimensional views of self-concept*

Early research focused on global self-esteem (e.g. Coopersmith, 1967; Piers and Harris, 1964; Rosenberg, 1965), a term that is often used interchangeably with global self-concept. Although some researchers argue that self-esteem is only the evaluative aspect of self-concept, others suggest that the differences in terminology are 'mostly semantic in nature' (e.g. Crain and Bracken, 1994: 496) and Byrne (2002) noted that construct validity research has been unable to discriminate between self-concept and self-esteem. Correlational studies yielded negative relationships between global self-concept and several psychological and behavioural variables, including depression, eating disorders, self-destructive actions and antisocial behaviour (Basic Behavioral Task Force, 1996). Self-concept was also examined in numerous samples of at-risk youth (e.g. Harper and Marshall, 1991; Richman et al., 1987; Sapp, 1990; Sewell et al., 1981; Stevens and Phil, 1982) and Kagan (1990: 105–106) drew the following conclusion: 'We now have available several decades of demographic and correlational studies that document a clear profile for students at risk ... at-risk students have low educational aspirations, low self-esteem, and an external locus of control'.

However, the research on at-risk youth yielded less definitive results than Kagan's (1990) conclusion suggests. In several studies, at-risk youth did not differ from their counterparts who were not at risk on measures of global self-concept. For example, Ekstrom et al. (1986) compared school dropouts and graduates from the National Educational Longitudinal Study (NELS; Haggerty et al., 1996) and reported no differences between these two groups on global self-concept. More recent studies have yielded similar findings, with at-risk youth obtaining comparable scores to their not-at-risk peers on global self-concept (e.g. Worrell, 1997a; Worrell et al., 1999).

In 1976, Shavelson et al. provided a comprehensive review of the self-concept literature, including an examination of five of the most commonly used self-concept instruments in the extant literature. These authors concluded that, among other things, self-concept was 'multifaceted' (p. 435) or multidimensional. Since the publication of the Shavelson et al. article, multidimensional approaches to self-concept have dominated both theory and scale development (e.g. Bracken, 1992; Byrne, 1996, 2002; Harter, 1982, 1988; Marsh, 1990a, 1990b, 1990c, 1991; Marsh and Shavelson, 1985) and empirical research has

provided support for the validity of multidimensional instruments (e.g. Bracken et al., 1996; Marsh and O'Neill, 1984; Van den Bergh and De Rycke, 2003; Worrell, 1997b; Yeung and Lee, 1999).

Several researchers have also provided discriminant validity support for a multidimensional approach to self-concept. For example, Rosenberg et al. (1995) argued that global self-concept was related to psychological well-being whereas domain-specific self-concepts were related to behavioural functioning. Using a sample of 1,800 students, these researchers found that global self-concept had higher correlations with measures of life satisfaction ( $M\ r = 0.34$ ) than did academic self-concept ( $M\ r = 0.08$ ), whereas academic self-concept had a higher correlation with GPA ( $r = 0.49$ ) than did global self-concept ( $r = 0.25$ ). They also found that the effect of global self-concept on grades was mediated by academic self-concept and vice versa.

In another study, Harter et al. (1998) compared 235 non-exceptional students with 118 students diagnosed with learning disabilities and 70 students with behavioural disorders. In keeping with their *a priori* hypotheses, Harter and her colleagues found that the non-exceptional group had higher cognitive self-concept scores than the other two groups and the students with behavioural disorders had lower behavioural self-concepts than the non-exceptional group or the group with learning disabilities. Cohen's  $d$  for the differences ranged from 0.56 to 0.86. See Marsh and Hau (2004) for similar findings.

#### *Group differences on self-concept*

Researchers have examined self-concept differences in groups defined by achievement (Harter et al., 1998; Hoge and Renzulli, 1993; Worrell et al., 1999), age (Crain and Bracken, 1994; Mullis et al., 1992; Worrell et al., 1998), ethnicity and race (Crain and Bracken, 1994; VanTassel-Baska et al., 1994; Wade, 1991; Whang and Hancock, 1994), gender (Crain and Bracken, 1994; Hagborg, 1993; Harper and Marshall, 1991; Jackson et al., 1994; Wilgenbusch and Merrell, 1999; Worrell et al., 1998) and socioeconomic status (SES; Mullis et al., 1992; VanTassel-Baska et al., 1994). Although there have been some inconsistencies across studies, a number of general patterns have emerged. High achieving students typically obtain higher academic self-concept scores than their counterparts with lower achievement (Harter et al., 1998; Hoge and Renzulli, 1993; Worrell, 1997a). Males most often report higher physical/athletic (Crain and Bracken, 1994; Hagborg, 1993; Jackson et al., 1994; Wilgenbusch and Merrell, 1999; Worrell et al., 1998), physical appearance (Hagborg, 1993; Jackson et al., 1994) and mathematics self-concepts than females and females often report higher social/friendship (Hagborg, 1993; Jackson et al., 1994) and verbal/reading self-concepts (Jackson et al., 1994; Wilgenbusch and

Merrell, 1999) than males. When gender differences are found on measures of global self-concept, they typically favour males (Harper and Marshall, 1991; Jackson et al., 1994; Worrell et al., 1998).

Most studies on racial and ethnic group differences have focused on global self-concept and results have been inconsistent here as well. However, the trends in findings indicate generally higher self-concept scores for African Americans (Wade, 1991) and generally lower scores for Asian Americans (Whang and Hancock, 1994; Worrell, 2002). Differences by age group have also been inconsistent with no obvious trends emerging (Crain and Bracken, 1994) and findings on differences across SES groups have also been mixed (e.g. Coleman, 1985; Glovin-sky-Fahsholtz, 1992; Mullis et al., 1992; Richman et al., 1985; VanTassel-Baska et al., 1994). Crain and Bracken noted that even when group differences in self-concepts are found, effect sizes are small and these researchers concluded that at least with regard to age, race and gender, there are few 'meaningful, systematic differences in domain-specific and global self-concept' (p. 507). In 1996, Bracken highlighted the clinical utility of self-concept using the Multi-dimensional Self-Concept Scale (Bracken, 1992) as a reference point. He noted that the use of a global score versus a subscale score is dependent on contexts that one wants to make statements about.

### *The present study*

The Republic of Trinidad and Tobago is an oil-rich twin-island nation in the southern Caribbean with a population of approximately one million and an area of approximately 5,000 km<sup>2</sup>. Formerly a British colony with English as the primary language, it was granted independence in 1962. The country has the most diverse population in the Caribbean with two large ethnic groups: individuals of African descent constitute about 38 percent of the population and individuals of East Indian descent constitute about 40 percent. The third largest group consists of individuals of mixed descent ( $\approx$  20 percent) and there are also very small but distinct groups of Arabic, Chinese and European descent. Although the country boasts a literacy rate of 98 percent, other data (United Nations Development Programme [UNDP], 2001) suggest that the functional literacy rate is much lower. In addition to increasing numbers of youth leaving the school system with low literacy and numeracy skills, crime statistics indicate youth aged 17–21 constitute the largest group in prison (UNDP, 2001) and the 18- to 25-year-old age group constitutes the majority of individuals in prison for violent crimes. It is probable that there is a strong relationship between the increasing number of youth who are unemployable due to poor academic skills and the increasing number of youth engaged in criminal activities of all types.

The government of Trinidad and Tobago has engaged in a process to achieve *developed nation* status by 2020 and education is seen as an important contributor to this goal. Thus, the Ministry of Education has engaged in a process of developing local norms for academic performance and psychological functioning in a variety of areas to facilitate prevention and early intervention activities. Most of this work has been done with elementary schools. However, the Minister of Education specifically requested norms for self-concept at the secondary school level. As the context for decision-making was the school system, the decision was made to measure mathematics and English self-concepts, as these subjects were the only two that all secondary school students in Trinidad and Tobago have in common. There were also concerns about students' general psychological well being, which is not addressed by academic self-concept (Marsh et al., 2004; Rosenberg et al., 1995; Worrell, 2000). Thus, a global self-concept subscale was also included. Including these three self-concept domains is also supported by findings which suggest that behaviours are more closely related to domain-specific self-concepts and general psychological well-being is related to global self-concept (e.g. Harter et al., 1998; Rosenberg et al., 1995; Worrell, 2000).

Although the reliability and validity of self-concept scores have been established in the United States and many other countries, they had never been examined in Trinidad and Tobago. As reliability and validity of scores are population-specific (Goodwin and Goodwin, 1999) and establishing validity is an important prerequisite and ethical requirement for recommending scores on an instrument for use (American Educational Research Association, American Psychological Association and National Council on Measurement in Education, 1999), we examined the reliability and structural validity of the scores in a sample of secondary school students from Trinidad and Tobago. It was hypothesized that (a) a three-factor structure, consisting of mathematics, English and global self-concepts, would be supported; (b) subscale scores would have reliability estimates greater than 0.70 and (c) males would report significantly higher global and mathematics self-concepts than females and females would report significantly higher English self-concepts than males.

## **Methods**

### *Participants*

Participants consisted of a random sample of 897 students (44.7 percent male;  $M$  age = 14.2 years) from 27 classes in the five compulsory years of secondary school in Trinidad and Tobago, Forms 1–5. A list of

all secondary schools compiled by the Trinidad and Tobago Ministry of Education (1998) was used to identify a random sample of schools by educational region. Given that not all secondary schools contain all grade levels, selection of participants was done by grade level and school. Thus, for example, the Form 1 sample was randomly chosen from all schools that served students in Form 1 and so on. To ensure gender balance, if a single-gender school was selected on a draw, then the next random draw at that form was from schools that exclusively served the other gender. Data were not obtained from three of the 30 classrooms that were chosen. Thus, only 27 classrooms were actually included in the final sample. This omission also resulted in two of the smaller educational regions, which account for 6.6 percent of the school-aged population, not being represented in the sample. However, the 897 students who were actually sampled were distributed across the other six educational divisions in proportions equivalent to the population, with the largest discrepancy between the sample and any educational region being 3.9 percent.

Participation across the grade levels ranged from 143 students in Form 2 (15.9 percent of the sample) to 234 in Form 4 (26.1 percent). Although the major ethnic groups in Trinidad and Tobago were all represented in the sample (African descent = 22.1 percent; East Indian descent = 42.4 percent; Mixed descent = 32.1 percent; Other = 2.5 percent), individuals of African descent were under-represented and individuals of mixed descent were over-represented. Participants also represented a range of socioeconomic levels based on highest level of parental education. They reported that 11.6 percent of their parents had completed elementary school or some secondary school, 22.9 percent had completed Ordinary Level secondary school exams, 17.8 percent had completed Advanced Level secondary school exams, 22 percent had completed university degrees and 27.8 percent did not know the educational level of their parents.

### ***Measure***

The global, mathematics and English subscales of the Self-Description Questionnaire-II (SDQ; Marsh, 1990b), each consisting of ten items, were used in the current study. The full SDQ-II consists of 102 items that assess 11 areas of self-concept – three academic, seven non-academic and one general self-concept – in junior and senior high school students. Respondents complete the items using a six-point Likert scale with verbal anchors ranging from False to True. Originally developed and standardized on samples in Australia (e.g. Marsh, 1990b; Marsh and Barnes, 1982; Marsh et al., 1985), the scale's scores have since been validated on samples in the United States (e.g. Gilman et al., 1999; Marsh et al., 2001), France (e.g. Guérin et al., 2003) and

Spain (e.g. Martorell et al., 1992). Using a reduced number of subscales as in the current study, the structural validity of SDQ-II scores have also been supported in a sample in China (e.g. Yeung and Lee, 1999). Reliability estimates for subscale scores are in the 0.7–0.9 range and Byrne (1996), in a comprehensive review of self-concept measures, strongly endorsed the construct validity of the SDQ-II subscales' scores.

### *Procedure*

Data collection was conducted by Guidance Officers from the Ministry of Education. These Guidance Officers, who were trained in the administration of the measure, obtained a list of the classrooms for each form at each selected school. If there was only one classroom at the appropriate grade in a selected school, then that classroom was chosen for participation. If there were multiple classrooms at the appropriate grade, a table of random numbers was used to randomly select one classroom at that school to participate. The Guidance Officers then administered the abbreviated SDQ-II to the entire class.

Of the original 897 participants, 167 skipped one or two items and 27 omitted three or more items. Participants who skipped more than two items were not included in subsequent analyses. The one or two items omitted by 167 participants were estimated via multiple imputation methods operationalized in SPSS. Thus, the final SDQ-II sample contained 870 adolescents.

## **Results**

### *Factor analyses*

As SDQ-II scores had never been examined in the population under study, the structural validity was examined first using exploratory factor analyses based on principal axis extraction. The Kaiser-Meyer-Olkin measure of sampling adequacy (Kaiser, 1974) was 0.91 and Bartlett's Test of Sphericity was significant,  $\chi^2$  (435) = 10,486.9,  $p < 0.001$ , indicating that the correlation matrix was factorable. Both the scree test (Cattell, 1966) and parallel analysis (Horn, 1965; Watkins, 2000) criteria suggested that four factors should be retained for rotation. Consequently, four factors were extracted and subjected to Promax rotation. However, a single item loaded on the fourth factor. A more satisfactory solution was obtained when three factors were extracted and rotated with Promax<sup>1</sup>.

Only one English item loaded weakly on its hypothesized factor, but the other 29 items loaded on the appropriate factors with pattern coefficients ranging from 0.39–0.87. This solution, which can be obtained

from the first author, accounted for 40.8 percent of the total variance and factor intercorrelations were low (0.37 and 0.31 for global with English and mathematics, respectively and -0.05 between English and mathematics). Coefficients of congruence for all three factors across gender and ethnicity were strong and supportive of factorial invariance (i.e. 0.90–0.99, median of 0.98; Jensen, 1998). Thus, the three factors appear to be measuring the same construct for boys and girls as well as for students of African, East Indian and Mixed ancestry.

#### *Reliability estimates*

Internal consistency (alpha) coefficients were calculated for the three factors across gender, ethnic and grade level groups.<sup>1</sup> These coefficients indicate that the SDQ-II factors are sufficiently reliable for screening decisions and, in some instances, might be adequate for making individual decisions (Salvia and Ysseldyke, 2001). That is, all but two exceeded 0.80, some exceeded 0.90 and all but four of the reliability estimates were significantly greater than 0.70 ( $p < 0.001$ ).

#### *Group differences*

Mean scores of students on the SDQ-II factors across gender, ethnicity and grade levels are presented in Table 1. Based on a family-wise error rate of 0.001, there was only one significant group difference – Form 4 students had a lower mathematics self-concept score than students in Form 1,  $F(4, 865) = 6.69, p < 0.001$ , Cohen's  $d = 0.50$ . Although boys reported higher self-concept on the mathematics scale and girls expressed higher self-concept on the English scale, the differences were not significant and effect sizes were small.

## **Discussion**

In this study, we examined the reliability and structural validity of global, mathematics and English self-concept scores in a representative sample of secondary school students in Trinidad and Tobago. The results indicated that the scores on the three subscales were generally reliable and their factor structure was in keeping with the constructs measured in previous research.

As indicated previously, the evidence in favour of the structure of SDQ-II scores is quite strong (Byrne, 1996). However, most studies that have used a reduced version of the instrument have not examined the structural validity of the instrument (e.g. Delugach et al., 1992), or have added or modified items (e.g. Tashakkori and Kennedy, 1993), so the findings cannot be used to generate hypotheses about the structure of a reduced SDQ-II. Yeung and Lee (1999) examined a Chinese translation of a reduced SDQ-II consisting of four subscales, including the

**Table 1** Means and Standard Deviations of SDQ-II composites

	N	Mathematics		English		Global	
		M	SD	M	SD	M	SD
<b>Gender</b>							
Female	478	41.1	13.6	46.3	10.4	50.1	9.1
Male	386	44.6	12.1	44.5	10.1	50.7	8.3
<b>Ethnicity</b>							
African	188	40.4	13.8	46.7	10.3	50.9	8.7
East Indian	368	44.2	12.7	45.2	10.6	50.2	9.2
Mixed	285	42.0	13.0	45.7	9.7	50.2	8.2
Other	21	44.3	10.7	43.2	12.1	49.6	9.2
<b>Grade Level</b>							
Form 1	204	45.6 <sup>a</sup>	11.4	44.6	10.1	49.9	7.6
Form 2	136	42.8	12.4	45.9	9.5	50.9	9.1
Form 3	161	43.7	12.2	47.0	9.8	51.1	8.8
Form 4	227	39.4 <sup>a</sup>	13.4	45.7	10.7	50.6	8.4
Form 5	142	42.6	15.2	44.5	11.2	49.1	10.4
Total Sample	870	42.7	13.1	45.5	10.3	50.3	8.8

SDQ-II = Self-Description Questionnaire-II. Means with the same superscripts differ at the 0.001 level.

three used in this study and the general academic subscale. Using confirmatory factor analytic techniques, their results supported a four-factor structure in scores from two separate administrations. These findings, in conjunction with those reported in this study, suggest that the SDQ-II subscales are robust and do not seem to be affected by using fewer than the 11 subscales with which the instrument was normed.

The reliability estimates for the subscale scores were generally high, with 34 of the 36 estimates calculated greater than 0.80. No significant group differences were found by gender or ethnicity, in keeping with Crain and Bracken's (1994) contention that the demographic group differences reported in the literature are generally of little practical or clinical significance. And all of the findings support the use of SDQ-II scores with school-aged adolescents in Trinidad and Tobago.

These findings have practical implications for clinicians working in the schools in Trinidad and Tobago. The abbreviated SDQ-II used in this study is a brief measure which can be administered in 10 minutes or so. Given the robust reliability validity estimates for the scores across gender, grade-level and ethnic groups, the SDQ-II can be used to screen students entering the secondary school system with low self-concepts in the core subject areas of mathematics and English. Once appropriate cut-scores are established, early intervention can stem the

tide of males leaving the school system in greater numbers than females (UNDP, 2001) and prevent the increasing achievement gap in favour of females in elementary and secondary schools and in university enrollment (Brown, 2005; Kutnick et al., 1997; Worrell, 2006). Additionally, longitudinal examinations of students' scores across the secondary school years may be able to assist in identifying differences between students who drop out and those who do not.

Both the global and domain-specific self-concept may prove potentially useful in another way. It is possible that the use of these subscales in combination may identify profiles of students who are prone to engaging in violent activity. From another point of view, it may be useful to use these measures with the adolescents who are now incarcerated for participating in violent crimes and see how they compare to the normative sample. Although there is no guarantee that specific profiles will emerge, the presence of validated scores on this instrument provides a tool that did not exist previously. Moreover, the results of this study assures that the instrument can be used with all of the secondary school-aged adolescents without fair of measurement or cultural bias.

In sum, the results of this study provide educators and clinicians with working with adolescents with tools that may be useful for both prevention and intervention. Future research on SDQ-II scores in this population should concentrate on establishing convergent and discriminant validity and appropriate cut-scores for decision making, especially as there is a growing consensus about the positive effects of mathematics and English self-concept scores on academic achievement in those domains (Marsh and Hau, 2004; Marsh et al., 1985) and an established relationship between global self-concept and depression (Rosenberg et al., 1995).

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1 A table with the factor structure can be obtained from the first author.

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