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MASTER THESIS

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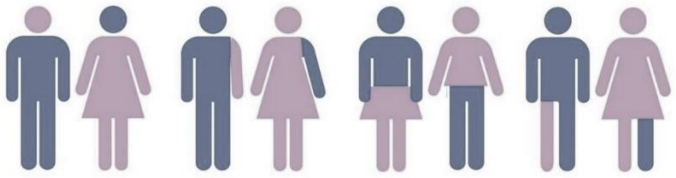
Exploring the gender gap in science education: The effects of parental support and parental role modeling on students' academic self-efficacy and intrinsic motivation



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A special thanks goes to my son, Mason Maddox, for being my inspiration and motivator. I hope to make you proud little boy. You were not even three months old when I started with the EST Master. Mason, with hard work and dedication you can achieve anything you want in life. I will be in your corner supporting you with everything you do.

At last, I would like to dedicate this thesis to the memory of my father, Wilbert van Foeken. Although he was my inspiration for pursuing my master's degree, he was not able to see my graduation. This is for him.

Abstract

The nature of gender inequality in science education is complex, since young women remain a minority when it comes to participating in science-related courses. When societies are unable to correct these inequities, they are cheating themselves out of meaningful and important contributions from a significant portion of their citizens. Prior research suggests that study choice is reciprocally related to students' intrinsic motivation and self-efficacy, as well as to parental influences. The main goal of this research was to gain more insight into the underlying reasons for the gender gap in science education. Using data from the PISA 2015 assessment of 15-year-old students in 18 countries, a series of mean comparisons and regression analyses were conducted to determine the relationships between students' self-efficacy and intrinsic motivation, and parental support and parental role modeling (with science achievement as a control variable), as well as their interaction with gender. The results showed that even though the gender gap in science achievement is narrow, girls have lower science self-efficacy and intrinsic motivation than boys do. Moreover, the results suggested that parents support their daughters and sons in different ways, since girls receive more emotional support whereas boys receive more science-related support. A remarkable finding was that science-related support has a significant impact on both science self-efficacy and intrinsic motivation, whereas emotional support does not seem to have any impact on those two constructs. Regarding parental role modeling, only parents' view on science showed a significant positive effect. A final aim of the current study was to determine if interactions between gender and parental influences or science achievement could explain the differences in students' self-efficacy and intrinsic motivation, but only a few interaction effects were significant, from which the majority was in favor of girls. Even though parents might support their sons and daughters differently, this does not seem to have a big impact on the students' self-efficacy and intrinsic motivation. In sum, gender remains an important factor for students' academic self-efficacy and intrinsic motivation, even when science achievement and parental influences are controlled for. The results of the current research can be used as input for further research in this direction and for designing interventions focusing on parents as well as students, with the goal to stimulate girls in pursuing a science related career.

Keywords: Gender differences, science education, self-efficacy, intrinsic motivation, parental influences, PISA 2015.

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Chapter 1 - Introduction

Gender equality in education has been an important goal at European level since the 1970s, with a special focus on equal treatments and equal opportunities (Forsthuber, Horvath & Motiejunaite, 2010). The efforts that have been made to achieve this goal, like the foundation of comprehensive legislative frameworks, are starting to pay off, but gender equality in education has not yet been achieved. For the first time in European history, there are more highly educated women than highly educated men (Vincent-Lancrin, 2008), but these highly educated women still have lower employment rates and lower salaries. Also, with regard to training and education, gender differences are still persistent in both the choice of study courses and attainment (Forsthuber et al., 2010; OECD, 2016).

Over recent decades, the nature of gender inequality in education has changed and became more complex. There is a gender gap in science education, since young women remain a minority when it comes to participating in science-related courses. Unfortunately, many girls and women choose academic and career paths outside of science and mathematics, because they believe they will have more opportunities available to them in other fields of study (Wang, Eccles & Kenny, 2013; Jacobs, Davis-Kean, Bleeker, Eccles & Malanchuk, 2005). As an example, in 2012 only 14% of the young women who entered the university for the first time chose a field of study that was science-related, in comparison to 39% of the young men who chose to pursue one of those study fields (OECD, 2015). Research that has been conducted across different countries shows that gender differences in math and science education generalize reasonably well, which indicates that societies and schools have not yet succeeded in maintaining and generating comparable levels of motivation and interest in these domains among female and male students (Marsh, Hau, Artelt, Baumert & Peschar, 2006).

Even though serious efforts have been made in trying to close this gender gap, there needs to be more insight in the underlying reasons for this phenomenon, since it brings along some important negative consequences. When women fail to pursue the potentially lucrative science- and mathematics-related careers for which they are capable, they cannot take advantage of the fulfillment and personal challenges that are represented by these opportunities and are possibly decreasing their chances for a financially stable career future (Hackett, 1995). Moreover, societies that are unable to correct their inequities are cheating themselves out of meaningful and important contributions from a significant portion of their citizens. This is especially a concern since there is a proportional incline of female students alongside a decline of male students in college populations. If this trend holds, it is unavoidable that societies will need to increasingly rely on the scientific and mathematical talents of women to maintain their economical, technological and scientific viability (OECD, 2015; Vincent-Lancrin, 2008; Hackett, 1995).

Research suggests that future career expectations and study choice are reciprocally related to self-efficacy beliefs and intrinsic motivation (Eccles, 2005, 2009; Ceci & Williams, 2010b; Jacobs et al., 2005). Additionally, experts in the fields of psychology and education have increasingly recognized

the significant impact that parental support has on the academic learning and developing processes of children (Fan, 2001; Domina, 2005; Sheldon & Epstein, 2005; Desimone, 1999; Sirvani, 2007b). Furthermore, parents serve as long-term role models and their beliefs have the power to influence children as they develop their own values, motivations, identity and self-efficacy (Tiedemann, 2000; Jacobs, 2005).

Even though empirical research on the subject has shown that the intrinsic motivation and self-efficacy of children are shaped by environmental influences, and especially by parental support and parental role modeling (Fan & Williams, 2010; Simpkins, Fredricks & Eccles, 2012), it is still unclear if this has the same effect on boys and girls. In order to gain more insight into the underlying reasons for the underrepresentation of young women in science programs, the main goal of this research is to explore the relationship between parental support and parental role modeling and the students' intrinsic motivation and self-efficacy in science, as well as their interaction with gender.

1.1 Theoretical Conceptual Framework

Since the main focus of this study is on students' academic self-efficacy and intrinsic motivation and the role of parental influences (i.e., parental support and parental role modeling) on these constructs, these variables will be explored more in depth in this theoretical conceptual framework, as well as the interrelations between them and their interaction with gender. In addition, science achievement will be taken into account since this variable is being controlled for in the current study.

1.1.1 Students' academic self-efficacy and intrinsic motivation

Science self-efficacy

As mentioned before, research suggests that future career expectations and study choice are reciprocally related to self-efficacy beliefs (e.g., Eccles, 2005, 2009; Ceci & Williams, 2010b). According to Bandura, self-efficacy can be defined as the judgments people have of their capabilities to execute and organize courses of action required to attain designated types of performances (Bandura, 1986). Self-efficacy has a strong influence on the choices students make, how long they persevere in challenging situations, and the amount of effort they expend. Moreover, research suggests that student behavior can be predicted more effectively by their beliefs about their capabilities than by what they are actually capable of accomplishing, because these beliefs are often determining what students do with the skills and knowledge they have (Bandura, 1986). The influence of self-efficacy on student behaviors has not been left unnoticed and has led to a growing interest in this subject among educational researchers. Recently conducted studies have shown that there is extensive evidence of the link between academic achievement and self-efficacy (Stankov, Lee, Luo & Hogan, 2012; Diseth, Danielson, Samdal, 2012 & Phan, 2012).

In science-related domains, self-efficacy also plays an important role. High performing students in science report higher levels of self-efficacy, which is caused by the positive emotions that are associated with it and the positive feedback received from peers, teachers and parents. At the same time, students with low levels of self-efficacy are at risk of underperforming when they engage in self-fulfilling prophecy; they do not believe in their abilities to accomplish a particular task so they do not exert the effort needed to be successful (Bandura, 1986). Research has shown that self-efficacy in science has not only been related to performance, but also to the choice of courses and future career orientations (Eccles, 2005, 2009; Ceci & Williams, 2010b; Jacobs et al., 2005).

Interestingly, even though the performance of boys and girls in a variety of math and science subjects is comparable, as well as their abilities (Else-Quest, Hyde & Lynn, 2010), girls are more likely to have lower levels of self-efficacy than boys (OECD, 2015; Pajares, 2005). These findings are consistent with Bandura's observation that girls have lower opinions of their abilities than boys do, even though they perform equally well in this subject (Bandura, 1986). As a consequence, when girls come to believe that they are incapable or not able to compete in a male dominated domain such as mathematics or science, they may shy away and avoid science related courses, and select a different academic path for which they may be less interested but more confident (Hackett & Betz, 1989; Eccles et al., 1999). However, research shows that gender differences are reversed when the context concerns reading or writing. For example, Parajes and Valiante (2001) found that middle school girls reported higher writing self-efficacy than boys, even though there was no gender difference in actual writing performance.

Science intrinsic motivation

Another important factor that is affecting future career orientations and the willingness of students to spend effort and time in science-related activities is enjoyment of science, also referred to as intrinsic motivation (Eccles, 2009; Jacobs et al., 2005). Intrinsic motivation can be defined as the motivation that exists within the individual that is driven by enjoyment or interest in the task itself, rather than relying on outcome or external pressure (Amabile, Hill, Hennessey & Tighe, 1994).

Regarding intrinsic motivation for science in general, there is a lack of consensus when it comes to gender differences. Some studies report that girls have a lower science motivation (e.g., Simpson & Oliver, 1985; Patrick et al., 2009), while other studies report no gender differences (e.g., DeWitt et al., 2013; DeBacker & Nelson, 2000). However, PISA data show that there is a difference between boys and girls and their intrinsic motivation towards science-related topics (OECD, 2015). Girls tend to be more interested in health-related topics, whereas boys are more invested in chemistry and physics. The differences between boys and girls are narrower for the topics history, the universe, and biosphere. In all economies and countries, more girls than boys reported being interested in how science can be used to prevent disease, whereas boys were more likely than girls to report being interested in the topics of forces and motion.

Research shows that there is a decline in the enjoyment of science among students from elementary to high school, which may reflect the fact that the interests of students are becoming increasingly specialized and differentiated as they grow older. Moreover, this decline may also be linked to teaching practices that can either nurture or undermine the natural motivation of students to learn science (Krapp & Prenzel, 2011; Hampden-Thompson & Bennett, 2013; Logan & Skamp, 2013). Research suggests that environments have an important impact on the development of intrinsic motivation of children. The role of social environments is recognized within the cognitive evaluation theory that was proposed by Deci and Ryan (1980, 1985), as they can either hinder or enhance intrinsic motivation based upon the interpersonal context in which rewards are delivered (Ryan & Desi, 2000b; Deci, Koestner & Ryan, 2001).

1.1.2 Parental influences

Parental support

Parental support has long been an important topic of fascination for educational experts, which has led to a great amount of research on parental support in education. Interestingly, it has often produced contradictory findings. The effect of parental support on student outcomes has been different depending on which academic outcomes were studied and which aspects of parental support were investigated. One possible reason for these mixed results might be the lack of a clear definition of parental support, since this construct is often defined in a non-specific manner (Fan & Chen, 2001). This has made it difficult to draw any general conclusions across studies. For the purposes of this study, parental support is defined as parents' participation in their children's education with the purpose of promoting their social and academic success (Fishel & Ramirez, 2005). It includes (a) parental current support for learning in the home (e.g., helping with science homework, obtaining science-related materials, asking about performance in science), and (b) parental emotional support (e.g., showing interest in child's school activities, being supportive of child's efforts and achievements in school, encouraging confidence).

Parental role modeling

In addition to the important influence of parental support on student outcomes, parents serve as long-term role models for their children (Tiedemann, 2000; Jacobs, 2005). According to Bandura's social learning theory, the action of others is the most common and informative predictive cue that influences behavior at any given moment (Bandura, 1986). Children acquire and learn internal codes of behavior influencing their actions and perceptions by observing their parents or caretakers. Learning from role models can transmit new patterns of behaviors, or strengthen or weaken the children's existing restraints against particular behaviors (Bandura, 1986; Matthews & Moser, 1996). Research has demonstrated that social learning from parental role models influences children's later professional orientation (Korunka et al., 2003; Carr & Sequeira, 2007; Jacobs & Bleeker, 2004). Parental work experiences have a significant effect on children and children learn from their parents' work experiences by internalizing

them as norms of behavior (Menaghan & Parcel, 1995). For the purposes of this study, parental role modeling includes (a) parental occupational status, (b) parental educational level, and (c) parents' view on science.

1.1.3 Parental influences on students' self-efficacy

Since parents serve as long-term role models for their children and their beliefs have the power to influence them as they grow older (Tiedemann, 2000; Jacobs, 2005), they play an important role when it comes to the development of their children's self-efficacy. Bandura (1997) has pointed out that children's behavior and sense of self-efficacy can be affected by the social environment through supportive communication and observational learning experiences. Due to the fact that children exist within social systems and that there is a continuous interaction with care takers, parents do not only influence the development of self-efficacy, but they are also providing observational models that guide the children's self-efficacy adjustments. Children are more likely to persist when facing difficulty, exercise greater effort, and experience less self-doubt when their capabilities are affirmed and encouraged by their parents.

Also, a great amount of research has been conducted using an expectancy-value framework (Wigfield & Eccles, 2000), which focused on the transmission of gender stereotypes from parents to children and how this influenced the students' achievement outcomes. Results show the existence of a same-gender dyad model, which means that, for example, math-stereotypes are predominantly communicated from mother to daughter and from father to son. Unfortunately, parents still are often holding gender stereotypes about their children's math performance, believing that sons have stronger math abilities than daughters, even when there is no evidence supporting this belief (Furnham, Reeves & Budhani, 2002). As a result, parents may expect their daughters to perform more poorly in male-oriented domains such as mathematics and science, which may contribute to greater anxiety and lower self-efficacy for girls.

Zeldin and Pajares (2000) found themselves fascinated by this subject and focused their qualitative research on the self-efficacy beliefs of women who went against the odds and pursued mathematics- and science related careers and became successful in these areas. Their most important finding was the importance of role models in the women's families who had mathematics- or science-related careers or who modeled mathematics- or science-related skills on a regular basis. Another prominent theme that emerged was that it was equally important for the women to feel that others believed in them as much as they believed in themselves. This is consistent with Bandura's (1997) insight that "self-affirming beliefs of others promote development of skills and a sense of personal efficacy" (P.101).

Although the women reported that they preferred to see more female role models, they needed to rely on men as important sources of social persuasions and observational learning experiences, since there were more men than women working in science and mathematics. This preference for female role

models has been investigated in depth, and has led to several theories that show how children most likely act in similar ways as people who are most similar to themselves (Maccoby, 1998; Tomasetto, Romana & Cadinu, 2011; Simpkins et al., 2012). Research that was done by Bleeker and Jacobs showed consistent results; the self-efficacy of girls in science and mathematics was significantly correlated with the expectations of the mothers for their daughter's success, whereas the mothers' perceptions only had a small effect on their sons (Bleeker & Jacobs, 2004).

1.1.4 Parental influences on students' intrinsic motivation

Regarding students' academic intrinsic motivation, an important aspect to take into consideration are parental attitudes towards science, since they can affect children's motivation and achievement in several ways (Sun, Bradley & Akers, 2012). Children who reported to have parents with more positive attitudes towards science tend to have higher occupational and educational science aspirations (DeWitt et al., 2013). In addition, research results show that parents who believe that science is an important subject and who encourage their children to take advanced science courses have a larger effect on students' test scores than parents who have more magazines and books at home and attend parent-teacher conferences (Smith & Hausafus, 1998). Perera, Bomhoff and Lee (2014) conclude in their research that more positive parental attitudes towards science creates more favorable attitudes towards the subject among children, which in turn will lead to higher science achievement.

According to the expectancy-value model, there are several important pathways by which the motivation of children is influenced by their parents (Eccles et al., 1983). The model shows that parents contribute to gender differences in motivation by encouraging different activities and skills, communicating different goals and expectations for girls and boys, and modeling sex-typed behavior (Eccles et al., 1983; Jacobs et al., 2005). Bleeker and Jacobs (2004) found that the promotive activities parents engaged in were dependent on both the child as well as the parent and were connected to the later involvement in science and mathematics activities of the children. More specifically, mothers were less likely to purchase science and mathematics items for girls than for boys, regardless of their grade level. Analyses that were done six years later showed an increase in children's science and mathematics interests related to the number of purchases made (Bleeker et al., 2004).

Moreover, research suggests that both fathers and mothers are more likely to be more involved in the mathematics and science activities of their sons and provide fewer science and math opportunities for their daughters (Jacobs et al., 2005; Bleeker et al., 2004). For example, several studies demonstrated that parents spend more time explaining science processes in detail to their sons than to their daughters, and the amount of 'science talk' between parents and their children has been shown to predict comprehension of science readings a few years later (Tenenbaum, Snow, Roach & Kurland, 2005; Crowley, Callanan, Tenenbaum & Allen, 2001). This differential treatment could possibly be contributing to the gender gap in science programs given that parental science and math behaviors are

closely linked to children's career interests and classroom engagement (Turner, Steward & Lapan, 2004).

It is important to note that the effect of parental involvement on intrinsic academic motivation is two-sided; parental involvement that children perceive as controlling, such as deadlines and surveillance, controlling communication and externally controlled rewards, will pressure students towards certain outcomes and undermine intrinsic motivation (Ginsburg & Bronstein, 1993). For example, uninvited homework assistance may undermine the confidence of children in the domain of study, and research suggests that girls are more sensitive to such intrusions (Bhanot & Jovanovic, 2005). On the other hand, parental involvement that conveys meaningful feedback in the context of self-determination will be perceived as informational and will cause an enhancement in intrinsic motivation (Ginsburg et al., 1993).

1.1.5 Science achievement

The control variable for this study is science achievement. Research has shown that sex-differences in educational achievement have been decreasing steadily over the past decades (Wiliam, 2000; OECD, 2016). However, with regard to science performance, there are some small differences between boys and girls (OECD, 2016). On average across 72 countries and economies, the mean performance of boys in science is 4 points higher than the mean performance of girls, which is a numerically small but statistically significant difference. Interestingly however, on average, girls show less variation in performance than boys. The variation in science performance is smaller among girls than among boys in all but 18 countries and economies. As a result, the percentage of top-performing boys is higher than the percentage of top-performing girls, but so is the percentage of low-achieving boys. Also, Research that has been conducted by Marsh et al. (2006) has shown a gender stereotypic pattern; boys have higher scores in science- and math-specific constructs (i.e., achievement, interest, and self-concept), whereas girls have high scores in verbal-specific constructs. However, these differences are asymmetrical. Whereas the advantage favoring boys in math achievement is small, the advantage favoring girls in verbal achievement is substantial.

1.2 Research questions and model

The main goal of this research is to gain more insight into the underlying reasons for the gender gap in educational attainment when it comes to science programs, by exploring the relationships between students' intrinsic motivation and self-efficacy in science, and parental support and role modeling (with science achievement as a control variable), as well as their interaction with gender (see Figure 1).

The research questions that need to be answered in order to achieve this goal, are the following:

1.A. Is there a relationship between parental support (i.e., parental current support and parental emotional support) and the students' self-efficacy and intrinsic motivation in science?

1.B. Is there a gender difference in the relationship between parental support (i.e., parental current support and parental emotional support) and the students' self-efficacy and intrinsic motivation in science?

2.A. Is there a relationship between parental role modeling (i.e., parental occupational status, parental educational level, and parents' view on science) and the students' self-efficacy and intrinsic motivation in science?

2.B. Is there a gender difference in the relationship between parental role modeling (i.e., parental occupational status, parental educational level, and parents' view on science) and the students' intrinsic motivation and self-efficacy in science?

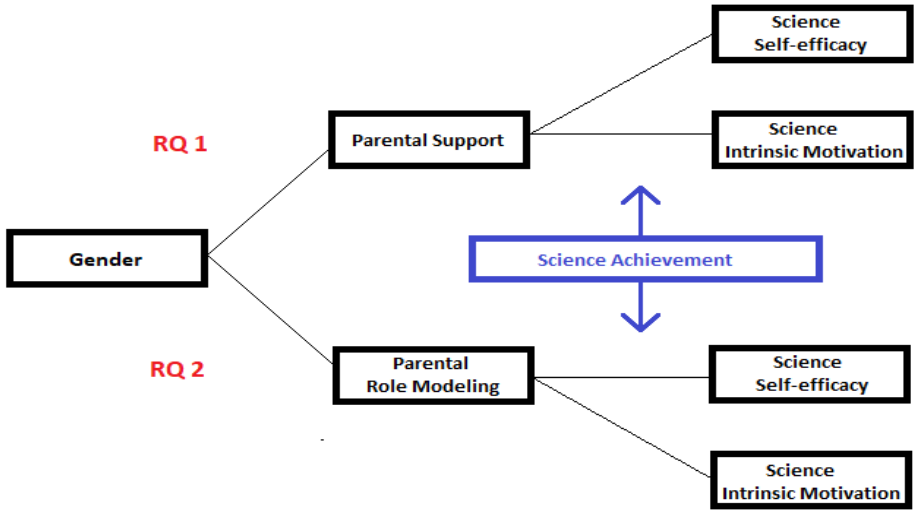


Figure 1. Research model

1.3 Scientific and practical relevance

Research that has been conducted across different countries shows that gender differences in science education generalize reasonably well, which indicates that societies and schools have not yet succeeded in maintaining and generating comparable levels of motivation and interest in these domains among female and male students (Marsh, Hau, Artelt, Baumert & Peschar, 2006).

This study can offer valuable insight into the underlying reasons for this gender gap in educational attainment when it comes to science programs, especially with regard to the role that parents play. The PISA 2015 dataset offers the unique possibility to analyze a large multinational sample of students and their parents on this specific topic. The results of the analysis can be used as input for further research in this direction and for designing interventions focusing on parents' as well as students, with the goal to stimulate girls in pursuing a science related career.

Chapter 2 - Methods

2.1 Research design

This quantitative study used a descriptive survey design to answer the research questions and can be classified as cross-sectional, since data was collected at only one point in time. Additionally, this study used a correlational design for examining the relationship between students' science self-efficacy and intrinsic motivation, and parental support and role modeling, as well as their interaction with gender. The dependent variables in this research were self-efficacy and intrinsic motivation, and the predictor variables were gender, parental support (i.e. current support and emotional support) and parental role modeling (parental educational level, parental occupational status, and parents' view on science). The control variable for this study was science achievement.

2.2 Data source

The data used for this study comes from the 2015-version of the Programme for International Students Assessment (PISA), which is issued by the Organisation for Economic Co-operation and Development (OECD). PISA assesses the extent to which 15-year-old students have acquired essential key knowledge and skills for successful participation in modern societies. This ongoing programme aims to help monitoring trends in students' acquisition of skills and knowledge across countries and in different demographic subgroups within each country as well as offers insights for education practice and policy (OECD, 2015). In 2015, the assessment was completed by approximately 540.000 students, representing about 29 million 15-year-olds in the schools of the 72 participating economies and countries.

The main focus of the PISA 2015 was on scientific literacy, with mathematics, reading, collaborative problem solving and financial literacy as minor areas of assessment. Students also answered a background questionnaire which sought information about the students themselves, their school, their learning experiences and their homes. For additional information, educational systems were offered the option to distribute a teacher questionnaire and/or a parent questionnaire.

2.3 Respondents

Sampling. According to the OECD standards, the desired population in each education system (country or subnational region), consisted of 15-year-old students attending public and private schools in grade 7 and higher. The sample design for PISA 2015 was a two-stage stratified sample. The first stage was a sample of schools, followed by the second stage which involved the sampling of students within the schools. The PISA consortium (group of international contractors responsible for the implementation and design of PISA internationally) drew the sample of schools for each educational system. For each educational system assessing a minimum of 5.400 students from a minimum of 150 schools was required. The technical standards proposed by the OECD required that students in the sample must be 15 years and 3 months to 16 years and 2 months at the beginning of the testing period.

The OECD's international guidelines specified that within schools a sample of 35 students needed to be selected in an equal probability sample, unless fewer than 35 age-eligible students were attending the school (in which case all 15-year-old students were selected). The school response-rate target was set at 85 percent for all educational systems. In order to be included in the international database, a minimum of 65 percent of schools from the original sample was required to participate. Once the 65 percent benchmark was reached, educational systems were allowed to use replacement schools to increase the response rate. These replacements schools needed to be selected during the previous sampling process. According to the OECD's technical standards a minimum participation rate of 80 percent of sampled students from schools (sampled and replacement) within each educational system was required. This target did not apply to each individual school, but in aggregate, since replacing students within a school was not allowed.

Choice of countries. For this study, information was needed from the parents as well as the students. For this reason, countries were included in the research when they made use of the parent questionnaire option provided by PISA. This resulted in 18 countries (N = 111.594) that participated in the research, including Belgium, Chile, Croatia, the Dominican Republic, France, Georgia, Germany, Hong Kong, Ireland, Italy, Korea, Luxembourg, Macao, Malta, Mexico, Portugal, Spain and the United Kingdom.

2.4 Instrumentation

For this study, the scientific literacy questionnaire as well as the student background questionnaire and parent questionnaire were used (developed for PISA 2015 by the OECD). All questionnaires were computer-based and the complete assessment lasted a total of 2 hours for each student. For more detailed information (e.g. reliability/validity) the OECD provided a technical report (OECD, 2016).

Scientific literacy. Science achievement was measured by using a scientific literacy survey. According to the OECD (2016), scientific literacy in PISA 2015 was defined by the three competencies to: (1) explain phenomena scientifically, (2) evaluate and design scientific enquiry, and (3) interpret data and evidence scientifically. Additionally, the PISA 2015 definition of scientific literacy consisted of four aspects (contexts, competencies, attitudes and knowledge) which were interrelated (see Figure 2). The items of the tests were organized in groups based on a passage setting out a real-life situation and consisted of a mixture of open-ended questions and multiple-choice questions.

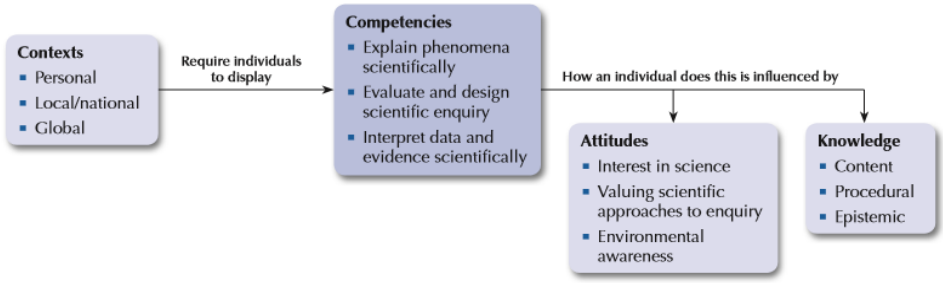


Figure 2. Inter-relations between the four scientific literacy aspects (OECD, 2016).

Student background questionnaire. Students filled in a background questionnaire which sought information about the students themselves, their school, their learning experiences and their homes. For this study, items were used that focused on the variables self-efficacy, intrinsic motivation and parental role modeling (see Table 1). The items were measured using a Likert scale, with the exception of parental role modeling, which contained a classification of education or an index of occupational status. Tables 2 – 5 show examples of the items that were used for each variable.

Table 1

Variables student questionnaire

Variable	**DV name PISA**	**Description**	**Question no.**
Self-efficacy	SCIEEFF	Science self-efficacy	ST129
Intrinsic motivation	JOYSCIE	Science intrinsic motivation	ST094
Parental role modeling	HISEI	Highest parental occupational status	ST014, ST015
	HISCED	Highest parental educational level	ST005, ST006, ST007, ST008

Table 2

Items science self-efficacy (SCIEEFF)

Item	**How easy do you think it would be for you to perform the following tasks on your own?**
ST129Q01	Recognize the science question that underlies a newspaper report on a health issue.
ST129Q02	Explain why earthquakes occur more frequently in some areas than in others.
ST129Q03	Describe the role of antibiotics in the treatment of disease.
ST129Q04	Identify the science question associated with the disposal of garbage.
ST129Q05	Predict how changes to an environment will affect the survival of certain species.
ST129Q06	Interpret the scientific information provided on the labelling of food items.
ST129Q07	Discuss how new evidence can lead you to change your understanding about the possibility of life on Mars.
ST129Q08	Identify the better of two explanations for the formation of acid rain.

Table 3

Items science intrinsic motivation (JOYSCIE)

Item	How much do you disagree or agree with the statements about yourself below?
ST094Q01	I generally have fun when I am learning <broad science> topics.
ST094Q02	I like reading about <broad science>.
ST094Q03	I am happy working on <broad science> topics.
ST094Q04	I enjoy acquiring new knowledge in <broad science>.
ST094Q05	I am interested in learning about <broad science>.

Table 4

Items highest parental occupational status (HISEI)

Item	The following two questions concern your mother's job: (If she is not working now, please tell us her last main job.)
ST014Q01	What is your mother's main job? (e.g. school teacher, kitchen-hand, sales manager) *Please write in the job title.*
ST014Q02	What does your mother do in her main job? (e.g. teaches high school students, helps the cook prepare meals in a restaurant, manages a sales team) *Please use a sentence to describe the kind of work she does or did in that job.*

Table 5

Items highest parental educational level (HISCED)

Item	What is the highest level of schooling completed by your father?
ST007Q0	<ISCED level 3A>
ST007Q0	<ISCED level 3B, 3C>
ST007Q0	<ISCED level 2>
ST007Q0	<ISCED level 1>
ST006Q0	He did not complete <ISCED level 1>

Parent background questionnaire. PISA 2015 offered an optional questionnaire for parents, asking about parental perceptions of and involvement in their child's school as well as parental support for learning in the home, and the parents' view on science. For this study, items were used that focused on the variables current support, emotional support and parents' view on science (see Table 6). The items were measured using a Likert scale. Tables 7 – 9 show the items that were used for each variable.

Table 6

Variables parent questionnaire

Variable	DV name PISA	Description	Question no.
Parental support	CURSUPP	Parental current support	PA003
	EMOSUPP	Parental emotional support	PA004
Parental role modeling	PVS	Parents' view on science	PA033

Table 7

Items parental current support (CURSUPP)

Item	How often do you or someone else in your home do the following things with your child?
PA003Q01	Discuss how well my child is doing at school.
PA003Q02	Eat <the main meal> with my child around a table.
PA003Q03	Spend time just talking to my child.
PA003Q04	Help my child with his/her science homework.
PA003Q05	Ask how my child is performing in science class.
PA003Q06	Obtain science-related materials (e.g., software, study guides etc.) for my child.
PA003Q07	Discuss with my child how science is used in everyday life.
PA003Q08	Discuss <science related career> options with my child.

Table 8

Items parental emotional support (EMOSUPP)

Item	Thinking about the last academic year, to what extent do you agree with the following statements?
PA004Q01	I am interested in my child's school activities.
PA004Q02	I am supportive of my child's efforts at school and his/her achievements.
PA004Q03	I support my child when he/she is facing difficulties at school.
PA004Q04	I encourage my child to be confident.

Table 9

Items parents' view on science (PVS)

Item	How much do you agree with the following statements?
PA033Q02	<Broad science> is important to help us to understand the natural world.
PA033Q06	<Broad science> is valuable to society.
PA033Q07	<Broad science> is very relevant to me.
PA033Q08	I find that <broad science> helps me to understand the things around me.
PA033Q09	Advances in <broad science> usually bring social benefits.

2.5 Procedure

Prior to the analysis, the PISA 2015 data was downloaded from the OECD website. The datafile that was used is the student-questionnaire data file, which includes estimates of student performance, the student background-questionnaire data and the parent-questionnaire data. The data file was downloaded in SPSS format.

It needed to be considered that PISA applied matrix sampling to reduce the length of the scientific literacy test, which splits one long test into multiple smaller tests. Because all students completed a different test, it was not possible to obtain traditional test scores for science achievement. Instead, plausible values were used, which are 'multiple imputations of unobservable latent achievement for each student' (Uysal, 2015).

2.6 Data Analysis

Data has been analyzed using SPSS (IBM Statistics Version 23) and Microsoft Excel 2016, in combination with the IEA International Database (IDB) Analyzer software (Version 4.0.14).

First, the SPSS dataset was reduced by selecting the cases that successfully included the parents' questionnaire option and deleting the cases that were invalid or missing. Also, the categorical variable gender was dummy coded to (0) female and (1) male. Additionally, in order to incorporate interaction effects into the regression analyses, new variables were computed (e.g., gender * achievement, gender * current support, etc.).

Second, the SPSS data was transmitted to the IDB Analyzer. This software was chosen because it makes use of a plausible value methodology and because of its ability to handle complex sample designs (IEA, 2017). The data analysis started with a correlational study and a mean comparison, followed by a multiple regression analysis to study the relationships between gender, science achievement, parental support/parental role modeling (predictor variables) and science self-efficacy/science intrinsic motivation (dependent variables), with science achievement as a control variable. To answer the final research questions, interaction effects between gender and parental support and gender and parental role modeling, as well as gender and science achievement, were included in the regression analysis. For the interaction effects that were found, high scores and low scores were determined based on the descriptive statistics of the students' scores on each variable.

For all the analyses, plausible values were used. The output of every analysis run in the IDB Analyzer was a SPSS syntax file. This syntax file was then run with SPSS, which led to the results in different output formats, including different SPSS files as well as Excel files. The Excel files were used to compute significance values and to create tables and graphs to demonstrate the results.

Chapter 3 – Results

In order to reach the main goal of this research, which is gaining more insight into the underlying reasons for the gender gap in educational attainment when it comes to science programs, a correlational study is conducted as well as a mean comparison and multiple regression analysis. To answer the research questions, interaction effects between gender and parental support and parental role modeling are included in the regression analysis. For this study, girls are chosen as the reference group and boys are chosen as the comparison group.

3.1 Correlations & mean comparison

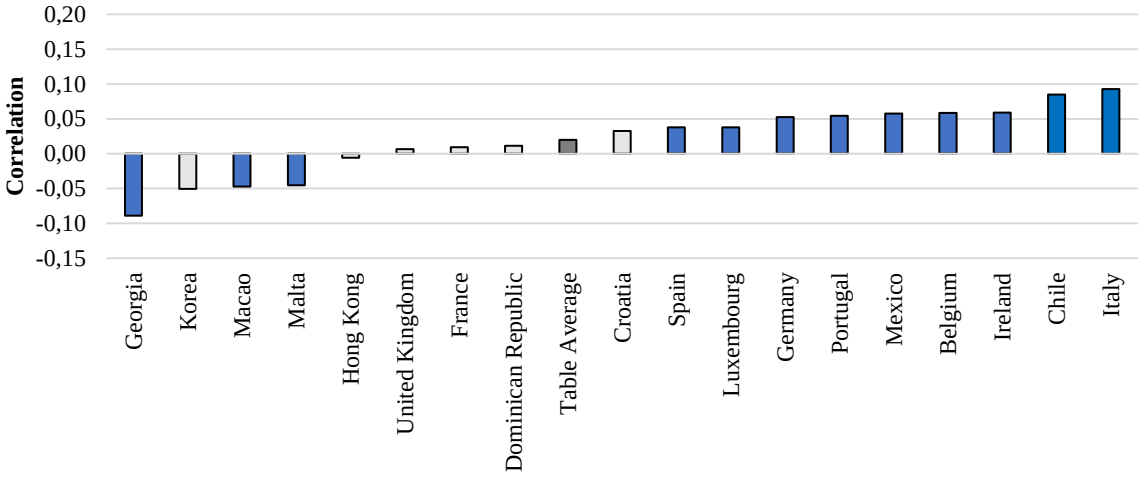
It is important to note that the correlations which are shown in this section are comparable to the standardized regression coefficients from the multiple regression analysis which are presented further in this chapter (see section 3.2 and 3.3). For this study, correlation is significant at the .05 level (two-tailed).

3.1.1 Science achievement

Overall, the differences in science achievement between boys and girls are relatively small. The average science achievement score is 478.20 (SD = 94.49) for boys; and 474.74 (SD = 87.42) for girls. The correlation between gender and science achievement ranges from -.09 to .09. The correlation is positive in 13 countries, and negative in 5 countries. Furthermore, the correlation is statistically significant in 12 countries (see Figure 3).

Girls have the highest achievement scores in Macao, Hong Kong and Korea, and boys score the highest in Macao, Hongkong and Ireland. Boys as well as girls from the Dominican Republic, Mexico and Georgia have the lowest science achievement. The complete information regarding gender differences in science achievement per country is presented in Appendix A.

The gender gap in science achievement is most visible in Georgia, Italy and Chile. Interestingly, the gender gap in Georgia is in favor of girls, where girls score significantly higher than boys. On the contrary, the gender gap in Chile and Italy is in favor of boys, where boys score significantly higher than girls. Overall, the results suggest that in most countries girls have a lower science achievement score than boys.



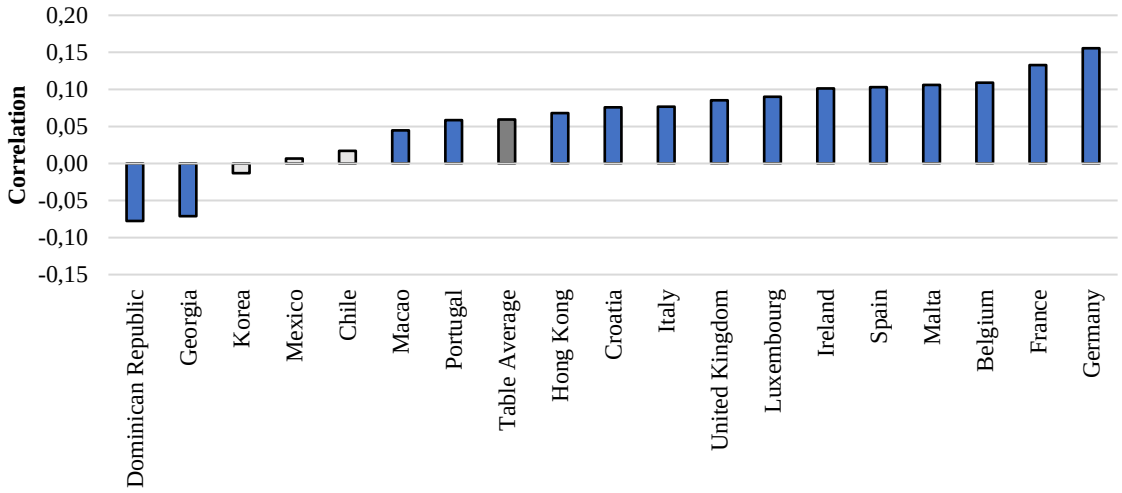
Note. Statistically significant differences from mean comparison are marked in blue; reference group is girls.

Figure 3. Correlation between gender and science achievement, by country.

3.1.2 Self-efficacy

The results suggest that in all countries, except for the Dominican Republic, Georgia and Korea, girls have lower science self-efficacy than boys. The average science self-efficacy is .12 (SD = 1.27) for boys; and -.03 (SD = 1.18) for girls. The correlation between gender and science self-efficacy ranges from -.08 to .16. The correlation is positive in 15 countries, and negative in 3 countries. Furthermore, the correlation is statistically significant in 15 countries (see Figure 4), and the positive correlations are larger than the negative ones.

Interestingly, girls and boys from the Dominican Republic have the highest science self-efficacy in comparison to the other countries, even though they also have the lowest science achievement scores. In addition, boys from Chile, Korea, and Spain have the lowest science self-efficacy, as well as girls from France, Spain and Belgium. The complete information regarding gender differences in science self-efficacy per country is presented in Appendix B.



Note. Statistically significant differences from mean comparison are marked in blue; reference group is girls.

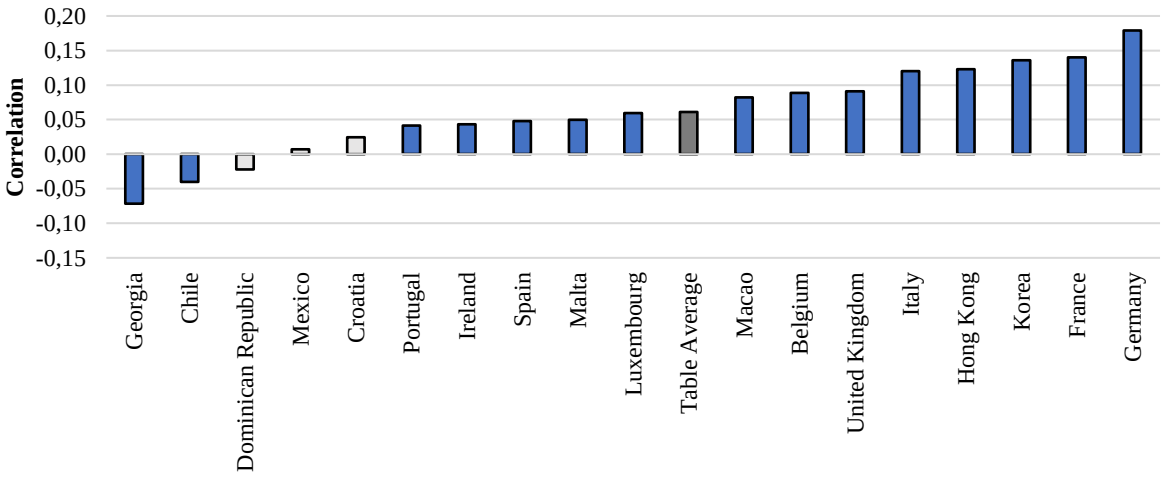
Figure 4. Correlation between gender and self-efficacy, by country.

3.1.3 Intrinsic motivation

The results show that the average science intrinsic motivation is .20 (SD = 1.10) for boys; and .06 (SD = 1.06) for girls. The correlation between gender and intrinsic motivation ranges from -.07 to .18. The correlation is positive in 15 countries, and negative in 3 countries. Furthermore, the correlation is statistically significant in 15 countries, and the positive correlations are larger than the negative ones (see Figure 5).

These results suggest that in all countries, except for Georgia, Chile and the Dominican Republic, girls have lower science intrinsic motivation than boys. The difference in science intrinsic motivation between boys and girls is especially high in Germany, where girls have a mean score of -.39 (SD = 1.14), whereas boys have a mean score of .05 (SD = 1.24).

Overall, girls from Germany, Korea and France have the lowest intrinsic motivation, as well as boys from Chile, Korea and Croatia. Girls and boys from the Dominican Republic score the highest on intrinsic motivation, even though they also have the lowest scores on science achievement. The complete information regarding gender differences in intrinsic motivation is presented in Appendix C.



Note. Statistically significant differences from mean comparison are marked in blue; reference group is girls.

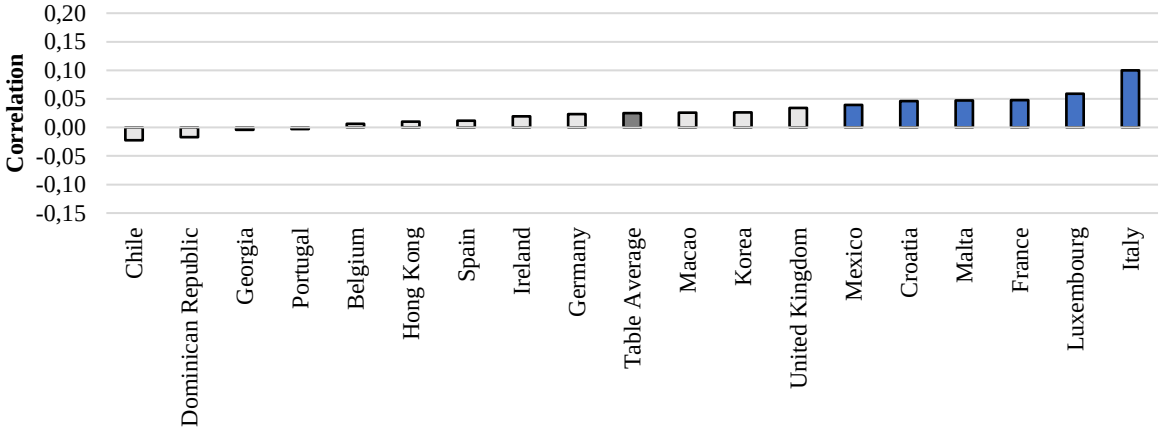
Figure 5. Correlation between gender and intrinsic motivation, by country.

3.1.4 Parental current support

The results suggest that in all countries, except for Chile, the Dominican Republic and Georgia, girls receive less current support from their parents than boys do. The average current support is .07 (SD = .99) for boys; and .03 (SD = .99) for girls. The correlation between gender and current support ranges from -.02 to .10. The correlation is positive in 15 countries, and negative in 3 countries. Furthermore, the correlation is statistically significant in 6 countries, including Mexico, Croatia, Malta, France, Luxembourg and Italy, and the positive correlations are larger than the negative ones (see Figure 6).

Boys and girls from the Dominican Republic, Georgia and Croatia score the highest on parental current support, whereas boys and girls from Korea, Macao and Hong Kong score the lowest. In Italy

the gender gap is the largest; Italian girls receive significantly less current support than Italian boys. The complete information regarding gender differences in parental current support per country is presented in Appendix A.



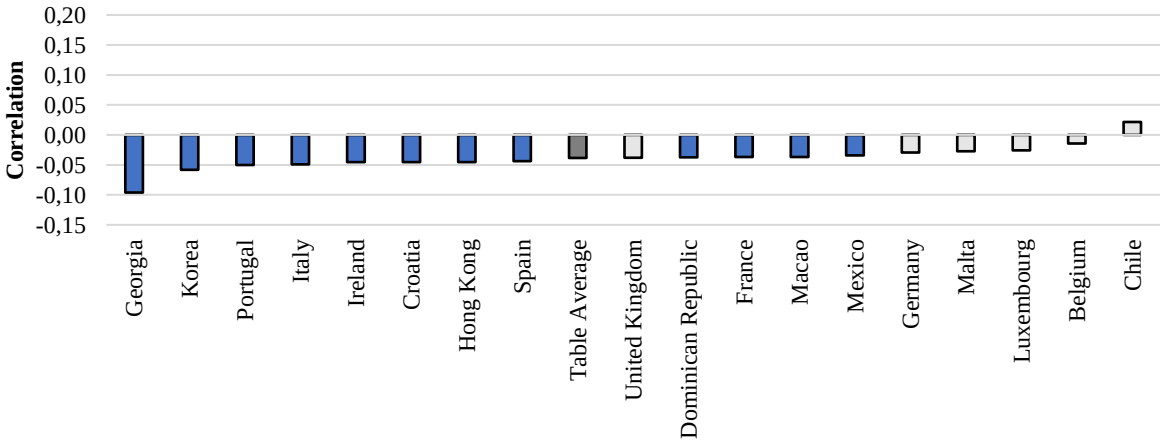
Note. Statistically significant differences from mean comparison are marked in blue; reference group is girls.

Figure 6. Correlation between gender and current support, by country.

3.1.5 Parental emotional support

The results suggest that in all countries, except for Chile, girls receive more emotional support from their parents than boys do. The average emotional support is -.10 (SD = .97) for boys; and -.03 (SD = .94) for girls. The correlation between gender and emotional support ranges from -.10 to .02. The correlation is negative in all countries, except for Chile. Furthermore, the correlation is statistically significant in 12 countries, and the negative correlations are larger than the positive one (see Figure 7).

Overall, boys and girls from Ireland, Luxembourg and the United Kingdom receive the most emotional support from their parents, whereas boys and girls from Macao, Korea and Hong Kong score the lowest on parental emotional support. The complete information regarding gender differences in parental emotional support per country is presented in Appendix E.



Note. Statistically significant differences from mean comparison are marked in blue; reference group is girls..

Figure 7. Correlation between gender and emotional support, by country.

3.2 Multiple regression analysis

A multiple regression analysis is conducted to study the relationship between the predictor variables parental support (i.e., current support and emotional support), parental role modeling (i.e., HISCED, HISEI and PVS) and gender, and the dependent variables science self-efficacy and science intrinsic motivation, with science achievement as a control variable. For this study, the significance threshold was set at .05 (2-tailed). It is important to note that the axes-values from science achievement (Figure 9 and 10) are not comparable to the values used for the axes of the other variables, since the effect of science achievement is larger.

3.2.1 General overview

An overview of the standardized results of the explanatory variables on the students' science self-efficacy and science intrinsic motivation, across all countries, is given in Figure 8 and in Table 10. For the complete results of the regression analysis, see Appendix F.

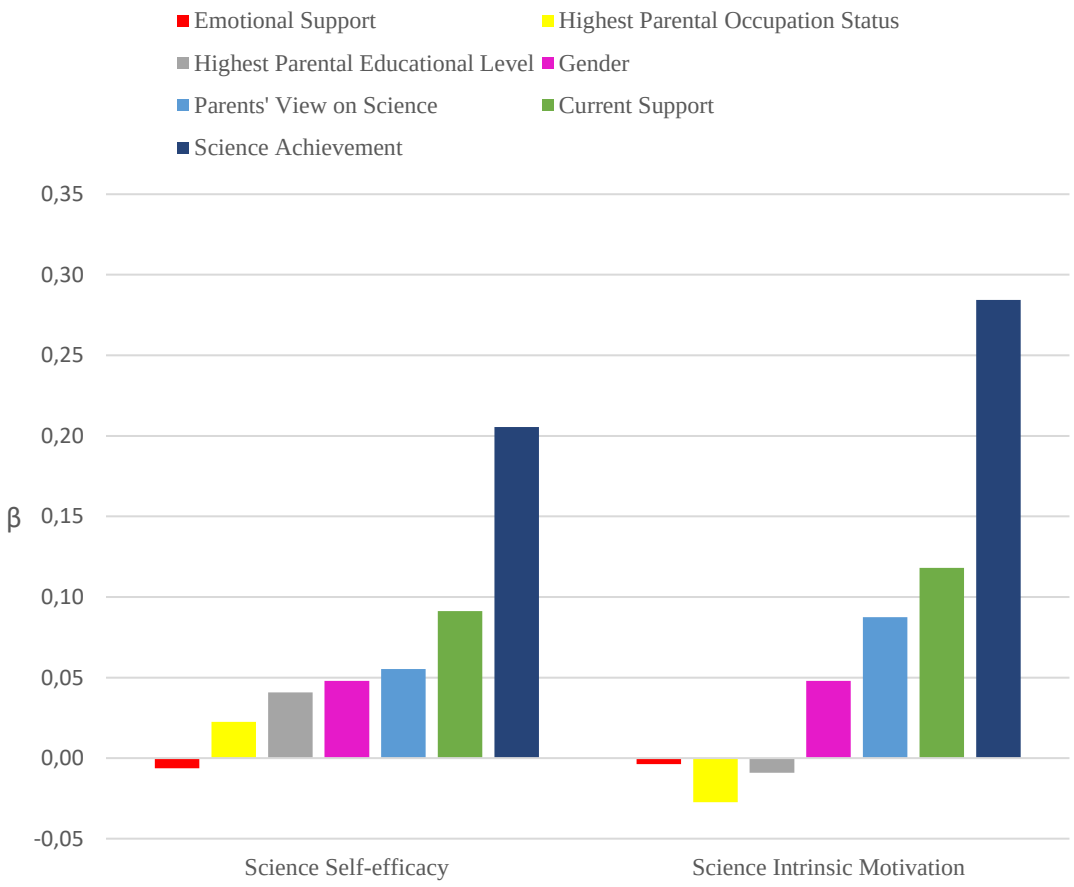


Figure 8. Summary of regression analysis results on students' self-efficacy and intrinsic motivation

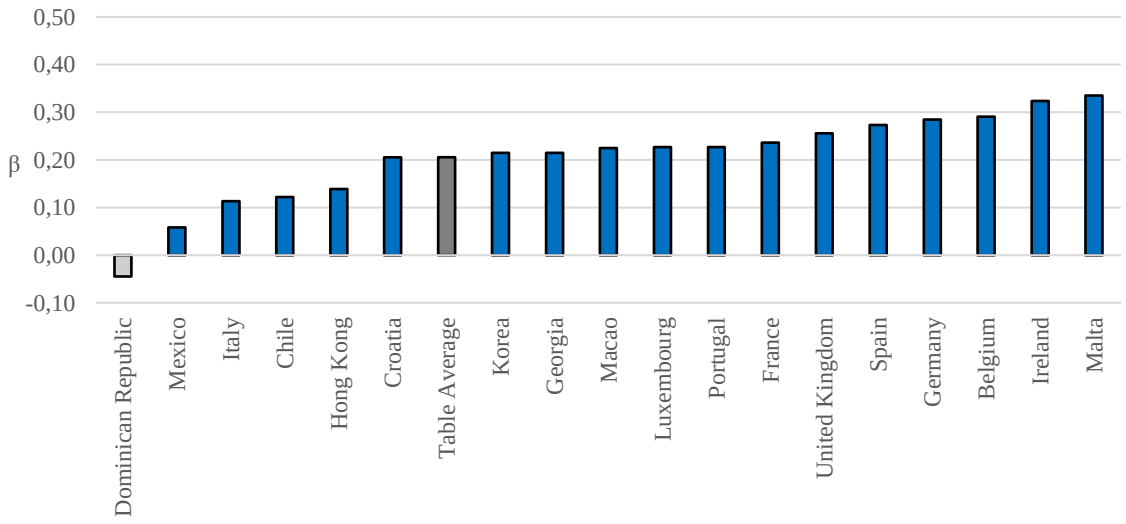
Table 10

Summary of regression analysis results on students' self-efficacy and intrinsic motivation across all countries

	Model	*b*	*SE b*	*β*	*t*
Self-Efficacy					
Table Average	(Constant)	-1,630	0,036		-44,977
R^2 = .097	Current Support	0,119	0,006	0,091	19,298
	Emotional Support	-0,009	0,005	-0,006	-1,688
	HISCED	0,035	0,005	0,041	7,710
	HISEI	0,001	0,000	0,023	4,322
	PVS	0,062	0,005	0,055	12,628
	Gender (Dummy)	0,115	0,010	0,048	11,863
	Science Achievement	0,003	0,000	0,206	38,844
Intrinsic Motivation					
Table Average	(Constant)	-1,559	0,030		-52,255
R^2 = .136	Current Support	0,142	0,005	0,118	28,003
	Emotional Support	-0,007	0,005	-0,004	-1,423
	HISCED	-0,007	0,004	-0,009	-1,896
	HISEI	-0,001	0,000	-0,027	-5,353
	PVS	0,088	0,004	0,088	20,152
	Gender (Dummy)	0,107	0,009	0,048	12,491
	Science Achievement	0,003	0,000	0,284	56,707

3.2.2 Science achievement

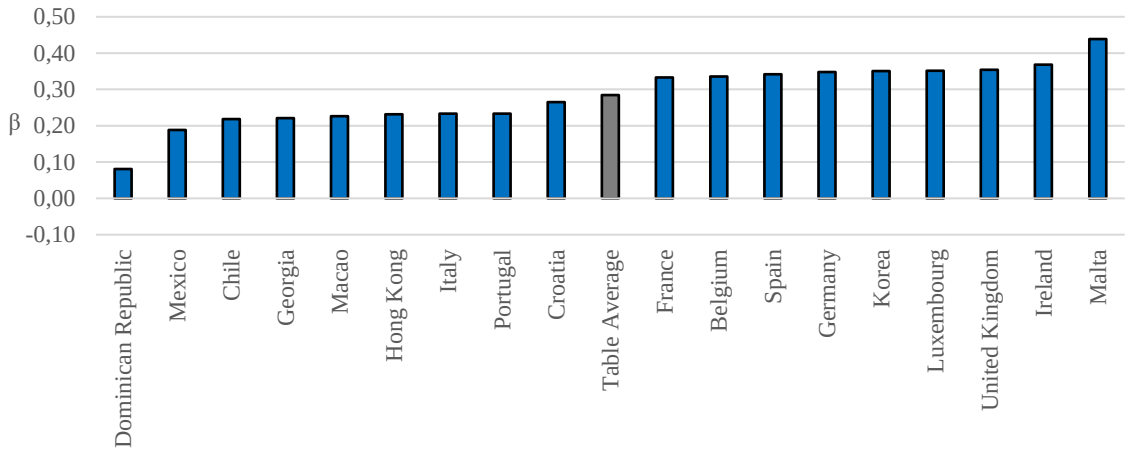
Self-efficacy. As shown in Figure 9, science achievement has a significant positive effect on the students' science self-efficacy in all the participating countries, except for the Dominican Republic in which it has a negative non-significant effect on self-efficacy (β = -.045, p = .065). The largest effects of science achievement are found in Malta (β = .335, p < .001), Ireland (β = .323, p < .001) and Belgium (β = .290, p < .001).



Note. Significant effects are marked in blue; reference group is girls.

Figure 9. Results regression analysis self-efficacy / science achievement, by country.

Intrinsic motivation. As shown in Figure 10, science achievement also has a significant positive effect on the students' science intrinsic motivation in all the participating countries. The largest effects of science achievement are found in Malta (β = .439, p < .001), Ireland (β = .369, p < .001) and the United Kingdom (β = .354, p < .001).

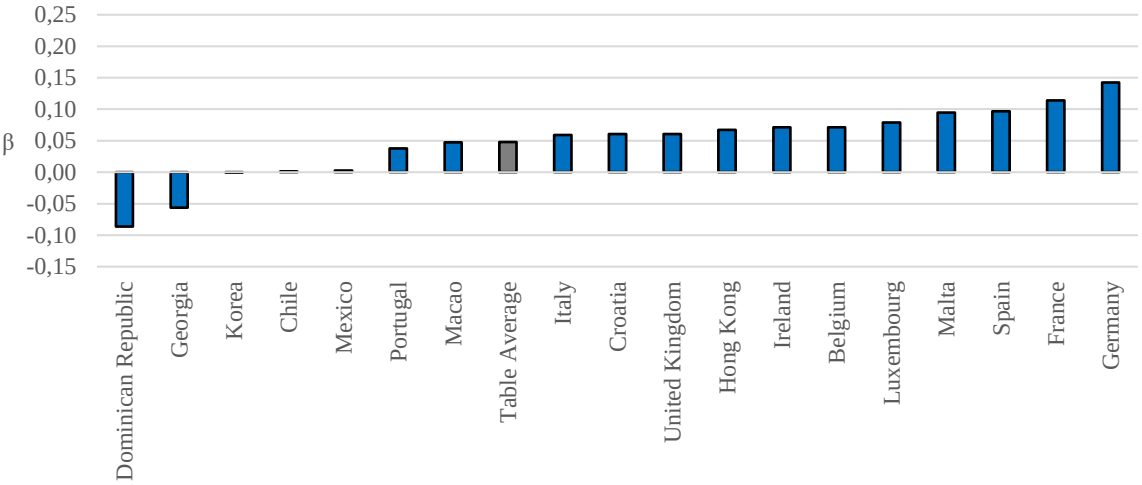


Note. Significant effects are marked in blue; reference group is girls.

Figure 10. Results regression analysis intrinsic motivation / science achievement, by country.

3.2.3 Gender

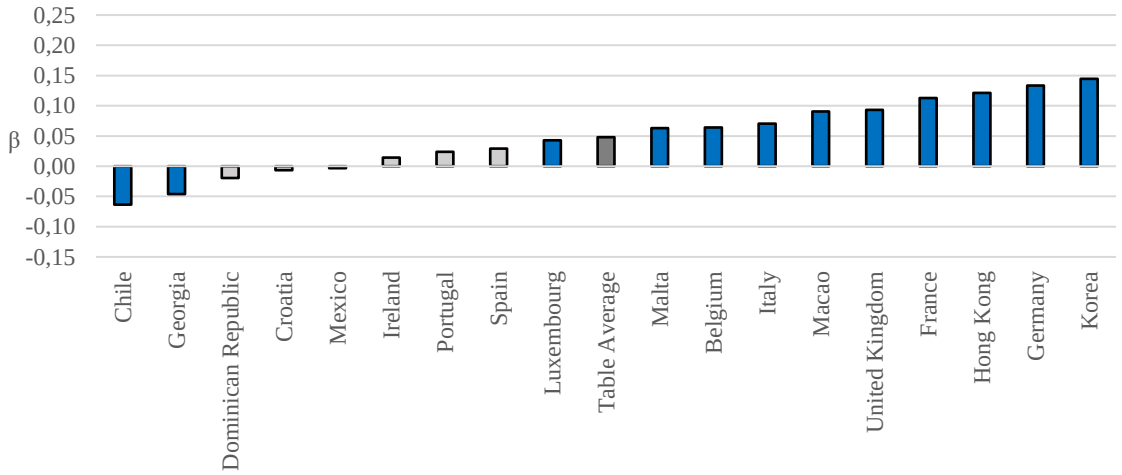
Self-efficacy. Gender has a significant positive effect on science self-efficacy in 15 countries in favor of boys, with the largest effects in Germany (β = .14, p < .001) and France (β = .11, p < .001) (see Figure 11). Gender has a significant negative effect on science self-efficacy in the Dominican Republic (β = -.09, p < .001) and Georgia (β = -.06, p < .001), which means that boys in these countries have lower science self-efficacy than girls. No significant gender effects are found in Mexico, Korea and Chile.



Note. Significant effects are marked in blue; reference group is girls.

Figure 11. Results regression analysis self-efficacy / gender, by country.

Intrinsic motivation. Gender has a significant positive effect on science intrinsic motivation in 10 countries in favor of boys, with the largest effects in Korea (β = .144, p < .001), Germany (β = .134, p < .001) and Hong Kong (β = .121, p < .001) (see Figure 12). Gender has a significant negative effect on science intrinsic motivation in Chile (β = -.063, p < .001) and Georgia (β = -.046, p = .005), which means that boys in these countries have lower science intrinsic motivation than girls. The countries with no significant gender effects are the Dominican Republic, Croatia, Mexico, Ireland, Portugal and Spain.

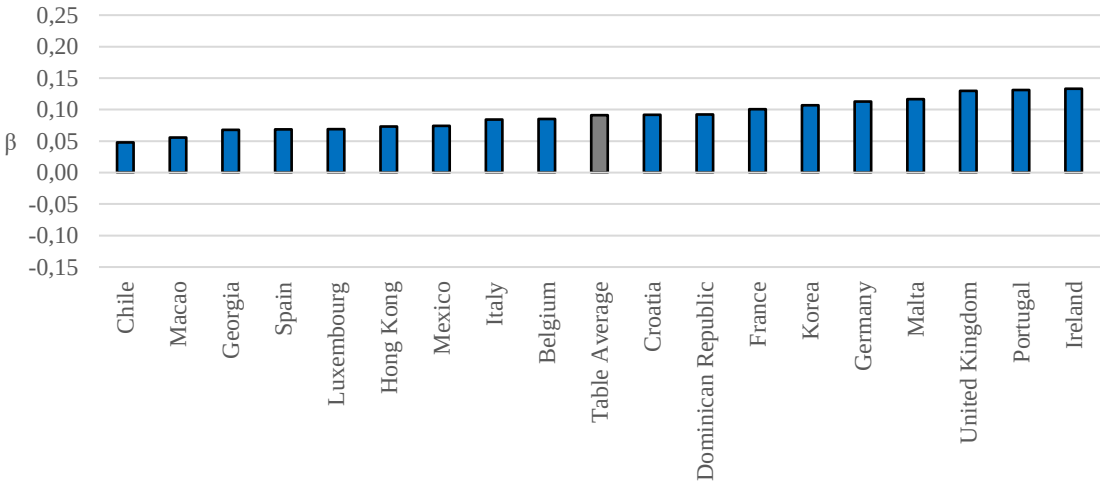


Note. Significant effects are marked in blue; reference group is girls.

Figure 12. Results regression analysis intrinsic motivation / gender, by country.

3.2.4 Parental current support

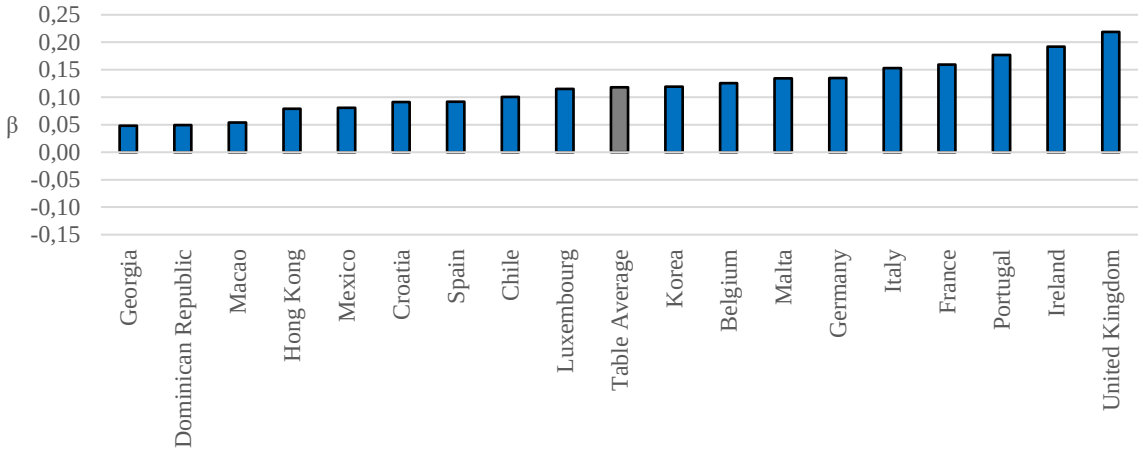
Self-efficacy. Current support has a significant positive effect on the students' science self-efficacy in all the participating countries, with the largest standardized coefficients in Ireland (β = .133, p < .001), Portugal (β = .131, p < .001) and the United Kingdom (β = .130, p < .001) (see Figure 13).



Note. Significant effects are marked in blue; reference group is girls.

Figure 13. Results regression analysis self-efficacy / current support, by country.

Intrinsic motivation. Current support also has a significant positive effect on the students' science intrinsic motivation in all the participating countries, with the largest standardized coefficients in the United Kingdom (β = .219, p < .001), Ireland (β = .192, p < .001) and Portugal (β = .177, p < .001) (see Figure 14).

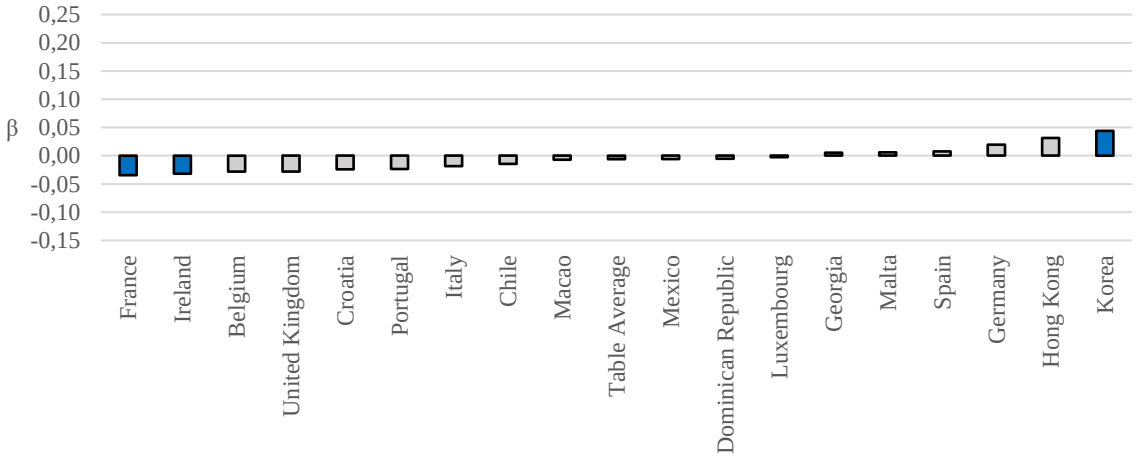


Note. Significant effects are marked in blue; reference group is girls.

Figure 14. Results regression analysis intrinsic motivation / current support, by country.

3.2.5 Parental emotional support

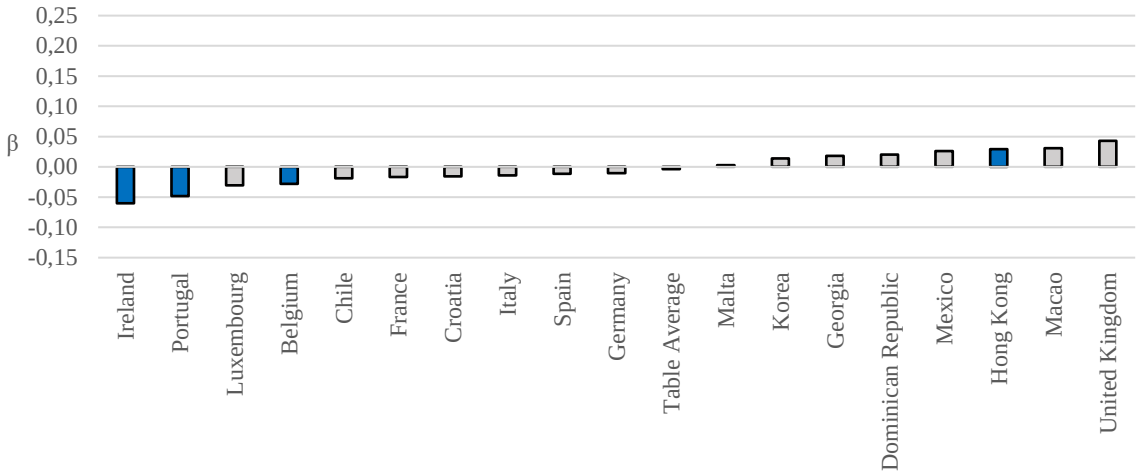
Self-efficacy. The effect of emotional support on science self-efficacy is shown in Figure 15. There are 14 countries which show no significant effect. In 11 countries the effect is negative, from which two are significantly so; France (β = -.035, p = .018) and Ireland (β = -.032, p = .036). A total of 7 countries show a positive effect, from which only Korea is significantly positive (β = .044, p = .005).



Note. Significant effects are marked in blue; reference group is girls.

Figure 15. Results regression analysis self-efficacy / emotional support, by country.

Intrinsic motivation. The effect of emotional support on science intrinsic motivation is shown in Figure 16. There are 14 countries which show no significant effect. In 10 countries the effect is negative, from which three are significantly so; Ireland (β = -.060, p < .001), Portugal (β = -.048, p = .002) and Belgium (β = -.028, p = .036). A total of 7 countries show a positive effect, from which only Hong Kong is significantly positive (β = .029, p = .050).

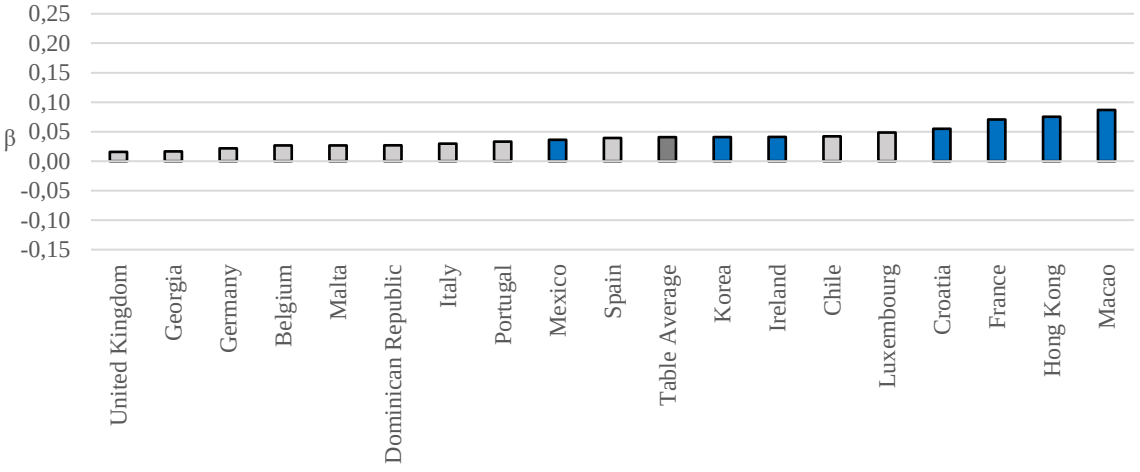


Note. Significant effects are marked in blue; reference group is girls.

Figure 16. Results regression analysis intrinsic motivation / emotional support, by country.

3.2.6 Highest parental educational level (HISCED)

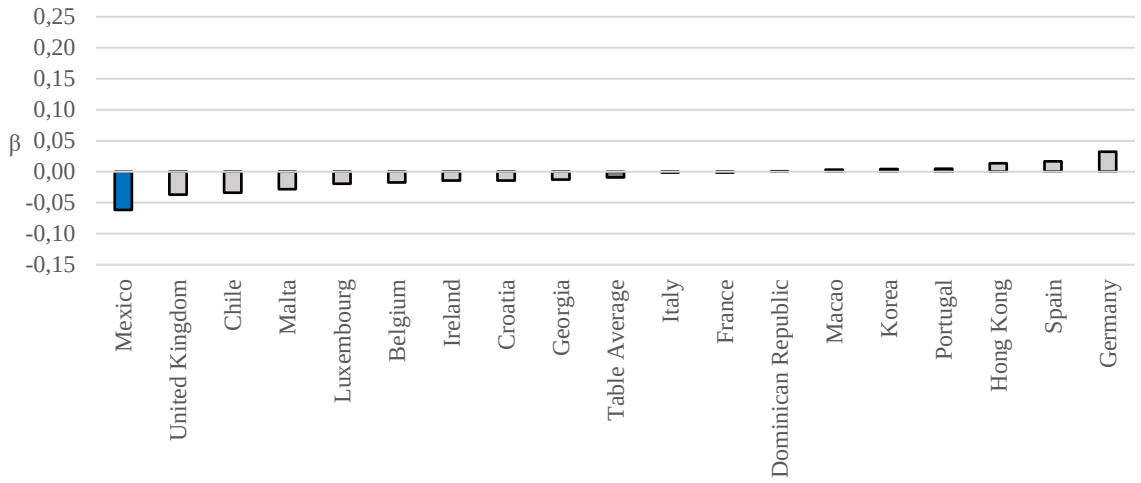
Self-efficacy. As shown in Figure 17, HISCED has a significant positive effect on self-efficacy in 7 countries, from which the largest standardized coefficients are found in Macao (β = .087, p < .001), Hong Kong (β = .075, p < .001) and France (β = .071, p < .001). The countries with no significant effects are Belgium, Chile, the Dominican Republic, Georgia, Germany, Ireland, Luxembourg, Malta, Portugal and the United Kingdom. The results show no negative effects in any of the participating countries.



Note. Significant effects are marked in blue; reference group is girls.

Figure 17. Results regression analysis self-efficacy / HISCED, by country.

Intrinsic motivation. As shown in Figure 18, HISCED has a positive effect on science intrinsic motivation in half of the participating countries, although these positive effects are not significant. From the 9 countries which show a negative effect, only the effect in Mexico is significant (β = -.062, p < .001).

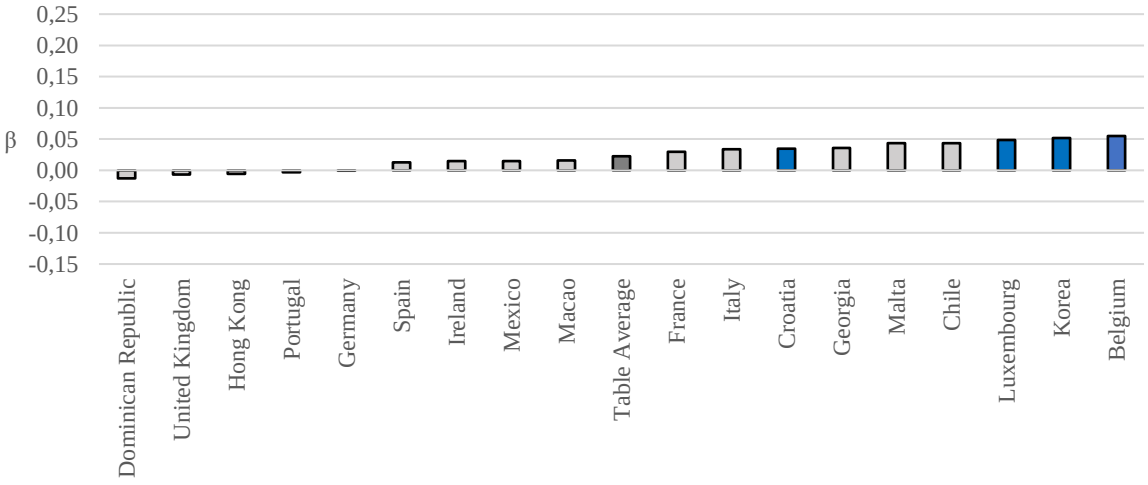


Note. Significant effects are marked in blue; reference group is girls.

Figure 18. Results regression analysis intrinsic motivation / HISCED, by country.

3.2.7 Highest parental occupational status (HISEI)

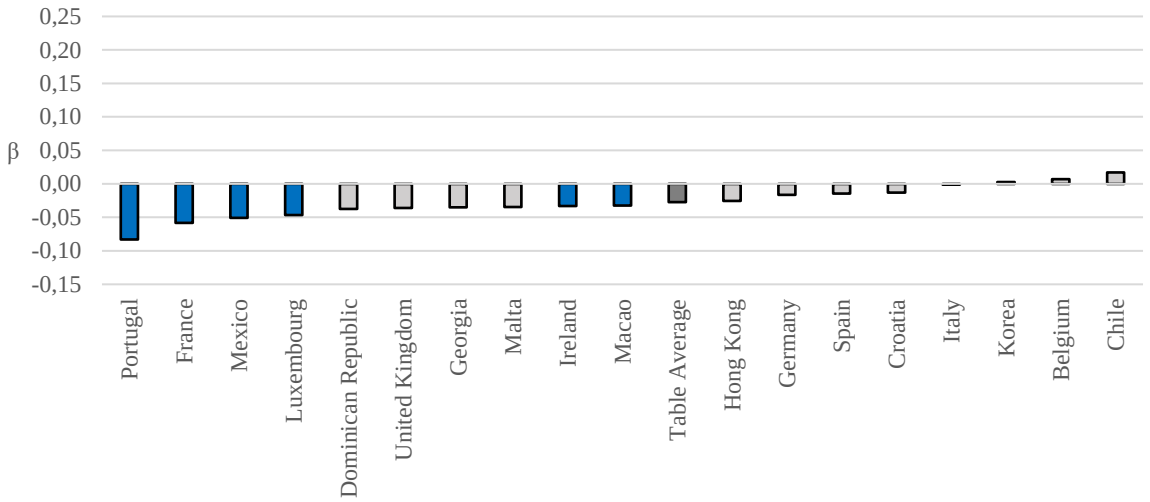
Self-efficacy. HISEI has a positive effect on the students' self-efficacy in all the participating countries, except for the Dominican Republic, Hong Kong, the United Kingdom, Portugal and Germany, which show non-significant negative effects (see Figure 19). A total of 4 countries show a significant positive effect, from which the largest standardized coefficients are found in Belgium (β = .055, p = .029), Korea (β = .052, p = .002) and Luxembourg (β = .049, p = .047).



Note. Significant effects are marked in blue; reference group is girls.

Figure 19. Results regression analysis self-efficacy / HISEI, by country.

Intrinsic motivation. HISEI has a negative effect on the students' intrinsic motivation in all the participating countries, except for Italy and Korea where no effects were found, and Belgium and Chile, which show non-significant positive effects (see Figure 20). A total of 6 countries show a significant negative effect, from which the largest standardized coefficients are found in Portugal (β = -.083, p < .001), France (β = -.058, p = .007) and Mexico (β = -.051, p = .015).

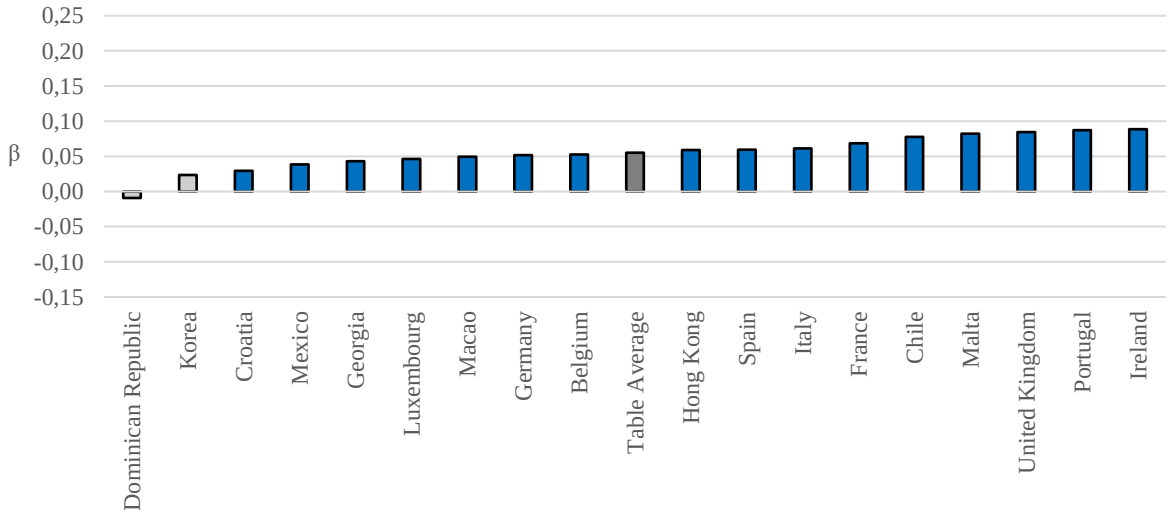


Note. Significant effects are marked in blue; reference group is girls.

Figure 20. Results regression analysis intrinsic motivation / HISEI, by country.

3.2.8 Parents' view on science (PVS)

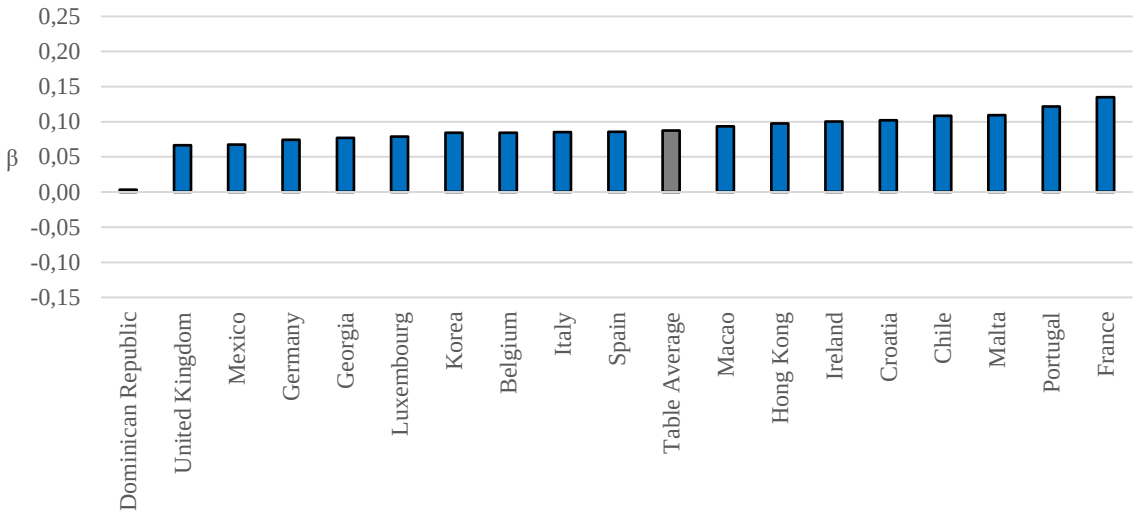
Self-efficacy. The parents' view on science has a significant positive effect on science self-efficacy in all countries, except for the Dominican Republic (β = -.009, p = .683), in which the effect is negative but not significant, and Korea (β = .024, p = .122), in which the effect is positive but not significant (see Figure 21). The largest effects are found in Ireland (β = .089, p < .001), Portugal (β = .087, p < .001), and the United Kingdom (β = .084, p = .001).



Note. Significant effects are marked in blue; reference group is girls.

Figure 21. Results regression analysis self-efficacy / PVS, by country.

Intrinsic motivation. The parents' view on science has a significant positive effect on science intrinsic motivation in all countries, except for the Dominican Republic (β = .003, p = .861), in which no effect was found (see Figure 22). The largest standardized coefficients are found in France (β = .135, p < .001), Portugal (β = .122, p < .001), and Malta (β = .109, p < .001).



Note. Significant effects are marked in blue; reference group is girls.

Figure 22. Results regression analysis intrinsic motivation / PVS, by country.

3.3 Interaction effects

To further investigate the influence of gender on the outcome variables, the original regression model has been expanded by including interaction effects. To be specific, interaction effects between gender and parental support and gender and parental role modeling are included in the new model, as well as the interaction between gender and science achievement. For this study, the significance threshold was set at .05 (2-tailed).

3.3.1 General overview

An overview of the standardized results of the explanatory variables, including gender interactions, on the students' science self-efficacy and science intrinsic motivation, across all countries, is given in Figure 23 and in Table 11. Since the main effects did not show any big changes in comparison to the first regression analysis, these results will not be further presented in this section. This section will focus solely on the interaction effects. For the complete results of the regression analyses per country, including the main effects, see Appendix G.

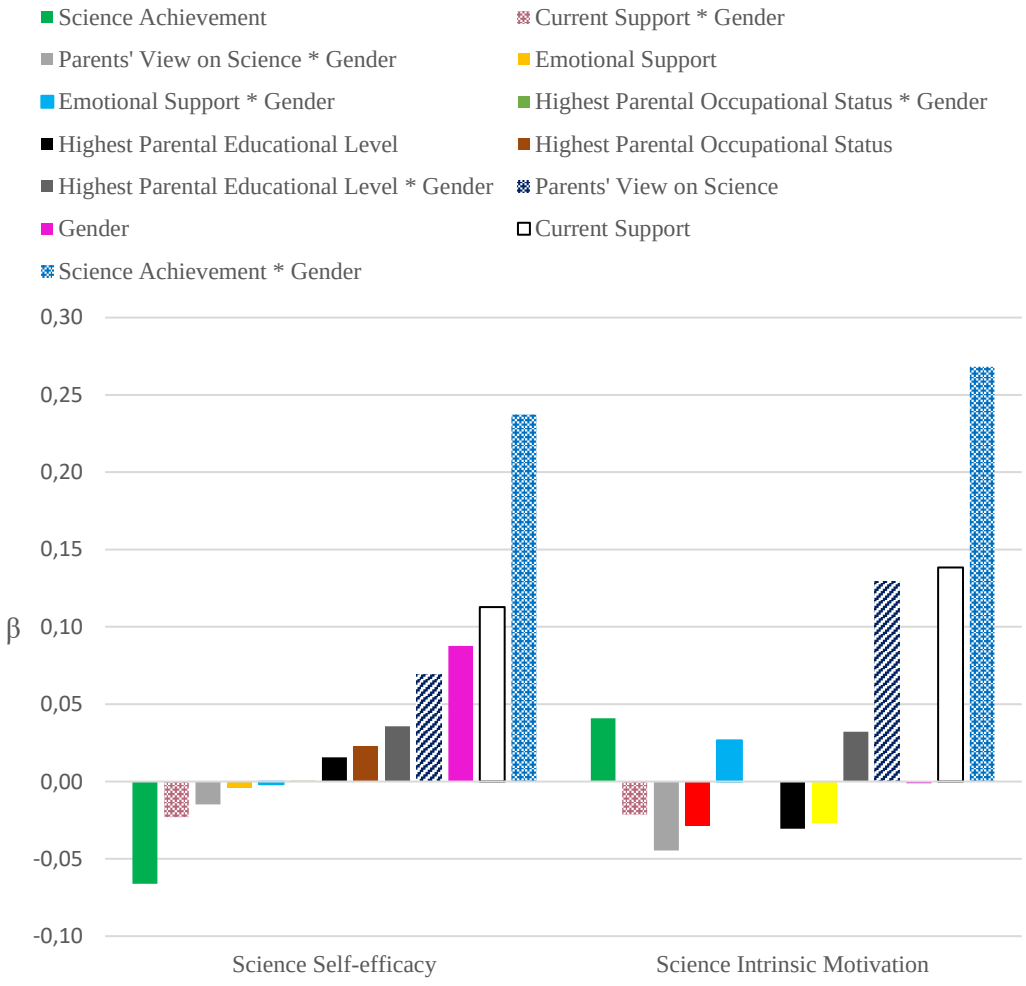


Figure 23. Summary of regression analysis (with gender interaction) results on students' self-efficacy and intrinsic motivation.

Table 11

Summary of regression analysis results (with gender interaction) on students' self-efficacy and intrinsic motivation across all countries.

	Model	*b*	*SE b*	β	*t*
Self-efficacy					
Table Average	(Constant)	-1,683	0,050		-33,566
R^2 = .100	Current Support	0,150	0,019	0,113	7,984
	Gender * Current Support	-0,021	0,012	-0,023	-1,708
	Emotional Support	-0,004	0,017	-0,004	-0,223
	Gender * Emotional Support	-0,003	0,011	-0,002	-0,305
	HISCED	0,017	0,014	0,016	1,197
	Gender * HISCED	0,013	0,009	0,036	1,343
	HISEI	0,001	0,001	0,023	1,388
	Gender * HISEI	0,000	0,001	0,000	0,061
	PVS	0,076	0,015	0,069	5,004
	Gender * PVS	-0,010	0,010	-0,015	-1,005
	Gender (Dummy)	0,211	0,072	0,088	2,921
	Science Achievement	0,003	0,000	0,237	14,773
	Gender * Science Achievement	0,000	0,000	-0,066	-1,830
Intrinsic Motivation					
Table Average	(Constant)	-1,507	0,041		-36,840
R^2 = .138	Current Support	0,163	0,016	0,138	9,925
	Gender * Current Support	-0,014	0,011	-0,021	-1,278
	Emotional Support	-0,037	0,014	-0,029	-2,582
	Gender * Emotional Support	0,020	0,009	0,027	2,202
	HISCED	-0,022	0,012	-0,031	-1,929
	Gender * HISCED	0,010	0,007	0,032	1,403
	HISEI	-0,001	0,001	-0,027	-1,826
	Gender * HISEI	0,000	0,000	0,000	0,057
	PVS	0,130	0,013	0,129	10,236
	Gender * PVS	-0,028	0,008	-0,045	-3,444
	Gender (Dummy)	-0,001	0,056	-0,001	-0,020
	Science Achievement	0,003	0,000	0,268	18,121
	Gender * Science Achievement	0,000	0,000	0,041	1,115

3.3.2 Interaction science achievement * gender

Self-efficacy. There is a significant interaction effect between gender and science achievement on science self-efficacy in two countries. In Malta (β = -.447, p < .001) and Croatia (β = -.395, p = .001), the science self-efficacy of both boys and girls increases with higher science achievement, however, increases in girls' science self-efficacy are larger (see Figures 24 & 25). This suggests that girls from Malta and Croatia gain more science self-efficacy than boys do, with increases in science achievement.

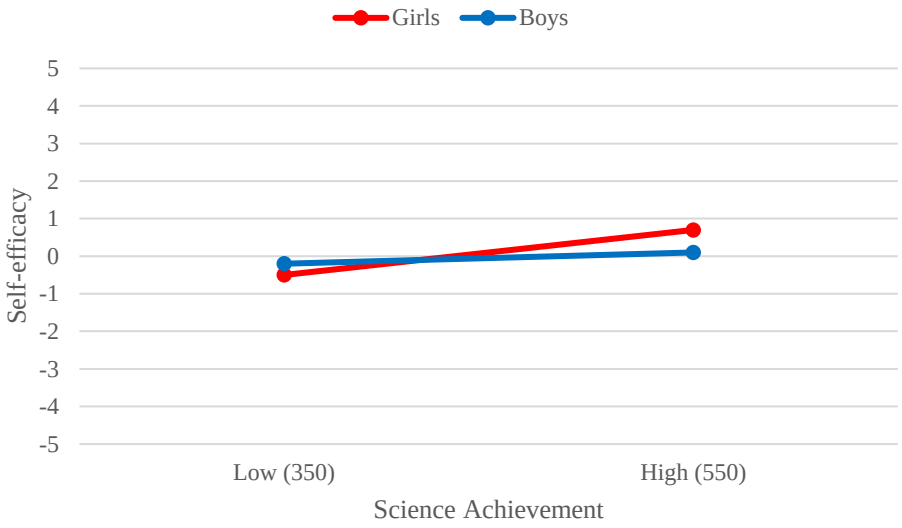


Figure 24. Interaction effect in Malta: self-efficacy / science achievement * gender.

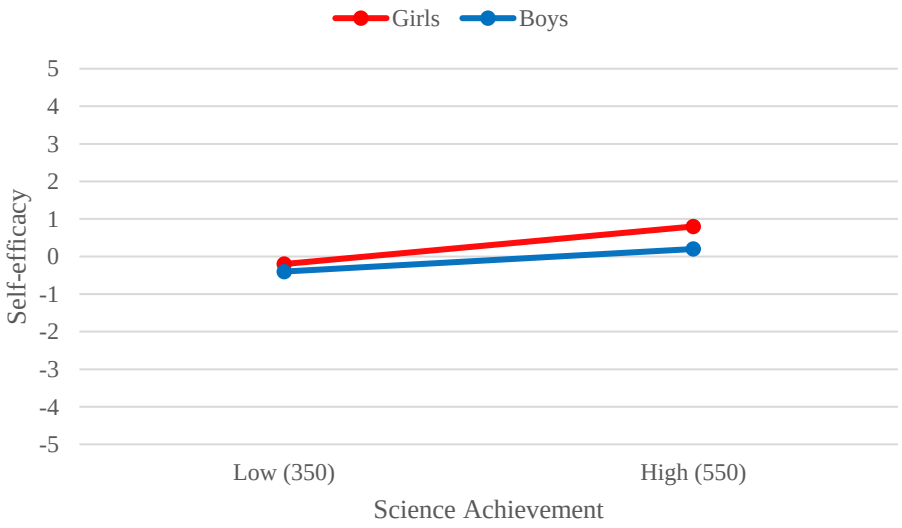


Figure 25. Interaction effect in Croatia: self-efficacy / science achievement * gender.

Intrinsic motivation. Regarding science intrinsic motivation, an interaction between gender and science achievement is found in Belgium (β = .380, p < .001), where both boys and girls show an increase in intrinsic motivation with an increase in science achievement, but boys' increment on science intrinsic motivation is larger (see Figure 26).

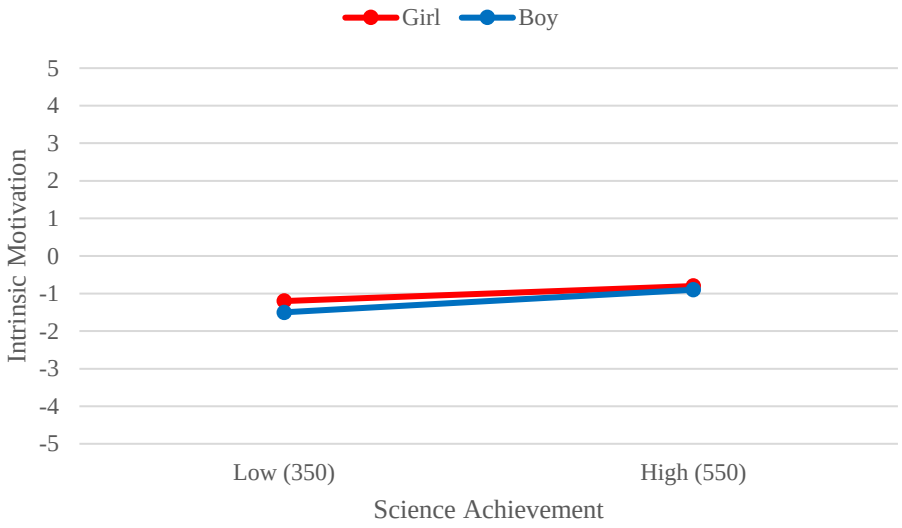


Figure 26. Interaction effect in Belgium: intrinsic motivation / science achievement * gender.

3.3.3 Interaction current support * gender

Self-efficacy. As shown in Figure 27, the only significant interaction effect between gender and current support on science self-efficacy is found in the United Kingdom (β = -.160, p = .047), where there is a difference in science self-efficacy in favor of boys when parents give low current support, but when the support is higher the gender gap gets smaller. In sum, with higher current support the science self-efficacy from boys and girls goes up, but the effect is larger for girls.

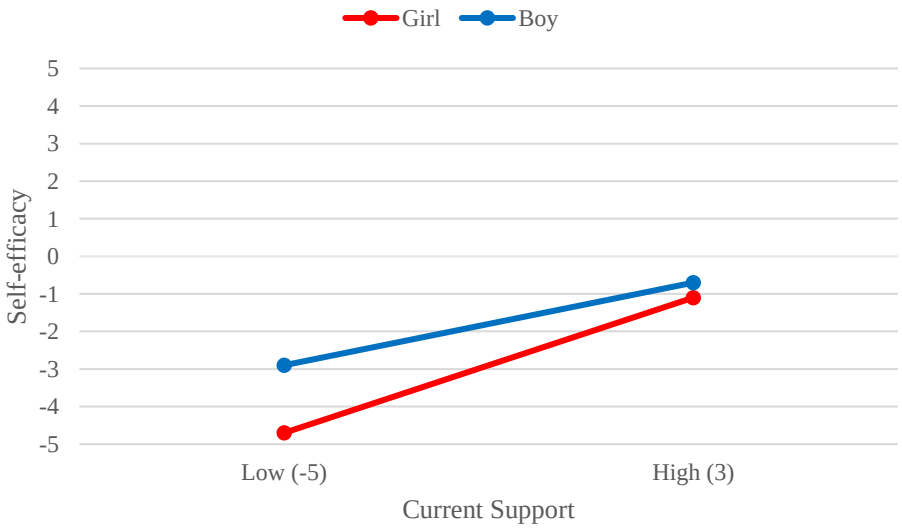


Figure 27. Interaction effect in the United Kingdom: self-efficacy / current support * gender.

Intrinsic motivation. Regarding science intrinsic motivation, an interaction between gender and current support is found in two countries. In Portugal (β = -.141, p = .005) and Georgia (β = -.123, p = .017), the science intrinsic motivation of both boys and girls increases with more current support, however, increases in girls' science intrinsic motivation are larger (see Figures 28 & 29).

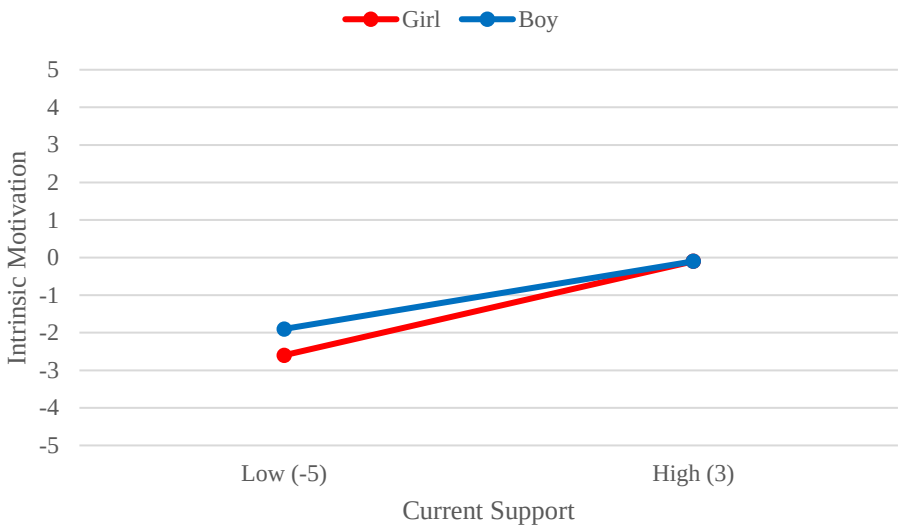


Figure 28. Interaction effect in Portugal: intrinsic motivation / current support * gender.

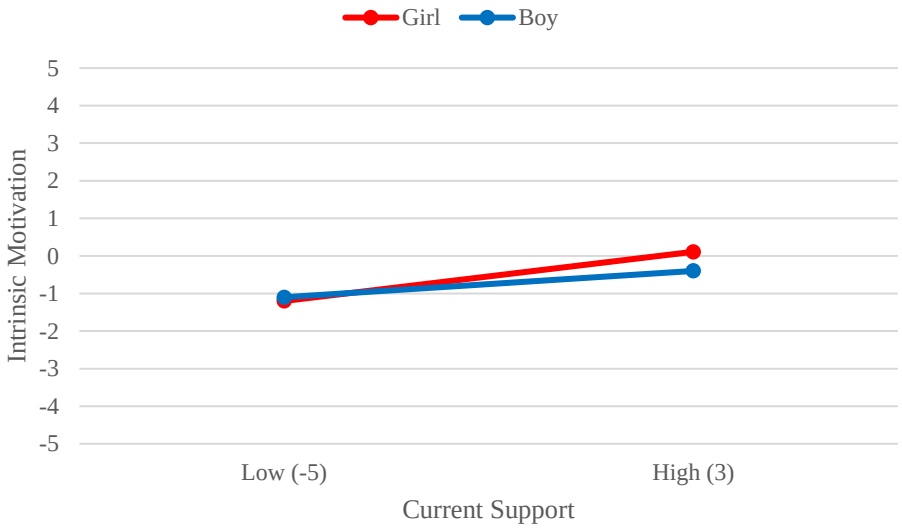


Figure 29. Interaction effect in Georgia: intrinsic motivation / current support * gender.

3.3.4 Interaction emotional support * gender

Self-efficacy. Regarding science self-efficacy, an interaction between gender and emotional support is found in only one country. In Ireland (β = -.096, p = .024), increases in emotional support come with increases in girls' science self-efficacy but decreases in boys' self-efficacy (see Figure 30).

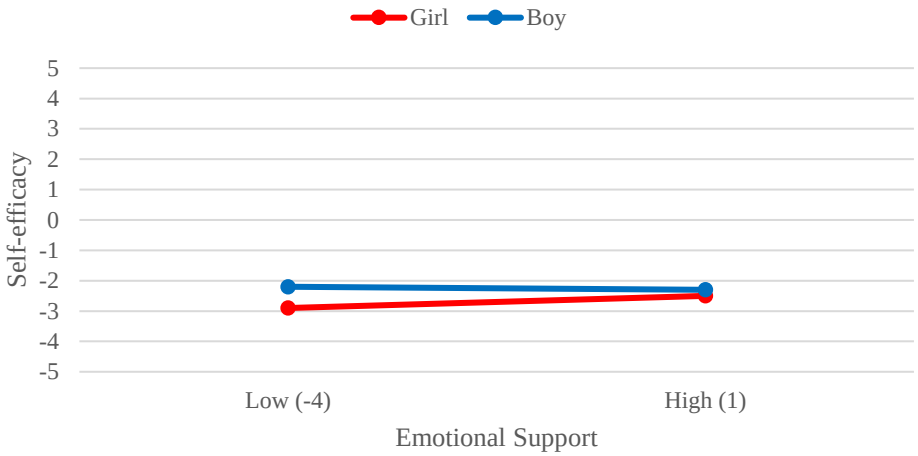


Figure 30. Interaction effect in Ireland: self-efficacy / emotional support * gender.

Intrinsic motivation. No significant interaction effects between gender and emotional support on science intrinsic motivation are found.

3.3.5 Interaction highest parental educational level (HISCED) * Gender

Self-efficacy. As shown in Figure 31, the only significant interaction effect between gender and HISCED on science self-efficacy is found in Mexico (β = .176, p = .002), where the science self-efficacy of both boys and girls decreases with higher educated parents, however, decreases in boys' self-efficacy are larger.

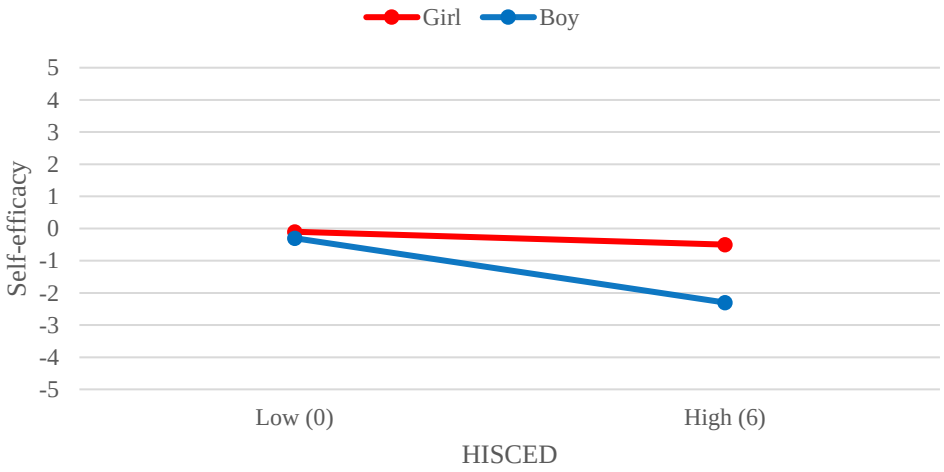


Figure 31. Interaction effect in Mexico: self-efficacy / emotional HISCED * gender.

Intrinsic Motivation. Regarding science intrinsic motivation, an interaction between gender and HISCED was found in three countries. In the Dominican Republic (β = -.226, p = .036), Spain (β = .153, p = .024) and Portugal (β = .125, p = .036) the science intrinsic motivation of both boys and girls decreases with higher educated parents, however, decreases in girls' science intrinsic motivation are larger (see Figures 32, 33 & 34).

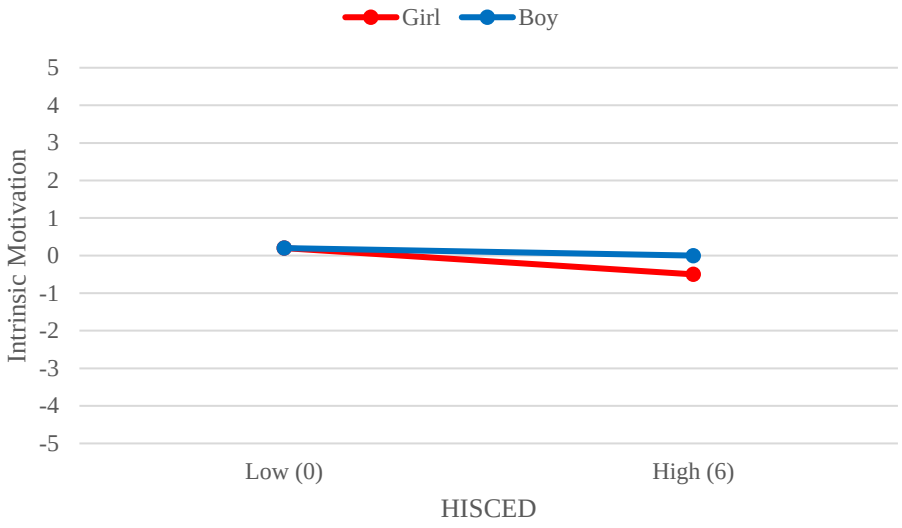


Figure 32. Interaction effect in the Dominican Republic: intrinsic motivation / HISCED * gender.

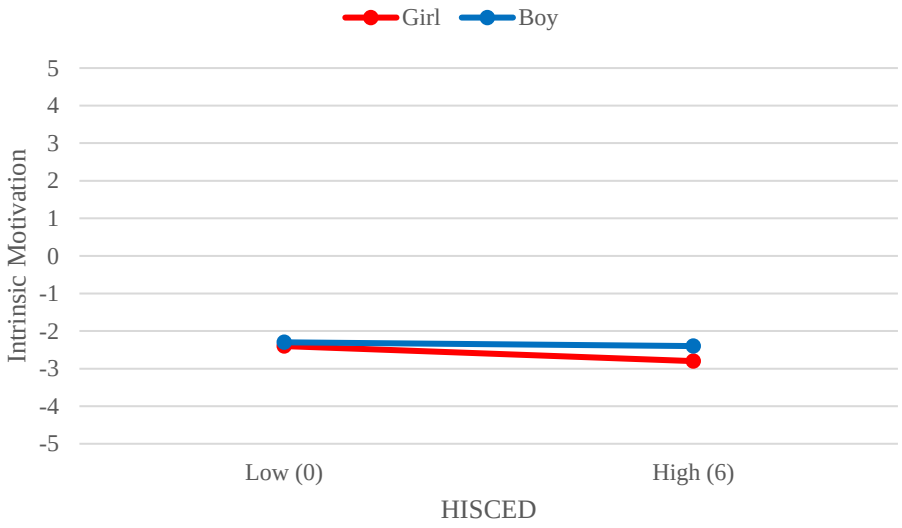


Figure 33. Interaction effect in Spain: intrinsic motivation / HISCED * gender.

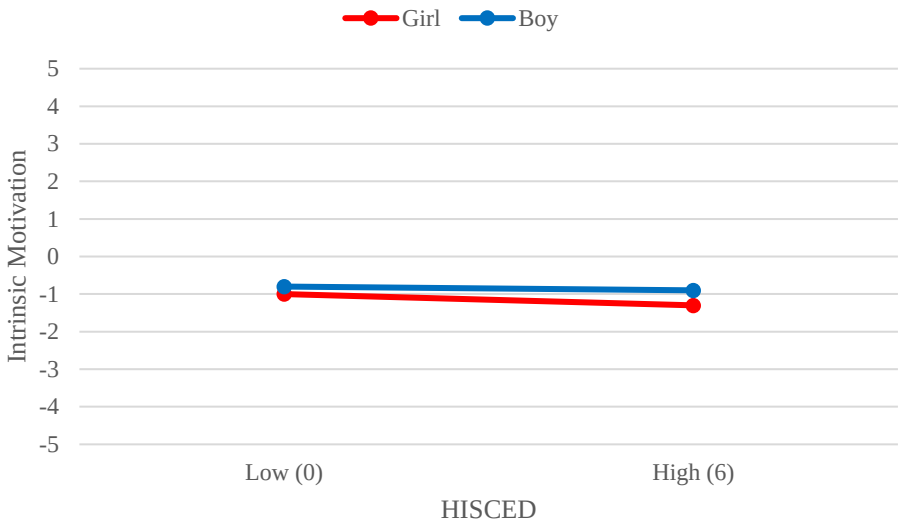


Figure 34. Interaction effect in Portugal: intrinsic motivation / HISCED * gender.

3.3.6 Interaction highest parental occupational status (HISEI) * Gender

No significant interaction effects between gender and HISEI on science self-efficacy or science intrinsic motivation are found.

3.3.7 Interaction parents' view on science (PVS) * Gender

Self-efficacy. Two significant interaction effects between gender and PVS on science self-efficacy are found. In Hong Kong (β = -.129, p = .012) and Chile (β = -.114, p = .019), the science self-efficacy of both boys and girls increases when parents have higher views on science, but increases in girls' science self-efficacy are larger (see figures 35 and 36).

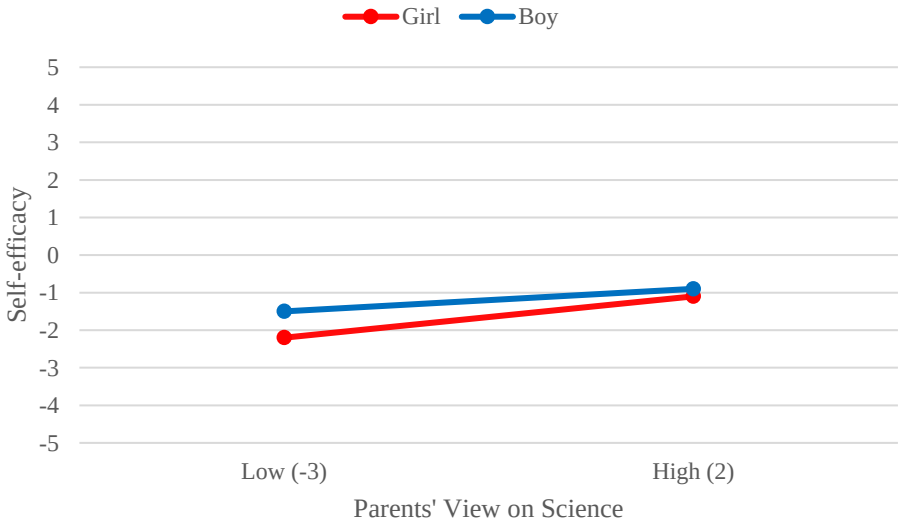


Figure 35. Interaction effect in Hong Kong: self-efficacy / PVS * gender.

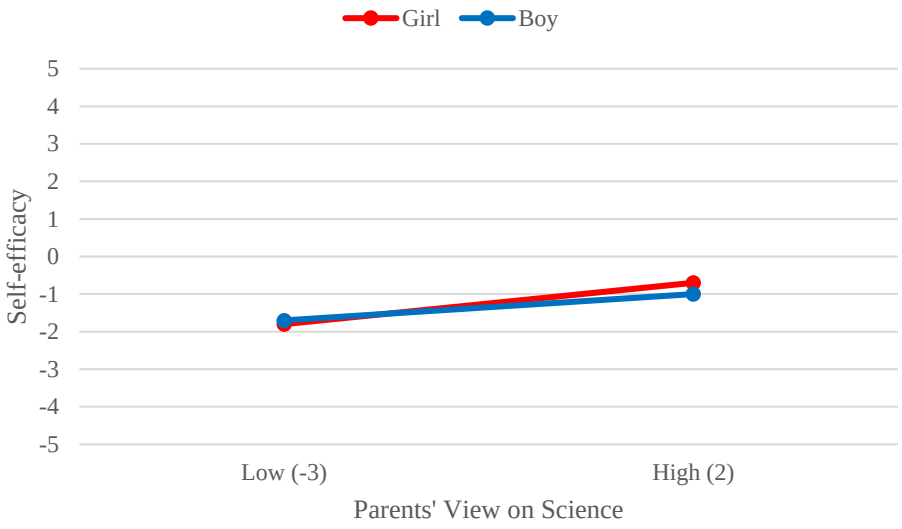


Figure 36. Interaction effect in Chile: self-efficacy / PVS * gender.

Intrinsic motivation. Regarding science intrinsic motivation, an interaction between gender and PVS was found in two countries. In Chile (β = -.144, p = .007), boys' science intrinsic motivation remains the same – regardless of changes in parents' view on science – while girls' intrinsic motivation increases with higher PVS (see Figure 37). In Belgium (β = -.109, p = .044), the intrinsic motivation of both boys and girls increases when parents have higher views on science, but increases in girls' intrinsic motivation are larger (see Figure 38).

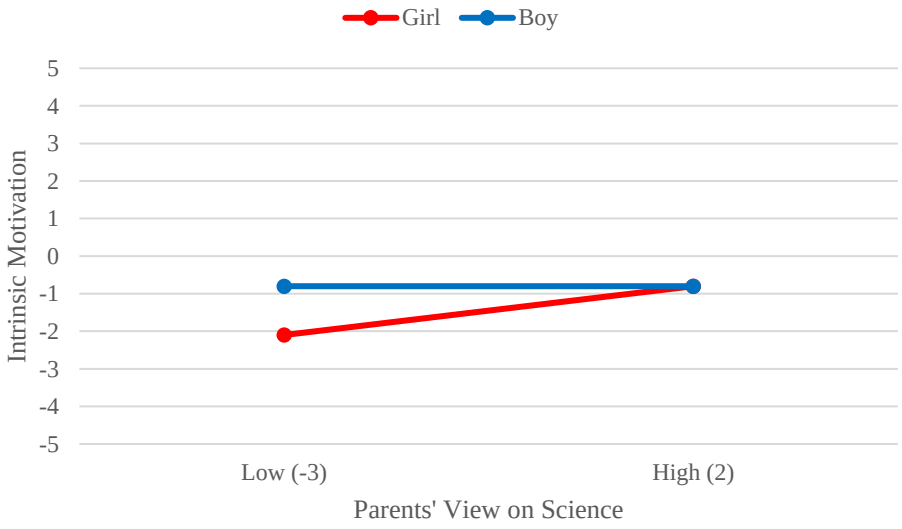


Figure 37. Interaction effect in Chile: intrinsic motivation / PVS * gender.

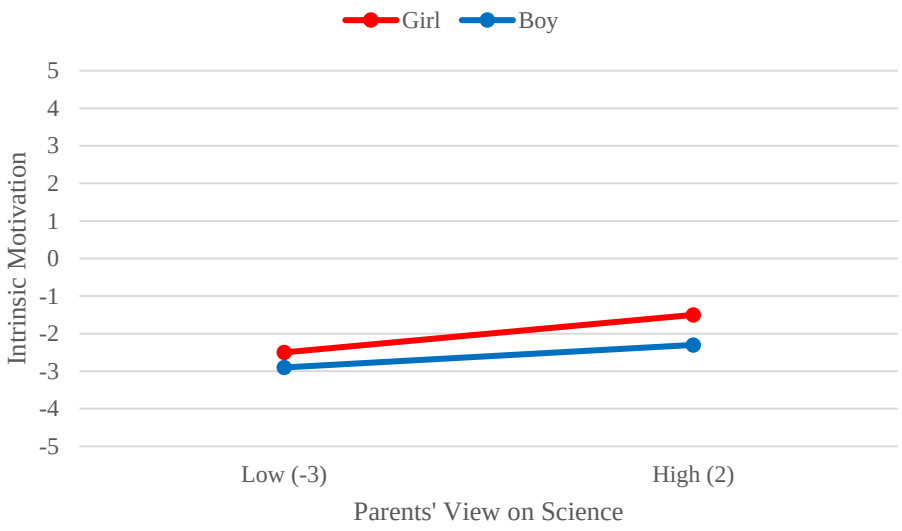


Figure 38. Interaction effect in Belgium: intrinsic motivation / PVS * gender.

Chapter 4 – Conclusions and Discussion

4.1 Discussion

In order to move forward with closing the gender gap in science education it is important to understand why talented beta-girls continue to choose study-paths and careers outside of science, when they have all the abilities, skills and knowledge they need to become successful in science-related domains. The main goal of this research was to explore the relationship between students' intrinsic motivation and self-efficacy, and parental support and role modeling (with science achievement as a control variable), as well as their interaction with gender. As a result, this study offers some valuable insight into the underlying reasons for the gender gap in educational attainment when it comes to science programs, especially with regard to the role that parents play.

Gender differences in science achievement, self-efficacy and intrinsic motivation

As mentioned before, research has shown that intrinsic motivation and self-efficacy relate to performance, but also to the choice of courses and future career orientations (Eccles, 2005, 2009; Ceci & Williams, 2010b; Jacobs et al., 2005). Results from this study show that science achievement has the biggest impact on science intrinsic motivation and science self-efficacy, whereas gender comes in fourth place. Interestingly, the results also show that even though the gender gap in science achievement is narrow, girls tend to have lower science self-efficacy and science intrinsic motivation than boys do. Despite the fact that these gender differences are numerically small, they are statistically significant in the majority of the countries. These findings are consistent with Bandura's observation that girls have lower opinions of their abilities than boys do, even though they perform equally well in science (Bandura, 1997). One possible explanations for this – somewhat contradictory – phenomenon, could be a gender stereotypic pattern. Research suggests that gender differences in self-efficacy are reversed when the context changes. For example, Pajares and Valiante (2001) found that middle school girls reported higher writing self-efficacy than boys, even though there was no gender difference in actual writing performance. When it comes to intrinsic motivation, the results are also partly in line with prior research on this subject, which found either a significant difference in favor of boys (Patrick et al., 2008) or no significant differences (De Witt et al., 2013; DeBacker & Nelson, 2000).

Parental support

The present study's main focus was on the role that parents might play when it comes to influencing and shaping their children as they grow up. Research suggests that the intrinsic motivation and self-efficacy of children are shaped by environmental influences, and especially by parental support and parental role modeling (Fan & Williams, 2010; Simpkins, Fredricks & Eccles, 2012). However, it is still unclear if this has the same effect on boys and girls and if parents treat their sons and daughters the same when it comes to giving support for learning in the home. The current study offers an interesting insight

in this matter, since the results suggest that parents do support their daughters and sons in different ways. In all participating countries, except for Chile, the Dominican Republic and Georgia, girls receive less current support (like helping with homework and discussing science related career options) than boys do. On the contrary, girls receive more emotional support from their parents then boys do in all the participating countries, with the exception of Chile.

The question rises if these different styles of parental support have the same effect on children's self-efficacy and intrinsic motivation in science. According to the present study, the answer to this question would be no. A remarkable finding was that parental current support has a significant impact on both science self-efficacy and science intrinsic motivation, whereas parental emotional support does not seem to have any impact on those two constructs.

Since these findings have the potential to be influential for future research on this subject, it is important to take a closer look at these results. PISA 2015 offered a parent questionnaire option, in which parents were asked, among other things, about their perception of the support they give to their child. The items that were used to measure current support were for the most part (5 out of 8 questions) focused on science (i.e. helping with science homework, obtaining science-related materials, asking about performance in science, discussing science related career options and discussing how science is used in everyday life). On the other hand, the items that were used to measure emotional support were not at all focused on science, but had a strong emotional orientation (i.e. showing interest in child's school activities, being supportive of child's efforts and achievements in school, being supportive when child is facing difficulties at school, and encouraging confidence). This suggests that parents have the tendency to communicate more with their sons about science and are more involved in promoting and encouraging their son's science-related school activities.

Unfortunately, parents still are often holding gender stereotypes about their children's academic performance, believing that sons have stronger science abilities than daughters, even when there is no evidence supporting this belief. As a result, parents may expect their daughters to perform more poorly in science, which may contribute to greater anxiety and lower self-efficacy for girls (Furnham, Reeves & Budhani, 2002). Zeldin and Pajares (2000) focused their research on the self-efficacy beliefs of women who went against the odds and pursued science related careers and became successful in these areas. One of their most important finding was that it was equally important for women to feel that others believed in them as much as they believed in themselves, which is consistent with Bandura's (1997) insight that "self-affirming beliefs of others promote development of skills and a sense of personal efficacy" (P.101). The results of the present study support these results. Moreover, when parents do not believe in their daughters' science abilities, they may choose to focus their communication on more female-oriented domains, such as reading or writing. This is in line with the findings of Pajares and Valiante (2001), which showed that gender differences in self-efficacy are reversed when the context changes from science to writing.

One of the items that was used to measure current support focused on obtaining science-related materials, which is an interesting topic. Bleeker and Jacobs (2004) found that the promotive activities parents engaged in are connected to the later involvement in science and mathematics activities of the children. More specifically, mothers were less likely to purchase science and mathematics items for girls than for boys, regardless of their grade level. Analyses that were done six years later showed an increase in children's science and mathematics interests related to the number of purchases made (Bleeker et al., 2004). These findings are in line with the result of the current study, since parents report giving significantly less current support to girls.

Parental role modeling

When looking at the effect of parental role modeling on students' science self-efficacy and science intrinsic motivation, the present study showed mixed results. In this study, parental role modeling consisted of three aspects: highest parental educational level, highest parental occupational status and parents' view on science.

The results showed that parental educational level and parental occupational status have a minimum impact on students' science self-efficacy and intrinsic motivation. Putting educational level and occupational status side by side, it shows that the educational level of parents has a slightly higher impact on students' self-efficacy and intrinsic motivation, but this difference is negligible. Prior research on this subject demonstrated that social learning from parental role models influences children's later professional orientation (Korunka et al., 2003; Carr & Sequeira, 2007), and especially parental work experiences seemed to have a significant effect on children, since children learn from their parents' work experiences by internalizing them as norms of behavior (Menaghan & Parcel, 1995). Despite these promising findings, according to the present study, higher educated parents or higher parental occupational levels do not seem to matter when it comes to students' academic self-efficacy and intrinsic motivation. Interestingly, parental educational level and occupational status even seem to have a small negative effect on students' intrinsic motivation. A recent study conducted by Mejía Rodríguez (2018), showed comparable results, since she also reported finding a negative effect of parents' education on students' attitudes. According to Mejía Rodríguez (2018), one possible explanation for this could be that highly educated parents might have higher expectations of their children's level of education. In turn, this could possibly undermine intrinsic motivation when children perceive this as being pressured or controlled (Ginsburg & Bronstein, 1993).

Regarding parents' view on science, the results are interesting, since it appears that parents' view on science does have a significant positive effect on students' self-efficacy and intrinsic motivation. Prior research already suggested that parental attitudes towards science need to be taken into consideration, since they can affect children's science interest and achievement in several ways (Sun, Bradley & Akers, 2012). More specifically, children who reported to have parents with more positive attitudes towards science tend to have higher occupational and educational science aspirations (DeWitt

et al., 2013). Perera, Bomhoff & Lee (2014) conclude in their research that more positive parental attitudes towards science creates more favorable attitudes towards the subject among children, which in turn will lead to higher science achievement. In sum, it can be concluded that parents' view on science has an important impact on students' science achievement, self-efficacy and intrinsic motivation, which is clearly visible in the results of the current study.

Interaction effects

A final aim of the current study was to determine if interactions between students' gender and parental support and parental role modeling could explain differences in students' self-efficacy and intrinsic motivation. Also, the interaction between gender and science achievement was taken into account. Only a few interaction effects were found. Respectively, seven interaction effects were significant for science self-efficacy, and eight interaction effects were significant for science intrinsic motivation.

Regarding science self-efficacy, there were significant interaction effects between gender and science achievement (girls from Malta and Croatia gain more self-efficacy than boys do, with increases in achievement), current support (in the UK, the self-efficacy from boys and girls goes up with higher current support, but the effect is larger for girls), emotional support (in Ireland, increases in emotional support come with increases in girls' self-efficacy but decreases in boys' self-efficacy), parents' educational level (in Mexico, the self-efficacy of both boys and girls decreases with higher educated parents, but decreases in boys' self-efficacy are larger), and parents' view on science (in Hong Kong and Chile, the self-efficacy of both boys and girls increases when parents have higher views on science, but increases in girls' self-efficacy are larger). No interaction effects were found between gender and parents' occupational status.

Regarding science intrinsic motivation, there were significant interaction effects between gender and science achievement (in Belgium, both boys and girls show an increase in intrinsic motivation with an increase in achievement, but boys' increment on intrinsic motivation is larger), current support (in Portugal and Georgia, the intrinsic motivation of both boys and girls increases with more current support, but increases in girls' intrinsic motivation are larger), parents' educational level (in the Dominican Republic, Spain and Portugal, the intrinsic motivation of both boys and girls decreases with higher educated parents, but decreases in girls' intrinsic motivation are larger), and parents' view on science (in Chile, boys' intrinsic motivation remains the same – regardless of changes in parents' view on science – while girls' intrinsic motivation increases; in Belgium, the intrinsic motivation of both boys and girls increases when parents have higher views on science, but increases in girls' intrinsic motivation are larger). No interaction effects were found between gender and emotional support and parents' occupational status.

In sum, the majority of the significant interaction effects are in favor of girls, which suggests that the relationships that were found could be more important for girls than for boys. However, given the small amount of significant effects, it is important to keep in mind that this could have been a result

of mere chance, which makes it difficult - maybe even impossible - to draw any general conclusions from these results.

4.2 Limitations and Recommendations for Future Research

Even though the PISA 2015 dataset offered the unique possibility to analyze a large multinational sample of students and their parents, this study is not without limitations. First of all, data was collected at only one point in time, which makes it impossible to determine causality (e.g., does an increase in achievement lead to higher self-efficacy or does an increase in self-efficacy lead to higher achievement?). As a result, even though some significant relationships were found, interpreting these relationships has proven to be challenging and must be done with caution.

A second limitation is that PISA 2015 used self-report questionnaires for the students as well as the parents, which makes it prone to different types of response bias. For example, students and parents may have the tendency to present themselves favorably to cultural norms (i.e., social desirability bias) or rely more heavily on recent events than on events that have taken place in the more distant past (i.e., recency response bias). A third limitation is that the questionnaire items for some of the variables that were used for this research might be too limited and general and therefore possibly pose a threat to validity.

Since the main focus of PISA 2015 was on scientific literacy, it was no surprise that the background questionnaires for the students as well as the parents were limited in order to fit into the 2-hour time frame. A recommendation for future research would be to shift the main focus from science achievement (since the science achievement gap has proven to be very small or even non-existent) towards the influence of parental support and/or parental role modeling on students' academic self-efficacy and intrinsic motivation. The results of the current research can be used as input for further research in this direction and for designing interventions focusing on parents' as well as students, with the goal to stimulate girls in pursuing a science related career.

Another valuable recommendation would be to compare the results of PISA 2015 with previous and future editions of PISA, or with comparable student assessments with different age-groups, such as the TIMSS assessment. For example, it would be valuable to analyze if the gender differences in parental support are already present in younger age groups.

4.3 Conclusion

The current study offers some valuable insights into possible underlying reasons for the underrepresentation of girls in science education, and especially when it comes to the role that parents may play in this.

First, the results showed that even though the gender gap in science achievement is narrow, girls tend to have lower science self-efficacy and science intrinsic motivation than boys do. Despite the fact that these gender differences are numerically small, they are statistically significant in the majority of

the countries. Interestingly, the results also showed that students' self-efficacy and intrinsic motivation in science are mainly explained by their relationship with science achievement, whereas gender comes in fourth place.

Prior research suggested that parental support and parental role modeling can have an important impact on the development of children's academic intrinsic motivation and self-efficacy (Fan & Williams, 2010). Regarding parental support, the results of the present study suggest that parents support their daughters and sons in different ways. Girls receive less current support than boys do, although they do receive more emotional support than boys. A remarkable finding was that current support has a significant impact on both science self-efficacy and intrinsic motivation, whereas emotional support does not seem to have any impact on those two constructs. Regarding parental role modeling, the results showed that parental educational level and parental occupational status only have a minimum impact on students' science self-efficacy and intrinsic motivation, whereas parents' view on science does have a significant positive effect.

A final aim of the current study was to determine if interactions between students' gender and parental support, parental role modeling or science achievement could explain differences in students' self-efficacy and intrinsic motivation. Only a few interaction effects were significant, from which the majority was in favor of girls. However, given the small amount of significant effects, this could have been the result of mere chance, which makes it difficult to draw any general conclusions from these results. Even though parents might support their sons and daughters differently, this does not seem to have a big impact on the students' self-efficacy and intrinsic motivation in science.

In sum, the results from the multiple regression analysis showed that gender remains an important factor for students' academic self-efficacy and intrinsic motivation, even when science achievement and parental influences are controlled for. Unfortunately, this is posing a threat on the progress towards gender equity in science education. However, the ultimate goal should be that every individual feels free to follow their passion, and those passions don't necessarily have to lie within science.

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Appendix A

Gender differences in science achievement

Table 12

Science Achievement by gender

Country	Gender	N	*M*	*SD*	Correlation	Mean Difference	Sig.
Georgia	Girl	2557	419.62	86.22	-.09	-16.12	.000*
	Boy	2759	403.50	93.70			
Korea	Girl	2669	520.83	88.07	-.05	-9.62	.055
	Boy	2912	511.22	101.03			
Macao	Girl	2230	532.42	75.84	-.05	-7.70	.000*
	Boy	2246	524.71	86.34			
Malta	Girl	1790	470.21	114.89	-.05	-10.70	.001*
	Boy	1844	459.51	120.00			
Hong Kong	Girl	2675	523.75	77.50	-.01	-0.93	.821
	Boy	2684	522.82	83.46			
United Kingdom	Girl	1532	496.12	92.44	.01	1.24	.746
	Boy	1579	497.37	97.39			
France	Girl	3111	494.03	97.21	.01	1.90	.579
	Boy	2997	495.94	106.56			
Dominican Republic	Girl	2474	330.83	70.66	.01	1.65	.537
	Boy	2266	332.48	74.27			
Table Average	Girl	3093	474.74	87.42	.02	3.46	
	Boy	3107	478.20	94.49			
Croatia	Girl	3013	472.59	85.50	.03	5.83	.093
	Boy	2796	478.42	93.17			
Spain	Girl	3404	489.46	84.31	.04	6.67	.013*
	Boy	3332	496.13	91.44			
Luxembourg	Girl	2683	479.01	96.53	.04	7.64	.001*
	Boy	2616	486.65	104.03			
Germany	Girl	3197	503.81	96.73	.05	10.47	.000*
	Boy	3307	514.28	101.50			
Portugal	Girl	3651	496.06	87.05	.05	10.00	.000*
	Boy	3674	506.05	96.01			
Mexico	Girl	3803	411.55	67.84	.06	8.20	.000*
	Boy	3765	419.75	74.48			
Belgium	Girl	4752	496.03	97.03	.06	11.75	.001*
	Boy	4899	507.78	102.40			
Ireland	Girl	2833	497.17	82.93	.06	10.53	.001*
	Boy	2908	507.70	93.93			
Chile	Girl	3500	439.62	83.41	.08	14.60	.000*
	Boy	3553	454.22	87.92			
Italy	Girl	5792	472.12	88.86	.09	16.96	.000*
	Boy	5791	489.08	93.21			

*p < .05, two-tailed.

Appendix B

Gender differences in science self-efficacy

Table 13

Science self-efficacy by gender

Country	Gender	N	*M*	*SD*	Correlation	Mean Difference	Sig.
Dominican Republic	Girl	1859	.65	1.35	-.08	-.21	.000*
	Boy	1689	.44	1.38			
Georgia	Girl	2492	.35	1.09	-.07	-.16	.000*
	Boy	2601	.19	1.20			
Korea	Girl	2650	.00	1.15	-.01	-.03	.397
	Boy	2873	-.03	1.30			
Mexico	Girl	3433	.26	1.07	.01	.01	.594
	Boy	3342	.27	1.11			
Chile	Girl	3124	-.12	1.16	.02	.04	.251
	Boy	3076	-.08	1.16			
Macao	Girl	2227	-.08	1.03	.04	.10	.004*
	Boy	2232	.02	1.21			
Portugal	Girl	3513	.20	1.19	.06	.15	.000*
	Boy	3484	.34	1.30			
Table Average	Girl	2789	-.03	1.18	.06	.15	
	Boy	2736	.12	1.27			
Hong Kong	Girl	2622	-.15	1.11	.07	.17	.000*
	Boy	2603	.01	1.33			
Croatia	Girl	2886	.01	1.17	.08	.19	.000*
	Boy	2595	.20	1.31			
Italy	Girl	5435	.04	1.11	.08	.18	.000*
	Boy	5332	.22	1.20			
United Kingdom	Girl	1400	-.18	1.41	.09	.24	.000*
	Boy	1349	.06	1.38			
Luxembourg	Girl	2345	-.15	1.24	.09	.24	.000*
	Boy	2231	.09	1.39			
Ireland	Girl	2757	-.06	1.18	.10	.24	.000*
	Boy	2753	.18	1.20			
Spain	Girl	3140	-.28	1.25	.10	.27	.000*
	Boy	3069	-.01	1.34			
Malta	Girl	1734	-.22	1.27	.11	.27	.000*
	Boy	1753	.05	1.27			
Belgium	Girl	4068	-.24	1.20	.11	.28	.000*
	Boy	4089	.04	1.33			
France	Girl	2558	-.30	1.22	.13	.34	.000*
	Boy	2492	.04	1.29			
Germany	Girl	1750	-.19	1.11	.16	.37	.000*
	Boy	1618	.18	1.25			

*$p < .05$, two-tailed.

Appendix C

Gender differences in science intrinsic motivation

Table 14

Science Intrinsic Motivation by gender

Country	Gender	N	*M*	*SD*	Correlation	Mean Difference	Sig.
Georgia	Girl	2511	.40	.90	-.07	-.13	.000*
	Boy	2626	.27	.91			
Chile	Girl	3222	.12	1.10	-.04	-.09	.005*
	Boy	3165	.03	1.07			
Dominican Republic	Girl	1976	.56	1.07	-.02	-.05	.273
	Boy	1772	.52	1.13			
Mexico	Girl	3501	.42	.92	.01	.01	.623
	Boy	3433	.43	.99			
Croatia	Girl	2924	-.13	1.03	.02	.05	.143
	Boy	2653	-.08	1.13			
Portugal	Girl	3549	.28	.98	.04	.08	.003*
	Boy	3511	.36	1.01			
Ireland	Girl	2771	.15	1.10	.04	.09	.004*
	Boy	2792	.25	1.10			
Spain	Girl	3198	-.02	1.13	.05	.11	.000*
	Boy	3129	.09	1.14			
Malta	Girl	1747	.12	1.14	.05	.11	.001*
	Boy	1771	.23	1.13			
Luxembourg	Girl	2469	.03	1.19	.06	.14	.000*
	Boy	2349	.17	1.25			
Table Average	Girl	2868	.06	1.06	.06	.14	
	Boy	2819	.20	1.10			
Macao	Girl	2226	.13	.92	.08	.16	.000*
	Boy	2236	.28	.96			
Belgium	Girl	4268	-.13	1.08	.09	.20	.000*
	Boy	4325	.07	1.15			
United Kingdom	Girl	1450	.01	1.16	.09	.21	.000*
	Boy	1429	.23	1.17			
Italy	Girl	5556	-.12	1.00	.12	.24	.000*
	Boy	5433	.12	1.02			
Hong Kong	Girl	2627	.15	1.02	.12	.26	.000*
	Boy	2602	.40	1.07			
Korea	Girl	2654	-.30	1.13	.14	.32	.000*
	Boy	2885	.02	1.18			
France	Girl	2877	-.18	1.09	.14	.31	.000*
	Boy	2667	.13	1.12			
Germany	Girl	2086	-.39	1.14	.18	.43	.000*
	Boy	1971	.05	1.24			

*p < .05, two-tailed.

Appendix D

Gender differences in parental current support

Table 15

Parental current support by gender

Country	Gender	N	*M*	*SD*	Correlation	Mean Difference	Sig.
Chile	Girl	3250	.23	1.21	-.02	-.05	.145
	Boy	3246	.18	1.16			
Dominican Republic	Girl	2386	.56	1.32	-.02	-.05	.273
	Boy	2182	.51	1.33			
Georgia	Girl	2497	.51	.91	.00	-.01	.772
	Boy	2645	.50	.97			
Portugal	Girl	3467	.30	.99	.00	-.01	.827
	Boy	3396	.29	.99			
Belgium	Girl	2376	-.25	.86	.01	.01	.635
	Boy	2336	-.24	.84			
Hong Kong	Girl	2650	-.37	1.10	.01	.02	.578
	Boy	2593	-.35	1.16			
Spain	Girl	2476	.18	.96	.01	.02	.444
	Boy	2223	.21	.93			
Ireland	Girl	2589	-.18	.84	.02	.03	.193
	Boy	2521	-.14	.84			
Germany	Girl	1857	.07	.79	.02	.04	.190
	Boy	1535	.11	.73			
Table Average	Girl	2568	.03	.99	.02	.04	
	Boy	2479	.07	.99			
Macao	Girl	2204	-.43	1.24	.03	.07	.076
	Boy	2212	-.37	1.29			
Korea	Girl	2656	-.60	.97	.03	.05	.085
	Boy	2875	-.54	1.06			
United Kingdom	Girl	745	.08	.85	.03	.06	.157
	Boy	680	.13	.81			
Mexico	Girl	3594	-.03	1.27	.04	.10	.002*
	Boy	3451	.06	1.19			
Croatia	Girl	2807	.32	.89	.05	.08	.002*
	Boy	2587	.40	.87			
Malta	Girl	1591	-.01	1.06	.05	.10	.003*
	Boy	1571	.09	1.05			
France	Girl	2776	-.09	.86	.05	.08	.001*
	Boy	2570	-.01	.84			
Luxembourg	Girl	1714	.04	.90	.06	.11	.002*
	Boy	1559	.14	.89			
Italy	Girl	4601	.15	.89	.10	.18	.000*
	Boy	4431	.33	.89			

*p < .05, two-tailed.

Appendix E

Gender differences in parental emotional support

Table 16

Parental emotional support by gender

Country	Gender	N	*M*	*SD*	Correlation	Mean Difference	Sig.
Georgia	Girl	2470	-.31	1.00	-.10	-.20	.000*
	Boy	2628	-.51	1.05			
Korea	Girl	2654	-.65	1.11	-.06	-.13	.001*
	Boy	2871	-.78	1.10			
Portugal	Girl	3462	.13	.87	-.05	-.09	.000*
	Boy	3393	.04	.90			
Italy	Girl	4556	-.27	1.03	-.05	-.10	.002*
	Boy	4382	-.37	1.05			
Ireland	Girl	2577	.40	.80	-.05	-.08	.003*
	Boy	2512	.32	.85			
Croatia	Girl	2810	.21	.83	-.05	-.08	.000*
	Boy	2587	.13	.90			
Hong Kong	Girl	2648	-.56	.98	-.05	-.09	.005*
	Boy	2590	-.65	1.01			
Spain	Girl	2477	.10	0.94	-.04	-.09	.006
	Boy	2222	.02	1.00			
Table Average	Girl	2556	-.03	.94	-.04	-.07	
	Boy	2466	-.10	.97			
United Kingdom	Girl	746	.35	.87	-.04	-.07	.088
	Boy	681	.28	.94			
Dominican Republic	Girl	2378	-.02	1.06	-.04	-.08	.029*
	Boy	2165	-.10	1.12			
France	Girl	2773	.18	.86	-.04	-.07	.002*
	Boy	2563	.12	.89			
Macao	Girl	2208	-.71	1.04	-.04	-.08	.013*
	Boy	2209	-.79	1.07			
Mexico	Girl	3590	-.01	1.04	-.03	-.07	.004*
	Boy	3437	-.08	1.07			
Germany	Girl	1856	.15	.89	-.03	-.05	.085
	Boy	1531	.10	.90			
Malta	Girl	1588	.19	.83	-.03	-.05	.110
	Boy	1568	.14	.85			
Luxembourg	Girl	1691	.22	.86	-.03	-.05	.169
	Boy	1544	.17	.90			
Belgium	Girl	2369	.00	.97	-.01	-.03	.292
	Boy	2330	-.03	1.00			
Chile	Girl	3162	.10	.93	.02	.04	.129
	Boy	3169	.14	.91			

*p < .05, two-tailed.

Appendix F

Regression analysis results for students' science self-efficacy and science intrinsic motivation

Table 17

Regression analysis results for students' science self-efficacy

Country	Model	*b*	*SE b*	*β*	*t*	Sig
Belgium	(Constant)	-2,709	0,176		-15,357	0,000*
R^2 = .140	Current Support	0,134	0,027	0,085	5,005	0,000*
	Emotional Support	-0,037	0,019	-0,028	-1,947	0,052
	HISCED	0,032	0,029	0,027	1,086	0,278
	HISEI	0,003	0,002	0,055	2,186	0,029*
	PVS	0,063	0,016	0,052	3,905	0,000*
	Gender (Dummy)	0,184	0,041	0,071	4,489	0,000*
	Science Achievement	0,004	0,000	0,290	12,990	0,000*
Chile	(Constant)	-1,185	0,122		-9,687	0,000*
R^2 = .039	Current Support	0,047	0,018	0,048	2,632	0,009*
	Emotional Support	-0,019	0,024	-0,015	-0,778	0,436
	HISCED	0,033	0,020	0,042	1,659	0,097
	HISEI	0,002	0,001	0,043	1,954	0,051
	PVS	0,084	0,019	0,078	4,495	0,000*
	Gender (Dummy)	0,002	0,038	0,001	0,064	0,949
	Science Achievement	0,002	0,000	0,122	6,170	0,000*
Croatia	(Constant)	-1,777	0,122		-14,586	0,000*
R^2 = .074	Current Support	0,127	0,026	0,092	4,982	0,000*
	Emotional Support	-0,034	0,021	-0,024	-1,615	0,106
	HISCED	0,061	0,021	0,055	2,933	0,003*
	HISEI	0,002	0,001	0,035	2,199	0,028*
	PVS	0,033	0,016	0,029	2,012	0,044*
	Gender (Dummy)	0,146	0,038	0,060	3,844	0,000*
	Science Achievement	0,003	0,000	0,205	11,370	0,000*
Dominican Republic	(Constant)	0,857	0,178		4,819	0,000*
R^2 = .019	Current Support	0,095	0,022	0,092	4,227	0,000*
	Emotional Support	-0,007	0,032	-0,005	-0,215	0,830
	HISCED	0,023	0,021	0,027	1,082	0,279
	HISEI	-0,001	0,001	-0,013	-0,527	0,599
	PVS	-0,011	0,026	-0,009	-0,408	0,683
	Gender (Dummy)	-0,233	0,057	-0,086	-4,100	0,000*
	Science Achievement	-0,001	0,000	-0,045	-1,848	0,065
France	(Constant)	-2,312	0,136		-16,957	0,000*
R^2 = .134	Current Support	0,151	0,024	0,101	6,351	0,000*
	Emotional Support	-0,048	0,020	-0,035	-2,373	0,018*
	HISCED	0,068	0,017	0,071	4,081	0,000*
	HISEI	0,002	0,001	0,030	1,644	0,100
	PVS	0,075	0,016	0,068	4,855	0,000*
	Gender (Dummy)	0,276	0,034	0,114	8,138	0,000*
	Science Achievement	0,003	0,000	0,237	13,363	0,000*
Georgia	(Constant)	-1,031	0,133		-7,747	0,000*
R^2 = .072	Current Support	0,085	0,021	0,068	3,974	0,000*
	Emotional Support	0,006	0,023	0,005	0,258	0,796
	HISCED	0,018	0,020	0,017	0,918	0,359
	HISEI	0,002	0,001	0,036	1,795	0,073

	PVS	0,051	0,022	0,043	2,295	0,022*
	Gender (Dummy)	-0,129	0,043	-0,057	-3,023	0,003*
	Science Achievement	0,003	0,000	0,215	10,923	0,000*
Germany	(Constant)	-2,139	0,222		-9,648	0,000*
R^2 = .139	Current Support	0,187	0,044	0,113	4,249	0,000*
	Emotional Support	0,025	0,030	0,019	0,849	0,396
	HISCED	0,017	0,019	0,022	0,893	0,372
	HISEI	0,000	0,001	0,000	-0,006	0,995
	PVS	0,054	0,024	0,052	2,260	0,024*
	Gender (Dummy)	0,332	0,058	0,142	5,694	0,000*
	Science Achievement	0,004	0,000	0,285	8,909	0,000*
Hong Kong	(Constant)	-1,432	0,163		-8,805	0,000*
R^2 = .057	Current Support	0,078	0,022	0,073	3,524	0,000*
	Emotional Support	0,037	0,021	0,031	1,744	0,081
	HISCED	0,058	0,016	0,075	3,610	0,000*
	HISEI	0,000	0,001	-0,006	-0,312	0,755
	PVS	0,066	0,019	0,059	3,380	0,001*
	Gender (Dummy)	0,159	0,034	0,067	4,679	0,000*
	Science Achievement	0,002	0,000	0,139	6,974	0,000*
Ireland	(Constant)	-2,501	0,120		-20,825	0,000*
R^2 = .188	Current Support	0,190	0,021	0,133	9,247	0,000*
	Emotional Support	-0,047	0,022	-0,032	-2,101	0,036*
	HISCED	0,043	0,017	0,041	2,588	0,010*
	HISEI	0,001	0,001	0,015	0,914	0,361
	PVS	0,094	0,015	0,089	6,130	0,000*
	Gender (Dummy)	0,169	0,033	0,071	5,075	0,000*
	Science Achievement	0,004	0,000	0,323	20,972	0,000*
Italy	(Constant)	-0,892	0,140		-6,376	0,000*
R^2 = .042	Current Support	0,108	0,022	0,084	4,880	0,000*
	Emotional Support	-0,020	0,020	-0,018	-1,011	0,312
	HISCED	0,023	0,013	0,030	1,849	0,064
	HISEI	0,002	0,001	0,034	1,664	0,096
	PVS	0,067	0,024	0,061	2,811	0,005*
	Gender (Dummy)	0,132	0,029	0,059	4,479	0,000*
	Science Achievement	0,001	0,000	0,113	5,112	0,000*
Korea	(Constant)	-1,794	0,167		-10,717	0,000*
R^2 = .097	Current Support	0,128	0,017	0,107	7,471	0,000*
	Emotional Support	0,048	0,017	0,044	2,824	0,005*
	HISCED	0,059	0,025	0,041	2,392	0,017*
	HISEI	0,003	0,001	0,052	3,170	0,002*
	PVS	0,027	0,018	0,024	1,546	0,122
	Gender (Dummy)	-0,001	0,033	0,000	-0,032	0,974
	Science Achievement	0,003	0,000	0,214	11,591	0,000*
Luxembourg	(Constant)	-1,925	0,134		-14,392	0,000*
R^2 = .103	Current Support	0,099	0,036	0,069	2,706	0,007*
	Emotional Support	-0,004	0,025	-0,003	-0,162	0,871
	HISCED	0,037	0,020	0,049	1,809	0,071
	HISEI	0,003	0,001	0,049	1,987	0,047*
	PVS	0,052	0,022	0,046	2,357	0,019*
	Gender (Dummy)	0,197	0,043	0,079	4,591	0,000*
	Science Achievement	0,003	0,000	0,227	9,245	0,000*
Macao	(Constant)	-1,992	0,149		-13,398	0,000*
R^2 = .078	Current Support	0,050	0,013	0,056	3,791	0,000*
	Emotional Support	-0,008	0,019	-0,007	-0,401	0,688

	HISCED	0,057	0,010	0,087	5,817	0,000*
	HISEI	0,001	0,001	0,016	1,066	0,286
	PVS	0,054	0,017	0,049	3,117	0,002*
	Gender (Dummy)	0,106	0,034	0,048	3,074	0,002*
	Science Achievement	0,003	0,000	0,225	11,268	0,000*
Malta	(Constant)	-2,191	0,132		-16,643	0,000*
R^2 = .198	Current Support	0,141	0,027	0,117	5,290	0,000*
	Emotional Support	0,009	0,030	0,006	0,296	0,768
	HISCED	0,021	0,017	0,027	1,253	0,210
	HISEI	0,002	0,001	0,043	1,716	0,086
	PVS	0,091	0,027	0,082	3,337	0,001*
	Gender (Dummy)	0,231	0,039	0,095	5,894	0,000*
	Science Achievement	0,004	0,000	0,335	14,325	0,000*
Mexico	(Constant)	-0,237	0,130		-1,816	0,069
R^2 = .017	Current Support	0,066	0,015	0,074	4,386	0,000*
	Emotional Support	-0,006	0,014	-0,006	-0,451	0,652
	HISCED	0,021	0,010	0,036	2,153	0,031*
	HISEI	0,001	0,001	0,015	0,889	0,374
	PVS	0,039	0,015	0,038	2,598	0,009*
	Gender (Dummy)	0,005	0,030	0,002	0,178	0,859
	Science Achievement	0,001	0,000	0,058	2,835	0,005*
Portugal	(Constant)	-1,526	0,109		-14,021	0,000*
R^2 = .101	Current Support	0,166	0,019	0,131	8,680	0,000*
	Emotional Support	-0,034	0,024	-0,024	-1,403	0,161
	HISCED	0,022	0,013	0,033	1,604	0,109
	HISEI	0,000	0,001	-0,003	-0,167	0,867
	PVS	0,113	0,019	0,087	5,855	0,000*
	Gender (Dummy)	0,093	0,035	0,038	2,631	0,009*
	Science Achievement	0,003	0,000	0,227	14,150	0,000*
Spain	(Constant)	-2,460	0,143		-17,238	0,000*
R^2 = .121	Current Support	0,090	0,022	0,069	4,101	0,000*
	Emotional Support	0,010	0,022	0,008	0,460	0,645
	HISCED	0,028	0,014	0,039	1,929	0,054
	HISEI	0,001	0,001	0,013	0,828	0,408
	PVS	0,069	0,022	0,059	3,199	0,001*
	Gender (Dummy)	0,240	0,041	0,097	5,875	0,000*
	Science Achievement	0,004	0,000	0,273	15,098	0,000*
United Kingdom	(Constant)	-2,093	0,229		-9,139	0,000*
R^2 = .134	Current Support	0,208	0,048	0,130	4,354	0,000*
	Emotional Support	-0,039	0,027	-0,028	-1,466	0,143
	HISCED	0,016	0,033	0,016	0,496	0,620
	HISEI	0,000	0,002	-0,007	-0,180	0,857
	PVS	0,093	0,028	0,084	3,262	0,001*
	Gender (Dummy)	0,156	0,059	0,060	2,633	0,009*
	Science Achievement	0,004	0,000	0,256	8,659	0,000*
Table Average	(Constant)	-1,630	0,036		-44,977	
R^2 = .097	Current Support	0,119	0,006	0,091	19,298	
	Emotional Support	-0,009	0,005	-0,006	-1,688	
	HISCED	0,035	0,005	0,041	7,710	
	HISEI	0,001	0,000	0,023	4,322	
	PVS	0,062	0,005	0,055	12,628	
	Gender (Dummy)	0,115	0,010	0,048	11,863	
	Science Achievement	0,003	0,000	0,206	38,844	

*p < .05, two-tailed.

Table 18
Regression analysis results for students' science intrinsic motivation

Country	Model	*b*	*SE b*	β	*t*	Sig
Belgium	(Constant)	-2,268	0,107		-21,149	0,000*
R^2 = .165	Current Support	0,166	0,023	0,126	7,146	0,000*
	Emotional Support	-0,031	0,015	-0,028	-2,096	0,036*
	HISCED	-0,017	0,018	-0,017	-0,969	0,332
	HISEI	0,000	0,001	0,007	0,360	0,719
	PVS	0,086	0,015	0,084	5,802	0,000*
	Gender (Dummy)	0,139	0,029	0,064	4,866	0,000*
	Science Achievement	0,004	0,000	0,336	17,525	0,000*
Chile	(Constant)	-1,120	0,119		-9,393	0,000*
R^2 = .071	Current Support	0,094	0,016	0,101	5,840	0,000*
	Emotional Support	-0,023	0,020	-0,019	-1,151	0,250
	HISCED	-0,026	0,016	-0,034	-1,621	0,105
	HISEI	0,001	0,001	0,017	0,698	0,485
	PVS	0,112	0,020	0,109	5,689	0,000*
	Gender (Dummy)	-0,138	0,036	-0,063	-3,827	0,000*
	Science Achievement	0,003	0,000	0,219	9,915	0,000*
Croatia	(Constant)	-1,607	0,139		-11,585	0,000*
R^2 = .092	Current Support	0,112	0,017	0,092	6,665	0,000*
	Emotional Support	-0,020	0,016	-0,016	-1,236	0,217
	HISCED	-0,014	0,018	-0,014	-0,800	0,423
	HISEI	-0,001	0,001	-0,013	-0,741	0,459
	PVS	0,101	0,016	0,102	6,533	0,000*
	Gender (Dummy)	-0,014	0,040	-0,007	-0,349	0,727
	Science Achievement	0,003	0,000	0,265	13,767	0,000*
Dominican Republic	(Constant)	0,219	0,144		1,524	0,128
R^2 = .010	Current Support	0,040	0,018	0,049	2,283	0,023*
	Emotional Support	0,021	0,025	0,021	0,845	0,398
	HISCED	0,000	0,018	0,000	0,015	0,988
	HISEI	-0,002	0,001	-0,038	-1,499	0,134
	PVS	0,003	0,018	0,003	0,175	0,861
	Gender (Dummy)	-0,042	0,043	-0,020	-0,988	0,323
	Science Achievement	0,001	0,000	0,081	2,701	0,007*
France	(Constant)	-2,082	0,100		-20,714	0,000*
R^2 = .201	Current Support	0,220	0,023	0,160	9,403	0,000*
	Emotional Support	-0,021	0,019	-0,017	-1,110	0,267
	HISCED	-0,001	0,016	-0,001	-0,060	0,952
	HISEI	-0,003	0,001	-0,058	-2,686	0,007*
	PVS	0,136	0,015	0,135	8,935	0,000*
	Gender (Dummy)	0,250	0,032	0,113	7,897	0,000*
	Science Achievement	0,004	0,000	0,333	20,744	0,000*
Georgia	(Constant)	-0,450	0,103		-4,378	0,000*
R^2 = .066	Current Support	0,048	0,017	0,048	2,852	0,004*
	Emotional Support	0,016	0,017	0,018	0,959	0,338
	HISCED	-0,011	0,014	-0,013	-0,757	0,449
	HISEI	-0,001	0,001	-0,035	-1,639	0,101
	PVS	0,073	0,017	0,077	4,406	0,000*
	Gender (Dummy)	-0,084	0,030	-0,046	-2,831	0,005*
	Science Achievement	0,002	0,000	0,221	10,786	0,000*
Germany	(Constant)	-2,768	0,142		-19,528	0,000*
R^2 = .187	Current Support	0,225	0,033	0,135	6,836	0,000*

	Emotional Support	-0,014	0,026	-0,010	-0,526	0,599
	HISCED	0,026	0,016	0,032	1,610	0,108
	HISEI	-0,001	0,002	-0,016	-0,630	0,529
	PVS	0,080	0,022	0,074	3,716	0,000*
	Gender (Dummy)	0,324	0,058	0,134	5,630	0,000*
	Science Achievement	0,004	0,000	0,348	15,577	0,000*
Hong Kong	(Constant)	-1,447	0,127		-11,380	0,000*
R^2 = .105	Current Support	0,074	0,016	0,079	4,714	0,000*
	Emotional Support	0,031	0,016	0,029	1,957	0,050*
	HISCED	0,010	0,013	0,014	0,749	0,454
	HISEI	-0,001	0,001	-0,025	-1,678	0,093
	PVS	0,097	0,020	0,098	4,818	0,000*
	Gender (Dummy)	0,255	0,030	0,121	8,417	0,000*
	Science Achievement	0,003	0,000	0,231	13,642	0,000*
Ireland	(Constant)	-1,976	0,138		-14,281	0,000*
R^2 = .217	Current Support	0,255	0,018	0,192	14,387	0,000*
	Emotional Support	-0,082	0,020	-0,060	-4,187	0,000*
	HISCED	-0,014	0,017	-0,014	-0,828	0,408
	HISEI	-0,002	0,001	-0,033	-2,062	0,039*
	PVS	0,099	0,015	0,100	6,462	0,000*
	Gender (Dummy)	0,031	0,034	0,014	0,912	0,362
	Science Achievement	0,005	0,000	0,369	19,268	0,000*
Italy	(Constant)	-1,414	0,099		-14,240	0,000*
R^2 = .103	Current Support	0,175	0,021	0,153	8,496	0,000*
	Emotional Support	-0,013	0,018	-0,014	-0,750	0,453
	HISCED	-0,001	0,012	-0,001	-0,073	0,942
	HISEI	0,000	0,001	-0,001	-0,048	0,962
	PVS	0,084	0,017	0,085	4,954	0,000*
	Gender (Dummy)	0,140	0,031	0,070	4,513	0,000*
	Science Achievement	0,003	0,000	0,233	12,012	0,000*
Korea	(Constant)	-2,542	0,135		-18,784	0,000*
R^2 = .198	Current Support	0,138	0,016	0,119	8,497	0,000*
	Emotional Support	0,015	0,014	0,014	1,101	0,271
	HISCED	0,006	0,019	0,004	0,314	0,753
	HISEI	0,000	0,001	0,003	0,189	0,850
	PVS	0,094	0,014	0,084	6,956	0,000*
	Gender (Dummy)	0,338	0,030	0,144	11,197	0,000*
	Science Achievement	0,004	0,000	0,351	20,913	0,000*
Luxembourg	(Constant)	-1,901	0,141		-13,470	0,000*
R^2 = .139	Current Support	0,158	0,033	0,115	4,814	0,000*
	Emotional Support	-0,043	0,025	-0,031	-1,709	0,088
	HISCED	-0,014	0,016	-0,020	-0,873	0,383
	HISEI	-0,002	0,001	-0,047	-2,074	0,038*
	PVS	0,085	0,024	0,079	3,477	0,001*
	Gender (Dummy)	0,102	0,044	0,043	2,305	0,021*
	Science Achievement	0,004	0,000	0,351	14,016	0,000*
Macao	(Constant)	-1,160	0,100		-11,641	0,000*
R^2 = .079	Current Support	0,041	0,012	0,054	3,391	0,001*
	Emotional Support	0,028	0,015	0,031	1,839	0,066
	HISCED	0,002	0,009	0,003	0,200	0,842
	HISEI	-0,002	0,001	-0,032	-2,061	0,039*
	PVS	0,087	0,015	0,094	5,850	0,000*
	Gender (Dummy)	0,169	0,027	0,090	6,248	0,000*
	Science Achievement	0,003	0,000	0,226	15,612	0,000*

Malta	(Constant)	-1,831	0,088		-20,858	0,000*
R^2 = .261	Current Support	0,146	0,022	0,134	6,775	0,000*
	Emotional Support	0,004	0,024	0,003	0,170	0,865
	HISCED	-0,020	0,013	-0,028	-1,509	0,131
	HISEI	-0,002	0,001	-0,035	-1,603	0,109
	PVS	0,109	0,021	0,109	5,238	0,000*
	Gender (Dummy)	0,139	0,034	0,063	4,128	0,000*
	Science Achievement	0,004	0,000	0,439	23,086	0,000*
Mexico	(Constant)	-0,487	0,110		-4,426	0,000*
R^2 = .049	Current Support	0,063	0,012	0,081	5,217	0,000*
	Emotional Support	0,024	0,013	0,026	1,799	0,072
	HISCED	-0,031	0,009	-0,062	-3,600	0,000*
	HISEI	-0,002	0,001	-0,051	-2,439	0,015*
	PVS	0,061	0,016	0,068	3,923	0,000*
	Gender (Dummy)	-0,006	0,027	-0,003	-0,228	0,820
	Science Achievement	0,003	0,000	0,189	9,998	0,000*
Portugal	(Constant)	-0,926	0,080		-11,588	0,000*
R^2 = .107	Current Support	0,178	0,015	0,177	12,164	0,000*
	Emotional Support	-0,054	0,017	-0,048	-3,110	0,002*
	HISCED	0,003	0,010	0,005	0,264	0,792
	HISEI	-0,004	0,001	-0,083	-4,296	0,000*
	PVS	0,125	0,017	0,122	7,444	0,000*
	Gender (Dummy)	0,047	0,028	0,024	1,663	0,096
	Science Achievement	0,003	0,000	0,234	15,072	0,000*
Spain	(Constant)	-2,357	0,123		-19,169	0,000*
R^2 = .154	Current Support	0,111	0,024	0,092	4,549	0,000*
	Emotional Support	-0,013	0,019	-0,011	-0,696	0,486
	HISCED	0,011	0,015	0,017	0,728	0,466
	HISEI	-0,001	0,001	-0,014	-0,768	0,442
	PVS	0,091	0,021	0,086	4,461	0,000*
	Gender (Dummy)	0,066	0,034	0,029	1,953	0,051
	Science Achievement	0,005	0,000	0,342	20,782	0,000*
United Kingdom	(Constant)	-1,939	0,217		-8,921	0,000*
R^2 = .241	Current Support	0,314	0,034	0,219	9,269	0,000*
	Emotional Support	0,054	0,032	0,043	1,661	0,097
	HISCED	-0,034	0,025	-0,037	-1,390	0,165
	HISEI	-0,002	0,002	-0,036	-1,314	0,189
	PVS	0,065	0,028	0,066	2,350	0,019*
	Gender (Dummy)	0,215	0,051	0,093	4,181	0,000*
	Science Achievement	0,004	0,000	0,354	11,224	0,000*
Table Average	(Constant)	-1,559	0,030		-52,255	
R^2 = .136	Current Support	0,142	0,005	0,118	28,003	
	Emotional Support	-0,007	0,005	-0,004	-1,423	
	HISCED	-0,007	0,004	-0,009	-1,896	
	HISEI	-0,001	0,000	-0,027	-5,353	
	PVS	0,088	0,004	0,088	20,152	
	Gender (Dummy)	0,107	0,009	0,048	12,491	
	Science Achievement	0,003	0,000	0,284	56,707	

*p < .05, two-tailed.

Appendix G

Regression analysis results with gender interactions for students' science self-efficacy and science intrinsic motivation

Table 19

Regression analysis results with gender interactions for students' science self-efficacy

Country	Model	*b*	*SE b*	β	*t*	Sig
Belgium	(Constant)	-2,491	0,198		-12,560	0,000*
R^2 = .143	Current Support	0,124	0,095	0,079	1,304	0,192
	Gender * Current Support	0,007	0,060	0,007	0,112	0,911
	Emotional Support	-0,095	0,066	-0,072	-1,427	0,154
	Gender * Emotional Support	0,038	0,042	0,045	0,899	0,369
	HISCED	-0,090	0,089	-0,076	-1,008	0,314
	Gender * HISCED_	0,085	0,055	0,204	1,532	0,126
	HISEI	-0,001	0,004	-0,010	-0,134	0,893
	Gender * HISEI	0,003	0,003	0,088	0,912	0,362
	PVS	0,083	0,060	0,069	1,386	0,166
	Gender * PVS	-0,013	0,041	-0,018	-0,329	0,742
	Gender (Dummy)	-0,293	0,304	-0,114	-0,965	0,334
	Science Achievement	0,004	0,001	0,308	5,344	0,000*
	Gender * Science Achievement	0,000	0,001	-0,044	-0,328	0,743
Chile	(Constant)	-1,093	0,199		-5,479	0,000*
R^2 = .041	Current Support	0,099	0,050	0,101	1,969	0,049*
	Gender * Current Support	-0,035	0,031	-0,056	-1,127	0,260
	Emotional Support	-0,128	0,078	-0,101	-1,643	0,100
	Gender * Emotional Support	0,074	0,045	0,092	1,632	0,103
	HISCED	-0,008	0,064	-0,010	-0,121	0,903
	Gender * HISCED	0,027	0,037	0,076	0,727	0,467
	HISEI	0,005	0,004	0,096	1,283	0,200
	Gender * HISEI	-0,002	0,002	-0,065	-0,735	0,462
	PVS	0,199	0,053	0,185	3,777	0,000*
	Gender * PVS	-0,076	0,032	-0,114	-2,349	0,019*
	Gender (Dummy)	-0,190	0,269	-0,083	-0,708	0,479
	Science Achievement	0,001	0,001	0,072	1,087	0,277
	Gender * Science Achievement	0,000	0,001	0,108	0,847	0,397
Croatia	(Constant)	-1,953	0,163		-11,966	0,000*
R^2 = .079	Current Support	0,092	0,073	0,066	1,262	0,207
	Gender * Current Support	0,022	0,049	0,025	0,453	0,650
	Emotional Support	0,006	0,066	0,004	0,088	0,930
	Gender * Emotional Support	-0,027	0,041	-0,030	-0,646	0,518
	HISCED	-0,055	0,066	-0,050	-0,836	0,403
	Gender * HISCED	0,080	0,044	0,196	1,797	0,072
	HISEI	-0,002	0,003	-0,027	-0,491	0,623
	Gender * HISEI	0,003	0,002	0,082	1,087	0,277
	PVS	0,097	0,048	0,086	2,001	0,045*
	Gender * PVS	-0,043	0,032	-0,059	-1,338	0,181
	Gender (Dummy)	0,468	0,269	0,194	1,739	0,082
	Science Achievement	0,005	0,001	0,387	6,785	0,000*
	Gender * Science Achievement	-0,002	0,001	-0,395	-3,184	0,001*
Dominican Republic	(Constant)	0,997	0,240		4,150	0,000*

R^2 = .022	Current Support	0,119	0,073	0,116	1,615	0,106
	Gender * Current Support	-0,017	0,048	-0,027	-0,362	0,717
	Emotional Support	0,099	0,099	0,078	1,001	0,317
	Gender * Emotional Support	-0,070	0,056	-0,088	-1,253	0,210
	HISCED	0,091	0,050	0,106	1,823	0,068
	Gender * HISCED	-0,045	0,034	-0,117	-1,313	0,189
	HISEI	0,000	0,005	0,008	0,103	0,918
	Gender * HISEI	-0,001	0,003	-0,028	-0,286	0,775
	PVS	-0,050	0,091	-0,043	-0,549	0,583
	Gender * PVS	0,028	0,053	0,039	0,534	0,593
	Gender (Dummy)	-0,494	0,321	-0,183	-1,541	0,123
	Science Achievement	-0,003	0,001	-0,159	-2,297	0,022*
	Gender * Science Achievement	0,001	0,001	0,218	1,754	0,080
France	(Constant)	-2,338	0,204		-11,481	0,000*
R^2 = .135	Current Support	0,159	0,076	0,106	2,095	0,036*
	Gender * Current Support	-0,004	0,052	-0,004	-0,079	0,937
	Emotional Support	-0,107	0,067	-0,077	-1,612	0,107
	Gender * Emotional Support	0,040	0,044	0,045	0,893	0,372
	HISCED	0,047	0,059	0,049	0,789	0,430
	Gender * HISCED	0,014	0,037	0,037	0,391	0,696
	HISEI	0,000	0,003	0,006	0,114	0,909
	Gender * HISEI	0,001	0,002	0,032	0,447	0,655
	PVS	0,068	0,049	0,062	1,401	0,161
	Gender * PVS	0,005	0,032	0,007	0,163	0,870
	Gender (Dummy)	0,328	0,279	0,135	1,174	0,241
	Science Achievement	0,004	0,001	0,275	4,432	0,000*
	Gender * Science Achievement	0,000	0,001	-0,086	-0,646	0,518
Georgia	(Constant)	-1,216	0,175		-6,953	0,000*
R^2 = .075	Current Support	0,150	0,056	0,120	2,684	0,007*
	Gender * Current Support	-0,040	0,040	-0,053	-0,990	0,322
	Emotional Support	0,102	0,054	0,090	1,869	0,062
	Gender * Emotional Support	-0,063	0,037	-0,092	-1,681	0,093
	HISCED	0,059	0,067	0,054	0,882	0,378
	Gender * HISCED	-0,029	0,044	-0,079	-0,651	0,515
	HISEI	0,005	0,002	0,109	2,177	0,030*
	Gender * HISEI	-0,002	0,002	-0,094	-1,480	0,139
	PVS	0,123	0,061	0,103	2,009	0,045*
	Gender * PVS	-0,048	0,039	-0,064	-1,222	0,222
	Gender (Dummy)	0,218	0,253	0,096	0,864	0,388
	Science Achievement	0,003	0,001	0,238	4,349	0,000*
	Gender * Science Achievement	0,000	0,000	-0,037	-0,360	0,719
Germany	(Constant)	-2,039	0,279		-7,321	0,000*
R^2 = .140	Current Support	0,265	0,121	0,160	2,178	0,030*
	Gender * Current Support	-0,059	0,087	-0,052	-0,674	0,500
	Emotional Support	0,047	0,087	0,036	0,542	0,588
	Gender * Emotional Support	-0,014	0,063	-0,016	-0,222	0,825
	HISCED	-0,056	0,072	-0,073	-0,781	0,435
	Gender * HISCED	0,052	0,051	0,146	1,010	0,313
	HISEI	0,001	0,005	0,024	0,292	0,770
	Gender * HISEI	-0,001	0,003	-0,036	-0,294	0,768
	PVS	0,096	0,069	0,093	1,395	0,163
	Gender * PVS	-0,031	0,049	-0,044	-0,628	0,530
	Gender (Dummy)	0,095	0,411	0,041	0,232	0,816
	Science Achievement	0,003	0,001	0,270	3,140	0,002*

	Gender * Science Achievement	0,000	0,001	0,036	0,184	0,854
Hong Kong	(Constant)	-1,526	0,196		-7,770	0,000*
R^2 = .059	Current Support	0,059	0,056	0,055	1,059	0,289
	Gender * Current Support	0,012	0,040	0,018	0,300	0,764
	Emotional Support	-0,073	0,061	-0,061	-1,186	0,236
	Gender * Emotional Support	0,075	0,042	0,101	1,788	0,074
	HISCED	0,071	0,048	0,092	1,493	0,136
	Gender * HISCED	-0,008	0,033	-0,021	-0,240	0,811
	HISEI	0,000	0,003	-0,007	-0,143	0,886
	Gender * HISEI	0,000	0,002	0,002	0,021	0,984
	PVS	0,200	0,053	0,179	3,763	0,000*
	Gender * PVS	-0,091	0,036	-0,129	-2,515	0,012*
	Gender (Dummy)	0,366	0,324	0,155	1,129	0,259
	Science Achievement	0,002	0,001	0,157	3,007	0,003*
	Gender * Science Achievement	0,000	0,001	-0,049	-0,351	0,725
Ireland	(Constant)	-2,591	0,162		-16,016	0,000*
R^2 = .189	Current Support	0,211	0,062	0,147	3,401	0,001*
	Gender * Current Support	-0,014	0,038	-0,016	-0,377	0,706
	Emotional Support	0,086	0,065	0,059	1,318	0,188
	Gender * Emotional Support	-0,087	0,039	-0,096	-2,253	0,024*
	HISCED	0,096	0,049	0,091	1,956	0,051
	Gender * HISCED	-0,035	0,032	-0,091	-1,111	0,267
	HISEI	-0,002	0,003	-0,038	-0,765	0,445
	Gender * HISEI	0,002	0,002	0,071	1,136	0,256
	PVS	0,126	0,050	0,120	2,516	0,012*
	Gender * PVS	-0,021	0,030	-0,032	-0,706	0,480
	Gender (Dummy)	0,322	0,260	0,136	1,239	0,215
	Science Achievement	0,005	0,001	0,334	6,234	0,000*
	Gender * Science Achievement	0,000	0,000	-0,021	-0,171	0,865
Italy	(Constant)	-0,960	0,187		-5,135	0,000*
R^2 = .043	Current Support	0,123	0,074	0,095	1,663	0,096
	Gender * Current Support	-0,009	0,048	-0,011	-0,182	0,855
	Emotional Support	-0,091	0,067	-0,085	-1,352	0,176
	Gender * Emotional Support	0,048	0,042	0,071	1,158	0,247
	HISCED	0,010	0,044	0,013	0,221	0,825
	Gender * HISCED	0,009	0,030	0,026	0,296	0,767
	HISEI	-0,001	0,003	-0,012	-0,184	0,854
	Gender * HISEI	0,002	0,002	0,062	0,740	0,459
	PVS	0,116	0,054	0,106	2,148	0,032*
	Gender * PVS	-0,034	0,035	-0,049	-0,956	0,339
	Gender (Dummy)	0,291	0,255	0,130	1,142	0,253
	Science Achievement	0,002	0,001	0,171	2,763	0,006*
	Gender * Science Achievement	0,000	0,001	-0,133	-0,992	0,321
Korea	(Constant)	-2,087	0,223		-9,367	0,000*
R^2 = .098	Current Support	0,105	0,056	0,087	1,882	0,060
	Gender * Current Support	0,015	0,034	0,020	0,434	0,664
	Emotional Support	0,041	0,055	0,037	0,751	0,453
	Gender * Emotional Support	0,005	0,035	0,007	0,142	0,887
	HISCED	0,126	0,073	0,087	1,734	0,083
	Gender * HISCED	-0,043	0,045	-0,095	-0,952	0,341
	HISEI	0,004	0,003	0,068	1,628	0,104
	Gender * HISEI	-0,001	0,002	-0,023	-0,402	0,688
	PVS	-0,033	0,059	-0,028	-0,556	0,578
	Gender * PVS	0,040	0,035	0,055	1,117	0,264

	Gender (Dummy)	0,515	0,310	0,212	1,664	0,096
	Science Achievement	0,004	0,001	0,280	6,153	0,000*
	Gender * Science Achievement	-0,001	0,000	-0,132	-1,423	0,155
Luxembourg	(Constant)	-1,707	0,207		-8,242	0,000*
R^2 = .106	Current Support	0,188	0,104	0,132	1,803	0,072
	Gender * Current Support	-0,060	0,060	-0,065	-1,001	0,317
	Emotional Support	0,141	0,095	0,097	1,475	0,140
	Gender * Emotional Support	-0,100	0,063	-0,107	-1,601	0,110
	HISCED	0,068	0,053	0,090	1,275	0,202
	Gender * HISCED	-0,022	0,037	-0,060	-0,587	0,557
	HISEI	0,001	0,004	0,013	0,161	0,872
	Gender * HISEI	0,001	0,003	0,047	0,473	0,636
	PVS	-0,021	0,072	-0,019	-0,296	0,767
	Gender * PVS	0,051	0,044	0,071	1,156	0,248
	Gender (Dummy)	-0,223	0,290	-0,089	-0,769	0,442
	Science Achievement	0,002	0,001	0,121	1,586	0,113
	Gender * Science Achievement	0,001	0,001	0,222	1,484	0,138
Macao	(Constant)	-1,994	0,189		-10,543	0,000*
R^2 = .079	Current Support	0,091	0,051	0,102	1,773	0,076
	Gender * Current Support	-0,026	0,034	-0,046	-0,772	0,440
	Emotional Support	-0,116	0,054	-0,110	-2,138	0,033*
	Gender * Emotional Support	0,071	0,037	0,110	1,946	0,052
	HISCED	0,029	0,039	0,045	0,745	0,456
	Gender * HISCED	0,018	0,025	0,052	0,723	0,470
	HISEI	0,002	0,003	0,023	0,474	0,636
	Gender * HISEI	0,000	0,002	-0,010	-0,142	0,887
	PVS	0,048	0,055	0,044	0,874	0,382
	Gender * PVS	0,004	0,036	0,006	0,115	0,908
	Gender (Dummy)	0,103	0,297	0,046	0,345	0,730
	Science Achievement	0,003	0,001	0,227	3,980	0,000*
	Gender * Science Achievement	0,000	0,001	-0,002	-0,017	0,987
Malta	(Constant)	-2,579	0,193		-13,330	0,000*
R^2 = .205	Current Support	0,184	0,091	0,152	2,027	0,043*
	Gender * Current Support	-0,030	0,059	-0,039	-0,505	0,613
	Emotional Support	0,102	0,092	0,068	1,104	0,270
	Gender * Emotional Support	-0,065	0,061	-0,069	-1,065	0,287
	HISCED	-0,002	0,058	-0,002	-0,028	0,977
	Gender * HISCED	0,016	0,039	0,043	0,419	0,675
	HISEI	0,000	0,004	-0,007	-0,098	0,922
	Gender * HISEI	0,002	0,003	0,069	0,769	0,442
	PVS	0,078	0,084	0,070	0,924	0,356
	Gender * PVS	0,005	0,050	0,007	0,102	0,919
	Gender (Dummy)	0,969	0,252	0,397	3,839	0,000*
	Science Achievement	0,006	0,001	0,583	8,506	0,000*
	Gender * Science Achievement	-0,002	0,000	-0,447	-4,045	0,000*
Mexico	(Constant)	-0,136	0,161		-0,849	0,396
R^2 = .019	Current Support	0,046	0,047	0,052	0,971	0,332
	Gender * Current Support	0,014	0,029	0,024	0,462	0,644
	Emotional Support	0,073	0,056	0,069	1,297	0,195
	Gender * Emotional Support	-0,052	0,036	-0,079	-1,434	0,152
	HISCED	-0,061	0,028	-0,107	-2,198	0,028*
	Gender * HISCED	0,054	0,017	0,176	3,168	0,002*
	HISEI	0,004	0,002	0,084	1,742	0,082
	Gender * HISEI	-0,002	0,002	-0,085	-1,501	0,133

	PVS	0,113	0,054	0,110	2,113	0,035*
	Gender * PVS	-0,049	0,033	-0,077	-1,493	0,136
	Gender (Dummy)	-0,206	0,195	-0,095	-1,058	0,290
	Science Achievement	0,000	0,001	0,024	0,445	0,656
	Gender * Science Achievement	0,000	0,001	0,080	0,688	0,492
Portugal	(Constant)	-1,663	0,155		-10,702	0,000*
R^2 = .102	Current Support	0,196	0,061	0,155	3,194	0,001*
	Gender * Current Support	-0,021	0,041	-0,026	-0,500	0,617
	Emotional Support	-0,026	0,063	-0,019	-0,418	0,676
	Gender * Emotional Support	-0,005	0,043	-0,005	-0,110	0,913
	HISCED	-0,029	0,038	-0,045	-0,765	0,445
	Gender * HISCED	0,033	0,024	0,095	1,391	0,164
	HISEI	0,002	0,003	0,038	0,613	0,540
	Gender * HISEI	-0,001	0,002	-0,050	-0,649	0,516
	PVS	0,094	0,065	0,072	1,451	0,147
	Gender * PVS	0,013	0,041	0,016	0,304	0,761
	Gender (Dummy)	0,342	0,207	0,138	1,648	0,099
	Science Achievement	0,004	0,001	0,293	5,605	0,000*
	Gender * Science Achievement	-0,001	0,000	-0,142	-1,316	0,188
Spain	(Constant)	-2,482	0,197		-12,596	0,000*
R^2 = .121	Current Support	0,035	0,083	0,027	0,423	0,672
	Gender * Current Support	0,038	0,055	0,044	0,679	0,497
	Emotional Support	0,064	0,078	0,050	0,822	0,411
	Gender * Emotional Support	-0,036	0,051	-0,044	-0,702	0,483
	HISCED	0,010	0,044	0,015	0,236	0,814
	Gender * HISCED	0,012	0,028	0,033	0,414	0,679
	HISEI	0,000	0,003	-0,007	-0,112	0,911
	Gender * HISEI	0,001	0,002	0,026	0,324	0,746
	PVS	0,074	0,062	0,064	1,197	0,231
	Gender * PVS	-0,003	0,043	-0,004	-0,065	0,948
	Gender (Dummy)	0,283	0,285	0,114	0,995	0,320
	Science Achievement	0,004	0,001	0,299	5,480	0,000*
	Gender * Science Achievement	0,000	0,001	-0,063	-0,510	0,610
United Kingdom	(Constant)	-2,440	0,384		-6,353	0,000*
R^2 = .140	Current Support	0,448	0,133	0,279	3,373	0,001*
	Gender * Current Support	-0,170	0,085	-0,160	-1,992	0,047*
	Emotional Support	-0,194	0,093	-0,139	-2,078	0,038*
	Gender * Emotional Support	0,107	0,060	0,121	1,790	0,074
	HISCED	0,003	0,103	0,003	0,029	0,977
	Gender * HISCED	0,007	0,067	0,017	0,104	0,917
	HISEI	0,003	0,006	0,048	0,472	0,637
	Gender * HISEI	-0,002	0,004	-0,079	-0,521	0,603
	PVS	-0,036	0,100	-0,032	-0,357	0,721
	Gender * PVS	0,087	0,064	0,121	1,368	0,172
	Gender (Dummy)	0,897	0,550	0,348	1,633	0,103
	Science Achievement	0,006	0,001	0,392	3,680	0,000*
	Gender * Science Achievement	-0,001	0,001	-0,305	-1,307	0,191
Table Average	(Constant)	-1,683	0,050		-33,566	
R^2 = .100	Current Support	0,150	0,019	0,113	7,984	
	Gender * Current Support	-0,021	0,012	-0,023	-1,708	
	Emotional Support	-0,004	0,017	-0,004	-0,223	
	Gender * Emotional Support	-0,003	0,011	-0,002	-0,305	
	HISCED	0,017	0,014	0,016	1,197	
	Gender * HISCED	0,013	0,009	0,036	1,343	

	HISEI	0,001	0,001	0,023	1,388
	Gender * HISEI	0,000	0,001	0,000	0,061
	PVS	0,076	0,015	0,069	5,004
	Gender * PVS	-0,010	0,010	-0,015	-1,005
	Gender (Dummy)	0,211	0,072	0,088	2,921
	Science Achievement	0,003	0,000	0,237	14,773
	Gender * Science Achievement	0,000	0,000	-0,066	-1,830

*p < .05, two-tailed.

Table 20

Regression analysis results with gender interactions for science intrinsic motivation

Country	Model	*b*	*SE b*	β	*t*	Sig
Belgium	(Constant)	-1,881	0,165		-11,433	0,000*
R^2 = .169	Current Support	0,111	0,071	0,084	1,557	0,120
	Gender * Current Support	0,036	0,045	0,043	0,808	0,419
	Emotional Support	-0,090	0,048	-0,080	-1,863	0,062
	Gender * Emotional Support	0,038	0,032	0,054	1,188	0,235
	HISCED	-0,030	0,055	-0,030	-0,544	0,587
	Gender * HISCED	0,009	0,036	0,025	0,247	0,805
	HISEI	-0,001	0,003	-0,010	-0,177	0,859
	Gender * HISEI	0,001	0,002	0,023	0,278	0,781
	PVS	0,190	0,051	0,188	3,723	0,000*
	Gender * PVS	-0,071	0,035	-0,109	-2,016	0,044*
	Gender (Dummy)	-0,634	0,232	-0,291	-2,738	0,006*
	Science Achievement	0,002	0,001	0,172	3,447	0,001*
	Gender * Science Achievement	0,001	0,000	0,380	3,609	0,000*
Chile	(Constant)	-1,259	0,155		-8,125	0,000*
R^2 = .075	Current Support	0,081	0,050	0,087	1,616	0,106
	Gender * Current Support	0,010	0,032	0,016	0,304	0,761
	Emotional Support	-0,102	0,064	-0,084	-1,583	0,113
	Gender * Emotional Support	0,052	0,041	0,068	1,277	0,202
	HISCED	-0,102	0,057	-0,135	-1,787	0,074
	Gender * HISCED	0,050	0,034	0,149	1,461	0,144
	HISEI	0,004	0,004	0,072	0,981	0,327
	Gender * HISEI	-0,002	0,002	-0,068	-0,784	0,433
	PVS	0,251	0,050	0,243	5,043	0,000*
	Gender * PVS	-0,092	0,034	-0,144	-2,684	0,007*
	Gender (Dummy)	0,139	0,210	0,064	0,665	0,506
	Science Achievement	0,004	0,001	0,311	4,798	0,000*
	Gender * Science Achievement	-0,001	0,001	-0,201	-1,510	0,131
Croatia	(Constant)	-1,583	0,190		-8,327	0,000*
R^2 = .094	Current Support	0,059	0,053	0,048	1,110	0,267
	Gender * Current Support	0,035	0,036	0,045	0,976	0,329
	Emotional Support	-0,023	0,045	-0,019	-0,510	0,610
	Gender * Emotional Support	0,002	0,030	0,003	0,070	0,944
	HISCED	-0,063	0,055	-0,064	-1,154	0,249
	Gender * HISCED	0,034	0,034	0,094	0,999	0,318
	HISEI	-0,004	0,003	-0,085	-1,468	0,142
	Gender * HISEI	0,003	0,002	0,094	1,311	0,190
	PVS	0,125	0,044	0,126	2,826	0,005*
	Gender * PVS	-0,015	0,028	-0,024	-0,553	0,580
	Gender (Dummy)	-0,074	0,260	-0,034	-0,284	0,777
	Science Achievement	0,004	0,001	0,322	5,356	0,000*
	Gender * Science Achievement	0,000	0,000	-0,126	-1,010	0,312
Dominican Republic	(Constant)	0,172	0,179		0,959	0,338
R^2 = .014	Current Support	0,114	0,051	0,139	2,245	0,025*
	Gender * Current Support	-0,049	0,033	-0,093	-1,481	0,139
	Emotional Support	0,074	0,072	0,073	1,038	0,299
	Gender * Emotional Support	-0,035	0,044	-0,055	-0,791	0,429
	HISCED	-0,104	0,050	-0,152	-2,090	0,037*
	Gender * HISCED	0,070	0,033	0,226	2,098	0,036*

	HISEI	-0,001	0,004	-0,028	-0,370	0,711
	Gender * HISEI	0,000	0,002	-0,011	-0,122	0,903
	PVS	0,037	0,050	0,040	0,741	0,459
	Gender * PVS	-0,024	0,033	-0,042	-0,736	0,462
	Gender (Dummy)	0,004	0,227	0,002	0,019	0,984
	Science Achievement	0,003	0,001	0,172	2,344	0,019*
	Gender * Science Achievement	-0,001	0,001	-0,169	-1,350	0,177
France	(Constant)	-1,767	0,153		-11,579	0,000*
R^2 = .204	Current Support	0,240	0,070	0,174	3,422	0,001*
	Gender * Current Support	-0,013	0,048	-0,015	-0,281	0,779
	Emotional Support	-0,092	0,052	-0,072	-1,757	0,079
	Gender * Emotional Support	0,047	0,034	0,058	1,375	0,169
	HISCED	-0,045	0,046	-0,051	-0,975	0,330
	Gender * HISCED	0,030	0,033	0,086	0,935	0,350
	HISEI	-0,008	0,003	-0,147	-2,838	0,005*
	Gender * HISEI	0,003	0,002	0,121	1,754	0,079
	PVS	0,188	0,052	0,186	3,627	0,000*
	Gender * PVS	-0,036	0,035	-0,055	-1,029	0,304
	Gender (Dummy)	-0,406	0,219	-0,183	-1,853	0,064
	Science Achievement	0,003	0,001	0,252	4,700	0,000*
	Gender * Science Achievement	0,001	0,000	0,182	1,580	0,114
Georgia	(Constant)	-0,375	0,149		-2,522	0,012*
R^2 = .068	Current Support	0,163	0,050	0,163	3,241	0,001*
	Gender * Current Support	-0,074	0,031	-0,123	-2,379	0,017*
	Emotional Support	0,022	0,042	0,024	0,514	0,607
	Gender * Emotional Support	-0,003	0,026	-0,005	-0,105	0,916
	HISCED	-0,017	0,052	-0,019	-0,323	0,746
	Gender * HISCED	0,005	0,032	0,016	0,146	0,884
	HISEI	-0,001	0,002	-0,019	-0,364	0,716
	Gender * HISEI	0,000	0,001	-0,021	-0,361	0,718
	PVS	0,090	0,052	0,095	1,718	0,086
	Gender * PVS	-0,012	0,034	-0,020	-0,357	0,721
	Gender (Dummy)	-0,245	0,199	-0,135	-1,229	0,219
	Science Achievement	0,002	0,001	0,153	2,370	0,018*
	Gender * Science Achievement	0,000	0,000	0,129	1,147	0,252
Germany	(Constant)	-2,484	0,197		-12,624	0,000*
R^2 = .191	Current Support	0,235	0,109	0,141	2,165	0,031*
	Gender * Current Support	-0,010	0,077	-0,009	-0,127	0,899
	Emotional Support	-0,092	0,072	-0,068	-1,289	0,197
	Gender * Emotional Support	0,055	0,049	0,063	1,120	0,263
	HISCED	0,012	0,052	0,015	0,226	0,821
	Gender * HISCED	0,010	0,036	0,028	0,282	0,778
	HISEI	-0,007	0,004	-0,108	-1,642	0,101
	Gender * HISEI	0,004	0,003	0,136	1,349	0,177
	PVS	0,188	0,062	0,174	3,032	0,002*
	Gender * PVS	-0,076	0,045	-0,106	-1,675	0,094
	Gender (Dummy)	-0,298	0,308	-0,123	-0,967	0,334
	Science Achievement	0,003	0,001	0,267	3,865	0,000*
	Gender * Science Achievement	0,001	0,001	0,186	1,181	0,238
Hong Kong	(Constant)	-1,401	0,175		-7,993	0,000*
R^2 = .106	Current Support	0,051	0,044	0,054	1,149	0,251
	Gender * Current Support	0,016	0,027	0,026	0,574	0,566
	Emotional Support	-0,027	0,053	-0,026	-0,508	0,611
	Gender * Emotional Support	0,039	0,036	0,059	1,086	0,278

	HISCED	0,040	0,044	0,058	0,918	0,359
	Gender * HISCED	-0,020	0,028	-0,059	-0,708	0,479
	HISEI	0,000	0,003	0,006	0,115	0,908
	Gender * HISEI	-0,001	0,002	-0,042	-0,559	0,576
	PVS	0,146	0,059	0,148	2,474	0,013*
	Gender * PVS	-0,033	0,037	-0,053	-0,895	0,371
	Gender (Dummy)	0,172	0,245	0,082	0,703	0,482
	Science Achievement	0,002	0,001	0,179	3,217	0,001*
	Gender * Science Achievement	0,000	0,000	0,132	1,001	0,317
Ireland	(Constant)	-1,995	0,191		-10,431	0,000*
R^2 = .220	Current Support	0,367	0,061	0,276	6,034	0,000*
	Gender * Current Support	-0,075	0,040	-0,089	-1,898	0,058
	Emotional Support	-0,031	0,058	-0,022	-0,523	0,601
	Gender * Emotional Support	-0,033	0,039	-0,039	-0,857	0,392
	HISCED	0,058	0,054	0,060	1,090	0,276
	Gender * HISCED	-0,048	0,032	-0,134	-1,502	0,133
	HISEI	-0,005	0,003	-0,101	-1,880	0,060
	Gender * HISEI	0,002	0,002	0,091	1,328	0,184
	PVS	0,179	0,045	0,182	3,944	0,000*
	Gender * PVS	-0,054	0,028	-0,087	-1,913	0,056
	Gender (Dummy)	0,049	0,223	0,022	0,221	0,825
	Science Achievement	0,004	0,001	0,342	6,324	0,000*
	Gender * Science Achievement	0,000	0,000	0,066	0,574	0,566
Italy	(Constant)	-1,410	0,142		-9,956	0,000*
R^2 = .105	Current Support	0,269	0,060	0,235	4,480	0,000*
	Gender * Current Support	-0,063	0,036	-0,087	-1,781	0,075
	Emotional Support	-0,062	0,056	-0,064	-1,092	0,275
	Gender * Emotional Support	0,033	0,035	0,053	0,924	0,356
	HISCED	0,017	0,039	0,024	0,433	0,665
	Gender * HISCED	-0,012	0,026	-0,039	-0,467	0,640
	HISEI	-0,002	0,003	-0,036	-0,636	0,525
	Gender * HISEI	0,001	0,002	0,046	0,567	0,571
	PVS	0,115	0,047	0,118	2,438	0,015*
	Gender * PVS	-0,021	0,030	-0,035	-0,710	0,478
	Gender (Dummy)	0,145	0,216	0,073	0,672	0,501
	Science Achievement	0,003	0,001	0,225	3,586	0,000*
	Gender * Science Achievement	0,000	0,000	0,018	0,137	0,891
Korea	(Constant)	-2,581	0,178		-14,503	0,000*
R^2 = .199	Current Support	0,207	0,068	0,179	3,050	0,002*
	Gender * Current Support	-0,044	0,039	-0,063	-1,142	0,253
	Emotional Support	-0,010	0,045	-0,009	-0,220	0,826
	Gender * Emotional Support	0,016	0,029	0,025	0,579	0,563
	HISCED	-0,051	0,065	-0,037	-0,792	0,428
	Gender * HISCED	0,037	0,042	0,086	0,889	0,374
	HISEI	0,003	0,002	0,043	1,070	0,285
	Gender * HISEI	-0,002	0,002	-0,056	-1,002	0,316
	PVS	0,090	0,045	0,081	1,996	0,046*
	Gender * PVS	0,003	0,029	0,004	0,102	0,918
	Gender (Dummy)	0,403	0,239	0,172	1,684	0,092
	Science Achievement	0,005	0,001	0,391	8,042	0,000*
	Gender * Science Achievement	0,000	0,000	-0,081	-0,883	0,377
Luxembourg	(Constant)	-1,951	0,184		-10,578	0,000*
R^2 = .139	Current Support	0,148	0,086	0,108	1,717	0,086
	Gender * Current Support	0,008	0,052	0,009	0,145	0,884

	Emotional Support	-0,062	0,087	-0,044	-0,711	0,477
	Gender * Emotional Support	0,013	0,053	0,015	0,253	0,800
	HISCED	0,037	0,044	0,052	0,843	0,400
	Gender * HISCED	-0,036	0,029	-0,103	-1,221	0,222
	HISEI	-0,006	0,004	-0,115	-1,539	0,124
	Gender * HISEI	0,002	0,003	0,090	0,952	0,341
	PVS	0,065	0,057	0,060	1,123	0,261
	Gender * PVS	0,015	0,036	0,022	0,411	0,681
	Gender (Dummy)	0,215	0,269	0,090	0,799	0,424
	Science Achievement	0,005	0,001	0,371	5,041	0,000*
	Gender * Science Achievement	0,000	0,001	-0,043	-0,283	0,777
Macao	(Constant)	-1,151	0,130		-8,829	0,000*
R^2 = .080	Current Support	0,025	0,038	0,033	0,653	0,514
	Gender * Current Support	0,011	0,025	0,023	0,433	0,665
	Emotional Support	0,019	0,043	0,021	0,436	0,663
	Gender * Emotional Support	0,006	0,030	0,011	0,204	0,838
	HISCED	0,002	0,033	0,004	0,059	0,953
	Gender * HISCED	0,000	0,021	0,000	0,001	0,999
	HISEI	0,004	0,003	0,066	1,221	0,222
	Gender * HISEI	-0,004	0,002	-0,144	-1,858	0,063
	PVS	0,063	0,049	0,067	1,266	0,205
	Gender * PVS	0,017	0,031	0,028	0,538	0,590
	Gender (Dummy)	0,188	0,217	0,100	0,866	0,387
	Science Achievement	0,002	0,001	0,181	3,631	0,000*
	Gender * Science Achievement	0,000	0,000	0,101	0,874	0,382
Malta	(Constant)	-1,897	0,129		-14,672	0,000*
R^2 = .263	Current Support	0,085	0,068	0,078	1,246	0,213
	Gender * Current Support	0,041	0,043	0,059	0,939	0,348
	Emotional Support	-0,111	0,071	-0,082	-1,560	0,119
	Gender * Emotional Support	0,075	0,047	0,089	1,619	0,106
	HISCED	0,018	0,054	0,025	0,332	0,740
	Gender * HISCED	-0,025	0,034	-0,074	-0,737	0,461
	HISEI	-0,003	0,004	-0,066	-0,953	0,341
	Gender * HISEI	0,001	0,002	0,039	0,458	0,647
	PVS	0,219	0,061	0,220	3,591	0,000*
	Gender * PVS	-0,074	0,038	-0,117	-1,952	0,051
	Gender (Dummy)	0,276	0,177	0,125	1,561	0,119
	Science Achievement	0,005	0,001	0,462	7,621	0,000*
	Gender * Science Achievement	0,000	0,000	-0,041	-0,413	0,680
Mexico	(Constant)	-0,380	0,126		-3,011	0,003*
R^2 = .050	Current Support	0,082	0,037	0,105	2,252	0,024*
	Gender * Current Support	-0,013	0,025	-0,026	-0,515	0,607
	Emotional Support	0,036	0,042	0,039	0,850	0,395
	Gender * Emotional Support	-0,008	0,028	-0,013	-0,275	0,784
	HISCED	-0,044	0,025	-0,087	-1,719	0,086
	Gender * HISCED	0,009	0,016	0,032	0,538	0,590
	HISEI	-0,004	0,002	-0,094	-1,771	0,077
	Gender * HISEI	0,001	0,002	0,053	0,755	0,451
	PVS	0,090	0,044	0,099	2,050	0,040*
	Gender * PVS	-0,019	0,029	-0,034	-0,652	0,515
	Gender (Dummy)	-0,217	0,193	-0,114	-1,126	0,260
	Science Achievement	0,002	0,001	0,151	2,897	0,004*
	Gender * Science Achievement	0,000	0,000	0,087	0,725	0,468
Portugal	(Constant)	-1,010	0,112		-9,000	0,000*

R^2 = .110	Current Support	0,313	0,049	0,311	6,398	0,000*
	Gender * Current Support	-0,090	0,032	-0,141	-2,834	0,005*
	Emotional Support	-0,139	0,045	-0,124	-3,062	0,002*
	Gender * Emotional Support	0,055	0,030	0,079	1,839	0,066
	HISCED	-0,050	0,027	-0,097	-1,872	0,061
	Gender * HISCED	0,034	0,016	0,125	2,101	0,036*
	HISEI	0,000	0,003	-0,006	-0,095	0,925
	Gender * HISEI	-0,002	0,002	-0,095	-1,319	0,187
	PVS	0,118	0,048	0,116	2,467	0,014*
	Gender * PVS	0,004	0,032	0,006	0,120	0,905
	Gender (Dummy)	0,200	0,152	0,102	1,310	0,190
	Science Achievement	0,003	0,001	0,277	5,668	0,000*
	Gender * Science Achievement	0,000	0,000	-0,092	-0,924	0,356
Spain	(Constant)	-2,380	0,147		-16,164	0,000*
R^2 = .155	Current Support	0,078	0,077	0,064	1,013	0,311
	Gender * Current Support	0,022	0,046	0,029	0,487	0,626
	Emotional Support	0,013	0,060	0,011	0,225	0,822
	Gender * Emotional Support	-0,017	0,038	-0,023	-0,452	0,651
	HISCED	-0,062	0,035	-0,096	-1,772	0,076
	Gender * HISCED	0,050	0,022	0,153	2,252	0,024*
	HISEI	0,004	0,003	0,078	1,432	0,152
	Gender * HISEI	-0,003	0,002	-0,117	-1,870	0,062
	PVS	0,088	0,052	0,083	1,705	0,088
	Gender * PVS	0,002	0,033	0,004	0,073	0,941
	Gender (Dummy)	0,104	0,215	0,046	0,485	0,628
	Science Achievement	0,005	0,001	0,366	8,056	0,000*
	Gender * Science Achievement	0,000	0,000	-0,057	-0,539	0,590
United Kingdom	(Constant)	-1,793	0,319		-5,619	0,000*
R^2 = .244	Current Support	0,304	0,134	0,212	2,269	0,023*
	Gender * Current Support	0,008	0,091	0,008	0,084	0,933
	Emotional Support	0,008	0,101	0,007	0,081	0,935
	Gender * Emotional Support	0,030	0,065	0,039	0,470	0,639
	HISCED	-0,017	0,069	-0,019	-0,255	0,799
	Gender * HISCED	-0,012	0,039	-0,031	-0,297	0,767
	HISEI	0,003	0,005	0,062	0,706	0,480
	Gender * HISEI	-0,004	0,003	-0,143	-1,147	0,252
	PVS	0,102	0,086	0,104	1,185	0,236
	Gender * PVS	-0,024	0,053	-0,037	-0,458	0,647
	Gender (Dummy)	-0,042	0,401	-0,018	-0,105	0,917
	Science Achievement	0,003	0,001	0,232	2,287	0,022*
	Gender * Science Achievement	0,001	0,001	0,267	1,293	0,196
Table Average	(Constant)	-1,507	0,041		-36,840	
R^2 = .138	Current Support	0,163	0,016	0,138	9,925	
	Gender * Current Support	-0,014	0,011	-0,021	-1,278	
	Emotional Support	-0,037	0,014	-0,029	-2,582	
	Gender * Emotional Support	0,020	0,009	0,027	2,202	
	HISCED	-0,022	0,012	-0,031	-1,929	
	Gender * HISCED	0,010	0,007	0,032	1,403	
	HISEI	-0,001	0,001	-0,027	-1,826	
	Gender * HISEI	0,000	0,000	0,000	0,057	
	PVS	0,130	0,013	0,129	10,236	
	Gender * PVS	-0,028	0,008	-0,045	-3,444	
	Gender (Dummy)	-0,001	0,056	-0,001	-0,020	
	Science Achievement	0,003	0,000	0,268	18,121	

Gender * Science Achievement	0,000	0,000	0,041	1,115	

*p < .05, two-tailed.