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STUDENTS' VALUE BELIEFS, PERFORMANCE EXPECTATIONS, AND SCHOOL PERFORMANCE: THE EFFECT OF SCHOOL SUBJECT AND GENDER

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***Abstract*:** This study investigated (a) students' performance expectations, value beliefs, and performance in mathematics, ancient Greek, physics, and language, (b) the role of students' performance expectations and value beliefs in the perception of their school performance as successful or unsuccessful in the above school subjects, and (c) gender differences in performance expectations, value beliefs, and school performance. The sample comprised 190 girls and 160 boys of 8th grade. The results showed that (a) performance expectations, value beliefs, and school performance differed between school subjects (most valuable was considered mathematics, highest performance was expected in physics, best performance was achieved in language); (b) value beliefs and, mainly, performance expectations predicted the perception of performance as successful or not, while their relative power in discriminating the perceived successful from unsuccessful performance group of students varied across school subjects, and (c) gender effects were school subject-specific rather than global, with language being clearly favoured by girls.

***Key words*:** Gender, Performance expectations, Value beliefs.

INTRODUCTION

Recent research on student motivation focuses on sociocognitive constructs and their role in academic learning and achievement (Boekaerts, Pintrich, & Zeidner, 2000; Pintrich & Schunk, 2002). Value and competence beliefs are two such constructs included in the expectancy-value model of motivation (Eccles & Wigfield, 2002; Pintrich, 2003; Wigfield & Eccles, 2000), on

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which this study is based. According to this model, value and expectancy are the most significant determinants of achievement behaviour. Expectancy is defined as one's expectation for future success and is related to one's competence beliefs. Value refers to the importance and the interest of the task. It comprises the components of intrinsic interest, utility, importance, and cost. Utility is similar to extrinsic motivation, and reflects one's perception of the usefulness of the content or of the task to him or her, while intrinsic interest is similar to personal interest (Pintrich, 2003). Importance, or attainment value, reflects one's perceived importance of doing well in a task or how important is the task for one's personal identity. Cost refers to the perceived loss or negative consequences of being involved in a task. However, cost has not been consistently supported by previous research as part of value (Pintrich & Schunk, 2002).

Previous research has shown that high expectations for success are related to task engagement, persistence in carrying out tasks, effective use of cognitive and metacognitive strategies, and successful performance (Efklides, 2001; Pintrich, 1999; Stephanou, 2003a, b, 2004b; Vollmeyer & Rheinberg, 2000). Similarly, students' high value beliefs are associated with enjoyment, high effort in pursuing their goals, successful performance, and future academic choices (Eccles, Barber, Updegraff, & O' Brien, 1998; Eccles & Wigfield, 1995, 2002; Gottfried, Fleming, & Gottfried, 2001; Stephanou, 2004a).

The association of performance expectations[1] and value beliefs with academic achievement has been extensively investigated (Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Marsh, Trautwein, Ludtke, Koller, & Baumert, 2005; Pintrich, 2003; Stephanou, 2004b). In sum, previous findings suggest that, although value and expectancy are positively intercorrelated, the value component is more closely related to academic choices, whereas the expectancy component is more strongly associated with academic performance (Eccles et al., 1998; Eccles & Wigfield, 1995; Nagy, Trautwein, Baumert, Koller, & Garrett, 2006; Stephanou, 2004a; Wigfield & Eccles, 2000, 2002). Furthermore, expectancy has stronger effect on value than vice versa (Eccles & Wigfield, 2002; Jacobs et al., 2002; Marsh et al., 2005). However, the relative predictive power of expectancy and value as regards

1. There are three terms used in the bibliography to denote "expectancy": "self-perception", "competence beliefs", and "performance expectations". In the present study expectancy is operationalized as "performance expectations".

academic achievement depends on the academic domain (Dermitzaki & Efklides, 2000; Stephanou, 2004a; Wigfield & Eccles, 2002; Wolters & Pintrich, 1998).

School subject-specificity

Most empirical work on domain-specificity of students' motivation has reported mean-level differences in competence beliefs and value across domains, or school subjects. However, as some researchers (e.g., Anderman, 2004) suggested, students' motivation is better understood by contextualizing beliefs within a given domain rather than just by comparing between domains.

School subject-specificity is supported by research indicating that even kindergarten and first-grade children have subject-specific self-perceptions and value beliefs (Gottfried et al., 2001; Harter, 1999; Wigfield et al., 1997). Similarly, the strength of competence and value beliefs differs across various school subjects (Wigfield, Guthrie, Tonks, & Perencevich, 2004). For example, elementary and middle school children reported that they are more competent and interested in social and sports activities than in mathematics and reading (Wigfield et al., 1997). Furthermore, the differences in competence beliefs between school subjects appear to be lower than differences in value beliefs (Bong, 2004).

Yet, a limited number of studies have focused on school subject-specific competence and value beliefs and their relation with achievement across school subjects. More specifically, most empirical work has focused on mathematics and/or language, and, just, recently, there is an increased interest in investigating other school subjects, such as science and sport (see Eccles et al., 1998; Jacobs et al., 2002; Nagy et al., 2006; Pintrich & Schunk, 2002; Wang, 2006). Research in Greek education, in particular, has explored the impact of competence and value beliefs on achievement in language and, mainly, mathematics, and it has almost ignored other school subjects such as physics and ancient Greek (see Stephanou, 2004a, b). However, physics and ancient Greek are major subjects of Greek secondary school. Also, at Grades 11 and 12, students select "branches" of courses related to university studies. Students' competence and value beliefs, and school performance in ancient Greek, in particular, have proved to be strong predictors of choice of course branch (Stephanou, 2003b, 2005b). The present study focused on mathematics, language, physics, and ancient Greek so that a more diverse picture of students' motivation is attained.

Gender

Little research has focused on gender differences in competence and value beliefs across different academic domains (Eccles, 2005; Stephanou, 2005b; Wigfield & Eccles, 2002). Previous research has shown that, although gender differences in achievement in most academic domains are small or not existing, there are strong differences in domain-specific self-perceptions (or competence beliefs) and value beliefs (Hoffman, 1999; Jacobs et al., 2002; Marsh, Trautwein, Ludtke, Koller, & Baumert, 2006; Metallidou & Efklides, 2004; Wigfield, Battle, Keller, & Eccles, 2000). Boys expect higher performance and perceive their abilities as higher in stereotypically defined "male" domains (e.g., physics, mathematics, sports) than girls, whereas girls report higher competence beliefs in "female" domains (e.g., literacy, language) than boys (Eccles, 1993; Hoffman, 2002; Nagy et al., 2006; Pajares & Graham, 1999). Gender differences in competence beliefs in mathematics and physics have been reported even when girls perform equally well, or even better, than boys (Hoffman, Haussler, & Lehrke, 1998; Wolters & Pintrich, 1998). However, other studies suggest that this gender gap, that is, the "confidence gap" and, even more, the "task-value gap", is stronger in language than in mathematics (Campbell, Hombo, & Mazzeo, 2000; Jacobs et al., 2002; Marsh & Yeung, 1998; Stephanou, 2005b).

Gender differences in competence and value beliefs are influenced by school experience (Eccles, 1993; Eccles & Wigfield, 1995, 2000; Hoffman, 2002; Hosenfeld, Koller, & Baumert, 1999; Wigfield & Tonks, 2004). For example, Jacobs et al. (2002) found that boys' perceptions of their language competence decreased during secondary school, while girls' value beliefs for language increased. On the other hand, the gender gap in mathematics competence beliefs decreased, and girls valued mathematics more than boys by the end of high school. Hoffman (2002) found that the gender gap in physics self-perceptions and in interest decreased when physics instruction was oriented towards the interests of boys and girls. Other studies (Chouinard, Vezeau, Bouffard, & Jenkins, 2001) have shown that boys' positive attitude toward mathematics decreased dramatically during adolescence. Some other studies (Mullis et al., 2000) found gender differences among 12th graders, but not among 4th and 8th graders, in mathematical tasks that required higher-order cognitive processes. Therefore, although mathematics and physics are in general perceived as "male" domains, gender differences are not necessarily stable across grades or contexts.

In this study, gender differences were examined in language as a stereotypically perceived "female" domain, in mathematics and physics as either similar for males and females or slightly "male" domains, and ancient Greek as gender neutral since students had just one school year experience in it. It should be noted here that earlier studies on the domain-specificity of gender differences tested mean-level differences between females and males in competence and value beliefs within a domain. However, gender differences are better understood by examining the differentiation of beliefs within gender rather than just by comparing females and males (Jacobs et al., 2002). Thus, in the present study we investigated gender differences in competence and value beliefs between- and within school subjects, and between- and within gender.

Objective vs. subjective school performance

In academic settings "expectancy" can be defined in terms of performance expectations, that is, what grade one is expecting to get in a specific school subject. However, performance is also perceived as successful or not, regardless of the exact grade gained. It has been long recognized that perception of an outcome as successful or unsuccessful is better seen as psychological state, based upon students' own interpretation of performance (Dweck, 1999; Zimmerman, 1995). Students' performance expectations, goals, values, and self-perceptions of ability in a specific school subject influence the perception of how successful performance is (Pintrich, 2003; Pintrich & Schunk, 2002). Perceived performance, as compared to the objective one, has been found to be also related to students' achievement motivation and actual achievement (Weinstein, 1998; Zimmerman, 1995). From the expectancy-value perspective, one would expect performance expectations and value beliefs to be related to the subjectively defined successful performance rather than to objective performance, since the strength of motivation is jointly influenced by the expectation of a particular performance outcome (successful or not) and by the value placed on this performance outcome. For this reason, in the present study, besides objective performance, students were also asked to define what they consider successful performance for themselves.

Aim of the study - Hypotheses

This study aimed to examine (a) the relations of students' performance expectations and value beliefs (including the various components of value) with school performance in mathematics, ancient Greek, physics, and language, and (b) if the relations of students' performance expectations and value beliefs with performance are differentiated depending on whether they perceive their school performance in the same school subjects as successful or unsuccessful. Finally, (c) the study aimed at identifying school subject-related gender differences in students' performance expectations, value beliefs, and objective as well as subjective school performance, that is, perceived as successful or not.

The hypotheses of the study were the following:

The components of students' value beliefs will be consistent with Eccles and Wigfield's (2002) model, but there will be differences in their prevalence across the various school subjects (Hypothesis 1).

There will be gender differences in the components of value beliefs across and within school subjects (Hypothesis 2).

Students' value beliefs, performance expectations, and school performance will differ across school subjects (Hypothesis 3).

There will be gender differences in value beliefs, performance expectations, and performance within each school subject and across the various school subjects, favouring girls in language (Hypothesis 4).

The students, who perceive their performance as successful, compared to those who perceive it as unsuccessful, in a school subject will have higher value beliefs and higher performance expectations in the respective school subject (Hypothesis 5a). However, there would be subject-specific gender differences as well (Hypothesis 5b).

METHOD

Participants

A total of 350 students (190 girls, 160 boys) of Grade 8 participated in the study. Their age ranged from 13 to 14 years (M = 13.3 years, SD = 0.4). They came from schools of various towns of Greece, representing various parental socioeconomic levels.

Instruments

Value beliefs and performance expectations. A questionnaire with separate versions for mathematics, language, physics, and ancient Greek was constructed. The questionnaire was based on previous research (see Eccles & Wigfield, 2002; Nagy et al., 2006; Pintrich & Schunk, 2002; Stephanou, 2004a, b; Wigfield & Eccles, 2002). It comprised two scales of four questions each. The wording of the questions for the four school subjects was the same except for the subject name.

The Value Beliefs scale consisted of four questions: "How much value does Language have for you?", "Compared to other academic domains, how much value does Language have for you?", "How much do you value Language?", "How valuable is Language for you?". Responses ranged from 1 (not at all) to 7 (very much). Cronbach's alphas were .85, .82, .84, and .80 for mathematics, language, physics and ancient Greek, respectively.

The Performance Expectations scale consisted of four questions: "How well do you think you will do in Language this school term?", "Compared to other students, how well do you expect to do in Language this school term?", "How good will your performance be in Language this school term?", "How well do you expect to do in Language this school term?". Responses ranged from 1 (very poorly) to 20 (excellent). The 20-point scale was used to match the school marks scale. Cronbach's alphas were .81, .82, .85, and .80 for mathematics, language, physics and ancient Greek, respectively.

A series of factor analyses on the items of the two scales for the four school subjects yielded a two-factor solution in each school subject: performance expectations and value beliefs, respectively. Performance expectations explained 59%, 57%, 54%, and 53% of the variance in mathematics, language, physics, and ancient Greek, respectively. Value beliefs explained 17%, 16%, 19%, and 21% of the variance in mathematics, language, physics, and ancient Greek, respectively.

Components of value beliefs. An open-ended question followed the Value Beliefs scale asking students to explain their response to it. This open-ended question was included in order to reveal the content of value, that is, the components of value for each subject. The components of value were then defined by categorizing students' responses in terms of utility, enjoyment, intrinsic interest, and importance, according to the expectancy-value model of motivation (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000). The components of value beliefs identified were the following: perceived utility, enjoyment, intrinsic interest, self-esteem, satisfaction of significant others' achievement expectations, and importance of doing well. Of them, self-esteem and satisfaction of significant others' achievement expectations are not included in the expectancy-value model of motivation. There was no reference to costs related to engagement with the school subjects. The reliability of this coding scheme was tested with the percentage of agreement between two judges, who were familiar with the expectancy-value model. There was agreement in 90% of the categorized responses.

Objective and subjective school performance. Students' school marks in the four school subjects came from the school records. They represented objective school performance.

Besides school marks, students' perception of their school performance as successful or unsuccessful was also measured. Students were asked to indicate how successful they thought their school performance was. The students indicated the lowest mark (from 1 to 20) over which their term performance in each school subject would be considered successful.

Students whose school mark was lower than the indicated by them as successful formed the group of Unsuccessful Performance, while those whose school mark was equal or higher than the indicated one formed the group of Successful Performance.

The distribution of students per gender and perceived successful or unsuccessful performance within each school subject is presented in Table 1.

Table 1. Groups of students who perceive performance as successful or unsuccessful by gender and school subject

	Successful performance						Unsuccessful performance					
	Girls		Boys		Total		Girls		Boys		Total	
School subjects	f	%	f	%	f	%	f	%	f	%	f	%
Language	137	39.15	82	23.40	219	62.58	53	15.15	78	22.28	131	37.40
Mathematics	118	33.70	70	20.00	188	53.70	72	20.58	90	25.70	162	46.28
Physics	120	34.30	86	23.60	206	58.85	70	20.00	74	21.15	144	41.15
Ancient Greek	116	33.15	83	23.70	199	56.85	74	21.12	77	22.00	151	43.15

Procedure

All the participants completed the questionnaire for each of the four subjects in the middle of the first school term. To match the questionnaires that were responded by the same student, students were asked to choose a code name and use it on the response sheets. To match the participants with the school records, first, they were given individually their school marks, as found in the school records, in the four school subjects; then, the participants were asked to rewrite their school marks on a separate sheet of paper and use their code name on it. The students were assured of anonymity and confidentiality.

RESULTS

Components of value beliefs

The categories and the frequencies of responses to the open-ended question about the reason of the given value score to each school subject are presented in Table 2. Inspection of Table 2 reveals the variability of the components of value beliefs across school subjects, and within each of them. The χ^2 test for the distribution of responses within each school subject showed significant differences between the components. The most frequently mentioned component by the students was utility in pursuing their educational goals in all school subjects except physics. Specifically, for mathematics, $\chi^2(7, N = 350) = 133.65, p < .01$, for language, $\chi^2(7, N = 350) = 159.80, p < .01$, and for ancient Greek, $\chi^2(7, N = 350) = 201.40, p < .01$. However, in physics intrinsic interest was mentioned most often, $\chi^2(7, N = 350) = 116.60, p < .01$.

Also, the frequency of each of the components of value beliefs differed between the school subjects. Specifically, compared to other school subjects, students most often perceived ancient Greek as facilitator of future studies, $\chi^2(3, N = 384) = 25.60, p < .01$, language as useful in everyday life, $\chi^2(3, N = 183) = 34.50, p < .01$, and both language and physics as enjoyable, $\chi^2(3, N = 180) = 9.65, p < .05$. Similarly, intrinsic interest was most frequently mentioned for physics, $\chi^2(3, N = 250) = 21.00, p < .01$, and satisfaction of significant others' performance expectations was mainly mentioned with respect to ancient Greek and physics, $\chi^2(3, N = 171) = 19.40, p < .01$.

The above findings confirmed Hypothesis 1.

As shown in Table 2, the variability of the components of value beliefs was also present within each gender for each school subject. Thus, there was significant difference between the components for girls in

Table 2. Frequency of the components of value beliefs for language, mathematics, physics and ancient Greek by gender

	Mathematics						Language						Physics						Ancient Greek					
	Total		Girls		Boys		Total		Girls		Boys		Total		Girls		Boys		Total		Girls		Boys	
Components	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
1	101	28.90	58	30.50	43	26.90	103	39.40	58	30.50	45	28.10	56	16.00	32	16.80	24	15.00	124	35.40	60	31.60	64	40.00
2	52	14.90	34	17.90	18	11.30	70	20.00	52	27.40	18	11.30	46	13.00	13	6.80	33	20.60	15	4.30	10	5.30	5	3.10
3	39	11.10	18	9.50	21	13.10	54	15.40	19	10.00	21	13.10	56	16.00	30	15.80	26	16.30	31	8.90	18	9.50	13	8.10
4	65	18.60	29	15.30	36	22.50	50	14.30	33	17.30	31	19.40	91	26.00	47	24.70	44	27.50	44	12.60	26	13.70	18	11.30
5	20	5.70	12	6.30	8	5.00	20	5.70	11	5.80	9	5.60	19	5.40	13	6.80	6	3.80	35	10.00	22	11.60	13	8.00
6	28	8.00	10	5.30	18	11.30	16	4.60	5	2.60	11	6.90	20	5.70	12	6.30	8	5.00	29	8.30	18	9.50	11	6.90
7	35	10.00	24	12.60	11	6.90	23	6.60	8	4.20	15	9.40	55	15.70	39	20.50	16	10.00	58	16.60	27	14.20	31	19.40
8	10	2.90	5	2.60	5	3.10	14	4.00	4	2.10	10	6.30	7	2.00	4	2.10	3	1.90	14	4.00	9	4.70	5	3.10

Note: 1 = Utility in educational goals; 2 = Utility in life; 3 = Enjoyment; 4 = Intrinsic interest; 5 = Importance of good performance; 6 = Self-esteem; 7 = Satisfaction of significant others' performance expectations; 8 = Other (my best friend, do not know, the classmates).

mathematics, $\chi^2(7, N = 190) = 84.94, p < .01$, language, $\chi^2(7, N = 190) = 136.63, p < .01$, and ancient Greek, $\chi^2(7, N = 190) = 76.02, p < .01$; for boys in mathematics, $\chi^2(7, N = 160) = 62.20, p < .01$, language, $\chi^2(7, N = 160) = 53.90, p < .01$, and ancient Greek, $\chi^2(7, N = 160) = 136.30, p < .01$. In all these cases utility for future academic goals was prevailing over the other components. However, for girls, value beliefs for physics were closely linked to utility in educational goals, to intrinsic interest (24.70%) and to satisfaction of significant others' achievement expectations (20.50%), $\chi^2(7, N = 190) = 69.00, p < .01$. For boys, value beliefs for physics were mainly associated with their intrinsic interest (27.50%) and utility in everyday life (20.60%), $\chi^2(7, N = 160) = 73.10, p < .01$.

Gender differences within each school subject were also found. Girls, compared to boys, more often referred to utility in educational goals for mathematics, $\chi^2(1, N = 52) = 4.92, p < .05$, and language, $\chi^2(1, N = 70) = 16.52, p < .01$, whereas boys, compared to girls, more often referred to utility in everyday life for physics, $\chi^2(1, N = 46) = 8.69, p < .01$. Also, satisfaction of significant others' performance expectations proved a more important component of value beliefs for mathematics, $\chi^2(1, N = 35) = 4.82, p < .05$, and physics, $\chi^2(1, N = 55) = 9.60, p < .01$, for girls than for boys.

These findings are in agreement with Hypothesis 2.

Value beliefs and performance expectations

An ANOVA with the mean score of the Value Beliefs scale for the four school subjects as within-subjects factor and gender as between-subjects factor revealed a main effect of school subject, Wilks's lambda = .97, $F(3, 346) = 2.90, p < .05$, partial $\eta^2 = .02$. Post hoc pairwise comparisons showed that the students perceived mathematics as more valuable ($M = 5.80$, $SD = 1.25$) than language ($M = 5.60$, $SD = 1.20$), $t(1, 349) = 2.93, p < .01$, Cohen's[2] $d = .18$, and physics ($M = 5.40$, $SD = 1.30$), t(1, 349) = 3.90, $p < .01$, Cohen's $d = .33$. They also perceived physics as less valuable than ancient Greek ($M = 5.62$, SD = 1.25), $t(1, 349) = 3.16, p < .01$, Cohen's $d = .21$, and language, $t(1, 349) = 3.03, p < .01$, Cohen's $d = .19$.

There was also a significant interaction of gender with school subject, Wilks's lambda = .97, $F(3, 346) = 3.50, p < .05$, partial $\eta^2 = .027$. To better

2. According to Cohen (1992), small, medium, and large effect sizes are ≥ .20, .50, and .80, respectively.

understand this effect, ANOVAs were conducted. These analyses showed that girls (M = 5.85, SD = 1.50), compared to boys (M = 5.45, SD = 1.28), considered language more valuable, $F(1, 348) = 6.30, p < .05$, Cohen's d = .33. There was no gender difference in the value beliefs for mathematics (girls: M = 5.60, SD = 1.25; boys: M = 5.92, SD = 1.20), physics (girls: M = 5.45, SD = 1.30; boys: M = 5.40, SD = 1.45), and ancient Greek (girls: M = 5.40, SD = 1.25; boys: M = 5.80, SD = 1.20).

Because we were also interested in differences between the school subjects in the value beliefs within gender, we conducted two repeated measures ANOVAs, one for each gender, in which value beliefs for the four school subjects was the within-subjects factor. Significant main effect of school subject was found in girls, $F(3, 187) = 3.20, p < .05$, partial η^2 =.05, and in boys, $F(3, 157) = 3.90, p < .05$, partial $\eta^2 = .07$. The mean scores and post hoc pairwise comparisons indicated that boys perceived mathematics as more valuable than both physics, $t(159) = 3.70, p < .01$, Cohen's d = .45, and language, $t(159) = 3.20, p < .01$, Cohen's d = .41, they also valued ancient Greek more than both physics, $t(1, 159) = 2.90, p < .01$, Cohen's d = .34, and language, $t(159) = 2.63, p < .01$, Cohen's d = .30. In contrast, girls had higher value beliefs for language than mathematics, $t(189) = 3.00, p < .01$, Cohen's d = .33, physics, $t(189) = 3.50, p < .01$, Cohen's d = .34, and ancient Greek, $t(189) = 4.00, p < .01$, Cohen's d = .41.

The 2(gender) x 4(performance expectations for the four school subjects) MANOVA revealed a significant main effect of school subject, Wilks's lambda = .93, $F(3, 346) = 11.70, p < .01$, partial $\eta^2 = .07$. The results from the post hoc pairwise comparisons showed that students expected to perform better in physics (M = 14.50, SD = 2.30) than in ancient Greek (M = 14.15, SD = 2.10), $t(349) = 2.35, p < .05$, Cohen's d = .29, and in mathematics (M = 14.15, SD = 2.65), $t(349) = 2.15, p < .05$, Cohen's d = .26. There was no significant difference between language (M = 14.30, SD = 2.00) and the other school subjects in performance expectations.

The MANOVA also showed a significant main effect of gender, Wilks's lambda = .98, $F(1, 348) = 4.30, p < .05$, partial $\eta^2 = .01$, and a significant interaction of gender and school subject, Wilks's lambda = .95, $F(3, 346) = 5.90, p < .01$, partial $\eta^2 = .03$. Examination of the univariate effects indicated significant gender differences in performance expectations in ancient Greek, $F(1, 348) = 6.80, p < .05$, Cohen's d = .33, and language, $F(1, 348) = 11.10, p < .01$, Cohen's d = .41. More precisely, girls (M = 14.80, SD = 2.40) had higher expectations of performance in language than boys (M = 14.00, SD =

2.30), whereas boys (M = 14.50, SD = 2.15), compared to girls (M = 13.80, SD = 2.20), had higher expectations of performance in ancient Greek. There were no gender differences in performance expectations in mathematics (girls: M = 13.95, SD = 2.75; boys: M = 14.37, SD = 2.50), and physics (girls: M = 14.40, SD = 3.10; boys: M = 14.45, SD = 2.80).

The repeated measures ANOVAs, examining differences between the four school subjects in performance expectations within each gender, showed a significant effect of school subject in girls, $F(3, 187) = 20.50, p < .01$, partial $\eta^2 = .14$, and in boys, $F(3, 157) = 6.70, p < .01$, partial $\eta^2 = .05$. Inspection of the mean scores and the post hoc pairwise comparisons showed that boys expected to achieve lower school performance in language than in mathematics, $t(159) = 2.80, p < .01$, Cohen's $d = .20$, in physics, $t(189) = 3.20, p < .01$, Cohen's $d = .26$, and in ancient Greek, $t(159) = 3.42, p < .01$, Cohen's $d = .29$. In contrast, girls expected to perform better in language than in both mathematics, $t(189) = 4.80, p < .01$, Cohen's $d = .46$, and ancient Greek, $t(189) = 5.15, p < .01$, Cohen's $d = .59$; they also expected to perform better in physics than in both mathematics, $t(1, 189) = 4.12, p < .01$, Cohen's $d = .22$, and ancient Greek, $t(189) = 4.72, p < .01$, Cohen's $d = .31$.

Discriminant analysis, with stepwise method, was conducted to determine the set of variables that best discriminated boys from girls. The performance expectations and value belief scores for each school subject were the predictor variables, and gender was the grouping variable. Results showed that language performance expectations (.85) was the most powerful factor in discriminating girls from boys, followed by performance expectations in ancient Greek (.42). Value beliefs for language had no significant contribution in separating the genders.

The above findings partly confirmed Hypotheses 3 and 4 with respect to value beliefs and performance expectations.

School performance

A MANOVA with performance in the four school subjects as within-subjects factor and gender as between- subjects factor showed a significant main effect of school subject, Wilks's lambda = .96, $F(3, 346) = 4.20, p < .01$, partial $\eta^2 = .03$. Post hoc pairwise comparisons indicated that students performed better in language (M = 15.15, SD = 2.90) than in ancient Greek (M = 14.90, SD = 3.35), $t(349) = 2.35, p < .05$, Cohen's $d = .18$, in mathematics (M = 14.90, SD = 3.20), $t(349) = 2.80, p < .01$, Cohen's $d = .21$, and in physics (M = 14.92, SD = 3.30), t(349) = 2.25, p < .05, Cohen's d = .16.

The results from the MANOVA also indicated a significant main effect of gender, Wilks's lambda = .95, F(1, 348) = 12.70, p < .01, partial η^2 = .03, and a significant interaction of gender and school subject, Wilks' lambda = .96, F(3, 346) = 4.60, p < .01, partial η^2 = .04. Subsequent ANOVAs showed that the girls (M = 15.75, SD = 2.80), compared to boys (M = 14.40, SD = 2.60), performed better in language, F(1, 348) = 21.12, p < .01, Cohen's d = .65, whereas the boys performed better in both mathematics (M = 15.40, SD = 3.25), F(1, 348) = 7.90, p < .01, Cohen's d = .35, and ancient Greek (M = 15.50, SD = 2.90), F(1, 348) = 14.00, p < .01, Cohen's d = .50, than girls (mathematics: M = 14.50, SD = 3.20, ancient Greek: M = 14.30, SD = 2.80). However, there was no significant difference between girls (M = 15.10, SD = 3.10) and boys (M = 14.70, SD = 3.20) in performance in physics. Furthermore, according to discriminant analysis, language performance (.76), compared to performance in both ancient Greek (.62) and mathematics (.52), was a more powerful factor in discriminating girls from boys.

Repeated measures ANOVAs revealed performance differences between the four school subjects within each gender: girls, F(3, 187) = 11.50, p < .01, partial η^2 = .14, and boys, F(3, 157) = 8.30, p < .01, partial η^2 = .08. Mean scores and post hoc pairwise comparisons showed that boys performed better in mathematics than in both language, t(159) = 3.90, p < .01, Cohen's d = .70, and physics, t(159) = 3.40, p < .01, Cohen's d = .43; they also performed better in ancient Greek than in both physics, t(159) = 3.60, p < .01, Cohen's d = .48, and language, t(159) = 4.00, p < .01, Cohen's d = .75. In contrast, girls performed better in language than in mathematics, t(189) = 4.10, p < .01, Cohen's d = .72, in ancient Greek, t(189) = 4.50, p < .01, Cohen's d = .80, and in physics, t(189) = 3.50, p < .01, Cohen's d = .36; they also performed better in physics than in both mathematics, t(189) = 3.60, p < .05, Cohen's d = .33, and ancient Greek, t(189) = 3.70, p < .01, Cohen's d = .42.

Thus, Hypotheses 3 and 4 with respect to performance were partly supported.

Successful and unsuccessful subjective performance groups

MANOVAs with perceived successful and unsuccessful performance groups and gender as independent variables and Value Beliefs scale and Performance

Expectations scale mean scores as dependent variables were conducted in each school subject.

These analyses revealed significant main effect of successful and unsuccessful performance groups in language, Wilks's lambda = .66, $F(2, 345) = 80.20, p < .01$, partial $\eta^2 = .34$, in mathematics, Wilks's lambda = .70, $F(2, 345) = 70.80, p < .01$, partial $\eta^2 = .30$, in ancient Greek, Wilks's lambda = .73, $F(2, 345) = 64.00, p < .01$, partial $\eta^2 = .27$, and in physics, Wilks's lambda = .74, $F(2, 345) = 60.50, p < .01$, partial $\eta^2 = .26$, with respect to performance expectations and value beliefs.

The findings from subsequent ANOVAs and examination of the mean scores (Table 3) indicated that the successful group of students had higher value beliefs and higher performance expectations than the unsuccessful group of students in each school subject.

The results from discriminant analyses (Table 3) confirmed the univariate effects and, in addition, showed that school-subject value beliefs, as compared to performance expectations, was a less powerful factor in discriminating the successful from the unsuccessful group of students. Furthermore, value beliefs had no significant contribution in discriminating the two groups of students in language and physics.

According to the MANOVAs on performance expectations and value beliefs scores in the four school subjects, the interaction of gender and group (perceived successful / unsuccessful performance groups) was significant in language, Wilks's lambda = .98, $F(2, 345) = 3.50, p < .05$, partial $\eta^2 = .02$, in physics, Wilks's lambda = .97, $F(2, 345) = 4.80, p < .05$, partial $\eta^2 = .03$, and in ancient Greek, Wilks's lambda = .97, $F(2, 345) = 3.80, p < .01$, partial $\eta^2 = .02$. There was no significant interaction effect in mathematics.

To specify the source of these differences ANOVAs with gender as between subjects factor and discriminant analysis were conducted in the perceived successful and unsuccessful performance groups separately. These analyses revealed that in the perceived successful performance group, girls, as compared to boys, (a) had higher value beliefs, $F(1, 217) = 6.63, p < .01$, discriminating power = .51, Cohen's $d = .40$, and higher performance expectations, $F(1, 217) = 6.90, p < .01$, discriminating power = .80, Cohen's $d = .39$, in language; (b) they also had higher value beliefs, $F(1, 204) = 5.50, p < .05$, discriminating power = .90, Cohen's $d = .32$, in physics. In contrast, in the perceived unsuccessful performance group, boys, as compared to girls, (a) had higher value beliefs, $F(1, 160) = 8.85, p < .01$, discriminating power = .93, Cohen's $d = .50$, and expected to perform better, $F(1, 160) =$

Table 3. Discriminant analyses for the effects of performance expectations and value beliefs on separating the perceived successful from the perceived unsuccessful performance group by gender and school subject

	Girls							Boys							Total sample						
	Successful performance		Unsuccessful performance					Successful performance		Unsuccessful performance					Successful performance		Unsuccessful performance				
	Mean	*SD*	Mean	*SD*	*DP*	*d*	*F*(1, 188)	Mean	*SD*	Mean	*SD*	*DP*	*d*	*F*(1, 158)	Mean	*SD*	Mean	*SD*	*DP*	*d*	*F*(1, 348)
										Language											
Performance expectations	15.75	2.37	13.25	1.90	.89	1.05	83.00	14.90	2.40	13.20	1.60	.87	.74	40.65	15.35	2.15	13.30	2.00	.96	1.02	170.60
Value beliefs	6.25	1.01	5.30	1.38	.52	.63	33.20	5.75	1.10	5.30	1.35	---	--	--	5.80	1.25	5.30	1.50	---	.40	32.40
										Mathematics											
Performance expectations	15.25	2.40	12.60	2.15	.93	.96	85.30	15.75	2.40	13.00	1.50	.96	1.10	48.00	15.50	2.50	12.85	2.25	.96	1.00	137.20
Value beliefs	6.20	1.26	5.00	1.36	.55	.96	40.67	6.30	.95	5.60	1.35	---	.58	14.30	6.20	1.00	5.25	1.20	.55	.76	48.50
										Physics											
Performance expectations	16.20	2.34	12.60	2.80	.98	1.16	97.23	15.65	2.60	13.20	2.40	.91	.87	35.16	16.00	2.30	12.90	2.20	.95	1.35	127.00
Value beliefs	5.90	1.04	5.00	1.32	.48	.69	30.15	5.50	1.54	5.30	1.32	---	--	--	5.70	1.20	5.10	1.25	---	.46	18.00
										Ancient Greek											
Performance expectations	15.50	2.15	12.20	2.20	.95	1.50	95.02	15.54	2.80	13.37	1.50	.90	1.00	33.50	15.55	2.30	12.80	2.10	.96	1.30	133.60
Value beliefs	6.00	1.27	5.06	1.40	.49	.75	26.30	6.20	1.05	5.40	1.27	.60	.67	16.95	6.20	1.10	5.10	1.35	.56	.88	49.70

Note: All *F*-values are significant at the .01 level of significance; -- = nonsignificant difference at the level of .05; DP = Discriminating power; --- = nonsignificant contribution in discriminating the two groups.

4.80, $p < .05$, discriminating power = .68, Cohen's $d = .31$, in mathematics; (b) they also had higher value beliefs, $F(1, 142) = 4.05$, $p < .05$, discriminating power = .60, Cohen's $d = .24$, and higher performance expectations, $F(1, 142) = 4.78$, $p < .05$ discriminating power = .66, Cohen's $d = .28$. Finally (c) they expected to perform better in ancient Greek, $F(1, 149) = 7.77$, $p < .01$, discriminating power = .89, Cohen's $d = .50$.

The results from a series of separate MANOVAs for each gender on value beliefs and performance expectations scores revealed significant main effects of perceived successful and unsuccessful performance group in all four school subjects: in language, for girls, Wilks's lambda = .60, $F(2, 187) = 48.50$, $p < .01$, partial $\eta^2 = .40$, and for boys, Wilks's lambda = .79, $F(2, 157) = 19.30$, $p < .01$, partial $\eta^2 = 21$; in mathematics, for girls, Wilks's lambda = .67, $F(2, 187) = 50.40$, $p < .01$, partial $\eta^2 = .33$, and for boys, Wilks's lambda = .75, $F(2, 157) = 24.70$, $p < .01$, partial $\eta^2 = .25$; in ancient Greek, for girls, Wilks's lambda = .65, $F(2, 187) = 51.35$, $p < .01$, partial $\eta^2 = .34$, and for boys, Wilks's lambda = .80, $F(2, 157) = 18.40$, $p < .01$, partial $\eta^2 = .19$; in physics, for girls, Wilks's lambda = .68, $F(2, 187) = 48.85$, $p < .01$, partial $\eta^2 =.32$, and for boys, Wilks's lambda = .78, $F(2, 157) = 20.10$, $p < .01$, partial $\eta^2 = .22$.

The univariate tests and examination of the mean scores (Table 3) showed that both boys and girls of the perceived successful group had higher performance expectations and higher value beliefs (except for boys in physics and language) than in the perceived unsuccessful performance group in each school subject.

Discriminant analyses confirmed the univariate findings, and, in addition, revealed that (a) in both genders, performance expectations, compared to value beliefs, was a more powerful discriminator in separating the successful from the unsuccessful performance groups in each school subject (see Table 3), and (b) value beliefs had no significant contribution in discriminating the two groups in mathematics.

The above findings partly confirmed Hypotheses 5a and 5b.

DISCUSSION

The aim of this study was to investigate (a) students' value beliefs, performance expectations, and perceived performance for specific school subjects, (b) possible differences between the students who perceive their performance either as successful or unsuccessful in specific school subjects with respect to performance expectations and value beliefs, and (c) gender differences in performance expectations, value beliefs, and perceived school performance both between- and within-gender. The study involved four school subjects, namely mathematics, physics, ancient Greek, and language.

The findings regarding the components of value beliefs were partly in line with Wigfield and Eccles's (2002) expectancy-value model, thus confirming previous research that has not consistently supported cost as a component of value (Eccles & Wigfield, 2002; Stephanou, 2004a). Furthermore, findings revealed other value components as well, which were consistent with empirical evidence, highlighting the crucial role of significant others, such as teachers and parents, in students' formation of competence beliefs and valuing of particular academic tasks (Berger, 2000; Eccles, 1993; Eccles & Wigfield, 2000; Gottfried, Fleming, & Gottfried, 1994; Stephanou, 2005a).

As expected, variability in the components of value beliefs was found both between and within school subjects. More precisely, in accordance to previous studies (e.g., Stephanou, 2004a), students mentioned more often the utility of the school subject in pursuing their future educational goals than intrinsic interest or enjoyment; this regarded all school subjects except physics. This finding might reflect students' extrinsic motivation, and their willingness to do what school is expecting of them even if they do not like school (Hoffman, 2002; Pintrich, 2003). The age of the students may be related to this finding. For example, previous research showed that adolescent students are not intrinsically motivated, and they do not enjoy classroom (Gentry, Gable, & Rizza, 2002; Gottfried et al., 2001; Jacobs et al., 2002; Wigfield & Eccles, 2002). Also, the perceived relevance of the school subject to educational goals and everyday life may be another factor, as shown in the responses in ancient Greek. Students do not see any direct relation of this subject to everyday life and, therefore, the main value it has is its utility for their academic goals in future.

The main component of value beliefs for physics, in contrast to findings from previous research (see Hoffman, 2002), was intrinsic interest. For girls, significant others' expectations were also important. The latter finding is in agreement with research evidence (e.g., Koller, Baumert, & Schnabel, 2001) suggesting that students' interest in academic domains in secondary school, up to Grade 10, is facilitated by extrinsic conditions.

Also, in consistency with our hypotheses and the Eccles and Wigfield's model, students' value beliefs varied across the four school subjects. Specifically, mathematics was the most valuable, indicating the central role of mathematics in students' personal identity and academic development (Martin & Debus, 1998; Mason, 2003; Stephanou, 2005a). In contrast, students perceived physics as less valuable than the other school subjects, although they considered it interesting. This may reflect their reluctance to enter the science field (Schoon, 2001).

The findings regarding performance expectations were in the main as expected. Students' performance expectations varied across the four school subjects (this difference was stronger when gender was added into analysis). More precisely, students expected to perform better in physics than in both mathematics and ancient Greek. Perhaps, as previous studies have shown (e.g., De Corte, Op't Eynde, & Verschaffel, 2002; Efklides, 2001; Stephanou, 2004b), students doubted their abilities in these subjects and considered mathematics and ancient Greek as difficult.

The nonsignificant difference between language and both physics and ancient Greek in performance expectations may lend indirect support to the notion that general school experience influences the formation of competence beliefs in specific school areas (Eccles & Wigfield, 2000; Stipek, 2002; Wigfield, Eccles, & Rodriguez, 1998; Wigfield et al., 2004). Probably, students' competence beliefs in language positively influenced their competence beliefs in physics and ancient Greek through their perceptions of their general school ability –which, to a large extent, relied on language experience. These findings may be also related to the age and the educational level of the students. For example, previous research suggests that students do not formulate strong beliefs about their ability in specific academic domains until the high school years (Boekaerts, 1999; Harter, 1999; Mac Iver, 1988). However, this needs to be further investigated.

The nonsignificant difference between language performance expectations and mathematics performance expectations is consistent with empirical evidence showing positive and moderate relationship between language competence beliefs and mathematics competence beliefs in early adolescent students (Bong, 2001, 2004). Other studies have shown that students with high initial achievement in mathematics tend to have high achievement in language as well, but as time passes, high achievement and competence beliefs in mathematics may develop at a cost for competence beliefs in language (see Marsh & Hau, 2004; Marsh & Yeung, 1998). Further research is needed to examine the psychological processes and the contextual factors that seem to generate expectancy beliefs in different school subjects during secondary school.

As expected, students' performance (i.e., school marks) differed across the school subjects, in favor of language. Students might do well in language because of the emphasis on interpretation, opinions and ideas rather than abstract analytic reasoning required by the other school subjects. It is possible that language instruction satisfied the adolescent students' needs for participation and engagement, and facilitated the students' sense of belonging and relatedness (see Durkin, 2005; Furrer & Skinner, 2003). Or it might be a difference in teachers' expectations regarding language learning that affect their grading. Future research should examine the sociocognitive factors or the school factors that seem to influence performance in language.

Students also distinguished between performance expectations and value beliefs in each school subject suggesting that expectancy and value play different roles in motivating students (Eccles, 2005; Eccles, Vida, & Barber, 2004; Pintrich, 2003; Watt, 2004). More precisely, confirming our hypotheses and other findings (e.g., Eccles, Barber, et al., 1998; Stephanou, 2004a, b), value beliefs and, mainly, performance expectations discriminated the groups of students who perceived their performance as successful vs. unsuccessful in each school subject. Furthermore, value beliefs had no significant contribution into discriminating the two groups in language and physics.

Gender differences as regards the components of value confirmed our predictions. Specifically, girls stressed satisfaction of significant others' achievement expectations as an important component of value for physics. Also, girls, compared to boys, mentioned this component of value beliefs more frequently for mathematics and physics. This finding may reflect a higher degree of conformity in girls than in boys. This finding also highlights girls' sensitivity to changes of classroom context, and their deep need of support by significant others (Hoffman, 2002; Hoffman et al., 1998; Watt, 2004). Supporting previous empirical work, boys mentioned utility of physics in everyday life more frequently than girls, while girls, in comparison to boys, mentioned more often utility in everyday life of both language and, unexpectedly, mathematics. This finding means that the gender gap in value beliefs for mathematics is not well established.

Also, in line with our hypotheses, there were school subject-related gender differences in performance expectations, value beliefs, and performance. The findings, supporting recent research (e.g., Jacobs et al., 2002; Marsh et al., 2006; Stephanou, 2005b), indicated that language is a clearly "female" domain, while mathematics is only slightly "male" domain. Specifically, girls had higher value beliefs for language than for the other school subjects, and they expected to achieve better performance in language than in both mathematics and ancient Greek. Also, girls, compared to boys, expected to perform better and had higher value beliefs in language. To the contrary, boys, as compared to girls, performed better in mathematics, and expected to perform better in ancient Greek. Also, boys expected to perform lower in language than in the other school subjects, and they perceived mathematics as the most valuable school subject, and ancient Greek as more valuable than physics and language. In addition, boys were mainly discriminated from girls by language performance and performance expectations in language.

Substantial, but stronger, gender differences emerged in the groups of students that perceived their school performance as successful or unsuccessful. More precisely, in the perceived successful performance group, girls reported higher performance expectations in language and higher value beliefs for language and physics than boys. The opposite pattern was found for the unsuccessful performance group. Boys had higher value beliefs for mathematics and physics and higher performance expectations for mathematics, physics, and ancient Greek than girls. Confirming our expectations, gender differences in the impact of value beliefs and performance expectations in discriminating the successful from the unsuccessful performance group appeared to be subject-specific rather than global. For example, for girls, value beliefs, as compared to performance expectation, played a limited role in discriminating the two groups in each school subject; for boys, value beliefs had no significant effect in discriminating the two groups in physics and language.

The above findings indicate that the gender gap was stronger in language and mathematics than in physics and ancient Greek. Students may have acquired gender stereotypes about mathematics and language over school years, since both of them are major subjects of Greek primary school studies. The results also suggest that the gender gap was strongest in language than in the other school subjects. This specific finding lends further support to the earlier findings of Jacobs et al. (2002) showing that the competence and value beliefs in language become increasingly differentiated by gender through secondary education. It should be noted, however, that boys' value beliefs and performance expectations in language were associated with lower objective language performance, which might have long-term effects in their educational goals.

Interestingly, the pattern of gender differences in ancient Greek was similar to that in mathematics, although ancient Greek is 'soft' (humanities), verbal, and stereotypically "female" domain, and mathematics is 'hard', non verbal, and stereotypically "male" domain (see Jarvis & Woodrow, 2001). This could be partly attributed to students' limited experience with ancient Greek (see Marsh & Hau, 2004; Nagy et al., 2006). Furthermore, ancient Greek was favoured by boys. This finding may be due to the students' short experience in ancient Greek, boys' tendency to overestimate their abilities in many academic achievement domains, and girls' tendency to doubt their ability in academic achievement conditions and to expect low performance in a novel achievement task (Dermitzaki & Efklides, 2001; Eccles & Wigfield, 2002). It is interesting to examine the development of both competence and value beliefs for mathematics and ancient Greek during the secondary school for each gender.

Implications of the findings for educational practice and future research

The findings from the present study suggest that students have certain competence and value beliefs that influence their perceived school performance. Furthermore, these beliefs are school subject- specific, and develop in certain classroom context. Also, gender differences are subject-specific rather than global, and largely develop in classroom context (Birenbaum & Nasser, 2006; Gentry et al., 2002; Hofmann, 2002). Decrease of the gender gap presupposes helping boys and girls to enhance competence and value beliefs as well as performance in the other gender's stereotypical school subjects.

Overall, the findings from this study indicate the importance of examining value beliefs and performance expectations by school subject and gender, taking into account age and educational level. Furthermore, it is interesting to examine how the contextual factors, such as content and methods of instruction, classroom climate and teacher's behavior, facilitate students' generation of competence and value beliefs in various school subjects, as well as how these two constructs work together and differentially affect learning and achievement. It is also worthwhile to extend this work to other school subjects and domains or to specific activities within subjects and domains. Also, in order to understand the gender gap in competence and value beliefs as well as in performance, many factors need to be considered.

Parents' expectations for each gender, and school expectations and opportunities for each gender are two such factors.

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