Achievement and Self-Concept Relation: An Evidence of the Adequacy of the I/E Model with a Short Version of the Self-Description Questionnaire-II among School Students in Oman

Maher M. Abu-Hilal*, Sulaiman Al-Maamari**, Ibrahim S. Al-Harthy***, Joana Stocker****, Hilal Z. Al-Nabhani*****

Author information

*   Department of Psychology, Sultan Qaboos University, Oman. Email:mhilal@squ.edu.om

**   Ministry of Education, Oman. Email: Sulaiman868@moe.om

***   Department of Psychology, Sultan Qaboos University, Oman. Email: ibrahimh@squ.edu.om

****   Zayed University, Dubai, United Arab Emirates. Email: Joana.Stocker@zu.ac.ae

*****Department of Psychology, Sultan Qaboos University, Oman. Email:hnabhani@squ.edu.om

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Achievement and Self-Concept Relation: An Evidence of the Adequacy of the I/E Model with a Short Version of the Self-Description Questionnaire-II among School Students in Oman

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Abstract: Due to the segregated nature of schools in Arab countries and the differential socialization of boys and girls, the Arab culture presents interesting aspects to explore. In the current research, we tested the generalizability of the social comparison and dimensional comparison theory among school boys and girls in Oman. A sample of 700 students (334 boys and 366 girls) with ages between 13 and 20 years old participated. Two subscales of the Self-Description Questionnaire-II (SDQII, short form) were used: Arabic and math self-concepts. Statistical procedures included confirmatory factor analysis, invariance tests, and path analysis using AMOS (v.23) and MANOVA. The results revealed positive paths between achievement and respective self-concept domains (external comparison), and negative paths between achievement and non-matching domain (internal comparison). Differences in achievement were observed for girls, although boys presented higher math self-concept. Overall, the propositions of the internal/external (I/E) frame of reference model were valid in the Omani society, although more studies, especially longitudinal and using nationally representative wide samples of Arab countries are recommended.

Keywords: social and dimensional comparisons, verbal and math self-concepts, Self-Description Questionnaire, Oman, invariance analysis

Introduction

Academic achievement has been the focus of extensive research over many decades. Numerous factors and variables that go beyond the cognitive level have been found to influence individual achievement (Al-Harthy, 2016; Stocker & Faria, 2012). Indeed, research findings have shown that motivational variables such as self-concept, goal orientations, causal attributions, and perceptions of intelligence are factors influencing academic achievement (Abu-Hilal, 2001; Lyon, 1993; Marsh & Köller, 2003; Stocker & Faria, 2012). In this context, Lyon (1993, p. 203) highlighted the importance of the relationship between self-concept and achievement, stating that "academic self-concept is theoretically more closely related to academic achievement than most other cognitive variables."

Academic self-concept is defined as a self-evaluative dimension with regard to perceptions and judgments about one's capacities and skills in different academic domains, as science, math, English, and history (Marsh, Byrne & Shavelson, 1988; Marsh & Shavelson, 1985; Shavelson, Hubner & Stanton, 1976; Stocker, 2015). These perceptions are developed through personal experiences of previous assessments, interpretation of achievements in general, and successes and failures in particular, and feedback from significant others (Harter, 2006; Stocker, 2015).

There are three different approaches considering self-concept and academic achievement causal relations: *self-enhancement model*, *skill development model*, and *reciprocal effects model*. The self-enhancement approach postulates that self-concept is a proximal predictor of academic achievement, assuming that individuals with certain level of self-concept seek tasks that confirm and enhance it (Calsyn & Kenny, 1977). On the other hand, the skill development approach, argued that achievement influences the development of self-concept (see Abu-Hilal & Bahri, 2000; Marsh, Kong & Hau, 2001; Marsh & Hau, 2004). This particular theory hypothesizes that tasks – difficult or easy – and respective performance operate as motivators to improve one's self-concept. Finally, the reciprocal effects model maintains that academic self-concept both affects and is affected by academic achievement: they are mutually reinforcing, each leading to gains in the other (Marsh, Byrne & Yeung, 1999; Marsh & Martin, 2011).

The present study will explore the assumptions of the skill development approach, not only analyzing the academic achievement's causal impact on academic self-concept, but also scrutinizing its influence in different self-concept academic domains.

Frame of reference and achievement

As referred, Marsh (1986) presented the relationship between achievement and self-concept in a novel and unique fashion with his *internal/external (I/E)*

frame of reference model. The I/E frame of reference model has been considered "a major development in self-perception theory" (e.g., Skaalvik & Rankin, 1995), and provides an explanation to the surprising relationship among the self-concept (SC) dimensions. Also, it clarifies the relationships between achievement in various domains and matching, as well as non-matching, self-concepts (Marsh et al., 2015).

The I/E frame of reference model is an outgrowth of the *Self-Worth Theory* (Covington, 1992, for review see Al-Harthy, 2016). According to this theory, an individual learns that one is valued depending on his/her accomplishments. Accomplishments are usually judged in using two methods. First, by comparing one's achievements with those of others (external comparison), where a downward group comparison helps to increase one's self-concept and an upward group comparison tends to reduce it (also see *Cognitive Evaluation Theory* - Fistenger, 1954). Second, by comparing one's abilities in different academic domains (dimensional comparison). For example, a student compares his/her abilities in math with the abilities of his/her counterparts; and compares his/her abilities in math with his/her own abilities in Arabic. Children's sense of worth and self-perceptions begin to develop depending on whether they do better or worse in comparison with their companions. Therefore, Marsh (1986; 1988) and Marsh et al. (2015) hypothesized that performance in various domains, as well as social comparisons are factors that determine one's level of self-concept.

Based on that the correlations between math and verbal achievements vary between .50 and .80, Marsh (1988) expected that math and verbal self-concepts would be similarly related. Surprisingly, Marsh and his associates have found that math and verbal self-concepts are nearly uncorrelated, leading to the revision of the original Shavelson, Hubner, and Stanton (1976) model and to the proposal of the I/E model (see Marsh, 1988; Marsh et al., 2015; Marsh & Hau, 2004).

Following the Self-Worth Theory fundamentals, Marsh (1986; 1988) argued that math and verbal self-concepts were influenced by internal and external comparisons. Marsh and Shavelson (1985, p. 120) stated that ".. students based their academic self-concepts in particular subjects on how their ability in that subject compares with other students (external comparisons) and how their ability in that particular subject compares with their own abilities in other subjects (internal comparisons)." Marsh (1986) proposed that the external comparison process should produce a positive correlation between math and verbal self-concepts. Conversely, the internal comparison should lead to a negative correlation between the same two constructs of self-concept, because math and verbal achievements are compared with each other in the same person. Marsh and Yeung (1998) hypothesized that the internal comparison process predicts that good math skills lead to lower

verbal self-concept and good verbal skills lead to lower math self-concept. On the other hand, the external comparison process - as Marsh and Yeung (1998, p. 711) argued - "predicts that good math skills lead to higher math self-concept and that good English skills lead to higher English self-concept." The joint operation of both processes will lead to a correlation between math and verbal self-concepts that is substantially lower than the correlation between math and verbal achievements.

These predictions of the I/E model have received considerable support by several studies in the West (e.g., Arens et al., 2011; Byrne & Shavelson, 1987; Marsh, 1986; 1988; 1994; Marsh, Walker & Debus, 1991; Marsh & Yeung, 1998). Also, these predictions have received some support from cross-cultural research (Marsh *et al.*, 2013; Marsh et al., 2015; Marsh & Hau, 2004; Marsh, et al., 2001).

Socialization of Arab boys and girls

An important aspect of this study is that it was conducted in a single-sex educational setting with predominantly patriarchal norms (Abu-Hilal et al., 2013). Boys are taught by male teachers and girls are taught by female teachers (Barakat, 1993; Sharabi, 1975). As boys and girls live in separate worlds and segregated educational settings, unlike most studies in the West and East Asia, the reference group should belong to same gender. To be specific, the reference group for boys can only be boys and the reference group for girls can only be girls.

Single-sex vs. coeducation has been introduced to explain gender differences in achievement and attitudes (Dhindsa & Chung, 2003; Feniger, 2011; Halpern et al., 2007; Hyde et al., 1990; Marsh, 1989). However, the major finding has been that the type of school is not the main factor in explaining gender differences. The issue in the Arab culture is not only single-sex vs. coeducation, but also the segregation and differential socialization that is practiced in the larger society. Boys and girls are separated both in school and in society. Boys live in a social and psychological world separated from the world of girls.

Furthermore, in the Arab culture, boys and girls are brought up with different expectations, which may have an effect on student motivation and self-concept (Patai, 1983). A boy receives more attention than a girl; during infancy and childhood a boy's needs are more easily and quickly fulfilled because more attention is devoted to him, not only by the parents, but also by many other relatives in the extended family as well (Abu-Hilal, 2001; Sharabi, 1975). A boy is often praised for his behavior while a girl is seldom praised. In fact, family expectations for girls are modest, especially concerning school. For example, Abu-Hilal, Abdelfattah, Abduljabbar, and Marsh

(2013) found that fewer girls reported very high parental involvement in school activities (36.6%) compared to 61% for boys. Also, more boys indicated very high parental support in academic achievement, while girls reported very low support (see also Rasmi, Chuang & Safdar, 2012). These results indicate more focus are given to boys than to girls.

Other researchers (e.g., Barakat, 1993; Sharabi, 1975) argued that praising boys might have resulted in inflated egos or even narcissism if the boy happens to be the only son in the family. Considering motivation, we argue that the subordinate status of the girl may work to her advantage, as they are motivated to depend more on their efforts to get social recognition. As girls are more aware of their status and roles, they may develop more realistic self-conceptions and explanation of events, identifying their weaknesses and strengths more clearly than the boys, and achieving higher levels of intrinsic motivation (Abu-Hilal & Aal-Hussain, 1997; Abu-Hilal & Bahri, 2000; Abu-Hilal et al., 2013).

Actually, several empirical studies with Arab students revealed that Arab girls outscored Arab boys in almost every school subject (Abu-Hilal, 2001; 2008; Abu-Hilal & Bahri, 2000; Hassan & Khalifa, 1999). Despite this academic success, they are not likely to brag about their achievements (Marsh et al., 2013). Instead, girls seem to maintain a self-improving orientation by which they strive to correct their weaknesses and this makes them more task oriented (see Robins & Beer, 2001, for more details). On the other hand, boys may develop a self-enhancing orientation by which they tend to select tasks (probably easy) that help to confirm their self-concepts, being more performance oriented (also see Dweck, 2000; Heine, 2001; Heine & Hamamura, 2007; Minkov, 2008).

With the discussion framed above, in the current research, we argue that this differential socialization and the role expectations for Arab boys and girls may produce differences in academic achievement and self-concept levels.

The present study

Although Marsh's I/E model has received much attention and empirical support from researchers in the West, little research has been done on it in the Arabic context, a non-western culture. The structure of academic self-concept and validity of the I/E model are yet to be established in the Arabic context, and further empirical research needs to be done with regard to propositions of the I/E model. For this model to be complete, comprehensive and universal, the generality of the propositions of the I/E model ought to be investigated with samples in different cultures and environments.

Hence, the main purpose of the present study is to test the generalizability of the I/E frame of reference model in a non-western sample. First, the structure of the academic self-concept and the I/E model should be invariant across gender. Second, once invariance is established, boys and girls are expected to have different levels of achievement and self-concept. Furthermore, it is expected that girls have higher achievement both in language and math; whilst boys have more positive self-concepts in the correspondent self-concept dimensions.

Method

Sample

In this research 700 school students from schools in Aldhahera school directorate participated. A randomly stratified cluster sampling approach was used with class as the unit of selection. Both genders were represented (334 males and 366 females) with age ranged between 13 and 19 years old. Participants were nearly evenly distributed across grades: seven (n=123), eight (n=117), nine (n=125), ten (n=107), eleven (n=122) and twelve (n=106).

Instruments

The questionnaire was composed by 36 items distributed by nine self-concept dimensions (verbal, mathematics, general school, physical ability, physical appearance, emotional stability, honesty-trustworthiness, peer relations and parents' relations). Responses were rated on a 6-point Likert scale ranging from 1 (*true*) to 6 (*false*). In this study only two short academic self-concept subscales (4 items each) were used: Arabic and math. Alpha coefficients for the subscales were computed (.76, and .85) for Arabic and math self-concept subscales, respectively. These values match well with those obtained from other Arab samples that used the full versions of SDQI (Abu-Hilal & Aal-Hussein, 1997; Abu-Hilal & Bahri, 2000) and SDQII (Stocker, 2015).

Procedures

Both research project and instruments (including informed consents) were analyzed and approved by the Ethics Committee and local authorities also gave their support. Schools were firstly contacted by phone and a meeting with the school principal was arranged in order to get their approval. All the questionnaires were confidential, voluntary, and collectively administered by the second author, to students in a classroom during regular school hours, and standardized oral instructions were given. Classes were selected by the respective schools, according to their convenience, and an informed consent was obtained from all participants. Math and verbal scores were obtained from the official school records. These scores ranged from zero to

100 and represented cumulative scores based on assignments, quizzes, and exams.

Data analysis

Confirmatory factor analysis (CFA) and structural equation modeling (SEM) were used to test the assumptions of the IE model, using AMOS software. The model had two manifest variables (Arabic, and math grades) that were posited to be correlated and to have effects on the respective endogenous latent constructs. Arabic and math self-concepts were specified to underlie their respective observed measures (four items for each construct).

Invariance analysis is an important component of construct validation and a pre-requisite to any variance-covariance (including correlation and predictive paths) and mean-level comparisons across subpopulations (i.e. gender). In testing invariance across genders we were interested in whether there is support for the invariance of factor loadings (weak invariance), factor variances-covariances, path coefficients, and measurement residuals.

The maximum likelihood method was used to analyze the data. Because the χ^2 statistic is widely known to be sensitive to sample size (Cheung & Rensvold, 2002; Dimitrov, 2010), we also evaluated model fit using the comparative fit index (CFI), and the root mean square error of approximation (RMSEA) that have been recognized to be least affected by sample size (Dimitrov, 2010). According to Hu and Bentler (1999), an acceptable and good model fit are indicated by CFI values above .90 and .95, respectively; and when the RMSEA value is ideally below .06.

The most commonly used goodness-of-fit index for invariance tests has been the difference in chi square ($\Delta\chi^2$). However, due to its sensitivity to sample size Cheung and Rensvold (2002) and Dimitrov (2010) proposed ΔCFI or TLI as robust statistics for testing between-group invariance models when the sample size is large. They suggested that a value of ΔCFI (ΔTLI) smaller than or equal to .01 shows that the null hypothesis of invariance should not be rejected. As the sample size of this study was large (n = 700), $\Delta\chi^2$ might be a biased indicator to examine between-group invariance tests. Therefore, we adopted Chueng and Rensvold's, and Dimitrov's suggestions and used ΔTLI as the statistics indicator for the invariance tests. Finally, we also conducted a one-way ANOVA with SPSS to compare achievement and self-concept constructs' means of boys and girls.

Results

Descriptive statistics

Table 1 shows the correlations among the study variables and Cronbach alphas of the two constructs: Arabic SC and math SC.

Table 1. Correlations among latent self-concept constructs and exogenous variables and Cronbach's alphas of SC constructs

Variables	1	2	3	4	Alpha
Arabic SC	1.00				.76
Math SC	.249**	1.00			.85
Arabic score	.404**	.378**	1.00		--
Math score	.195**	.593**	.765**	1.00	--

*** p < .001*

Confirmatory factor analysis

A CFA was performed on the Arabic, and math self-concepts model. The goodness of fit indices showed that the data fit the structure well ($\chi^2_{(16)}$ = 24.964, p > .05; RMSEA = .028; CFI = .996; TLI = .992). The standardized factor loadings ranged from .452 to .797 (p < .001) for Arabic self-concept, and from .632 to .848 (p < .001) for math self-concept.

Testing the I/E model

Marsh and Shavelson (1985) stated, "the identification of theoretically consistent and distinct facets of self-concept and their structure is, at least initially, a prerequisite to the study of how self-concept is related to other constructs" (p.107). The above mentioned results clearly indicate a well-structured academic self-concept. Based on these results we tested the relations of the self-concept constructs with objective academic constructs as the I/E model specifies. The pattern of relations among Arabic and math grades; and Arabic, and math self-concepts were tested in the I/E model. Two self-concept constructs (Arabic and math self-concepts) were postulated and each was measured by 4 items. The two constructs were also predicted by Arabic and math grades. The fit of model for the full sample (N=700) was good ($\chi^2_{(28)}$ = 128.065, CFI = .968, TLI = .949, RMSEA = .078).

Measurement, structural and structural path invariance across gender

Measurement invariance, structural invariance, and structural path invariance were examined across gender. A series of invariance tests were conducted and Table 2 shows the results. M1 was the baseline model which allowed all parameters to be estimated freely. In M2, factor loadings were constrained to be equal across gender. The results suggested that factor loadings were invariant between genders (ΔTLI = -.009). In M3, structural weights were additionally constrained to be equal. The results showed that the structural weights were invariant across gender (ΔTLI = -.006). In M4, we examined structural covariances. In M5, we examined invariance of factor means. The results suggested that factor means were invariant across

gender (ΔTLI = .006). In M6 and M7, (M6) and variances (M7). The results indicated that structural covariances (ΔTLI = .000) and variances (ΔTLI = .000) were also invariant between the two genders. Lastly, we constrained measurement residuals to be equal. The results indicated that item residuals were invariant between the two genders (ΔTLI = .004). Although all models indicated invariance of parameters across genders, the least fitted model of invariance was measurement residuals.

The overall results of these analyses show that the measurement part of the structural equation model was invariant across gender. Consistent with predictions and with the findings of previous research, verbal and math grades were highly correlated (see Figure 1).

The I/E model predicts positive paths from Arabic grades to verbal self-concept. Also, it predicts positive paths from math grades to math self-concept. As predicted in the model, these paths were significantly positive (p. <.01). Furthermore, math grades had greater influence on math self-concept than had Arabic grades on verbal self-concept as previously found (Abu-Hilal & Bahri, 2000; Marsh et al., 1983).

The I/E model also predicts negative or weak paths from Arabic grades to math self-concept and from math grades to verbal self-concept. All path coefficients were significantly negative (p. <.01). The model explained 37% of the variance in math self-concept scores, and 19% in verbal self-concept scores. Finally, whereas achievement scores of the two subjects were substantially correlated, correlations among verbal and math self-concept factors' disturbances were modest. Also, as can be seen in Table 1, the correlations between the self-concept constructs were substantially lower than the correlations between the achievement scores. Hence, this adds to the construct validity of the I/E model and supports the prediction that academic self-concept constructs are substantially less correlated (see Table 1) than the achievement constructs.

Table 2. Goodness of fit indices of the models of invariance and model comparison

|	Model	χ^2	DF	CFI	TLI	RMSEA	DF	ΔTLI	Invariance
1	Unconstrained	189.423**	56	.960	.935	.058	--	--	--
2	Measurement weights	190.032**	62	.961	.944	.054	6	-.009	Yes
3	Structural weights	208.282**	66	.957	.941	.056	10	-.006	Yes
4	Structural covariances	238.451**	69	.949	.933	.059	13	.002	Yes
5	Structural residuals	242.144**	72	.948	.936	.058	16	-.001	Yes
6	Measurement residuals	345.234**	83	.921	.914	.067	27	.021	No
	Independence model	3391.428	90			.229			--

*Note. CFI = comparative fit index, TLI = Tucker-Lewis index, RMSEA = root mean square error of approximation.** p < .01*

In summary, the effects of Arabic and math grades on their respective self-concepts were straightforward and consistent with predictions. Also, the links between Arabic grades and math self-concept and between math grades and verbal self-concepts were consistent with predictions of the I/E model. All in all, the I/E model seems to fit the data for Omani students even with a short form of the measure.

Comparison of achievement and self-concept across gender

Table 3 shows the means and standard deviations of grades in Arabic and math as well as for the self-concepts in the same dimensions. Girls clearly outperformed boys in the two subjects as well as math self-concept. Considering Arabic self-concept, girls and boys did not present any differences. Although girls outperformed boys in Arabic, this subject may not present a threat to boys' self-esteem as much as math, which is seen as a more "masculine" skill than the language domain. However, contrary to our expectations, girls expressed more positive math self-concept than boys.

Figure 1. Path model testing the internal/external frame of reference model
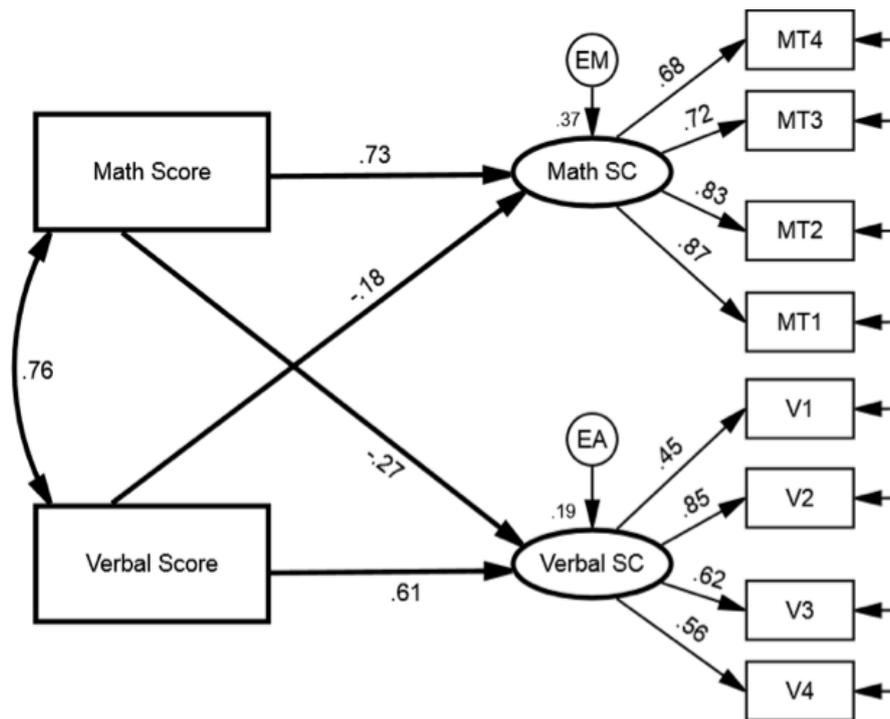
Note. Values on model (rounded to 2 decimal points) are from M6 in Table 3 – Common metric standardized estimates. Correlations among factors' disturbances (Arabic—Math = .29, p. < .05).

Table 3. Mean, standard deviation, F statistic, and effect size of Arabic, English and math grades and self-concepts by gender

Variables	Gender	N	Mean	SD	F	Effect size
Arabic Grade	Boys	334	77.68	13.64	5.33**	.039
	Girls	366	83.11	13.29		
Math Grade	Boys	334	74.77	14.22	3.83**	.021
	Girls	366	79.29	16.76		
Arabic SC	Boys	334	18.23	4.30	.835	.001
	Girls	366	18.51	4.48		
Math SC	Boys	334	19.20	4.26	2.37*	.008
	Girls	366	19.99	4.54		

$^{*}p < 0.05, ^{**}p < 0.01$

A point of caution here is that these differences in means should not be confused with the invariance test. The invariance test is a prerequisite to test mean differences. If the structure (loadings) and other invariance of parameters are not invariant, one cannot test for mean differences since the structure is different across the two genders.

Discussion

The current study was designed to test hypotheses about the structure of academic self-concept and relationships between these constructs and academic achievements; to examine if these relationships were invariant across gender; and to analyze gender's difference considering academic self-concept levels and objective academic achievement. Particularly, the present study purports to further validate the academic self-concept scales of the SDQII (short) and the I/E frame of reference model among a non-Western sample.

The CFA results support the claim that self-concept is domain specific and well structured. Considering the I/E model, the fit of the model for the full sample was good and the invariance analysis showed the model to be invariant across genders. These results reinforce the I/E model adequacy and provide a good basis for comparing achievement grades and self-concept scores between boys and girls of this sample.

As predicted and found in Western contexts, the two latent constructs (Arabic and math self-concept) were strongly and positively predicted by the respective academic grades, thus supporting the external (social comparison theory) frame of reference in the construction of the Arab self-concept. Considering the internal frame of reference (dimensional comparison), some studies in the region didn't corroborate it (e.g., cross-paths from achievement to SC in non-matching domains were not negative as expected: Abu-Hilal &

Aal-Hussain, 1997; Abu-Hilal & Bahri, 2000). In this study the overall nega-
tive paths across-domains were clearly present (Abu-Hilal et al., 2013; Arens
et al., 2011; Marsh, et al., 1983; Marsh et al., 2015).

Considering gender differences, girls clearly outperformed boys in the
two subjects (similarly to other Arab studies - Abu-Hilal, 2001; 2005; 2008;
Abu-Hilal & Bahri 2000; Hassan & Khalifa, 1999) and girls expressed more
positive math self-concept than boys. These results are well known as to
be contrasting with the Western ones, as in the West girls seem to present
higher levels in language domains and boys in math and Science domains,
both in SC and achievement, presenting a linear correspondence between
grades and motivational constructs (Marsh, 1989; Marsh et al., 2013; Stocker
& Faria, 2010). In Arab countries, these results are not replicated: not only
girls consistently present higher grades than boys in all academic subjects,
as well as boys present higher levels of self-concept in these domains, mak-
ing the correspondence between achievement and self-concept inexistent
(Abu-Hilal, 2001; Abu-Hilal et al., 2013).

Although boys and girls in the Arab culture share many common values
and characteristics, each sex is socially contained within its own world and
is faced with expectations. In fact, girls in Oman live under several pressures.
First, they need to do well in school to secure seats at local universities since
traditions limit their chances to study abroad. Second, girls in the Arab cul-
ture strive for recognition, and schooling provides one such opportunity to
prove their worth as many traditions give girls less rights than the boys get
(e.g., a girl receives half of what the boy receives as inheritance). Another
explanation is that girls, being aware of the preferential treatment given
to boys, are more strongly motivated to prove to themselves and to their
families that they can academically excel just as well as, if not better than,
their boys counterparts. Abu-Hilal (2001) noted that during adolescence -
contrary to infancy and childhood -, Arab girls have much less freedom than
boys, and that this lack of freedom served to focus the girls' attention more
on schoolwork than boys (also see Abu-Hilal, 2001; Hassan & Khailifa, 1999;
Marsh et al., 2013; Marsh et al., 2015). In another study on Arab students,
Abu-Hilal (2001) found that Arab girls reported putting more effort into
schoolwork and were more motivated in school than boys, but expressed
less positive self-concept than boys.

In support of the effect of pressure on achievement and self-concept,
Heine (2001), Heine and Hamamura (2007), Robins and Beer (2001), and
Minkov (2008) explained paradoxical results of relations between achieve-
ment and self-concept for students from East Asia and the West. They argued
that students in high achieving countries from East Asia feel a strong pres-
sure for high achievement and are described as self-improving; compared to
students from the US and some other Western countries that feel less pres-

sured and are described as self-enhancing. An analogy may be made for boys and girls in the Arab world, in general, and Oman, in particular. Our results confirm the argument that those who have more pressure (i.e., girls) achieve more than those who have less pressure (i.e., boys).

Still, although these arguments would explain girls' outperformance, they don't clarify the reason why boys tend to present higher SC levels in most studies that used Arab samples (Abu-Hilal, 2001; Abu-Hilal et al., 2014). Well, Arab and Muslim cultures guide themselves, especially the girls, towards modesty. Modesty is indeed present in all life dimensions, since how they dress, interact, express emotions (either of sadness or happiness), so, as they present themselves to others. It is also believed that due to this fact, Arab students, and again especially the girls, struggle with self-evaluation, talking and thinking about themselves, their skills and characteristics. This trend, however, is gradually changing. Girls in this study expressed more positive math self-concept than boys, but still girls under-evaluated themselves in the verbal domain. Given so, it may be that the girls under-evaluated themselves in the verbal self -concept, but not the boys though – possibly due to what was aforementioned: boys' preferential treatment, valorization, positive reinforcement and praise. These results also can be interpreted by using self-evaluation maintenance model (Tesser & Smith, 1980). In this model, an individual works toward maintaining his/her self-concept taking into account close and far friends as well as the how relevant the domain to an individual. This may plan a striking factor when students self-assess their abilities. Future studies may seek more understanding of this model as relationships in schools are prevalent through K-12.

Although the contributions of our study are mainly theoretical in nature with implications for social and dimensional comparison theory and frame of reference model, it is also possible to derive implications for interventions that target students' self-concepts and on the basis of our findings. When developing such interventions, it seems important to keep their domain-specific nature in mind. It is likely that these interventions will need to be implemented in a specific domain to be effective (see O'Mara et al., 2006).

Overall, our findings were consistent with the predictions made in the introduction of this study, since most of the results corroborate those from the West. The main exemption was that girls, although tend to outperform boys in school, still under-evaluate themselves in the verbal domain, making a linear correspondence between achievement and self-concept inexistent, especially in the verbal domain.

Limitations and directions for future research

This study has few limitations. One of the limitations is that the data of this study was cross-sectional from which one cannot plausibly make any

causal inferences about achievement and self-concept relations. Nevertheless, the results of the present study provide an enrichment of what is known considering Emirati students' self-concept level, structure, relationship with academic achievement, gender differences, and revalidation of the SDQ and I/E model in a non-Western context. In fact, probably one of the most important theoretical implications from this research is that models and instruments developed in one culture can be justifiably employed in other different cultures. Nonetheless, a handful of cross-sectional studies with similar samples' characteristics don't seem enough to be able to generalize such conclusions, models, and measures to all Arab countries. In fact, as Al-Darmaki (2003, p. 498) points out, "generalizations regarding the behavior of the individuals in the Arab culture can be misleading and problematic due to differing sociopolitical, historical, and ethnographic compositions of Arab countries". Henceforth, researchers are encouraged to further our understanding of the construct validity of conceptualizing subject specificity by conducting more longitudinal research in more diverse populations within the Middle Eastern Arab culture as well as across cultures. Methodologically speaking, future research on students' academic self-concepts would be well advised to consider the reciprocal effects model, which beyond contemplating academic grades' effect on self-concept, also analyzes self-concept influence on achievement during at least three longitudinal waves (Marsh, Byrne & Yeung, 1999; Marsh & Martin, 2011).

To conclude, although "the importance of self-concept and its relatedness to educational experiences has led many researchers in the Arab region to study this construct" (El-Hassan, 2004, p. 3), the extent of Arab self-concept research is still fairly limited, especially in topics such as age and country differences. As so, future research should attend to these issues, especially using nationally representative wide samples of Arab countries', considering the rapid social, economic, and cultural changes that have been taking place in this region.

References

Abu-Hilal, M. M. (2001). Correlates of achievement in the United Arab Emirates: A sociocultural study. In D. M. McInerney & S. V. Eaten (Eds.), Research on sociocultural influences on motivation and learning (Vol. 1, pp. 205-230). Greenwich, CT: Information Age Publishing.

Abu-Hilal, M. M. (2005). Generality of Self-Perception models in the Arab culture: Result from ten years of research. In H. Marsh, R. Carven & D. McInerney (eds.) The New Frontiers of Self Research (pp. 157–196). Greenwich: Information Age Publishing.

Abu-Hilal, M. M. (2008). Motivation, attribution of academic experiences and achievement among Arab students within a socio-cultural context. In T. O. Seng, D. M. McInerney, A. D. Liem & T. Ai-Girl (Eds.) Research in Multicultural Education and International Perspectives (Vol. 7, pp. 217-244). Greenwich, CT: Information Age Publishing.

Abu-Hilal, M. M. & Aal-Hussain, A. A. (1997). Dimensionality and hierarchy of the SDQ in a non-western milieu: A test of self-concept invariance across gender. *Journal of Cross-Cultural Psychology, 28*, 535-553. doi: 10.1177/0022022197285002

Abu-Hilal, M. M., Abdelfattah, F., Abduljabbar, A. & Marsh, H. W. (2013). Attitudes toward school, homework, subject matter value, self-concept and positive affect: a structural equation model. Paper presented at the 1st IEA International Research Conference, Singapore.

Abu-Hilal, M. M., Abdelfattah, F. A., Alshumrani, S. A., Abduljabbar, A. S. & Marsh, H. W. (2013). Construct validity of self-concept in TIMSS's student background questionnaire: A test of separation and conflation of cognitive and affective dimensions of self-concept among Saudi eighth graders. *European Journal of Psychology of Education. 28*, 1201-1220. doi:10.1007/s10212-012-0162-1

Abu-Hilal, M. M. & Bahri, T. M. (2000). Self-concept: The generalizability of research on the SDQ, Marsh/Shavelson model and I/E frame of reference model to United Arab Emirates students. *Social Behavior and Personality, 28,* 309-322. doi: http://dx.doi.org/10.2224/sbp.2000.28.4.309

Al-Darmaki, F. R. (2003). Attitudes towards seeking professional psychological help: What really counts for United Arab Emirates University students? *Social Behavior and Personality, 31*(5), 497-508.

Al-Harthy, I. S. (2016). Contemporary motivational learning theories: a review. *International Journal of Learning Management Systems, 4*(2), 99-117.

Arens, A. K., Yeung, A., Craven, R. & Hasselhorn, M. (2011). Toward twofold multidimensionality of academic self-concept: domain specificity and separation between competence and affect. *Journal of Educational Psychology, 103*, 970-981.

Barakat, H. (1993). The Arab world: Society, culture and state. Berkeley: University of California Press.

Byrne, B. M. & Shavelson, R. J. (1987). Adolescent self-concept: Testing the assumption of equivalent structure across gender. *American Educational Research Journal, 24*, 365-385.

Calsyn, R. J. & Kenny, D. A. (1977). Self-concept of ability and perceived evaluation of others: Cause or effect of academic achievement? *Journal of Educational Psychology, 69*, 136–145. doi:10.1037/0022-0663.69.2.136

Cheung, G. W. & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*, 233-255. doi: 10.1207/S15328007SEM0902_5

Covington, M.V. (1992). *Making the grade: A self-worth perspective on motivation and school reform.* New York, NY: Cambridge Univ. Press.

Dhindsa, H. S. & Chung, G. (2003). Attitudes and achievement of Bruneian science students. *International Journal of Science Education, 25*, 907-922.

Dimitrov, D. M. (2010). Testing for factorial invariance in the context of construct validation. *Measurement and Evaluation in Counseling and Development, 43*, 121-149. doi: 10.1177/0748175610373459

Dweck, C. (2000). Self-theories: Their role in motivation, personality and development. Philadelphia: Psychology Press.

El-Hassan, K. (2004). Structure and correlates of self-concept in Lebanon. *International Journal of Testing, 4*(1), 1-17.

Feniger, Y, (2011). The gender gap in advanced math and science course taking: Does same-sex education make a difference? *Sex Roles, 65*, 670-679. doi: 10.1007/s/11199-010-9851-x

Fistenger, L. (1954). A theory of social comparison processes. *Human Relations, 7,* 117-140. doi: 10.1177/001872675400700202

Gaspard, H., Wigfield, A., Jiang, Y., Nagengast, B., Trautwein, U. & Marsh, H.W. (2017). Dimensional comparisons: How academic track students' achievements are related to their expectancy and value beliefs across multiple domains. *Contemporary Educational Psychology,* Advance online publication. doi: 10.1016/j.cedpsych.2017.10.003

Halpern, D. F., Benbow, C. P., Geary, D. C., Gur, R. C., Hyde, J. S. & Gernsbacher, M. A. (2007). The science of sex differences in science and mathematics. *Psychological Science in the Public Interest, 8,* 1-51. doi: 10.1111/j.1529-1006.2007.00032

Harter, S. (2006). The self. In W. Damon & K. Lerner (Eds.), Handbook of child psychology: Social, emotional and personality development (6ª ed., pp. 505-570). Hoboken, NJ: John Wiley & Sons.

Hassan, M. & Khalifa, A. (1999). Sex differences in science achievement across ten academic years among high school students in United Arab Emirates. *Psychological Reports, 84*, 747–757. doi: 10.2466/pr0.1999.84.3.747

Heine, S. J. (2001). Self as a cultural product: An examination of East Asian and North American selves. *Journal of Personality, 69*, 882-906.

Heine, S. J. & Hamamura, T. (2007). In search of East Asian self-enhancement. *Personality and Social Psychology Review, 11*(1), 4-27. doi: 10.1177/108886306294587

Hu, L. T. & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55. doi: 10.1080/10705519909540118

Hyde, J. S., Fennema, E., Ryan, M., Frost, L. & Hopp, C. (1990). Gender comparisons of mathematics attitudes and affect. *Psychology of Women Quarterly, 14*, 299-324. doi: 10.1037/0033-2909.107.2.139

Lyon, M. A. (1993). Academic self-concept and its relationship to achievement in a sample of junior high school students. *Educational and Psychological Measurement, 53*, 201-210.

Marsh, H. W. (1986). Verbal and math self-concept: An internal/external frame of reference model. *American Educational Research Journal, 23*, 129-149. doi: 10.3102/00028312023001129

Marsh, H. W. (1988). Self-Description Questionnaire: A Theoretical and Empirical Basis for the Measurement of Multiple Dimensions of Preadolescent Self-Concept: A Test Manual and Research Monograph. San Antonio, TX: The Psychological Corporation.

Marsh, H. W. (1989). Effects of attending single-sex and coeducational high schools on achievement, attitudes, behaviors, and sex differences. *Journal of Educational Psychology, 81*, 70-85. 70-85. doi: 10.1037/0022-0663.81.1.70

Marsh, H. W. (1994). Using the national longitudinal study of 1988 to evaluate theoretical models of self-concept: The Self-Description Questionnaire. Journal of Educational Psychology, 86, 439-456.

Marsh, H. W., Abduljabbar, A. S., Abu-Hilal, M. M., Morin, A., Abdel Fattah, F., Leung, K. & Parker, P. (2013). Factorial, convergent and discriminant validity of TIMSS math and science motivation measures: A comparison of Arab and Anglo-Saxon countries. *Journal of Educational Psychology. 105*, 108-128. doi: 10.1037/a0029907

Marsh, H., Abduljabbar, A., Parker, P., Morin, A., Abdelfattah, F., Nagengast, B., Moller, J. & Abu-Hilal, M. (2015). The internal/external frame of reference model of self-concept and achievement relations: Age cohort and cross-cultural differences. *American Educational Research Journal, 52,* 168-202. doi: 10.3102/000283124549453

Marsh, H., Byrne, B. M. & Shavelson, R. J. (1988). A multifaceted academic self-concept: Its hierarchical structure and its relation to academic achievement. *Journal of Educational Psychology, 80*, 366-380.

Marsh, H. W., Byrne, B. M. & Yeung, A. S. (1999). Causal ordering of academic self-concept and achievement: Reanalysis of a pioneering study and revised recommendations. *Educational Psychologist, 34*, 154–157.

Marsh, H. W. & Hau, K. T. (2004). Explaining paradoxical relations between academic self-concepts and achievements: Cross-cultural generalizability of the internal-external frame of reference predictions across 26 countries. *Journal of Educational Psychology, 96*, 56–67. doi:10.1037/0022-0663.96.1.56

Marsh, H. W. & Koller, O. (2003). Bringing together two theoretical models of relations between academic self-concept and achievement. In H. W. Marsh, R. G. Craven & D. McInerney (Eds.), International advances in self research (Vol. 1, pp. 17–47). Greenwich, CT: Information Age.

Marsh, H. W., Kong, C. & Hau, K. (2001). Extension of the internal/external frame of reference model of self-concept formation: Importance of native and non-native languages for Chinese students. *Journal of Educational Psychology, 92*, 543-553.

Marsh, H. W. & Martin, A. J. (2011). Academic self-concept and academic achievement: Relations and causal ordering. *British Journal of Educational Psychology, 81*, 59–77. doi:10.1348/000709910X503501

Marsh, H. W. & Shavelson, R. (1985). Self-concept: Its multifaceted, hierarchical structure. *Educational Psychologist, 20*, 107-125.

Marsh, H. W., Smith, I., Barnes, J. & Butler, S. (1983). Self-concept: reliability, dimensionality, validity and measurement of change. *Journal of Educational Psychology, 16,* 331-345.

Marsh, H. W., Walker, R. & Debus, R. (1991). Subject specific components of academic self-concept and self-efficacy. *Contemporary Educational Psychology, 16*, 331-345.

Marsh, H. W. & Yeung, A. S. (1998). Longitudinal structural equation models of academic self-concept and achievement: Gender differences in the development of math and English constructs. *American Educational Research Journal, 35*, 705-739.

Minkov, M. (2008). Self-enhancement and self-stability predict school achievement at the national level. *Cross-Cultural Research, 42*, 172-196. doi: 10.1177/1069397107312956

O'Mara, A. J., Marsh, H. W., Craven, R. G. & Debus, R. L. (2006). Do self-concept interventions make a difference? A synergistic blend of construct validation and meta-analysis. *Educational Psychologist, 41*, 181–206. https://doi.org/10.1207/s15326985ep4103_4

Patai, R. (1983). The Arab mind. New York, NY: Scribner's.

Rasmi, S., Chuang, S. S. & Safdar, S. (2012). The relationship between perceived parental rejection and adjustment for Arab, Canadian and Arab Canadian youth. *Journal of Cross-Cultural Psychology, 43*, 84-90. doi: 10.1177/0022022111428172

Robins, R. W. & Beer, J. S. (2001). Positive illusions about the self: Short term benefits and long term costs. *Journal of Personality and Social Psychology, 80*, 340-352. doi: 10.1037/0022-3514.80.2.340

Sharabi, H. (1975). Introduction to the study of the Arab Society. Jerusalem: Salahueddin Publications.

Shavelson, R. J., Hubner, J. & Stanton, G. C. (1976). Validation of construct interpretation. *Review of Educational Research, 46*, 407-441.

Skaalvik, E. M. & Rankin, R. J. (1995). A test of the internal/external frame of reference model at different levels of math verbal self-perception. *American Educational Research Journal, 32*, 161-184.

Stocker, J. (2015). Self-Description Questionnaire: Adaptation to Emirati high schools. In N. Mastorakis, O. Corbi, I. Corbi, Z. Bojkovic, A. Brooks, I. Rudas, M. Katehakis, C. Bulucea, A. Ding, M. Shitikova & K. Psarris (Eds.), 11th International Conference on Educational Technologies (pp. 78-86). Dubai, UAE.

Stocker, J. & Faria, L. (2010). Diferenças na competência percebida no ensino secundário português. In L. S. Almeida, B. D. Silva & S. Caires (Orgs.), Actas do I Seminário Internacional "Contributos da Psicologia em Contextos Educativos" (pp.340-354). Braga: Edições CIED, Universidade do Minho. (ISBN: 978-972-8746-87-2)

Stocker, J. & Faria, L. (2012). Desenvolvimento intraindividual das Concepções pessoais de competência ao Longo do ensino secundário. *Boletim de Psicologia, 137*(62), 183-199.

Tesser, A. & Smith, J.(1980). Some effects of task relevance and friendship on helping: you don't always help the one you like. *Journal of Experimental Social Psychology, 16*, 582-590.