Students' classroom emotions:
Socio-cognitive antecedents and
school performance

Georgia Stephanou

Department of Early Childhood Education,
University of Western Macedonia

Greece

Correspondence: Georgia Stephanou, Department of Early Childhood Education, University of Western Macedonia, 53100 Florina, Greece. Email: gstephanou@uowm.gr & egokesy1@otenet.gr.

Georgia Stephanou

Abstract

Introduction. This study examined (a) students' experienced emotions in classes of Mathematics and Language, (b) the role of students' emotions in perceiving their school performance in the same school subjects as successful or unsuccessful, and (c) the effects of students' self-beliefs (performance expectations, value beliefs, ability self-perceptions and perceived task-difficulty) on their emotions, on the impact of their perceptions of their teachers (value beliefs, achievement pressure, competence support and flow experience in classes)- and classmates (value beliefs, competence support, task-difficulty and flow experience in classes)- related factors on the same emotions, and in turn on school performance.

Method. A total of 344 students, of both genders, of Grade 10 participated in the study. A questionnaire with separate versions for Mathematics and Language was used. It consisted of self- scales, and scales of students' perceptions of classmates- and teacher- related factors. Data were collected at the beginning of the second (final) school term.

Results. The results showed that the students experienced a rich variety, and a variation of intensity, of emotions in the classes which positively influenced their perception of performance as successful or not (mainly, in Mathematics). Self-beliefs, perceived teachers- related factors, and perceived classmates- related factors had positive effects on the generation of the emotions, but their predictive strength varied across the school subjects and within each school subject. Self-factors (particularly, ability self-perceptions in Mathematics and perceived task-difficulty in Language) affected the impact of the perceived teachers- and students- related factors in most of the emotions. Finally, the three sets of predictors had positive and complementary consequences for performance in both school subjects.

Discussion and Conclusion. This research suggests the significant role of students' experienced emotions in the classes on their life and academic achievement. The present findings also reveal the interaction of the self - factors and the perceived significant others (teachers and classmates)- related factors on emotions, which in turn affect achievement. These effects are also subject-specific rather than global, and largely develop in classroom context.

Keywords: Emotions, Perceived classmates- and teachers- related factors, Self-beliefs, School performance.

Emociones de los alumnos en la clase escolar: antecedentes socio-cognitivos y rendimiento escolar

Resumen

Introducción. El presente estudio ha investigado: (a) las emociones de los alumnos durante la enseñanza de Matemáticas y de Lengua, y el papel de éstas en la percepción del rendimiento escolar como exitoso o fracasado, (b) el efecto de la propia percepción de capacidad, de las expectativas de rendimiento, de la dificultad percibida y del concepto de validez en Matemáticas y en Lengua en las emociones, en la relación de los factores de percepción de los docentes (concepto de validez, presión de rendimiento, apoyo en el progreso, entusiasmo de enseñanza) y de los compañeros de clase (concepto de validez, apoyo en el progreso, dificultad percibida, entusiasmo) con las mismas emociones y, en consecuencia, en el rendimiento escolar.

Método. En el estudio participaron 344 alumnos de 4º de E.S.O, de ambos sexos. Se utilizó un cuestionario distinto para Matemáticas y otro para Lengua que comprendían escalas sobre el concepto de sí mismos, de los docentes y de los compañeros de clase. La investigación se realizó a mediados del segundo semestre escolar.

Resultados. Se ha observado que los alumnos vivieron en el aula emociones variadas y de distinta intensidad que influyeron positivamente en el rendimiento escolar (principalmente en Matemáticas). El concepto de sí mismos, los factores de percepción de los docentes y de los compañeros de clase influyeron en la formación de las emociones, sin embargo, su contribución varió entre cada asignatura y dentro de cada asignatura. La percepción de sí mismos (principalmente la propia percepción de la capacidad en Matemáticas y la dificultad percibida en Lengua) afectaron la acción de los factores de percepción de los docentes y de los compañeros de clase en la mayor parte de las emociones. En último lugar, los tres conjuntos de predicción contribuyeron positivamente en el rendimiento en las dos clases.

Discusión y conclusiones. El presente trabajo muestra la importancia del papel de las emociones relacionadas con la vida de los alumnos, la interacción de éstos con el concepto de sí mismos, de los docentes y de los compañeros de clase y, por último, con el rendimiento académico. El campo cognitivo influyó en las relaciones entre los factores.

Palabras Clave. Concepto de sí mismo, Emociones, Factores de percepción de los docentes y de los compañeros de clase, Rendimiento escolar.

Introduction

Although students' emotions significantly influence their subjective well-being and educational outcomes (Diener, 2000; Harackiewicz, Barron, Tauer, & Elliot, 2002; Pintrich, 2003; Schutz & DeCuir, 2002; Schutz, Hong, Cross, & Osbon, 2006), with the exception of test anxiety (Zeidner, 1998, 2007) and attribution-based emotions in academic achievement (Weiner, 1992, 2002), student emotions have been little investigated (Goetz, Zirngibl, Pekrun, & Hall, 2003; Meyer & Turner, 2002; Pekrun, 2009; Pekrun, Goetz, Titz, & Perry, 2002; Stephanou, 2007; Volet & Jarvela, 2001).

Also, traditionally, cognition and emotions were considered as independent processes of information and behaviour, and, just, recently, research focuses on the ways student emotions interact with cognitive, metacognitive and motivational processes in classroom (Boakaerts, 2002; Dina & Efklides, 2009; Do & Schallert, 2004; Efklides, 2006; Efklides & Petkaki, 2005; Pekrun et al., 2002; Pintrich & Schunk, 2002; Schutz & Lenehart, 2002; Turner & Schallert, 2001). More precisely, while socio-cognitive constructs of student motivation, such as self-concept, perceived task-difficulty, performance expectation and task-value, have each been linked to academic achievement, little research has explored their interactive role with emotions in real academic achievement situations (Anderman & Wolters, 2006; Boekaerts, Pintrich, & Zeidner, 2000; Eccles & Wigfield, 2002; Stephanou, 2004a,b, 2007). Similarly, although classroom emotions involve person-environmental transactions, and they are 'socially constructed, personally enacted' (Schutz et al., 2006; Siemer, Mauss & Gross, 2007), a limited number of investigations have examined the interrelations of student emotions with teachers- and classmates- related factors, probably, because, emotions were initially perceived as learning- or achievement- related (Astleitner, 2000; Glaser-Zikuda, Laukenmann, Metz, & Randler, 2005; Pekrun & Schutz, 2007; Perry, Turner, & Meyer, 2006; Stephanou & Kyridis, 2008). However, as many researchers (e.g., Perry et al., 2006; Vauras, Salonen, Lehtinen, & Kinnunen, 2009; Weiner, 2002) emphasize, achievement strivings are inherently social in nature. In a classroom learning a student's performance affects teacher and classmates, while they evaluate the student, reacting to the certain performance with praise, contempt, envy or like. These reactions influence the student's emotions, self-esteem and subsequent achievement (Brok, Bergen, Stahl, & Brekelmans, 2004; O'Donnell, 2006; Sansone & Harackiewicz, 2000; Vauras, Salonen & Kinnunen, 2008; Weiner, 2005).

More specifically, it is the students', interpretations of these reactions that influence their emotional experience and achievement behaviour, not the reactions themselves (Frenzel, Pekrun, & Goetz, 2007; Frijda, 2005; Kim, Walden, Harris, Karrass, Catron, 2007; Schutz et al., 2006; Weiner, 2002). This is particularly true for adolescent students, since interpretations of how the significant others, such as teachers and classmates, perceive them constitute a significant source of their identity (Dermitzaki & Efklides, 2000; Durkin, 2005; Harter, 1999; Rigby & Huebner, 2005; Sarason, Sarason & Pierce, 1990; Wigfield, Byrnes, & Eccles, 2006). Besides, emotions arise 'in response to the meaning structures of given situations' (Frijda, 1988, p. 349). Moreover, within a contextualist perspective, emotions appraisals cannot be separated from the context (Averill, 1997; Frijda, 2007, 2009).

Finally, although the relationships among the above variables are relatively domain specific and may vary from one school subject to the other, a limited number of investigations have focused on school subject-specific competence and value beliefs and their relation with emotions, classroom climate and achievement across school subjects (Anderman, 2004; Efklides, 2001; Frenzel, Goetz, Pekrun, & Watt, 2010; Goetz, Frenzel, Pekrun, Hall, & Lüdtke, 2007; Schunk & Zimmerman, 2006; Stephanou, 2007, 2008; Wigfield, Guthrie, Tonks, & Perencevich, 2004; Wolters & Pintrich, 1998).

Overall, little research has examined students' emotions, and the interrelations of emotions with cognition and perceived teacher- and classmates- related factors in classroom learning in various school subjects in secondary education (Do & Schallert, 2004; Harackiewicz et al., 2002; Nodding, 2003; Oosterheert & Vermunt, 2001; Pekrun, 2009; Stephanou, 2007). In response to this relative lack on student emotions, the present study examined secondary school students' experienced emotions in the classes of Mathematics and Language, and the associations of the role of students' perceptions of self-, teacher- and classmates- related factors on these emotions, and on school performance.

Relationships among emotions, self- factors, perceptions of teacher- and classmates- related factors, and school performance

In sum, previous studies on emotions in academic achievement, on one hand, have shown that emotions influence cognitive information processing, quality of thinking, motivation, learning strategies, self- regulation, metacognition, and achievement (Boakaerts, Pin-

trich, & Zeidner, 2000; Efklides & Volet, 2005; Pekrun, Goetz, Daniels, Stupnisky & Perry, 2010). For example, positive emotions, such as curiosity, enjoyment, hope and pride, enhance motivation, facilitate learning and increase performance (Meyer & Turner, 2002, Pekrun et al., 2002; Clore & Huntsinger, 2009), whereas, negative emotions, such as anxiety, hopelessness, boredom and insecurity, and related thoughts, like a feeling of incompetent, interface with learning, decrease motivation, and is related to low performance (Pekrun, 2005, Pekrun & Schutz, 2007; Pekrun, Goetz, Daniels et al., 2010; Zeidner, 2007). On the other hand, cognitions are the most powerful antecedents of students' emotions in classroom (Goetz et al., 2003; Pekrun, 2009; Pekrun et al., 2002; Weiner, 2005). More precisely, factors, such as student's goals, values, motives, prior knowledge and perceptions of self, contribute into eliciting an emotional response to a given classroom situation (Schutz & Lenehart, 2002; Turner & Schallert, 2001). For example, high expectations of successful performance, beliefs of adequate ability to master the task and high value beliefs for the task influence the generation of the emotion of pleasure (Glaser-Zikuda, Fub, Laukenmann, Metz, & Randler, 2005; Glaser-Zikuda & Mayring, 2003; Pekrun, 2000). Similarly, being involved in a high interest activity and a high valuable task causes enjoyment (Stephanou, 2006, 2007). In contrast, beliefs of inadequate ability in accomplishment the task, low performance expectations, and lack of interest in the task contribute into forming the feelings of hopelessness and anxiety (Pekrun et al., 2002; Stephanou, 2004b, 2006; Zeidner, 1998). Perceived task-difficulty influences task- and future activity- emotions like boredom, enthusiasm and confidence (Efklides, 2006; Pekrun, 2009; Pekrun & Schutz, 2007).

Also, since learning is contextual in nature, teacher's instructional and other behaviour is an important source of students' emotions in classroom learning (Davis, 2003; Furrer & Skinner, 2003; Jarvenoja & Jarvela, 2005; Vauras et al., 2009). For example, teachers' didactic competence and social interactions have an effect on students' well being. Also, aspects of instruction, such as lack of transparency of achievement expectations and lack of feedback, have an impact on test anxiety. Similarly, teacher-centrered instruction does not facilitate emotional aspects of learning (Schutz & Lenehart, 2002; Weiner, 2002). In contrast, teacher's high learning goals influence students' adoptions of high personal goals, and offering positive feedback and displaying positive emotions support students' motivation for learning (Anderman, Patrick, Hiruda, & Linnenbrink, 2002; De la Fuente, 2004; Pintrich & Schunk, 2002). Additionally, just as the student experience emotions based on the outcome at the task or the activity, so is involved and experience emotions the teacher (see Frenzel, Goetz, Lüdtke et al.,

2009). For example, the involved teacher in the student's success may experience pride and pleasure that enhance the possibilities of providing help toward student (see Stephanou, 2005, Stephanou & Giannopoulou, 2008). However, it is the students' perceptions of instruction and their evaluation of the learning process that influence how they learn and feel, not necessarily the instruction in itself (Frenzel et al., 2007; Kususanto, Ismail, & Jamil, 2010; Schutz & Lenehart, 2002; Weiner, 2001, 2002; Zimmerman & Schunk, 2001). Also, it is the students' perceptions of teachers' caring behaviour that affect their emotions not the behaviour itself (Brok, 2001; Davidson & Phelan, 1999; Stephanou & Kyridis, 2008; Wentzel, 2002). For example, perceived support from teachers has been found to be unique in predicting young adolescents' interest in class and pursuit of goals to be socially responsible (Wentzel, 1998; see also De la Fuente, 2004).

Yet, classmates-related factors, such as interest and value beliefs for specific school subject or certain task activity, participation into- or reactions to accomplishment of a task and emotional experience and its expression for performance, influence students' emotions and achievement-related behaviour in classes (Ellins, Marsh, & Craven, 2005; O'Donnell, 2006; Pintrich & Schunk, 2002; Slavin,1996; Weiner, 2002). Students adopt standard for performance and display academic skills modelled by their classmates (see Schutz & DeCuir, 2002; Schutz et al., 2006; Wentzel, 2002). Student who report more classmates support also show higher self-perceptions, higher academic expectations, and higher academic engagement (Furrer & Skinner, 2003). Moreover, as above mentioned, it is the students' perceptions and interpretation of peer behaviour that affect their own emotional experience and achievement behaviour.

This study was mainly based on Pekrun's (2006) control-value theory of student emotions, which incorporates the above factors. It suggests that control- related (e.g., expectancy beliefs) cognitions and subjective values- related (e.g., importance) beliefs are the most significant antecedents of students' academic emotions. These cognitive appraisals mediate the associations of emotions with social (e.g., teacher, classmates) environment with respect, mainly, to competence support, autonomy support versus control, expectations and goal structures, achievement outcomes and feedback, and social relatedness. Research, based on this model, reported a wide range of academic emotions, that is, emotions related to academic achievement (such as pride or shame) and academic learning processes (such as excitement, joy, or boredom) (see Efklides & Volet, 2005; Pekrun, Frenzel, Goetz, & Perry, 2007; Pekrun

& Stephens, 2010; Stephanou, 2007; Stephanou, Kariotoglou & Ntinas, submitted). Also, certain emotions (e.g., hope, anxiety) are derived from the self or the task, while social emotions driven from the interaction with the others (e.g., admiration, envy), or directed at others (e.g., anger). Overall, the emotions experienced in academic settings can be classified into four major categories as to whether they are positive activating emotions, (e.g., hope, enjoyment of learning), positive deactivating emotions (e.g., relaxation), negative activating emotions (e.g., anxiety) and negative deactivating emotions (e.g., hopelessness, boredom) (Pekrun, 1992, 2009; Pekrun et al, 2002). Pekrun and colleagues reported on their extensive work on academic emotions that students experience emotions as they learn, and that this emotional experience can be related to achievement through its effect on cognitive and motivational processes.

Wigfield and Eccles's (2000) expectancy-value model of motivation was also used. According to this model, expectancy beliefs and task value beliefs are the most significant determinants of achievement behaviour, and they are influenced by task specific self-concept belief and task difficulty belief. 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, and it comprises the components of intrinsic interest, utility, importance, and cost. The self-concept belief is student's perceptions of his / her ability to do a task, while task difficulty belief represents the student's judgments of the difficulty of the task.

Objective vs. subjective school performance

In secondary education, school performance has been usually estimated what grade one gets 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 success and failure are better seen as psychological states, based upon students' own interpretation of performance (Dweck, 1999; Pintrich, 2003; Pintrich & Schunk, 2002; Stephanou, 2005, 2008; Zimmerman, 1995). Perceived performance has been found to be also related to students' achievement motivation and actual achievement (see Weinstein, 1998; Stephanou, 2008). From the expectancy-value perspective, expect performance expectations and value beliefs are 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

This study aimed at investigating: (a) the students' emotions that they usually experience in the classes of the school subjects of Mathematics and Language, (b) the role of the students' emotions in perceiving their school performance in the same school subjects as successful or unsuccessful, (c) the associations between students' emotions, performance expectations, value beliefs, ability self-perceptions and perceived task-difficulty, their perceptions about teachers' value beliefs, achievement pressure, competence support and flow experience in classes, and their perceptions about classmates' value beliefs, competence support, task-difficulty and flow experience in classes in the above school subjects, (d) the role of students' performance expectations, value beliefs, ability self-perceptions and perceived task-difficulty in the formulation of the emotions, and in the impact of their perceptions of the teachers- and classmates- related factors on the same emotions, and (e) the role of the students' above factors in the impact of the teacher- and classmates- related factors on emotions, and in turn on school performance.

Hypotheses of the study

Students will experience various (mainly, context-, task- other- and future – related) emotions in the classes of Mathematics and language, but there will be differences in their prevalence between the two school subjects (Hypothesis 1).

The students, who perceive their performance as successful, will experience more positive emotions (mainly, self-esteem- and expectancy- related emotions) than the students who estimate their performance as unsuccessful in the respective school subject (Hypothesis 2a). The relative power of emotions in discriminating the two groups of students will differ between the two school subjects (Hypothesis 2b).

The antecedents of students' emotional experience in the classes of Mathematics and Language will be in agreement with Pekrun's theoretical model. More precisely, the students' self- factors will have positive effect on their emotions in the respective school subject (Hy-

pothesis 3a). Performance expectations, value beliefs, ability self-perceptions and perceived task-difficulty will mainly influence the future behaviour-, excitement-, self-esteem-, and task- and future activity- related emotions, respectively (Hypothesis 3b). Students' perceptions of classmates' (mainly, value beliefs and perceived task-difficulty) and, mainly, teachers' (particularly, competence support and flow experience) factors will influence positively their emotions, particularly, context- and task- related (Hypothesis 3c). Students' self-factors will enhance the impact of their perceptions of classmates' and teachers' factors on their emotions (Hypothesis 3d).

The pattern of the associations will differ across the school subjects (Hypothesis 4).

Each of the examined variables, particularly performance expectations, will be positively associated with school performance (Hypothesis 5a). The students' self- factors will have positive effect on the impact of the teacher- and classmates- related factors on emotions, and in turn, on school performance (Hypothesis 5b), but there will be differences in their prevalence within and across the two school subjects (Hypothesis 5c).

Method

Participants

A total of 344 students, of both genders, of Grade 10 participated in the study. Their age ranged from 15 to 16 years (M = 15.2 years, SD = 0.5). The students came from schools of various regions of Greece representing various parental socioeconomic levels. Of the participants, 199 and 145 perceived that their school term performance in Language was successful and unsuccessful, respectively. Similarly, in Mathematics, 164 and 180 students estimated their school term performance as successful and unsuccessful, respectively.

Measures

A questionnaire with separate versions for Mathematics and Language was used . It consisted of self- scales, and scales of students' perceptions of classmates- and teacher- related factors. The consistency of the questionnaire was based on previous researches (see Carr, 2005; Csikszentmihalyi & Csikszentmihalyi, 1988; Eccles, 2005; Eccles & Wigfield,

1995; Harter, 1999; Pekrun, 2000; Pekrun, 2009; Pekrun et al, 2002, Pintrich & Schunk, 2002; Stephanou, 2007; Weiner, 1992, 2002). The wording of the questions for the two school subjects was the same except for the subject name.

Students' self- factors

The scale of the experienced emotions in classes consisted of fifteen emotions. More precisely, the participants were asked to indicate the extent to which they usually experienced fifteen (happiness, pleasure, satisfaction, pride, cheerfulness, calmness, not irritation-irritation, encouragement, not anxiety-anxiety, not boredom-boredom, excitement, hope, con-fidence, competence, not anger-anger) emotions in the classes in Mathematics or Language. The emotions had the form of adjectives, with the positive pole having the high score of 7 and the negative pole having the low score of 1 (e.g., happy 7 6 5 4 3 2 1 unhappy). This scale is a valid and reliable research instrument in studying emotions experienced in classro-om in Greek population (see Stephanou, 2007).

The Ability self-perception scale consisted of 6 questions (e.g., "How good are you in Language?", "Compared to other students, how good are you in Language?"). Responses ranged from 1 (= not at all good) to 7 (= excellent). Cronbach's alphas were .79 for mathe-matics and .81 for language.

The Performance Expectations scale consisted of four questions (e.g., "How well do you think you will do in Language this school term?", "How good will your performance be 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 .83 for mathematics and .82 for language.

The task Value Beliefs scale consisted of four questions (e.g., "How much value does Language have for you?", "How valuable is Language for you?"). Responses ranged from 1 (= not at all) to 7 (= very much). Gronbach's alphas were: .80 for mathematics and 84 for lan-guage.

The Perceived task-difficulty scale comprised four items (e.g., "How difficult is Mat-hematics for you?", "Compared to other academic domains, how much difficult is Language

for you?"). Responses ranged from 7 (= not at all) to 1 (= very much). Gronbach's alphas were .75 and .78 for mathematics and language, respectively.

The successful or unsuccessful performance was estimated by the students themselves. Students' school marks in the two school subjects came from the school records. They represented objective school performance. Besides, 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 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 participants' personal information scale consisted of a set of questions relevant to personal factors, such as age and gender.

Students' perceptions of teacher- related factors

The students' perceptions of their teachers' Value Beliefs scale consisted of four questions (e.g., "How much value, do you think, does Language have for your teacher?", "How valuable, do you think, is Language for your teacher?"). Responses ranged from 1 (= not at all) to 7 (= very much). Gronbach's alphas were .85 and 86 for mathematics and language, respectively.

The students' perceptions of competence support from their teacher were measured through a six item scale (e.g., "My teacher praises me when I do well in Language", "My teacher helps me to do my best in Language"). Responses ranged from 1 (= not at all) to 7 (= very much). Gronbach's alphas were .79 for both mathematics and language.

The students' perceived achievement pressure from teachers scale comprises four items (e.g., "My teacher presses me to do better than I do in Language", "My teacher presses me to perform better than I can in Language"). Responses ranged from 7 (= not at all) to 1 (= very much). Gronbach's alphas were .87 for mathematics and .83 for language.

The students' perceptions of their teachers' flow experience in classes were assessed by a five item- scale (e.g., "My teacher teaches mathematics with enthusiasm", "My teacher

teaches Mathematics without thinking of something else", "My math teacher is totally invol-ved in what he / she is doing in classes"). This scale was based on Csikszentmihalyi and Csikszentmihalyi's (1988) Flow questionnaire. Responses ranged from 1 (= strongly disagree) to 7 (= strongly agree). Gronbach's alphas were .78 for mathematics and .80 for language.

Students' perceptions of classmates- related factors

The students' perceptions of their classmates' value beliefs scale consisted of four questions (e.g., "How much value, do you think, does Language have for your classmates?", "How valuable, do you think, is Language for your classmates?"). Responses ranged from 1 (= not at all) to 7 (= very much). Gronbach's alphas were .82 and .81 for mathematics and language, respectively.

The students' perceptions of their classmates' competence support was assessed via five items (e.g., "My classmates help me to do better in Language", "My classmate support me to perform well in Language"). Responses ranged from 1 (= not at all) to 7 (= very much). Gronbach's alphas were .75 for mathematics and .82 for language.

The students' perceptions of their classmates' flow experience in classes scale consis-ted of five items (e.g., "My classmates feel enthusiasm in the Mathematics classes", "My classmates attend Mathematics classes without thinking of something else", "My classmates are totally involved in what they are doing in Mathematics classes"). The wording of the questions was the same with the scale for the teachers except for the subject name. Responses ranged from 1 (= strongly disagree) to 7 (= strongly agree). Gronbach's alphas were .84 for mathematics and .83 for language.

The students' perceptions of their classmates' perceived task difficulty were estimated by a 4 -items questionnaire (e.g., "How much difficult, do you think, is Mathematics for your classmates?", "Compared to other academic domains, in your opinion, how much difficult is Language for your classmates?"). Responses ranged from 7 (= not at all) to 1 (= very much). Gronbach's alphas were .80 and .81 for mathematics and language, respectively.

Procedure

All the participants completed the scales at the beginning of the second (final) school term to ensure that they had good time to form an impression of the examined variables. Also, to ensure that any relation between emotions and the other variables was not due to procedure used, students completed first the emotions scale and then the rest of the scales. The students completed the questionnaire individually, in quite classrooms, in frond of the researcher. The students were explained the aim of this study, and they were assured of anonymity and confidentiality.

To match the questionnaires that were responded by the same student, the students were asked to choose a code name and use it on all the scales they completed. The researcher matched the students with the school records. Specifically, first, the participant were given individually their term school marks, according to the school records, in the two school subjects; and, then, they were asked to rewrite their school marks on a separate sheet of paper and use their code name on it.

Data analysis

Repeated measures MANOVAs, Anovas, and Discriminant Function analyses (see details below) were performed to examine the relations of students' emotions with their perceived successful or unsuccessful school performance. To estimate the effects of students' self-factors and their perceptions of teacher- and classmates- related factors on their emotions, a series of correlation coefficients and hierarchical regression analyses were conducted (see details below). Similarly, in order to examine the effects of students' self- factors, perceived teacher- and classmates- related factors, and emotions on their school performance a series of correlation coefficients and hierarchical regression analyses were conducted (see details below).

Results

Emotions and perceived successful or unsuccessful school performance

Repeated measures MANOVAs with perceived successful and unsuccessful performance groups as between-subjects factor and the mean score of the experienced emotions in classroom as within-subjects factor were conducted in each school subject.

These analyses revealed significant main effect of emotions in language, Wilk's lambda = .42, $F(14, 329) = 32.90$, $p < .01$, $\eta^2 = .57$, and in mathematics, Wilk's lambda = .59, $F(14, 329) = 16.30$, $p < .01$, $\eta^2 = .40$. The mean scores and post hoc pairwise comparisons showed that the students experienced a rich variety, and a variation of intensity, of emotions in classroom in both school subjects (Table 1). Specifically, in Language, the students experienced more intensely the positive emotions of not anger, calmness and not anxiety, and the negative emotions of boredom and not excitement than the other emotions. In Mathematics, calmness, confidence and not anger were the most intense positive emotions, while anxiety, boredom and not excitement were the most intense negative emotions.

Table1. Mean scores and Standard Deviations of students' experienced emotions
in classes of mathematics and Language

	Mathematics		Language	
	Mean	SD	Mean	SD
Happiness	4.38	1.73	4.69	1.46
Satisfaction	4.36	1.71	4.66	1.41
Pleasure	4.35	1.75	4.69	1.47
Pride	4.32	1.83	4.49	1.45
Encouragement	4.44	1.95	4.59	1.56
Confidence	4.62	1.82	4.78	1.61
Calmness	4.64	1.91	5.08	1.55
Not anger- anger	4.61	2.07	5.14	1.65
Cheerfulness	4.42	2.03	4.72	1.58
Not irritation - irritation	4.57	1.96	4.89	1.67
Hope	4.35	1.98	4.86	1.65
Competence	4.25	1.88	4.70	1.90
Not boredom - boredom	3.94	2.18	4.22	1.84
Not anxiety -anxiety	4.20	1.97	4.95	1.89
Excitement	4.20	2.01	3.98	1.72

The results from the MANOVAs also indicated a significant interaction of perceived school performance with emotions in language, Wilk's lambda = .54, $F(14, 329) = 19.50$, p < .01, $\eta^2 = .45$, and in mathematics, Wilk's lambda = .77, $F(14, 329) = 6.10$, p < .01, $\eta^2 = .22$. There was also a significant main effect of perceived school performance in language, $F(1, 342) = 190.70$, p < .01, $\eta^2 = .26$, and in mathematics, $F(1, 342) = 305.40$, p < .01, $\eta^2 = .46$.

The findings from subsequent ANOVAs, with the perceived (successful / unsuccessful) performance as between-subjects factor and each of the emotions as dependent variable, and examination of the mean scores indicated that the successful group of students felt better in classes than the unsuccessful group of students in each school subject. In addition, Discriminant analysis, with stepwise method, was conducted to determine the set of emotions that best discriminated the group of students who estimated their school performance as successful from the group of students who estimated their school performance as unsuccessful. The students' experienced emotions in the classes of the school subject were the predictor variables, and the perceived academic performance was the grouping variable. This analysis was conducted in each school subject.

The findings from the analyses (Table, 2) confirmed the results from ANOVAs, and revealed the relative power of emotions in discriminating the perceived successful from unsuccessful performance groups varied across the two school subjects. Also, the emotion of satisfaction, discriminating power = .68, Cohen's d^1 = 1.46, followed by the emotions of happiness, discriminating power = .67, Cohen's d = 1.40, confidence, discriminating power = .66, Cohen's d = 1.44, and pleasure, discriminating power = .64, Cohen's d = 1.42, as compared to the other emotions, was the most powerful factor in discriminating the two groups of students in Mathematics. However the emotions of encouragement, calmness and anger had no significant contribution in discriminating the two groups of students.

The findings regarding language showed that the emotion of confidence, discriminating power = .57, Cohen's d = 1.18, followed by the emotions of encouragement, discriminating power = .52, Cohen's d = 1.10, competence, discriminating power = .51, Cohen's d = 1.07, and anger, discriminating power = .50, Cohen's d = 1.07, as compared to the other emotions, was the most powerful factor in discriminating the two groups of students. However,

---

[1] According to Cohen (1992), small, medium, and large effect sizes are .20, .50, and .80, respectively.

the emotions of calmness, excitement, satisfaction and pride did not contribute significantly in discriminating the two groups of students.

Because we were also interested in differences between the intensity of the experienced emotions in classes within performance, we performed four repeated measures ANOVAs, one for each group of students, in which the fifteen emotions was the within-subjects factor. The findings revealed a significant effect in successful, $F(14, 150)= 25.65$, $p < .01$, $\eta^2 = .70$, and unsuccessful, $F(14, 166) = 5.60$, $p < .01$, $\eta^2 = .32$, performance group of students in mathematics. Similarly, there was a significant effect in successful, $F(14, 185) = 25.50$, $p < .01$, $\eta^2 = .65$, and unsuccessful, $F(14, 131) = 130.00$, $p < .01$, $\eta^2 = .79$, performance group in language. Inspection of the mean scores and the post hoc pairwise comparisons showed that the students experienced mainly the positive emotions of not anger, calmness and not irritation in successful performance group in both school subjects. In addition, they experienced confidence in mathematics, and competence in language. In the unsuccessful performance groups, the students felt mainly the negative emotions of boredom and anxiety in mathematics, and not excitement, and boredom in language.

The results from these analyses showed that the students reported more positive emotions in Language classes than did in Mathematics classes.

The above findings partly and totally confirmed Hypotheses 1 and 2a, and 2b, respectively.

Effects of self-factors and perceived teacher- and classmates- related factors on emotions

Inspection of the results from correlation coefficients analyses (Table 3) indicates clearly support to our expectations that there will be significant correlations among students' self- factors, their perceptions of teacher- and classmates- related factors and their experienced emotions in classes in both Mathematics and Language. However, the magnitude of the associations among the various factors partly confirmed our prediction.

The students, who had higher ability self-perceptions, perceived the task as less difficult, had higher value beliefs and had higher performance expectations, felt better in classes than the students, who estimated the respective factor as less favorite, in Language and, mainly, in Mathematics. Also, both ability self-perception and perceived task-difficulty, com-

pared to performance expectations and value beliefs, were more strongly associated with the emotions in both school subjects. Furthermore, the perceived ability and perceived task-difficulty were mainly associated with the emotions of satisfaction, pride, confidence, pleasure and happiness (self-esteem, expectancy, and task-related) in mathematics, and with the emotions of encouragement, confidence, happiness, calmness and anger- not anger (expectancy – activity – context - other- related) in Language. Performance expectations were more strongly associated with expectancy- and other- related emotions, and, in addition, in mathematics, with general emotions, compared to the rest of the emotions. Finally, value beliefs were evident the strongest association with emotions of encouragement and confidence in Language, while it was almost equally related to each of the emotions (less with boredom) in Mathematics.

Similarly, the students, who perceived their teachers as more favorite, compared to students, who perceived their teachers as less favorite, regarding task-value beliefs, achievement pressure, and, particularly, competence support and flow experience experienced more positive emotions in classes in Language and, mainly, in Mathematics. Furthermore, students' perceptions of teacher- related factors were more strongly associated with other (anger, irritation)-, self (pride)-, context- and general (satisfaction, pleasure)- related emotions in mathematics, and with context-, future behaviour- and activity (hope, confidence, encouragement, competence)- related emotions in Language than with the other emotions .

In addition, the more positively the students perceived their classmates, mainly, in value beliefs and competence support in mathematics, and flow experience and competence support (in some emotions task-difficulty) in language, the better they felt (mainly, general, achievement- and self-esteem emotions) in mathematics, and (particularly, task- and context-emotions) in language.

Because we were also interested in the mediate role of the students' competence and value beliefs in the impact of their perceived teacher- and classmates- related factors on emotions, a series of hierarchical regression analyses were conducted (Table, 4). Each of the emotions was the criterion variable. Students' perceptions of both teacher-related and classmates-related factors were entered into first step of the analysis, and their ability self-perception, perceptions of task-difficulty, value beliefs and performance expectations were entered into second step of the analysis.

Table 2. Discriminant analyses for the effects of the experienced emotions in classes on separating the perceived successful from the perceived unsuccessful performance group of students by school subject

| | Mathematics | | | | | | | Language | | | | | | |
| | Successful performance | | Unsuccessful performance | | | | | Successful performance | | Unsuccessful performance | | | | |
	Mean	SD	Mean	SD	DP	d	F(1, 342)	Mean	SD	Mean	SD	DP	d	F(1, 342)
Happiness*	5.70	1.16	3.18	1.23	.67	1.40	380.85	5.34	1.01	3.79	1.51	.49	1.06	129.46
Satisfaction	5.68	1.21	3.17	1.13	.68	1.46	390.98	5.21	1.02	3.91	1.53	---	.92	88.73
Pleasure	5.66	1.21	3.17	1.24	.64	1.42	349.11	5.14	1.18	4.06	1.60	.32	.73	51.16
Pride	5.54	1.41	3.23	1.45	.51	1.26	222.67	4.99	1.26	3.81	1.41	---	.81	66.15
Encouragement	5.85	1.31	3.16	1.51	---	1.37	310.61	5.32	.99	3.59	1.65	.52	1.10	145.92
Confidence	6.00	1.13	3.37	1.37	.66	1.44	370.81	5.58	1.10	3.68	1.57	.57	1.18	173.66
Calmness	5.96	1.15	3.45	1.67	---	1.34	257.38	5.73	1.07	4.17	1.65	---	1.00	111.03
Not anger -anger	6.02	1.19	3.32	1.85	---	1.30	252.34	5.89	1.07	4.11	1.76	.50	1.07	135.27
Cheerfulness	5.76	1.35	3.20	1.76	.52	1.26	225.54	5.29	1.19	3.95	1.71	.37	.84	72.75
Not irritation – irritation	5.93	1.28	3.33	1.63	.56	1.32	266.07	5.59	1.25	3.93	1.69	.45	.99	109.92
Hope	5.62	1.22	3.18	1.82	.51	1.23	207.89	5.47	1.31	4.01	1.69	.39	.89	81.32
Competence	5.45	1.25	3.15	1.69	.49	1.22	202.37	5.57	1.44	3.52	1.82	.51	1.07	134.25
Not boredom - boredom	4.95	1.99	3.02	1.92	.39	.88	83.31	4.82	1.61	3.41	1.84	.32	.76	56.71
Not anxiety - anxiety	5.46	1.27	3.05	1.79	.49	1.22	201.55	5.51	1.55	4.18	2.05	.29	.70	46.48
Excitement	5.28	1.74	3.22	1.72	.38	1.02	122.06	4.52	1.56	3.24	1.67	---	.72	52.95

Note: F- values are significant at the .01 level of significance; * = The nature of emotions is positive and negative in successful and unsuccessful performance, respectively; DP = Discriminating power; --- = nonsignificant contribution in discriminating the two groups; d = Cohen's d.

The findings revealed that (a) at the first step of the analysis, the students' perceptions of teacher-related and classmates-related factors, in combination, accounted for a significant variability of their experienced emotions in classes in language, with R^2 ranging from .20 (calmness) to .49 (competence), and in mathematics, with R^2 ranging from .59 (boredom) to .77 (cheerfulness), (b) the two sets of predictors, together, had significant and positive effect in the formation of students' emotions, explaining an amount of variance in language from .45 (excitement) to .72 (encouragement), and in mathematics from .70 (boredom) to .91 (happiness), (c) students' estimation of self-ability, task-difficulty, performance expectations and value beliefs, as a group, had indirect effect, throughout their perceptions of teachers' and classmates' factors, and a direct effect, beyond that affected by those factors on their emotions in language (mainly, self-, and future activity- related, R^2ch ranged from .09 to .29), and in mathematics (mainly, anxiety, and future- related behaviour, R^2ch ranged from .05 to .21), (d) ability self-perceptions (beta ranged from .23 to .75), and perceived task-difficulty (beta ranged from .28 to .70), compared to value beliefs and particularly performance expectations, was more powerful mediator in the impact of the perceived social classroom (teachers, classmates) factors on emotions in mathematics and language, respectively, (e) compared to the other perceived classmates' factors, value beliefs and competence support in mathematics, and flow experience and competence support in language, explained a greater amount of the variability of most of the students' emotions, (f) although, in comparison to the other perceived teachers' factors, competence support and flow experience evidenced the greater unique contribution in students' emotions in both school subjects, the perceived teachers' achievement pressure had significant and positive effect on students' emotions in mathematics.

The above findings also indicate that (a) the two set of predictors, together, explained a greater amount of the variability in emotions in mathematics than in Language, (b) students' perceptions of classmates- and, mainly, teacher- related factors were more powerful formulators of their emotions in mathematics classes than in language classes, (c) the role of self-factors in the impact of perceived classmates- and teacher- factors on emotions differed between the two school subjects, in favoring language, (d) the predictive strength of the predictors varied across the school subjects and within each school subject.

Thus, Hypotheses 3a, 3b, 3c and 3d were partly confirmed, while Hypothesis 4 was totally confirmed.

Table 3. Correlations among students' self- factors, experienced emotions in classes, perception of teacher- and classmates- related factors, and school performance in Mathematics and Language

(N = 344)	Mathematics													Language											
	PE	PA	PD	VB	P	TV	TCS	TAP	TE	CV	CCS	CE	CPD	PE	PA	PD	VB	P	TV	TCS	TAP	TE	CV	CCS	CE	CPD
Emotions																										
Happiness	.81	.88	.90	.81	.74	.74	.79	.58	.52	.59	.61	.53	.51	.58	.73	.73	.50	.38	.51	.56	.50	.54	.36	.35	.41	.39
Satisfaction	.83	.87	.90	.79	.76	.73	.75	.57	.73	.60	.65	.58	.56	.48	.69	.75	.45	.39	.53	.60	.55	.59	.31	.31	.37	.35
Pleasure	..82	.87	.89	.81	.74	.77	.77	.57	.72	.60	.62	.56	.54	.45	.62	.69	.45	.20	.51	.50	.50	.53	.22	.29	.32	.38
Pride	.74	.82	.82	.72	.64	.75	.76	59	.73	.59	.61	.56	.54	.49	.63	.71	50	.35	.47	.47	.49	.48	.22	.24	.24	.26
Encouragement	.76	.85	.83	.75	.67	.66	73	.56	.74	.58	.61	.51	.51	.60	.77	.78	.58	.42	.57	.59	.61	.59	32	.36	.33	.33
Confidence	.78	.87	.84	.78	.68	.64	73	.51	.72	.53	.58	.51	.50	.67	.76	.77	.57	.45	.62	.64	.54	.58	.26	.33	.33	.30
Calmness	.78	.84	83	.78	.67	.61	.68	.50	.71	.52	.59	.55	.59	.58	.71	.67	.49	.42	.47	.59	.41	.46	.33	.29	.26	.27
Not anger- anger	.78	.82	.81	.78	.64	.70	.70	.56	.79	.53	.59	.50	.49	.57	70	.62	.39	.41	.48	.62	.54	.61	.35	.33	.32	.32
Cheerfulness	.74	.79	.78	.71	.66	.75	.76	.55	.74	.63	.63	.56	.54	.51	.64	.60	.48	.33	.47	.47	.45	.49	.32	.31	29	.28
Not irritation- irritation	.74	.80	.81	.78	.64	.65	.69	.53	.74	.57	.59	.52	.52	.53	.66	.61	.36	.33	.43	.53	.56	.58	.42	.37	.34	.41
Hope	.75	.81	79	.77	.62	61	.66	.50	.75	.45	.52	.47	.47	.57	.67	.67	.43	.41	.53	.62	.59	.64	.34	.33	.30	.34
Competence	.61	.80	.72	.74	60	.62	.72	.59	.72	.53	.54	.44	.42	.55	.67	.65	.49	.34	.55	.63	.61	.64	.39	.37	.32	.41
Not boredom-boredom	.72	.68	.71	.64	.49	51	.57	.53	.69	.49	.48	.45	.46	35	.50	.53	.48	.22	.52	.50	.51	.56	.32	.33	.32	.33
Not anxiety- anxiety	.72	.75	.79	.76	.62	.55	.61	.56	.65	.45	.51	.40	.42.	.51	.58	.51	.44	.26	.54	.56	.46	.55	.38	44	.39	.43
Excitement	.68	73	.76	.70	.55	.50	.50	.50	.67	.41	.50	.42	.41	.42	.56	.54	.34	.26	.45	.52	.45	.53	.41	.34	.32	.34
Self- factors																										
PE						.58	.66	.42	.66	.46	.53	.55	.51						.49	.52	.32	.46	.36	.20	.23	.19
PA						.59	.71	.41	.71	.44	.54	.50	.50						.51	.65	.55	.56	.40	.33	.33	.31
PD						.64	.68	.43	.68	.51	.60	.55	.52						.52	.63	.55	.51	.21	.23	.26	.28
VB						.70	.72	.54	.70	.44	.48	.42	.40						.55	.44	.37	.39	.25	.23	.24	.20
School performance	.85	.87	.80	.64		.50	.51	.32	.59	.40	.46	.37	.37	.84	.60	.49	.42		.28	.28	.14	.20	.27	--	.12	--

Note: PE = Performance expectations; PA = Ability self-perceptions; PD = Perceived task difficulty; VB = Value beliefs; P = school performance; TV = perceived teachers' value beliefs; TCS = perceived teachers' competence support; TAP = perceived teachers' achievement pressure; TF= perceived teachers' flow in classes; CV = perceived classmates' value beliefs; CCS = perceived classmates' competence support; CE = perceived classmates' flow in classes; CPD = perceived classmates' perceptions of task difficulty;   r > .12, p < .01; r ≤ .12, p < .05, -- = no significant correlations at the .05 level of significance.

Table 4 Results from hierarchical regression analyses for the effects of students' self factors (ability self-perceptions, perceived task-difficulty, performance expectations, value beliefs) on the impact of the perceived teacher- and classmates- related factors on their experienced emotions in classes in language and Mathematics

			Mathematics							Language						
	Steps	Predictors	R^2	R^2ch	Fch	F		beta		R^2	R^2ch	Fch	F		beta	
Happiness	1st	Teachers' and classmates' factors	.76			131.25	PE -- PA .38	TV .17 TCS .24	CV .29 CCS .22	.42			31.25	PE -- PA .33	TV .22 TCS .24	CV -- CCS .22
	2nd	Students' self-factors	.91	.15	168.95	314.72	PD .36 VB --	TAP .13 TF --	CE -- CPD --	.64	.21	50.65	51.10	PD .46 VB --	TAP -- TF .29	CE .39 CPD --
Satisfaction	1st	Teachers' and classmates' factors	.74			122.50	PE -- PA .23	TV .16 TCS --	CV .23 CCS .18	.46			37.10	PE .25 PA .25	TV .20 TCS --	CV -- CCS .34
	2nd	Students' self-factors	.90	.15	133.20	254.85	PD .41 VB --	TAP .14 TF --	CE -- CPD	.65	.18	44.30	52.35	PD .61 VB .17	TAP .17 TF .43	CE .48 CPD --
Pleasure	1st	Teachers' and classmates' factors	.74			121.95	PE -- PA .39	TV .15 TCS --	CV .34 CCS .37	.39			29.32	PE .14 PA --	TV .31 TCS .52	CV .11 CCS --
	2nd	Students' self-factors	.90	.15	135.00	135.15	PD .27 VB --	TAP .18 TF --	CE .24 CPD	.59	.20	41.32	40.45	PD .70 VB --	TAP .20 TF .60	CE -- CPD .26
Pride	1st	Teachers' and classmates' factors	.75			130.90	PE .17 PA .63	TV .30 TCS	CV .43 CCS .58	.29			17.80	PE -- PA .25	TV .17 TCS .61	CV -- CCS .32
	2nd	Students' self-factors	.87	.11	72.00	185.10	PD .16 VB .21	TAP .27 TF .09	CE .39 CPD --	.59	.29	50.39	39.85	PD .10 VB --	TAP -- TF .61	CE .26 CPD --
Encouragement	1st	Teachers' and classmates' factors	.69			96.80	PE .15 PA .70	TV .07 TCS --	CV .30 CCS .16	.44			33.40	PE -- PA --	TV .24 TCS .47	CV -- CCS --
	2nd	Students' self-factors	.83	.14	72.62	141.23	PD -- VB --	TAP .20 TF .13	CE -- CPD --	.72	.28	84.50	72.60	PD .59 VB --	TAP -- TF .37	CE .18 CPD

Emotion		Factor														
Confidence	1st	Teachers' and class-mates' factors	.66			84.40	PE -- PA .72	TV -- TCS --	CV .29 CCS .31	.47			37.90	PE .17 PA .22	TV .32 TCS .18	CV .18 CCS .23
	2nd	Students' self-factors	.83	.16	79.74	135.82	PD -- VB .11	TAP .12 TF .08	CE .21 CPD --	.71	.23	68.20	6832	PD .37 VB --	TAP -- TF --	CE -- CPD .16
Calmness	1st	Teachers' and class-mates' factors	.62			70.20	PE -- PA .48	TV -- TCS .13	CV .11 CCS --	.28			16.47	PE -- PA .49	TV .26 TCS .44	CV -- CCS .43
	2nd	Students' self-factors	.79	.16	68.15	106.84	PD -- VB .24	TAP .13 TF .14	CE .48 CPD --	.57	.29	57.10	37.30	PD .37 VB --	TAP .30 TF .44	CE .38 CPD --
Not anger-anger	1st	Teachers' and class-mates' factors	.67			87.10	PE -- PA .53	TV .16 TCS .20	CV .15 CCS --	.42			31.55	PE -- PA .64	TV -- TCS --	CV -- CCS --
	2nd	Students' self-factors	.80	.13	58.15	117.50	PD -- VB .24	TAP .21 TF .13	CE -- CPD --	.57	.14	29.10	37.76	PD -- VB .13	TAP -- TF .35	CE -- CPD --
Cheerfulness	1st	Teachers' and class-mates' factors	.77			146.00	PE -- PA .48	TV .24 TCS .12	CV .40 CCS .30	.28			16.58	PE -- PA .46	TV .28 TCS .49	CV -- CCS 24
	2nd	Students' self-factors	.82	.05	24.50	132.75	PD -- VB --	TAP-- TF .11	CE .20 CPD --	.47	.19	31.15	25.35	PD -- VB --	TAP -- TF .43	CE CPD --
Not irritation-irritation	1st	Teachers' and class-mates' factors	.67			85.05	PE -- PA .38	TV -- TCS --	CV .29 CCS .25	.41			29.15	PE -- PA .35	TV -- TCS .40	CV -- CCS --
	2nd	Students' self-factors	.78	.11	42.95	98.76	PD -- VB .21	TAP .15 TF .21	CE .21 CPD	.58	.17	34.95	40.00	PD .25 VB .17	TAP -- TF .42	CE .48 CPD .38
Hope	1st	Teachers' and class-mates' factors	.62			69.59	PE -- PA .46	TV -- TCS .19	CV .27 CCS --	.44			33.48	PE .13 PA --	TV -- TCS .25	CV -- CCS .22
	2nd	Students' self-factors	.75	.13	46.50	87.10	PD -- VB --	TAP .12 TF .29	CE -- CPD --	.60	.16	33.60	42.30	PD .47 VB --	TAP -- TF .55	CE .37 CPD

Emotion	Step	Factor	R	R ch	F ch		PE/PA/PD/VB	TV/TCS/TAP/TF	CV/CCS/CE/CPD	R	R ch	F ch		PE/PA/PD/VB	TV/TCS/TAP/TF	CV/CCS/CE/CPD
Competence	1st	Teachers' and classmates' factors	.65			78.30	PE -- / PA .75	TV -- / TCS --	CV .34 / CCS .24	.49			40.90	PE -- / PA --	TV -- / TCS --	CV -- / CCS --
	2nd	Students' self-factors	.77	.12	45.70	95.30	PD .26 / VB --	TAP .29 / TF .13	CE .25 / CPD	.62	.12	27.55	45.15	PD .28 / VB --	TAP -- / TF .34	CE .56 / CPD
Not boredom-boredom	1st	Teachers' and classmates' factors	.59			61.80	PE .21 / PA .32	TV -- / TCS .36	CV .47 / CCS .76	.35			23.35	PE .24 / PA --	TV .19 / TCS .41	CV -- / CCS --
	2nd	Students' self-factors	.70	.10	29.16	64.76	PD .41 / VB --	TAP .44 / TF .43	CE .40 / CPD --	.47	.11	17.85	24.57	PD .56 / VB --	TAP .24 / TF .74	CE -- / CPD --
Not anxiety-anxiety	1st	Teachers' and classmates' factors	.72			46.70	PE -- / PA --	TV -- / TCS .20	CV -- / CCS .21	.40			28.50	PE -- / PA .39	TV .25 / TCS --	CV -- / CCS .38
	2nd	Students' self-factors	.86	.21	67.90	78.60	PD .50 / VB .13	TAP .25 / TF .12	CE .54 / CPD .36	.50	.09	15.80	27.65	PD -- / VB --	TAP .20 / TF .31	CE .37 / CPD .29
Excitement	1st	Teachers' and classmates' factors	.58			58.32	PE -- / PA --	TV .15 / TCS .29	CV .40 / CCS .57	.34			21.87	PE .17 / PA --	TV -- / TCS --	CV .25 / CCS --
	2nd	Students' self-factors	.73	.15	46.95	75.85	PD .42 / VB .13	TAP .33 / TF .31	CE -- / CPD --	.45	.11	16.85	22.96	PD .59 / VB --	TAP .38 / TF .61	CE -- / CPD --

Note:: PE = Performance expectations; PA = Ability self-perceptions; PD = Perceived task-difficulty; VB = Value beliefs; P = school performance; TV = perceived teachers' value beliefs; TCS = perceived teachers' competence support; TAP = perceived teachers' achievement pressure; TF= perceived teachers' flow in classes; CV = perceived classmates' value beliefs; CCS = perceived classmates' competence support; CE = perceived classmates' flow in classes; CPD = perceived classmates' perceptions of task-difficulty; All Fch(4, 331)- values are significant at the .01 level of significance; All 1st step F(8, 335)- and 2nd step F(12, 343)- values are significant at the .01 level of significance; beta values $\leq$ .23 (t = 2.53), p < .05; beta values > .23 (t = 2.53), p < .01; -- = no significant contribution in the formation of emotion at the .05

Effects of self- factors, perceived teacher- and classmates- related factors, and emotions on school performance

The results from correlation coefficients analyses (Table 3) revealed that better the students felt (mainly, self-, task- and other- related emotions) in the classes of the school subjects, higher competence (particularly, ability self-perception in mathematics, and performance expectation in Language) and value beliefs they had, more positively they estimated their teacher- related factors (mainly, competence support and flow experience –only in Language) and more positively they perceived the classmates- related factors (particularly, competence support in mathematics, and value beliefs in Language) higher school performance they achieved in Language and, mainly, in mathematics.

Because we were also interested in the mediate role of competence- and value beliefs in the impact of the teacher- and classmates- related factors on emotions, and in turn, on school performance, two hierarchical regression analyses were conducted, one for each school subject. School performance was the predicted variable. Emotions, teacher- and classmates-related factors and competence beliefs and value beliefs were entered in the first, second and third step of the analysis[2], respectively.

The findings regarding mathematics revealed that: (a) emotions contributed significantly to the generation of school term performance, $R^2 = .67$, $F(15, 328) = 32.60$, $p < .01$, (b) perceived teacher- and classmates- factors, together, enhanced the impact of emotions on performance, $Rch^2 = .032$, $Fch(8, 320) = 4.50$, $p < .01$, and, the two set of predictors, as a group had a significant positive effect on performance, $R^2 = .70$, $F(23, 320) = 33.50$, $p < .01$, (c) the three set of predictors, as a group, accounted for significant variance of performance, $R^2 = .88$, $F(27, 316) = 85.10$, $p < .01$, (c) competence beliefs (mainly, ability self-perception) mediated the effect of emotions on academic performance, $Rch^2 = .17$, $Fch(4, 316) = 112.00$, $p < .01$, and (d) satisfaction, $b = .68$, $t = 3.58$, $p < .01$, pride, $b = .26$, $t = 2.10$, $p < .05$, not angry-angry, $b = .27$, $t = 3.30$, $p < .01$, not irritated-irritated, $b = .15$, $t = 2.70$, $p < .01$, hope, $b = .16$, $t = 2.37$, $p < .05$, competence, $b = .16$, $t = 2.20$, $p < .05$, not boredom- boredom, $b = .25$, $t = 2.48$, $p < .05$, excitement, $b = .25$, $t = 2.18$, $p < .05$, perceived

---

[2] Only the variables that were significantly related to school performance were included in the analysis.

teachers' competence support, $b = .30$, $t = 3.10$, $p < .01$, perceived classmates' competence support, $b = .29$, $t = 2.95$, $p < .01$, perceived classmates' flow experience, $b = .31$, $t = 2.80$, $p < .01$, performance expectations, $b = .57$, $t = 10.34$, $p < .01$, ability self-perceptions, $b = .72$, $t = 7.40$, $p < .01$, and perceived task difficulty, $b = .19$, $t = 2.10$, $p < .05$, contributed uniquely to formulation of school term performance.

The findings for Language showed that: (a) emotions influenced significantly the formulation of school performance, $R^2 = .45$, $F(15, 328) = 18.70$, $p < .01$, (b) perceived teacher- and classmates- factors, together, enhanced the effect of emotions on performance, $Rch^2 = .05$, $Fch(6, 322) = 10.00$, $p < .01$, and, the two set of predictors, in combination, had positive impact on performance, $R^2 = .50$, $F(21, 322) = 18.50$, $p < .01$, (c) altogether, emotions, competence- and value beliefs, and perceived teacher- classmates- factors explained 85% of the variability in performance, $F(25, 318) = 75.20$, $p < .01$, (c) value- and competence beliefs (mainly, performance expectations) enhanced the impact of the other two set of predictors on school performance, $Rch^2 = .30$ $Fch(4, 318) = 169.72$, $p < .01$, and (d) satisfaction, $b = .45$, $t = 4.15$, $p < .01$, pleasure, $b = .72$, $t = 8.48$, $p < .01$, calmness, $b = .17$, $t = 2.35$, $p < .05$, not boredom- boredom, $b = .37$, $t = 6.35$, $p < .01$, not anxiety - anxiety, $b = .19$, $t = 3.27$, $p < .01$, perceived teachers' competence support, $b = .26$, $t = 3.55$, $p < .01$, performance expectations, $b = .89$, $t = 22.15$, $p < .01$, and value beliefs, $b = .11$, $t = 2.95$, $p < .01$, contributed significantly to the generation of school performance.

The above findings also indicate that (a) emotions explained a greater amount of the variability in performance in Mathematics than Language, (b) Language performance evidenced lower prediction by all the predictor variables, and (c) the effects of competence- and value beliefs in the combined effect of the other two set of predictors on school performance differed between the two school subjects, in favoring Language.

Thus, Hypotheses 5a and 5b were mainly confirmed, and Hypothesis 5c was totally confirmed.

Discussion

The aim of this study was to investigate (a) students' experienced emotions in the classes in Language and Mathematics, (b) possible differences between the students who perceive their school term performance either as successful or unsuccessful in the specific school subjects with respect to the same emotions, (c) the effects of students' performance expectations, value beliefs, ability self-perceptions and perceived task-difficulty in the generation of the emotions, and in the impact of their perceptions of the teachers- and classmates- related factors on the emotions, and (d) the role of the students' self-factors in the impact of their perceptions of the teacher- and classmates- related factors on the emotions, and in turn on school term performance.

Students' emotions

The students experienced a rich variety of emotions in the classes of mathematics and language supporting previous studies documenting the rich variety of sources of student emotions (see Efklides & Volet, 2005; Jarvenoja & Jarvela, 2005; Pekrun et al., 2002; Stephanou et al., submitted; Vauras et al., 2008; Weiner, 2002). The fact that the students experienced intense other (not anger-anger)- and context (not irritated-irritated, excitement)- related emotions is consistent with empirical evidence, highlighting the crucial role of classroom environment and significant others, such as teachers and classmates, in student emotions in particular academic tasks (Anderman & Anderman, 2000; Eccles, 1993; Eccles & Wigfield, 2000; Gottfried, Fleming, & Gottfried, 2001; Frenzel et al., 2007; Turner & Meyer, 2000). Additionally, the students felt intense performance (not anxiety-anxiety)- task and future activity (boredom)- and future behaviour (confidence, only in mathematics)- related emotions. This specific finding supports the notion that perceptions of self and task contribute into an emotional experience in a given classroom situation (Pekrun et al., 2007; Pekrun et al., 2010; Schutz & Lenehart, 2002; Turner & Schallert, 2001). Also, students might have appraised the status of self- factors in pursuing their goals that include performing well in the specific-activities in the classes and being good in the respective school subject, since such emotions are experienced in relationship to goals (Carver & Scheier, 2000; De la Fuente, 2004; Frijda, 2005, 2009; Linnenbrink & Pintrich, 2002). However, this needs to be further investigated.

In agreement with our hypotheses, the students, who perceived their school term performance as successful, felt better in the classes than the students, who estimated their performance as unsuccessful, in Language and, mainly in Mathematics. The findings regarding the nature of the emotions that were the most powerful determinants in separating the two groups of students were partly in line with Pekrun's model of student emotions. More specifically, the achievement (confidence, encouragement, competence)- related emotions, as compared to the learning processes (excitement, boredom)- related emotions, were more powerful factors in discriminating the successful from the unsuccessful performance groups of students in Language, but, unexpectedly, the emotion of satisfaction, followed by happiness, confidence and pleasure, was the most significant determinant factor in Mathematics. Probably, the students felt more satisfied in achieving their goals in Mathematics, which is considered by them as difficult, than in Language, and, hence they experienced the specific pattern of emotions. Additionally, context-, and task- related emotions contributed into discrimination of the two groups of students suggesting the importance of learning environment in students' learning and performance (Brok, 2001; Furrer & Skinner, 2003; Marsh & Dunkin, 1997; Stephanou, 2005; Turner, Midgey, Meyer, Gheen, Anderman, & Kang, 2002).

It seems that the students, in unsuccessful performance groups, did not enjoy classes, reflecting, probably, 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 (Frenzel et al., 2010; Gentry, Gable, & Rizza, 2002; Gottfried et al., 2001; Jacobs, Lanza, Osgood, Eccles, & Wigfield., 2002; Wigfield & Eccles, 2002;Vauras et al., 2009). However, these emotions may 'remove' or 'distance' the students from the objects (see, Frijda, 2005; Schutz et al., 2006; Meyer & Turner, 2002).

The students felt intense emotions of anxiety in mathematics in the whole sample and in the unsuccessful performance group. Perhaps, as previous studies have shown (e.g., De Corte, Op't Eynde, & Verschaffel, 2002; Efklides, 2001; Stephanou, 2004b, 2008), students doubted their abilities in this school subject and considered mathematics as difficult. This, latter finding is particular important because anxiety influence students to focus towards the self than to the content of the course and the strategies taking the course (Frijda, 2005).

Effects of self-factors and the perceived teacher- and classmates- related factors on emotions

The findings regarding the role of students' self-factors on their experienced emotions in the classes were in the main consistent with Pekrun's model. The students, who had higher ability self-perceptions, perceived the task as less difficult, had higher value beliefs and had higher performance expectations, felt better in the classes than the students, who estimated the respective factor as less favorite, in Language and, mainly, in Mathematics.

Also, in consistency with previous researches (e.g., Goetz, et al., 2007; Stephanou, 2006, 2007; Stephanou et al., submitted) the strength of the association of the self- factors with the emotions varied between the two school subjects and within each school subject. More accurately, both ability self perceptions and task-difficulty perceptions were mainly associated with the self-esteem-, expectancy-, and task-related emotions (satisfaction, pride, confidence, pleasure and happiness) in mathematics, and with the expectancy- activity-, context- other- related emotions (encouragement, confidence, happiness, calmness, anger-not anger) in Language. Performance expectations were more strongly related to expectancy- and other- related emotions, and, in addition, in mathematics, with general emotions, compared to the rest of the emotions. Finally, value beliefs were evident the strongest association with emotions of encouragement and confidence in Language, and it was almost equally related to each of the emotions (less with boredom) in Mathematics. Consequently, these specific findings partly supported the view that ability self perceptions, performance expectations, perceived task-difficulty and value beliefs is mainly related to self esteem-, future behaviour-, task- and future activity-, and task- and context- related emotions, respectively (Efklides, 2006; Goetz et al., 2003; Pekrun et al., 2002; Weiner, 1992, 2002).

In addition, the students' self-factors, as a group, accounted for significant amount of variance in emotions, even after controlling for the perceived teacher- and classmates- related factors. That means that the students, who had strong self- and value beliefs, were more likely to consider their teacher and classmates as more favourable, and, in turn, to feel better in classes, compared to students with low self- and value beliefs. But only the perceived Language-difficulty and mathematics ability self-perceptions contributed uniquely into generation of most of the emotions. Furthermore, ability self-perceptions explained a greater amount of the variability of the achievement- and future behaviour- related emotions, competence, confidence, encouragement, pride, anger and anxiety, than of the other emotions in Mathematics.

In contrast, perceived task-difficulty predominately explained the emotions of task-, context- and future activity- related emotions, pleasure, anger, satisfaction, excitement, encouragement and boredom than the other emotions in Language. It seems that the students focused on themselves in the classes in Mathematics, while they focused on the task in the classes in Language. These specific findings might be partly explained by the educational level of the participants with respect to achievement goals and school experience. Specifically, the upper high school defines success on the basis of high ability and outperforming others (Barron & Harackiewicz, 2003; Harackiewicz et al., 2002; Pintrich, 2000; Stephanou, 2004a, 2005; Wigfield et al., 2006). Thus, the students might have formulated constant belief that high ability is a prerequisite of success, particularly in the difficult school subject of Mathematics, and these beliefs influenced their emotional experience in the classes. Additionally, as above mentioned, the students appraise the self- and task- factors in performing well in classroom learning (Carver & Scheier, 2000; Frijda, 2005; Kususanto et al., 2010).

The findings from the present study also, confirming previous researches (see Frenzel et al., 2007; Frenzel et al., 2009; Pekrun et al., 2010; Stephanou, 2006; Weiner, 2002, 2005), supported the crucial role of students' perceptions of their teacher- and classmates- related factors on their experienced emotions in the classes, and the different role of teachers and classmates in the emotions. More precisely, the more favorably the students perceived their teachers regarding task-value beliefs, achievement pressure, and, particularly, competence support and flow experience, the more positive the emotions they experienced in the classes in Language and, mainly, in Mathematics. These perceptions were more strongly associated with the other (anger, irritation)-, self (pride)-, context- and general (satisfaction, pleasure)- related emotions in Mathematics, and with context-, future behaviour- and activity- (hope, confidence, encouragement, competence) related emotions in Language than with the other emotions. In addition, the perceived teachers' factors were found to be unique in predicting students' emotions in the classes in both school subjects, while the relative power of the four factors differed within and between the emotions, and school subjects. Unexpectedly, the perceived achievement pressure form the teachers accounted for a significant portion of the variance of student emotions in Mathematics. This latter finding is interesting given that achievement pressure has negative effects on academic achievement (see Pintrich & Schunk, 2002; Schutz & Lenehart, 2002; Weiner, 2005). This needs to be further examined with respect to how it is displayed and expressed toward students, how it is interpreted by the students, and the history of the teacher-student relationships (Jarvenoja & Jarvela, 2005; Kim et

al., 2007; Schutz et al., 2006; Schutz & Lenehart, 2002; Siemer et al., 2007). Similarly, in consistency with other similar researches (e.g., Furrer & Skinner, 2003; Ellins et al., 2005; O'Donnell, 2006; Vauras et al., 2009), the more positively the students perceived their classmates with respect to specific factors the better they felt in Mathematics (mainly, general, achievement- and self-esteem emotions), and in Language (particularly, task- and context- emotions). Additionally, the perceived classmates' factors, mostly, value beliefs and competence support in Mathematics, and flow experience and competence support in Language, proved unique formulators of emotions. Finally, students' perceptions of classmates- and teacher- related factors, as a group, and altogether the predictors, accounted for greater amount of the variability in emotions in Mathematics than in Language. Further research is needed to examine the psychological processes and the contextual factors that seem to generate students' emotional experience in classes in different school subjects in secondary school.

Performance

The findings regarding school term performance were partly in agreement with our expectations. The three sets of predictors, namely students' self-factors, their perceptions of teacher- and classmates- factors and their experienced emotions in the classes, had positive and complementary consequences for performance in both school subjects. Specifically, in Mathematics, although, unexpectedly, perceived self-ability was the most powerful predictor of school term performance, performance expectations, the emotions of satisfaction, pride, not angry-angry, not irritated-irritated, hope, competence, not boredom- boredom and excitement, the perceived competence support from teachers, the perceived competence support from classmates, the perceived classmates' flow experience, and the perceived task-difficulty accounted for a significant portion of the variance of performance. The dominant role of ability self-perception in performance may be partly related to participants' beliefs that ability is required in success in mathematics, as was mentioned above. In Language, confirming our hypotheses and other findings (e.g., Stephanou, 2004b, 2008; Wigfield & Eccles, 2000), performance expectations was the most powerful predictor of school term performance, followed by the emotions of satisfaction, pleasure, calmness, not boredom- boredom and not anxiety - anxiety, the perceived competence support from teacher and value beliefs, while the perceived classmates- related factors had not unique effect on performance. This latter finding is similar to Goodenow's (1993) study who found that, after controlling for perceived teacher support, perceived peer support did not contribute to students' effort or performance. Perhaps, as other

researchers (e.g., Hynel, Confrort Schonet-Reichi, McDougall, 1996; Hascher, 2003) suggested, the students experienced satisfying support and relationships with their teachers, and peers support was not necessary in successful performance in Language. Or it might be a difference in students' beliefs of the difficulty of the specific two school subjects. Future research should examine the sociocognitive and self- factors that seem to influence the effect of the perceived classmates- factors on performance in various school subjects.

As expected, students' self- factors played significant role in the impact of their perceptions of the teacher- and classmates- related factors on the experienced emotions in the classes, and in turn on school term performance. That means that the students, who had strong self- and value beliefs, were more likely to perceive more favourably their teacher and classmates in the specific factors, in turn to experience more positive emotions in the classes, and finally, to achieve higher school performance, relative to students with low self- and value beliefs.

Implications of the findings for educational practice and future research

This research suggests the significant role of students' experienced emotions in the classes on their life and academic achievement. Therefore, it is necessary to design effective classroom environment which foster students' learning and well-being. Research suggests that qualities such as caring, opportunities for participation, warmth and dedication of attention may be important to the development of enjoyable learning environment.

The findings from the present study also suggest that students have certain control and value beliefs that influence their perceptions of the social classroom environment (teachers, and classmates), their emotional experiences in the classes, and the perceived school performance. Furthermore, these beliefs are school subject- specific, and develop in certain classroom context. Students may enhance control- and value- beliefs, when they have opportunities for self-regulated learning, and are involved into useful, interest and meaningful task and activities.

The present findings also reveal the interaction of the self- related factors and the perceived significant others (teachers and classmates)- related factors on emotions, which in turn affect achievement. These effects are also subject-specific rather than global, and largely develop in classroom context.

Overall, the findings from the present investigation indicate the importance of examining student emotions by school subject, taking into account age, educational level and history of teacher-students relationship. As Schutz and Lanehart (2002) suggested emotions are intimately involved virtually every aspect of the teaching and learning processes, therefore, an understanding of the nature of emotions within school context is essential' (p. 67). Investigating students' emotions in respect to person and context (teacher, classmates) might provide useful information about such interaction, and, in so doing, understand learning and achievement in education. Moreover, investigating academic emotions, based on Pekrun's perspective of the origins of student emotions, might contribute into evaluation and development of programs towards enhancing academic emotions, learning and achievement.

Also, studies that examine the relative contributions of teaching, and peer contexts to student emotion and motivation in various school subjects as adolescents progress though secondary education are necessary to understand the developmental implications of these findings. Finally, it is interesting to examine how self-factors and teacher's and classmates' behavior work together and differentially affect, emotions, learning and achievement.

References

Anderman, L. H. (2004). Student motivation across subject-area domains. *The Journal of Educational Research, 97*(6), 283-285.

Anderman, E. M., & Anderman, L. H. (2000). The role of social contextin educational psychology: Substantive and methological issues. *Educational Psychologist, 35*, 67 − 68.

Anderman, L. H., Patrick, H., Hiruda, I. Z., & Linnenbrink, E. A. (2002). Observing classroom goal structures to clarify and expand goal theory. In C. Midgley (Ed.), Goals, goal structures, and patterns of adaptive learning 9pp. 243 -278). Mahwah, NJ: Lawrence Erlbaum.

Anderman, E. M., & Wolters, C. A. (2006). Goals, values, and affcet: Influences on student motivation. In P. A. Alexander & P. H. Winne (Eds), *Handbook of Educational Psychology* (pp. 369 - 389). London: Lawrence Erlbaum.

Astleitner, H. (2000). Designing emotionally sound instruction: the FEASP-approach. *Instructional Science 28,* 169-198.

Averill, J. (1997). The emotions: an integrative approach. In R. Hogan, J. Johnson, J. and S. Briggs (Eds), *Handbook of Personality Psychology* (pp. 513-541). New York: Academic Press.

Barron, K. E., & Harackiewicz, J. M. (2003). Achievement goals and optimal motivation: Testing multiple goal models. *Journal of Personality and Social Psychology, 80*(5), 706 – 722.

Berger, E. H. (2000). *Parents as partners in education: Families and schools working together.* Upper Saddle River, NJ: Prentice Hall.

Boakaerts, M. (2002). Toward a model that integrates motivation, affect, and learning. In L. Smith, C. Rogers, & P. Tolminson (Eds.), *Development and motivation: Joint perspectives* (pp. 173 – 189). Leicester, England: British Psychological Society.

Boekaerts, M., & Corno, L. (2005). Self-regulation in the classroom. *Applied Psychology, 54*(2), 199 - 231.

Boekaerts, M., Pintrich, P., & Zeidner, M. (2000). Handbook of self-regulation. London: Academic.

Brok, P. den (2001). *Teaching and students outcomes: A study on teachers' thoughts and actions from an interpersonal and a learning activities perspective.* Utrecht: W.C.C.

Brok, P. den, Bergen, T., Stahl, R. J., & Brekelmans, M. (2004). Students' perceptions of teacher control behaviours. *Learning and Instruction, 14,* 425 – 443.

Carr, A. (2005). *Positive psychology.* London: Routledge.

Carver, C. S., & Scheier, M. E. (2000). Scaling back goals and readibration of the affect system are processes in normal adaptive self-regulation: understanding 'response shift' phenomena. *Social Science and Medicine, 50,* 1715-1722.

Clore, G. L., & Huntsinger, J. R. (*2009*). A reply to commentaries: How the object of affect guides its impact. *Emotion Review, 1,* 58-59.

Csikszentmihalyi, M., & Csikszentmihalyi, I. (1988). *Optimal experience: Psychological studies of flow in consciousness.* Cambridge: University Press.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112,* 155-159.

Daniels, L., Haynes, T., Stupnisky, R., Perry, R. P., & Newall, N., & Pekrun, R. (2008). Individual differences in achievement goals: A longitudinal study of cognitive, emotional, and achievement outcomes. *Contemporary Educational Psychology, 33*, 584-608.

Davidson, A. L., & Phelan, P. (1999). Students' multiple worlds: An anthropological approach to understanding students' engagement with school. In Urdan, T. C. (Ed.), *Advances in motivation of context (Vol. 11,* pp. 233-273). Stamford, CT: JAI.

Davis, H. A. (2003). Conceptualizing the role and influence of student-teacher relationship on childern's social and cognitive development. *Educational Psychologist, 38*, 207-234.

De la Fuente, J. (2004). Recent perspectives in the study of motivation: Goal Orientation Theory. *Electronic Journal of Research in Educational Psychology, 2*(1), 35-62.

De Corte, E., Op't Eynde, P., & Verschaffel, L. (2002). Knowing what to believe: The relevance of students' mathematical beliefs for mathematics education. In B. K. Hofer & P. R. Pintrich (Eds.), *Personal epistemology: The psychology of beliefs about knowledge and knowing* (pp. 297-320). Mahwah, NJ: Erlbaum.

Dermitzaki, I., & Efklides, A. (2000). Self-concept and its relations with cognitive and meta-cognitive factors regarding performance in specific domains of knowledge [in Greek]. *Psychology: The Journal of the Hellenic Psychological Society, 7,* 354-368.

Diener, E. (2000). Subjective well-being. The science of happiness and a proposal for national index. *American Psychologist, 55*(1), 34 – 43.

Dina, F., & Efklides, A. (2009). Metacognitive experiences as the link between situational characteristics, motivation, and affect in self-regulated learning. In M. Wosnitza, S. A. Karabenick, A. Efklides & P. Nenniger (Eds.), *Contemporary motivation research: From global to local perspectives* (pp. 117-146). Cambridge: Hogrefe & Huber.

Do, S. L., & Schallert, D. L. (2004). Emotions and classroom talk: Toward a model of the role of affect in students' experiences of classroom discussions. *Journal of Educational Psychology*, *96*(4), 619-634.

Durkin, K. (2005). *Adolescence: An introduction.* London: Blackwell.

Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality, and development.* New York: Psychological Press.

Eccles, J. S. (1993). School and family effects on the ontogeny of children's interests, self-perceptions, and activity choices. In J. Jacobs (Ed.), *Developmental perspective on motivation* (pp. 145-208). Lincoln, NE: University of Nebraska Press.

Eccles, J. S. (2005). Studying the development of learning and task motivation. *Learning and Instruction, 15*, 161-171.

Eccles, J. S., & Wigfield, A. (1995). In the mind of the actor: The structure of adolescents' achievement task values and expectancy-related beliefs. *Personality and Social Psychology Bulletin, 21*, 215-225.

Eccles, J. S., & Wigfield, A. (2000). Schooling influences on motivation and achievement. In S. Danziuger & J. Waldfogel (Eds.), *Securing the future: Investing in children from birth to college* (pp. 153-181). New York: Sage.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values and goals. *Annual Review of Psychology, 53*, 109-132.

Efklides, A. (2001). Metacognitive experiences in problem solving: Metacognition, cognition and self regulation. In A. Efklides, J. Kuhl, & R. M. Sorrrentino (Eds.), *Trends and prospects in motivation research* (pp. 297-323). Dordrecht, The Netherands: Kluwer.

Efklides, A. (2006). Metacognition and affect: What can metacognitive experiences tell us about learning process? *Educational Research Review, 1,*3-14.

Efklides, A., & Petkaki, C. (2005). Effects of mood on students' metacognitive experiences, *Learning and Instruction, 15*, 415-431.

Efklides, A., & Volet, S. (Eds.). (2005). Feelings and emotions in the learning process. *Learning and Instruction, 15*(5) [whole issue].

Ellis, L. A., Marsh, H. W., & Craven, R. G. (*2005*). Navigating the transition to adolescence and secondary school: A critical evaluation of the impact of peer support. In H. W. Marsh, R. G. Craven, & D. M. McInerney (Eds.), *International advances in self research: New frontiers for self research* (pp. 329-355). Greenwich: Information Age Publishing.

Frenzel, A. C., Pekrun, R., Goetz, T. (2007). Perceived learning environments and students' emotional experiences: A multilevel analysis of mathematics classrooms. *Learning and Instruction, 17,* 478-493.

Frenzel, A. C., Goetz, T., Lüdtke, O., Pekrun, R., & Sutton, R. (2009). Emotional transmission in the classroom: Exploring the relationship between teacher and student enjoyment. *Journal of Educational Psychology, 101*, 705-716.

Frenzel, A. C., Goetz, T., Pekrun, R., & Watt, H. M. G. (2010). Development of mathematics interest in adolescence: Influences of gender, family, and school context. *Journal of Research on Adolescence, 20*, 507-537.

Frijda, N. H. (1988*).* The laws of emotion. *American Psychologist, 43*(5), 349-358.

Frijda, N. H. (2005). Emotion experience. *Cognition & Emotion, 19*, 473-498.

Frijda, N. H. (2007). *The laws of emotion.* Mahwah: Erlbaum.

Frijda, N. H. (2009). Emotion experience and its varieties. *Emotion Review, 1,* 261-271.

Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology, 95*(1), 148-162.

Gentry, M., Gable, R. K., & Rizza, M. (2002). Students' perceptions of classroom activities: Are there grade and gender differences? *Journal of Educational Psychology, 94*(3), 539-544.

Glaser-Zikuda, M., Fub, S., Laukenmann, M., Metz, K., & Randler, C. (2005). Promoting students' emotions and achievement- instructional design and evaluation of the ECO-LE-approach. *Learning and Instruction, 15*, 481 - 495.

Glaser-Zikuda, M., & Mayring, Ph. (2003). A qualitative oriented approach to learning emotions at school. In Ph. Mayring, & Ch. V. Rhoneck (Eds.), *Learning emotions. The influence of affective factors on classroom learning* (pp. 103 – 126). New York: Lang.

Goetz, T., Zirngibl, A., Pekrun, R, & Hall, N. (2003). Emotions, learning and achievement from an educational-psychological perspective. In P. Mayring & C. V. Rhoeneck (Eds.), *Learning and emotions: The influence of affective factors on classroom learning* (pp. 9 – 28). Frankfurt am Main: Peter Lang.

Goetz, T., Frenzel, A. C., Pekrun, R., Hall, N. C., & Lüdtke, O. (2007). Between- and within-domain relations of students' academic emotions. *Journal of Educational Psychology, 99,* 715-733.

Goodenow, C. (1993). Classroom belonging among early adolescent students: Relationships to motivation and achievement. *Journal of Early Adolescence, 13,* 21 – 43.

Gottfried, A. E., Fleming, J. S., & Gottfried, A. W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. *Journal of Educational Psychology, 93*, 3-13.

Harackiewicz, J. M., Barron, K. E., Tauer, J. M., & Elliot, A. J. (2002). Predicting success in college: A longitudinal study of achievement goals and ability measures as predictors of interest and performance from freshman year through graduation. *Journal of Educational Psychology*, *94*(3), 562 - 575.

Hascher, T. (2003). Well-being in school – why students need social support. In Ph. Mayring, & Ch. V. Rhoneck (Eds.), *Learning emotions. The influence of affective factors on classroom learning* (pp. 127 – 142). New York : Lang.

Harter, S. (1999). *The construction of the self: A developmental perspective.* New York: Guilford.

Hoffmann, L. (2002). Promoting girls' interest and achievement in physics classes for beginners. *Learning and Instruction, 12*, 447-465.

Hynel, S., Confrort, C., Schonet-Reichi, K., & McDougall, P. (1996). Academic failure and school dropout: The influence of peers. In J. Juvonen & K. R. Wentzel (Eds.), *Social motivation: Understanding children's school adjustment* (pp. 313-345). New York: Cambridge University Press.

Jacobs, J. E., Lanza, S., Osgood, D. W., Eccles, J., & Wigfield, A. (2002). Changes in children's self competence and values: Gender and domain differences across grades one through twelve. *Child Development, 37,* 509-527.

Jarvenoja, H., & Jarvela, S. (2005). How students describe the sources of their emotional and motivational experiences during the learning process: A qualitative approach. *Learning and Instruction, 15*, 465 - 480.

Jenkins, J. M., & Ball, S. (2000). Distinguishing between negative emotions: Children's understanding of the social-regulatory aspects of emotions. *Cognition & Emotion, 14*(2), 261-282.

Kususanto, P., Ismail, H. N., & Jamil, H. (2010). Students' self-esteem and their perceptions of teacher behaviour: A study of between-glass ability grouping. *Electronic Journal of Research in Educational Psychology, 8*(2), 707-724.

Kim, G., Walden, T., Harris, V., Karrass, J., Catron, T. (2007). Positive emotion, negative emotion, and emotion control in the externalizing problems of school-aged children. *Child Psychiatry of Human Development, 37*, 221-239.

Linnenbrink, E. A., & Pintrich, P. A. (2002). Achievement goal theory and affect: An asymmetrical bidirectional model. *Educational Psychologist, 37*, 69-78.

Marsh, H. W., & Dunkin, M. J. (1997). Students' evaluation of university teaching: multidimensional perspective. In R. P. Perry & J. C. Smart (Eds.) *Effective teaching in higher education* (pp.241 – 320). New York: Agathon.

Meyer, D. K., & Turner, J. C. (2002). Discovering emotion in classroom motivation research. *Educational Psychologist, 37*(2), 107 – 114.

Nodding, N. (2003). *Happiness and Education.* Cambridge: Cambridge University Press.

O'Donnell, A. M. (2006). The role of peers and group learning. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of Educational Psychology* (pp. 781 - 802). London: Lawrence Erlbaum.

Oosterheert, I. E., & Vermunt, J. D. (2001). Individual differences in learning to teach: Relating cognition, regulation and affect. *Learning and Instruction, 11*(2), 133 – 156.

Pekrun, R. (1992). The impact of emotions on learning and achievement: Towards a theory of cognitive/motivational mediators. *Applied Psychology: An International Review, 41,* 359-376.

Pekrun, R. (2000). A social- cognitive, control - value theory of achievement emotions. In J. Heckhausen (Ed.), *Motivational psychology of human development* (pp. 143 – 163). Oxford: Elsevier.

Pekrun, R. (2005). Progress and open problems in educational emotion research. *Learning and Instruction, 15*, 497-506.

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review, 18*, 315-341.

Pekrun, R. (2009). Emotions at school. In K. R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation in school* (pp. 575–605). New York: Routledge Taylor.

Pekrun, R., Frenzel, A., Goetz, T., & Perry, R. P. (2007). The control-value theory of achievement emotions: An integrative approach to emotions in education. In P. A. Schutz & R. Pekrun (Eds.), *Emotion in education* (pp. 13-36). San Diego, CA: Academic Press.

Pekrun, R., Goetz, T., Daniels, L. M., Stupnisky, R. H., & Perry, R. P. (2010). Boredom in achievement settings: Control-value antecedents and performance outcomes of a neglected emotion. *Journal of Educational Psychology, 102,* 531-549.

Pekrun, R., Goetz, T., Titz, W., & Perry, R. P. (2002). Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. *Educational Psychologist, 82*(1), 33- 40.

Pekrun, R., & Schutz, P. A. (2007). Where do we go from here? Implications and future directions for inquiry on emotions in education. In P. A. Schutz & R. Pekrun (Eds.), *Emotion in education* (pp. 313-331). San Diego, CA: Academic Press.

Pekrun, R., & Stephens, E. J. (2010). Achievement emotions: A control-value approach. *Social and Personality Psychology Compass, 4,* 238-255.

Perry, N. E., Turner, J. C., & Meyer, D. K. (2006). Classroom as contexts for motivating learning. In P. A. Alexander & P. H. Winne (Eds), *Handbook of Educational Psychology* (pp. 327 - 348). London: Lawrence Erlbaum.

Pintrich, P. R. (2000). An achievement goal theory perspective on issues in motivation terminology, theory and research. *Contemporary Educational Psychology, 25,* 92 – 104.

Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology, 95*(4), 667-686.

Pintrich, P. R., & Schunk, D. (2002). *Motivation in education: Theory, research, and applications* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

Rigby, B. T., & Huebner, E. S. (2005). Do causal attributions mediate the relationship between personality characteristics and life satisfaction in adolescence? *Psychology in the Schools, 42*(1), 91-99.

Sansone, C., & Harackiewicz, J. M., (2000). *Intrinsic and extrinsic motivation: The search for optimal motivation and performance.* San Diego, CA: Academic Press.

Sarason, B. R., Sarason, I. G., & Pierce, G. (1990). *Social support: An interactional view.* New York: Wiley.

Schunk, D. H., & Zimmerman, B. J. (2006). Distinguishing the means and ends. In P. A. Alexander & P. H. Winne (Eds), *Handbook of Educational Psychology* (pp. 349 - 368). London: Lawrence Erlbaum.

Schutz, P. A., & DeCuir, J. T. (2002). Inquiry on emotions in education. *Educational Psychologist, 37*(2), 125 – 134.

Schutz, P. A., & Lenehart, S. J. (2002). Emotions in education. *Educational Psychologist, 37*(2), 67-78.

Schutz, P. A. Hong, J. Y., Cross, D. I., & Osbon, J. N. (2006). Reflections on investigating emotions among educational contexts. *Educational Psychology Review, 18,* 343 -360.

Siemer, M., Mauss I., & Gross, J. (2007). Same situation-Different emotions: How appraisals shape our emotions. *Emotion, 7*, 592-600.

Slavin, R. E. (1996). Resarch on cooperative learning and achievement: What we know, what we need to know. *Contemporary Educational Psychology, 21*, 43 – 69.

Stephanou, G. (2004a). Ability self-perception, perceived task difficulty, performance expectations, and task value in language and mathematics: Their relationship to academic performance and educational choice [in Greek]. In M. Dikaiou, P. Roussi, & D. Cristidis (Eds.), *Scientific Annals of the School of Psychology* (Vol. VI, pp. 65-93). Thessaloniki, Greece: Aristotle University of Thessaloniki / Art of Text.

Stephanou, G. (2004b). Effects of ability self-perception, perceived task-difficulty, performance expectations and importance of performance on performance and attributions in specific academic domains. In J. Baumert, H. W. Marsh, U. Trautwein, & G. E. Richards (Eds), *Proceedings of the 3ʳᵈ International SELF Research Conference: Self-Concept, Motivation and Identity* (CD form). Berlin, Germany: Max Planck Institute for Human Development. http://www.self.ox.ac.uk

Stephanou, G. (2005). Academic performance and interpersonal relationships [in Greek]. In F. Vlachos, F. Bonoti, P. Metallidou, I. Dermitzaki, & A. Efklides (Eds.), *Human behavior and learning. Scientific Annals of the Psychological Society of Northern Greece* (Vol. 3, pp. 201-228). Athens: Ellinika Grammata.

Stephanou, G. (2006). Effects of cognitive factors and teacher effectiveness on students' academic emotions and performance. In R. G. Graven, J. Eccles, & M. Tr. Ha (Eds), *Pro-

ceedings of the 4*rd* International SELF Research Conference: Self – Concept, Motivation, Social and Personal Identity for the 21tst Century (CD form). Sydney, Australia: SELF Research Center, University of Western Sydney. http//self.uws.edu.au

Stephanou, G. (2007). Effects of cognitive and perceived teacher- related factors on student emotions in physical education. In Y. Theodorakis, M. Goudas, & A. Papaioannou (Eds.), *Proceedings of the 12th European Congress of Sport Psychology. Sport and Exercise Psychology. Bridges between disciplines and culture,* 242 – 247. Halkidiki - Greece: University of Thessaly & European Federation of Sport Psychology.

Stephanou, G. (2008). Students' value beliefs, performance expectations, and school performance: The effect of school subject and gender. *Hellenic Journal of Psychology: The Journal of the Psychological Society of Northern Greece, 5,* 231-257.

Stephanou, G., & Giannopoulou, M. (2010, May). Teachers' emotions in classes: Antecedents and effects on teaching expectations. *Paper presented at the 4th International Conference on Metacognition.* Munster, Germany.

Stephanou, G., Kariotoglou, p., & Ntinas, K. (submitted). University students' emotions in lectures: The effect of competence beliefs, value beliefs and perceived task-difficulty, and the impact on academic performance.

Stephanou, G., & Kyridis, A. (2008, August). Interrelations of cognition, emotions and perceived teacher effectiveness in student academic performance in teacher education. Paper presented *at the International Conference on Educational Effectiveness* (EARLI SIG18). Theoretical and Methodological Challenges for Research. Frankfurt, Germany.

Turner, J. C., & Meyer, D. K., (2000). Studing and understanding the instructional contexts of classroom: using our past to figure our future. *Educational Psychologist, 35*, 69-85.

Turner, J. C., Midgey, C., Meyer, D. K., Gheen, M., Anderman, E. M., & Kang, Y. (2002). The classroom environment and students' reports of avoidance strategies in mathematics: A multimethod study. *Journal of Educational Psychology, 94*, 88-106.

Turner, J. C., & Schallert, D. L. (2001). Expectancy-value relationships of shame reactions and shame resiliency. *Journal of Educational Psychology, 93*, 320 - 329.

Vauras, M., Salonen, P. & Kinnunen, R. (2008). Influences of group processes and interpersonal regulation on motivation, affect and achievement. In M. Maehr, S. Karabenick & T. Urdan (Eds.), *Social Psychological Perspectives. Advances in Motivation and Achievement, Vol. 15*, pp. 275-314. New York: Emerald Group.

Vauras, M., Salonen, Lehtinen, P., & Kinnunen, R. (2009). Motivation in school from contextual and longitudinal perspectives. In M. Wosnitza, S. A. Karabenick, A. Efklides & P. Nenniger (Eds.), *Contemporary motivation research: From global to local perspectives* (pp. 1 - 23). Cambridge: Hogrefe & Huber.

Volet, S., & Jarvela, S. (Eds.). (2001). *Motivation in learning context: Theoretical advances and methodological implications.* London: Pergamon.

Weiner, B. (1992). *Human motivation: Metaphors, theories and research*. London: Sage.

Weiner, B. (2001). Intrapersonal and interpersonal theories of motivation from an attribution perspective. In S. Farideh & C. Chi-yue (Eds.)*, Student motivation: The culture and context of learning,* (pp.17-30). Netherlands: Kluwer Academic Publishers.

Weiner, B. (2002). *Social emotions and personality inferences: A scaffold for a new direction in the study of achievement motivation*. Paper at the 8th International Conference on motivation: Workshop on Achievement and Task Motivation & Motivation and Emotion, Moskow, Russia.

Weiner, B. (2005). Motivation from an attribution perspective and the social psychology of perceived competence. In Elliot, A. J., & Dweck, C. S. (Eds.), *Handbook of Competence and Motivation* (pp. 73-84). New York: Guilford.

Weinstein, C. (1998). Promoting positive expectations in schooling. In N. Lambert & B. M. Lombs (Eds.), *How students learn: Performing schools through learner-centered education* (pp. 81-111). Washington, DC: American Psychological Association.

Wentzel, K. R. (1998). Student motivation in middle school: The role of perceived pedagogical caring. *Journal of Educational Psychology, 82,* 616- 622.

Wentzel, K. R. (2002). Are effective teachers like good parents? Teaching styles and students' adjustment in early adolescence. *Child Development, 73,* 287 - 301.

Wigfield, A., Byrnes, J. P., & Eccles, J. S. (2006). Development during early and middle adolescence. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of Educational Psychology* (pp. 87 - 113). London: Lawrence Erlbaum.

Wigfield, A., & Eccles, J. (2000). Expectancy value theory of achievement motivation. *Contemporary Educational Psychology, 25*, 68-81.

Wigfield, A., & Eccles, J. (2002). The development of competence beliefs and values from childhood through adolescence. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 92-120). San Diego, CA: Academic.

Wigfield, A., Guthrie, J., Tonks, S., & Perencevich, K. (2004). Children's motivation for reading: Domain specificity and instructional influences. *The Journal of Educational Research, 97,* 299-309.

Wolters, A., & Pintrich, P. R. (1998). Contextual differences in student motivation and self-regulated learning in mathematics, English, and social studies classrooms. *Instructional Science, 26,* 27-47.

Wosnitza, M., Karabenick, S. A., Efklides, A., & Nenniger, R. (2009). *Contemporary motivation research. From global to local perspectives.* Cambridge: Hogrefe & Huber Publishers.

Zeidner, M. (1998). *Test anxiety: The state of the art.* New York: Plenum.

Zeidner, M. (2007). Test anxiety in educational contexts: What I have learned so far. In P. A. Schutz & R. Pekrun (Eds.), *Emotion in education* (pp. 165-. 184). Boston: Elsevier.

Zimmerman, B. J. (1995). Self-efficacy and educational development. In A. Bandura (Ed.), *Self-efficacy in changing societies* (pp. 202-231). New York: Cambridge University Press.

Zimmerman, B. J., & Schunk, D. H. (2001). *Self- regulated learning and academic achievement. Theoretical perspectives.* Mahwah, NJ: Lawrence Erlbaum.

[This page intentionally left blank]