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*Full Length Research Paper*

# Perceptions of self-concept and actual academic performance in Math and English among High School Students in Kenya

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**This study examined the relationship between self-concept and students' academic performance in math and English for high school students in Kenya. Participants included 1990 students from two same sex boarding schools-one for boys and the other for girls. Results showed there were sex and grade differences in academic performance and most aspects of self-concept. Specifically, girls did better in math. Performance in English was not significantly different. Grade level differences showed a downward trend relative to norms in both math and English performance with the lower grade levels performing better. This trend possibly related to the changing standards by the teachers. On the self-concept measures, boys rated themselves significantly higher than girls except for physical appearance. As the students progressed through each grade level, their perceptions of self increased. Study implications are discussed.**

**Keywords:** Self-concept, academic performance, Math, English, high school, Kenya

## INTRODUCTION

How does an individual's perception of self influence academic performance? Individual differences in perceptions of self have been linked in several studies to academic performance (Eccles and Wigfield, 1995b; Eccles et al., 1993; Gose et al., 1980; Guay et al., 2003; Schicke and Fagan, 1994; Skaalvik and Hagtvet, 1990; Skaalvik and Valas, 1999; Spinath et al., 2006). Self-concept is broadly defined as the image or perceptions that students hold about themselves (Harter, 1989, 1990, 1996; Hoge and Renzulli, 1993; Marsh and O'Neill, 1984; Marsh and Shavelson, 1985). It includes attitudes, feelings, and knowledge about abilities, skills, appearance and social acceptability (Byrne, 1984; Byrne et al., 1988; Hartman and Everson, 1996). According to Marsh and Shavelson (1985), these perceptions of self are basically formed through "experiences with and interpretations of one's environment" (p. 107). Marsh and

Shavelson also suggest that self-concept is a construct that becomes more multifaceted as the individual moves from infancy to adulthood. Harter (1989) found that self-concept becomes more differentiated as children develop and suggested that, with development, an increasing number of self-concept domains can be articulated as well as differentiated. As children approach adolescence, they exhibit an increased ability to make judgments about self-worth, and as adolescents, they further articulate their ideas about self-esteem (Harter, 1989, 1990, 1996). One aspect of self-concept that may be more pertinent to academic performance is culture or ethnicity.

Research, mostly in Western and European cultures, has established that self-concept has a significant influence on student outcomes (Hoge and Renzulli, 1993; Marsh and Shavelson, 1985, Harter, 1989, 1996; Skaalvik and Hagtvet, 1990; Skaalvik and Valas, 1999; Spinath et al., 2006). Students' perceptions of the fit between their self-concept and academic demands are important for learning outcomes. Indeed, self-concept researchers have found a relationship between the way students describe themselves and their academic

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performance (Harlaar et al., 2006; Harter, 1989, 1990, 1996; Marsh and Shavelson, 1985). However, there has yet to be a significant amount of empirical investigation of whether these findings can be generalized to other cultures beside Western, European, and Asian cultures. Of particular importance to note is the limited research linking self-concept, (specifically those utilizing Marsh's Self description questionnaire (SDQ) and academic performance on the continent of Africa (Mboya, 1986; Marsh and Hau, 2004). Marsh and Hau's (2004) cross-cultural study of adolescents from 26 countries articulated this concern best: "In self-concept research, support for the construct validity of major instruments and the main theoretical models has been based largely on responses by students from Western countries-particularly English-speaking students in the United States, Australia, and Canada" (p. 56). If a person's perceptions of self are "formed through experience with and interpretations of one's environment" (p. 107) as posited by Marsh and Shavelson then research from across other cultures is warranted to reach hard and conclusive findings. Does the Self Description Questionnaire (SDQ), defined for mostly Western and European cultures, adequately assess the self -concept of students from an African culture? Is there a relationship between their self-concept and academic performance? Since most African high schools tend to be gender segregated, do males and females perceive their self-concept similarly?

### **Self –concept in different cultures**

Theoretically, the impact of self-concept on academic performance outcomes is compelling. Research indicates that self-concept influences academic performance differently depending on race or culture (Hartman and Everson, 1996; Picou et al., 1977; Rouse and Cashin, 2000; worrell, 2007). Yet little empirical research has examined whether self- description influences student academic performance outcomes across cultures (Marsh et al., 2006). Marsh et al (2002), in discussing the impact of Chinese culture on self-concept, stated that previous research suggests that Chinese students differ from Western students in ways that may be relevant to how they construct their self-concepts. In a related study examining the self description of American and Chinese children, Wang (2004) found that Chinese children focused on social roles and interactions in describing themselves while American children focused more on individual roles and personal goals. Wang suggests therefore that cultural values and beliefs about self play a crucial role in shaping an individual's self-concept. The study concludes that the framework of culture is embodied in the construct of the self.

In addition, relative to the relationship between self-concept and academic performance, Giota (2006)

conducted a study in Sweden on a large population of students (n=7,367) concerning relationships between adolescents' goal orientation, academic achievement, and self-evaluation. The results of Giota's study support the notion that beliefs about the self are multidimensional. Further, Swedish students (age 13 years old) who perceived their competence negatively showed lower academic performance and self-evaluations of competence, lower future expectations of success with respect to most academic school subjects, and higher levels of anxiety when compared to other students. These results are contrary to a study conducted in the United States with a similar age group which found that lower academic performance did not affect perceived self evaluation (Cokely, 2002). In addition, studies with African American students have found an indirect causal relationship between self concept and academic performance (Allen, 1980; Awad, 2007; Cokely, 2000, 2002). These studies support the assumption that individuals' beliefs about the self are hierarchically organized and involve beliefs about general or global competence as well as beliefs about specific abilities that are valued by the culture. Other commonly studied predictors of self-concept and academic performance are gender and age.

### **Self-concept as influenced by gender and age**

There is also a strong empirical evidence indicating differences in the conceptualization of self and academic performance according to sex and age (Awad, 2007; Allen, 1980; Barnes et al., 1984; Cokely, 2002; Hedges and Nowell, 1995; Hyde et al., 1990; Jordan, 1981; Marsh, 1989; Marsh et al., 1988; Marsh and Shavelson, 1985; Rouse and Austin, 2002; Signer et al., 1997; Thomson and Zand, 2007; Tolman et al., 2008; Wang, 2006; Witherspoon et al., 1997, Wong et al., 2002). Ahmavaara and Houston conducted a study using 856 English secondary school pupils in grades 7 and 10. The study focused on the relationship between sex and self-concept, and the researchers found that boys report higher levels of self-concept than girls, regardless of their school type (i.e., selective or non-selective) or age (Ahmavaara and Houston, 2007). Another study examining sex differences in math performance, competence beliefs, and value beliefs in 2, 053 fifth grade students in Bavaria, Germany, found that boys reported higher levels of enjoyment and pride in math compared to girls. In addition, the researchers showed that girls reported lower domain value in math than boys, even though there was no significant difference in the math achievement of both girls and boys (Frenzel and Pekrun, 2007). Research at the higher grades has revealed similar results. Gibb et al. (2008) examined the effects of single sex and co-educational schooling on the gender

gap in education achievement among 1,265 high school students in New Zealand. Results showed that regardless of the school setting (single-sex or co-education), females outperformed males in all academic subject areas.

Relative to an exploration of self-concept and specific school subjects, Marsh et al. (1988) found that fifth grade girls had lower math self-concepts than did boys even though their mathematics performance was better (on standardized tests and according to teacher ratings). Marsh et al suggested math self-concept for girls dropped in relation to that of boys before the corresponding drop in math achievement, suggesting that math self-concept may have a causal role in the subsequent decline in math achievement. In the same study, boys had lower scores for verbal achievement and verbal self-concept; however, the sex difference in verbal self-concept could be explained in terms of boys' lower verbal achievement. In further explaining the importance of these findings, Marsh et al stated that because sex stereotypes suggest that girls have better verbal achievement than do boys, their verbal self-concept may be even higher than can be explained by objective achievement differences. The same explanation holds true for boys and math self-concepts; that is, because sex stereotypes suggest that boys have better math achievement than do girls, their math self-concept may be even higher than can be explained by objective achievement differences. Indeed, these sex differences in academic self-concept may causally affect subsequent academic performance. The issue is an interesting one in examining achievement in specific subject areas, especially math and verbal scores, and their relation to self-concept. Furthermore, it would be interesting to investigate whether these findings apply to the Kenyan high school students.

Further, in work on self-concept and mathematics achievement in Hong Kong, Wang (2006) sought to examine the reciprocal relation model that postulates that "academic self-concept and academic achievement are reciprocally related and mutually reinforcing: improved academic self-concept will lead to greater achievement, and greater achievement will lead to improved academic self-concept" (House, 1993; Hyde et al., 1990; Marsh et al., 2002, Wang, 2006, p.690). Wang used data from both The Third International Mathematics and Science Study (TIMSS, 1995) and a repeat of the TIMSS (TIMSR) in 1999 in secondary students. Wang's study indicated a weak reciprocal relationship among the eighth-grade students across gender categories. Wang strongly argued for the need for cross-cultural comparisons to test theories and models of the relationship between self-concept and academic achievement.

In sum, sex differences and gender issues in self-concept have been of considerable interest in the literature for years. Marsh (1989) and Hyde (2005) state the issue clearly, suggesting stereotypical views of

differences in females and male performances relative to self-concept. However, other studies do not support the traditional stereotypes concerning gender and self-concept. Even in traditional Male-oriented cultures (e.g., China, Wong et al., 2002, Wang, 2006), there were no significant differences in the performances of females and males on the instruments used.

The goal of the current study was to examine the relationship between self-concept (as measured by the SDQ) and academic performance among Kenyan high school students. Because research on self-concept using Marsh's SDQ has largely been conducted in the United States, Europe and East Asia, these results make a unique contribution with knowledge of how Marsh's scale fits the Kenyan sample and how it relates to students' perceptions of self and academic performance. Knowledge of students' perception of self and the subsequent learning outcome across cultures is critical because of its significant impact on student learning.

Exploring the self-concept and its relation to academic performance in the Kenyan high school students is of paramount importance to this research because student self appraisals and academic goals, including teacher practices, most likely reflect the values and beliefs of the culture in which they live. As revealed in the macrosystem, the uttermost level of Bronfenbrenner's model is that society's cultural values, laws, customs and resources significantly affect the way individuals assess their self-worth in relation to other members of society (Bronfenbrenner, 1995, 1998). For example, studies on child rearing practices reveal that even though authoritative child rearing has advantages across cultures, ethnic groups often have distinct child-rearing beliefs and practices. Some involve variations in warmth and demandingness that are adaptive when viewed in light of cultural values and family circumstances (Garcia and Garcia, 2009; Pettit et al., 1998). These cultural variations remind us that just like parenting practices, students' self appraisal and academic goals can be fully understood only in their larger ecological context.

## METHOD

### Participants

Participants included 1990 students from two boarding high schools in Kenya. Except for few cases, students who pass the 8<sup>th</sup> grade national examination join same sex boarding schools. This is typical of the Kenyan education system. Participants' ages ranged from 14-18 years old (Mean age=16.5). School 1 (all boys) had 983 participants and school 2 (all girls) had 1007 participants (see Table 1 for participant details). The average class size for both schools was 45. The size of the schools ranged from 1000 to 1,120 students. Both schools are national schools, and they admit only high ranking students (those who score 450+ out of 600 points on the 8<sup>th</sup> grade national examination). Teachers in both schools are all

**Table 1.** Summary of Participant totals based on School and Grade

School	Grade 9	Grade 10	Grade 11	Grade 12	Total
Boys	245	318	256	164	983
Girls	279	265	273	190	1007
Total	524	583	529	354	1990

**Table 2.** Mean, standard deviation and Cronbach's alpha estimates (Kenyan sample and Marsh's 1990 sample) for the Self Description Scales

Scale	N	Mean	SD	Kenya	Original
Math	10	56.56	14.29	.87	.94
Verbal	10	59.57	10.27	.74	.86
Academics	10	61.96	10.75	.80	.92
Problem solving	10	56.12	08.40	.51	.84
Physical ability	10	54.17	15.17	.87	.94
Physical appearance	10	62.24	09.25	.66	.90
Same sex relations	10	58.48	11.11	.72	.87
Opposite sex relations	10	47.12	14.21	.79	.92
Parent relations	09	58.01	09.97	.50	.89
Spiritual/Religion	12	75.73	11.68	.49	.95
Honesty/Trustworthiness	12	65.71	10.58	.50	.74
Emotional stability	10	52.50	10.21	.50	.89
General esteem	12	80.61	10.18	.74	.93

N = # of item; Means and SD are based on the current study

graduates from the two main teacher training national universities in the country (KIE, 2001).

### Procedures

Participation in this study was voluntary; both parental consent and student assent were obtained prior to data collection. Data were collected from multiple sources using self-report and report cards for academic performance measures during the second term (May-July) of the school year.

### Construct validity

Prior to the visit, the Self Descriptive Questionnaire was sent to four volunteer teachers from each school (a total of 8) where the project was conducted. The teachers were requested to examine the questionnaire and identify any items or terms that might be confusing or difficult for students. The volunteer teachers were recruited via e-mail and personal phone calls. All the teachers noted that some items on the following subscales might be difficult for students to understand due in part to the use of colloquialisms. The subscales were, Relations with parents, Spiritual values/religion, and Emotional stability. A confirmatory factor analysis revealed low loadings and weak Cronbach's Alphas for these scales and were subsequently excluded from the final analyses (see Table 2).

### Measures

#### Student survey

Students completed a 135-item survey (Self Description Questionnaire-SDQ III). The survey was administered in English. English is the main language of instruction in the Kenyan schools, starting in first grade. The researcher and trained research assistants administered the survey during the second class period (at around 9:15am). This is the time principals in both schools thought would work best. Survey instructions were read aloud before students were allowed to read items on their own. The researcher and trained assistants were available to answer the questions students had about individual items. Students were assured of the confidentiality of their responses. Teachers were asked to leave the classroom during the completion of the survey. It took approximately 25-30 minutes to complete the survey.

The Self Description Questionnaire-III (SDQ) is a 135-item instrument that was developed by Herbert W. Marsh (1989, 1990, 2006) to measure self-concepts for late adolescents and young adults. The researchers used SDQIII because it has particular scales (Religious beliefs and Problem solving) that they wanted to consider. In addition, Marsh and O'Neil (1984) successfully used this scale with high school students (Marsh, 2010, personal communication). The SDQIII assesses domains of academic self-concept, non-academic self-concept, and a General-self domain derived from the Rosenberg (1965, 1979) self-esteem scale. The academic domain measures students' perceptions of their ability in

**Table 3.** Means and Standard Deviations for Self-concept Scales by Sex

Scales	Boys		Girls		F
	Mean	SD	Mean	SD	
Math	59	12	54	15	63.10**
Verbal	62	09	58	10	83.11**
Academic	64	10	60	11	55.10**
Physical ability	58	13	49	15	165.12**
Physical appearance	62	08	62	09	1.22 n.s.
Same sex relations	60	09	57	11	43.13**
Opposite sex relations	52	13	43	13	226.22**
General esteem	82	09	78	10	64.12**

\* $p < .01$ ; \*\* $p < .001$ 

Math, Verbal, Academic, and Problem solving areas. The non-academic domain assesses students' perceptions of their Physical ability, Physical appearance, same sex relations, Opposite sex relations, Parent relations, Spiritual values/Religion, Honesty/Trustworthiness, and Emotional stability), and the General-self domain assesses students' perception of their overall self-esteem.

Under these three domains are 13 specific scales assessed; the scales and original alphas are Math (e.g., "I find many mathematical problems interesting and challenging",  $\alpha = .94$ ), Verbal (e.g., "I can write well",  $\alpha = .86$ ), Academics (e.g., "I enjoy doing work for most academic subjects",  $\alpha = .92$ ), Problem solving (e.g., "I am good in combining ideas in ways that others have not tried",  $\alpha = .84$ ), Physical ability (e.g., "I am a good athlete",  $\alpha = .94$ ), Physical appearance (e.g., "I have a physically attractive body",  $\alpha = .90$ ), Same sex relations (e.g., "I am comfortable talking to members of the same sex",  $\alpha = .87$ ), Opposite sex relations (e.g., "I get a lot of attention from members of the opposite sex",  $\alpha = .92$ ), Parent relations (e.g., "I would like to bring up children of my own like my parents raised me",  $\alpha = .89$ ), Spiritual values/Religion (e.g., "I am a religious person",  $\alpha = .95$ ), Honesty/Trustworthiness (e.g., "People can always rely on me",  $\alpha = .74$ ), Emotional stability (e.g., "I am usually very relaxed",  $\alpha = .89$ ), and General esteem (e.g., "Overall, I have a lot of respect for myself",  $\alpha = .93$ ). All items are presented in a 8-step Likert continuum (e.g., 1= "Definitely False" to 8= "Definitely True"), with higher scores representing the high end of the scale. This survey has been used in self-concept studies with young and adult adolescents (Marsh, 1989, 1990, 2006), and has proven to be reliable and valid. A test-retest reliability of individual scores on scales, when administered twice with a six-week interval between occasions, ranged from .74 for Honesty to .95 for Spiritual values/Religion (Marsh, 1990). Traditionally, this survey has been used to assess self-concept mostly in Europe and in the West. Therefore, there was a need to determine if the internal consistency reliabilities of the scales in the present study were comparable to the original survey. To this end, a confirmatory factor analysis was conducted. Reliabilities are presented in Table 2.

### Academic Performance

To assess student academic performance we used the report card for the second term. This report card had students' scores across all the 12 academic subject areas. However, for this study, we only used their scores in Math and English since they were similar to the Math and Verbal scales on the SDQ.

## RESULTS

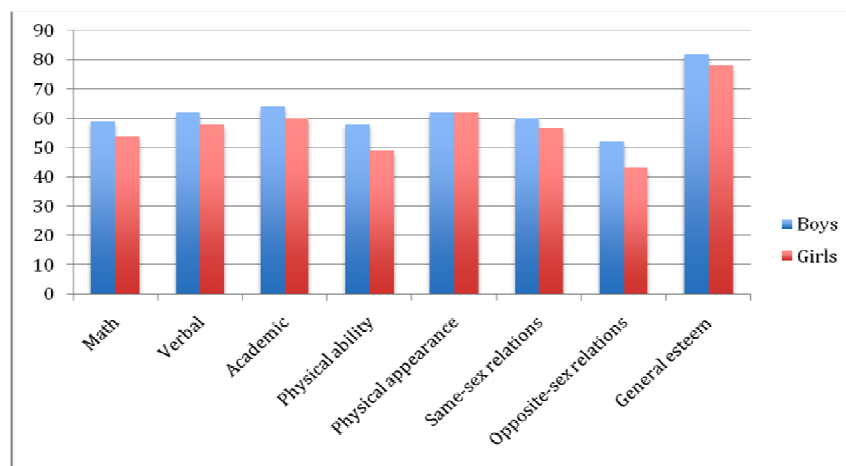
### Is there a sex and grade difference in students' perception of their self-concept?

After establishing SDQ's goodness-of-fit (see X and Finch, 2010), tests of means were conducted on the self-concept scales with a Sex (1-2) x Grade (9-12) MANOVA. Means and standard deviations for all significant effects are reported in Table 3. Significant main effects were observed for Sex, Pillai's Trace = .310,  $F(15, 1938) = 40.04$ ,  $p = .001$ ,  $Z^2 = .237$ , and Grade, Pillai's Trace = .548,  $F(45, 5820) = 28.73$ ,  $p = .001$ ,  $Z^2 = .182$ . Univariate analysis of variance indicated that boys and girls differed significantly on the self-concept scales with the exception of Physical Appearance. As Table 3 shows, boys rated themselves significantly higher than girls on most scales of self-concept. A similar univariate analysis of variance on grade indicated significant differences on self-concept scales with the exception of Physical Ability (see Table 4 and figure 1 for details).

The interaction effect for sex and grade was significant, Pillai's Trace = .299,  $F(45, 5820) = 14.33$ ,  $p = .001$ ,  $Z^2 = .106$ . As Table 5 shows, the interaction effect was significant for sex and grade on all self-concept aspects except Physical appearance. Specifically, the 12<sup>th</sup> grade boys rated themselves higher, while the 11<sup>th</sup> grade girls rated themselves lower in Math compared to all other grades,  $F(3, 1952) = 4.22$ ,  $p = .006$ ,  $Z^2 = .016$ . In Verbal ability, again, there was an upward trend observed in the 12<sup>th</sup> grade boys' ratings, while the ratings in the 9<sup>th</sup> and 11<sup>th</sup> grade girls took a downward trend,  $F(3, 1952) = 4.21$ ,  $p = .006$ ,  $Z^2 = .016$ . In Academic ability, the 10<sup>th</sup> and 11<sup>th</sup> grade girls rated themselves lower compared to all other grades,  $F(3, 1952) = 2.73$ ,  $p = .043$ ,  $Z^2 = .012$ . Interestingly, the 11<sup>th</sup> grade boys rated themselves higher in Physical ability while the 11<sup>th</sup> grade girls rated themselves lowest on this scale,  $F(3, 1952) = 3.10$ ,  $p = .031$ ,  $Z^2 = .014$ . For Same sex relations, the 9<sup>th</sup> and 12<sup>th</sup>

**Table 4.** Means and Standard Deviations for Self-concept Scales by Grade

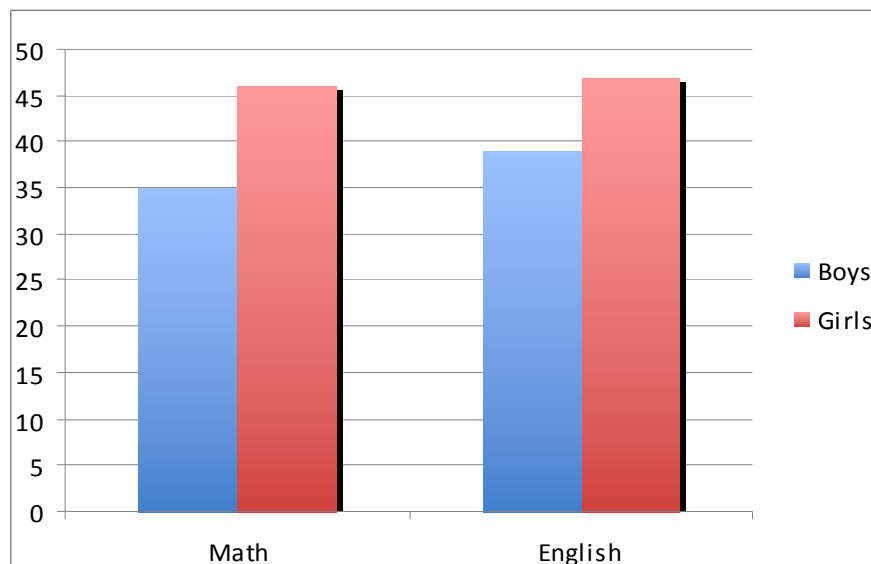
Scales	Means and Standard Deviations				F
	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>	
Math	58(13)	56(14)	55(14)	58(14)	8.19**
Verbal	58(9)	59(10)	59(10)	63(10)	18.05**
Academic	63(9)	61(11)	61(11)	64(11)	10.71**
Physical ability	53(14)	54(14)	53(16)	54(15)	n.s.
Physical appearance	61(9)	62(8)	63(9)	64(9)	7.38**
Same sex relations	59(10)	59(10)	56(11)	59(11)	7.41**
Opposite sex relations	42(13)	46(14)	50(14)	51(14)	43.51**
General esteem	79(9)	80(9)	80(10)	83(10)	7.45**

**Figure 1.** Perception of self-concept by sex**Table 5.** Significant Interaction Effects for Self-concept Scales by Sex and Grade

Scales	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>
Math				
Boys	60 (12)	57 (15)	58 (12)	63 (11)
Girls	57 (14)	54 (14)	52 (16)	54 (16)
Verbal				
Boys	61 (10)	60 (10)	62 (9)	65 (8)
Girls	56 (9)	58 (10)	56 (11)	61 (11)
Academic				
Boys	66 (8)	62 (11)	63 (10)	66 (10)
Girls	61 (10)	60 (11)	59 (12)	62 (11)
Physical ability				
Boys	58 (12)	58 (13)	59 (13)	58 (14)
Girls	49 (14)	50 (16)	48 (17)	52 (16)
Same sex relations				
Boys	61 (9)	60 (10)	58 (11)	62 (9)
Girls	58 (12)	59 (12)	55 (12)	56 (12)
Opposite sex relations				
Boys	45 (14)	50 (14)	56 (12)	57 (13)
Girls	40 (12)	41 (13)	45 (13)	45 (13)
General esteem				
Boys	82 (9)	81 (10)	83 (9)	85 (8)
Girls	77 (10)	80 (10)	78 (11)	81 (12)

**Table 6.** Overall Means for Actual Academic Performance in Math and English by Sex

	Boys		Girls		F
	Mean	SD	Mean	SD	
Math	35	16	39	15	37.12**
English	46	11	47	11	.55 n.s

\*\* $p < .001$ **Figure 2.** Actual Academic Performance by Sex

graders perceived themselves to have better relations with same sex peers, while the 12<sup>th</sup> grade girls felt their relations with same sex peers was not as good,  $F(3, 1952) = 4.83$ ,  $p = .002$ ,  $Z^2 = .019$ . On the Opposite sex relations, the 12<sup>th</sup> grade boys had better relationships with the opposite sex peers while the 9<sup>th</sup> grade girls' ratings on this aspect was low,  $F(3, 1952) = 6.13$ ,  $p = .001$ ,  $Z^2 = .021$ . Finally, looking at General self-esteem, the 12<sup>th</sup> grade boys had the highest general esteem while the 9<sup>th</sup> and 11<sup>th</sup> grade girls rated themselves low on general esteem,  $F(3, 1952) = 6.10$ ,  $p = .001$ ,  $Z^2 = .021$ . See Table 5 for all significant means and standard deviations.

### Students' Actual Performance in Math and English

Similar analyses were conducted on the measures of students' actual performance in Math and English with a Sex (1-2) x Grade (9-12) MANOVA. Means and standard deviations for all significant effects are reported.

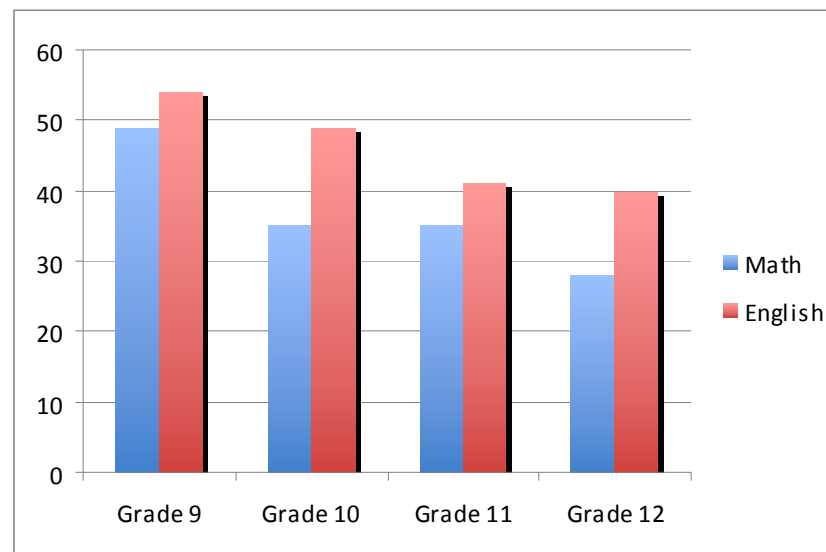
### What is the actual performance of high school students in Math and English? Are there sex and grade differences in students' actual performance in Math and English?

Means and standard deviations of all significant effects for the actual academic performance in Math and English are reported in Table 6. The first set of analyses examined student performance in Math and English with Sex (1-2) x Grade (9-12). Statistically significant main effects were found for Sex, Pillai's Trace = .237,  $F(15, 1838) = 40.04$ ,  $p = .001$ ,  $Z^2 = .237$ , indicating a significant difference between boys and girls only in Math. A test of means revealed that girls performed better than boys in Math ( $M = 39; 35$ ) (figure 2). Significant main effects were also found for grade, Pillai's Trace = .501,  $F(45, 5820) = 25.91$ ,  $p = .001$ ,  $Z^2 = .167$ . Tests of means revealed the 9<sup>th</sup> and 10<sup>th</sup> grade students performed better than the 11<sup>th</sup> and 12<sup>th</sup> grade students in both Math and English. However these grades are not based on a common test, they were assigned by different teachers. Therefore, this



**Table 7.** Overall Means for Actual Academic Performance in Math and English by Grade

	Math		English	
	Mean	SD	Mean	SD
Grade 9	49	14	54	8
Grade 10	35	14	49	9
Grade 11	35	15	41	9
Grade 12	28	11	40	13
F	185.5**		216.5**	

\*\* $p < .001$ **Figure 3.** Actual Academic Performance in Math and English by Grade

finding should be interpreted with caution. See Table 7 and Figure 3 for details. There was also a significant interaction effect between sex and grade on students' actual performance in Math and English, Pillai's Trace = .299,  $F(45, 5820) = 14.33$ ,  $p = .001$ ,  $Z^2 = .112$ . Individual ANOVAs revealed significant differences for both Math,  $F(3, 2461) = 12.50$ ,  $p = .001$ ,  $Z^2 = .019$  and English,  $F(3, 9248) = 105.29$ ,  $p = .001$ ,  $Z^2 = .139$  (see Table 8 for details).

### Is there a relationship between students' actual academic performance and perceived self-concept?

#### Correlational Analysis

To examine the relationship between students' actual performance and their perceived self-concept, a correlational analysis was conducted on the two actual

academic performance variables and the self-concept scales used in this study. To this end, we report in Table 9 the pattern of correlations between the two actual performance measures and the 9 self-concept scales. As one can see, students' actual performance in Math and English were significantly correlated with their self-concept perception in math and verbal ability. Interestingly, the actual performance in Math was significant but negatively correlated with their perceived verbal ability. Marsh and Hau's study across 26 countries found similar results (2004). The authors use the internal/external frame of reference (I/E) model to explain this pattern of relations between math and verbal self-concepts and corresponding measures of achievement (see Marsh and Hau's study). Overall, students' actual performance in Math and English was significantly related to their perceived ability in most aspects of their self-concept. Looking at the self-concept scales separately,

**Table 8.** Significant Interaction Effects for Actual Performance in Math and English by Sex and Grade

Gender	Grade	Math	English
Boys	9 <sup>th</sup>	47(15)	50(8)
	10 <sup>th</sup>	36(14)	46(9)
	11 <sup>th</sup>	31(15)	45(9)
	12 <sup>th</sup>	23(13)	42(17)
Girls	9 <sup>th</sup>	51(12)	58(6)
	10 <sup>th</sup>	34(14)	53(8)
	11 <sup>th</sup>	38(14)	36(7)
	12 <sup>th</sup>	31(8)	39(6)

SD in parenthesis

**Table 9.** Correlation among the Actual Performance Measures and the Self-concept Scales

	1	2	3	4	5	6	7	8	9	10
1-Math	1	.40**	.45**	-.10**	.20**	-.12**	.06	.03	-.21**	-.02
2-English		1	.12**	.11**	.14**	-.09**	.03	.07**	.06**	.05*
3-Math-SC			1	.25**	.53**	.19**	.18**	.20**	.04	.33**
4-Verbal				1	.49**	.28**	.36**	.28**	.29**	.56**
5-Academic					1	.26**	.31**	.29**	.05*	.51**
6-P-Ability						1	.29**	.22**	.16**	.32**
7Appearance							1	.28**	.17**	.51**
8-S-Sex								1	-.04	.37**
9-O-Sex									1	.25**
10-G-Esteem										1

P- Physical; S-Same; O-Opposite; G-General

\*\* - Correlation is significant at the .01 level; \*-Correlation is significant at the .05 level

almost all of them were significantly correlated. See Table 9 for details.

## DISCUSSION

This study contributes to the research on the perceptions of self-concept and academic performance in high schools relative to sex and age. Even more importantly is the contribution to the limited available research on self-concept and academic performance conducted on the African continent, particularly research using the SDQ (Marsh and Hau, 2004).

### Perceptions of Self-concept based on Sex

Consistent with previous research findings that have reported high positive self-concept among preadolescent

and adolescent boys compared to girls (Bouchey and Harter, 2005; Impett et al., 2008; Marsh et al., 1988;), the present study's findings reveal boys perceived their ability to be high in all aspects of self-concept that were significant, namely: math, verbal, academic, physical ability, same sex relations, opposite sex relations, and general self-esteem. Girls' perceptions in all self-concept aspects were lower, including math, even though their actual performance in math was higher than that of the male counterparts. This finding is consistent with several studies that found girls to hold low perceptions of their academic ability even when they do better on actual performance (Ahmavaara and Houston, 2007; Frenzel and Pekrun, 2007; Gibb et al., 2008). These findings are disconcerting given the number of high school girls pursuing higher level math courses, such as Advanced Placement (AP) math or math related subjects when they get to college. This finding should be of concern to educators and parents. Perceptions can significantly

influence one's behavior. Earlier studies on social perceptions and academic achievement in Kenyan high school students found that Kenyan parents and teachers tend to expect encourage and support males to achieve higher academic goals compared to females (Frank, 2009; Mensch and Lloyd, 1998; Mensch et al., 1999). The sex difference in math and verbal skills has been studied extensively in the West and Europe and fortunately, these differences are shrinking (e.g., Hyde, 2005; Wang, 2006; Wong et al., 2002). In addition, the present study confirmed previous research that reported that overall, boys tend to have higher general self-esteem than girls, especially during adolescence (e.g., Ahmavaara and Houston, 2007; Kling et al., 1999; Major et al., 1999; Pinquart and Sorensen, 2001; Tolman et al., 2008).

Of interest to note were the sex differences found relative to relationships with the opposite sex peers. Compared to the girls, the boys perceived themselves to have significantly better relations with opposite sex peers. During the administration of the survey, most of the girls indicated they were uncomfortable responding to the items on opposite sex peers. Some of them even shared with the researcher that, girls who had better relations with the opposite sex peers were "known," meaning, they had loose morals. One explanation could be that girls in this culture are not allowed to have associations with opposite sex peers during adolescence. In addition, these students are in single-sex schools, and except for infrequent field trips to events such as music festivals, sports, and club related activities, in which they mingle with the other sex, these students are basically with the same sex peers for over nine months a year for four years. In addition, the African culture tends to discourage girls from associating with the opposite sex peers until they go to college (Frank, 2009).

Research in self-concept, specifically Harter's work (e.g., Harter, 1989, 1990, 1996; Bouchey and Harter, 2005) has consistently indicated physical appearance as one of the strongest predictors of one's self-concept and overall self-esteem. Contrary to Harter's research findings, the present study found no significant relationship between girls and boys based on physical appearance. Again, some students made comments like: "why would one talk about their body?" "It's inappropriate to talk about your self in that way." Some students found some of the items just unusual. For instance, the following item "I have a physically attractive body" was met with lots of comments. It appears as though talking about one's body and or physique in this culture is considered immodest. It also suggests physical appearance is not as germane to one's self-concept nor does it affect one's general self-esteem in this culture. This finding offers advice to avoid colloquialisms when discussing some issues.

### **Perceptions of Self-concept based on Grade Level**

Examining students' self-concept by grade level showed that students in advanced grades had higher self-concepts. As students advanced in years and grade levels, their perception of the various aspects of self-concept went up. A possible explanation could be that students improve in verbal and problem solving skills as they take more academic subjects in school (Nelson et al., 2006). These two schools are boarding schools in which teachers appoint students in upper grades to be supervisors (referred to as prefects/monitors) in various contexts such as classrooms, dormitories, cafeteria, and games in the teachers' absence, especially in the dorms and during preparation time early in the morning and at night. Therefore, students in the lower grades look up to students in the upper grades for guidance and support. The upper grades have also been at the school longer and know how to play by the "rules". The head student (i.e., one who is in charge of the entire school in the teachers' absence), one in charge of the dining hall, games, dorm, and any club is always a 12<sup>th</sup> grader. All these responsibilities, privileges and opportunities in and by themselves would promote the 12<sup>th</sup> graders' general self-esteem. In other words, as Marsh et al. (2002) theory concerning reciprocal and mutually reinforcing situations illustrates, in this instance, social acceptance and promotion to high office (head student, prefects, monitors) are reason for an elevated self-concept, and subsequent self-esteem.

For academic ability, the trend was different. Perception of academic ability was high in 9<sup>th</sup> grade, then declined in 10<sup>th</sup> and 11<sup>th</sup> grade, and went up in 12<sup>th</sup> grade. The researchers do not know why this was so. Further research, with specific focus on the pattern of academic performance of 10<sup>th</sup>, 11<sup>th</sup> and 12<sup>th</sup> grade students, is needed to help explain this trend. Another interesting trend was the students' perceptions of their relationship with the same sex peers. The perception for same sex relations with peers was quite similar across the three grades (9<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup>) except for the 11<sup>th</sup> graders. Again, the researchers do not have any possible explanation for these findings.

### **Actual Academic Performance in Math and English**

The girls and boys in the present study performed fairly similarly in English. However, their performance in math was significantly different, with the girls performing better than the boys. It should be emphasized here that these measures of performance were teachers' perceptions, therefore the findings should be interpreted with caution. Research findings on sex and academic performance in math have been mixed. Some studies have supported

the above finding (Frenzel and Pekrun, 2007; Gibb et al., 2008), while other studies have revealed contradictory findings that boys outperform girls in Math especially in high school (Awad, 2007; Hedges and Nowell, 1995; House, 1993; Hyde et al., 1990; Marsh et al., 1988; Wang, 2006; Wong et al., 2002).

However, examining their actual performance by grade revealed an interesting trend. Overall, the lower grades consistently performed better than the higher grades in both math and English. This trend of the younger students performing better was steeper in math performance as compared to English performance. As noted previously, this finding should be interpreted with caution since the grades used in this study were assigned by different teachers and may possibly be attributed to teacher judgments. A possible explanation for this trend in the math and English performance could be attributed to the changing standards by the teachers, especially for students in higher grades (11<sup>th</sup> and 12<sup>th</sup> grades) who are preparing for the national examinations which are usually rigorous and graded by external examiners (KIE, 2001; Mwiria, 1990; Richard, 2009). It could therefore be that teachers begin to grade their students more rigorously and strictly as they enter the higher grades as a means of preparing them for this national examination.

There are, however, some potentially important limitations in the researchers' statistical analyses that dictate caution in the interpretation of our results. The researchers used the teacher assigned grades to measure student actual academic achievement. It's problematic to compare grades assigned by different teachers, and the test scores in different years are not based on a common metric. However, these teachers assigned scores served the purpose of the current study. In addition, previous studies using teacher assigned scores have found similar results (Ahmavaara and Houston, 2007; Frank, 2009). An ideal situation however, would have been to moderate school grades based on a common test, such as the entry test for the 8<sup>th</sup> grade. In this case, there was no common test, and the entry test for year 8 was only available for the 9<sup>th</sup> graders in one school. Also, the effects of sex are confounded with school. However, the two schools are well matched in terms of admission standards, location, and national ranking.

## CONCLUSION

In conclusion, the study findings pose significant implications for teachers, parents, and education policy makers. It's apparent that the way students perceive themselves is influenced by factors such as the way they are socialized as boys or girls, and the teaching practices

in their various schools which appear to be linked to the values of their culture/society. Parents and teachers need to be cognizant of the messages they are communicating (implicitly or explicitly) to their children/students from a young age with regard to academic performance. This is important because these messages are evidently used later on to define their self-concept which subsequently influences their academic performance.

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