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Gender Perception of Students in Compulsory Education Regarding Mathematics and Reading

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Abstract: This study explores the extent to which the gendered views exist among students in Kosovo's compulsory education (primary and lower secondary schools) regarding mathematics and reading. It analyzes students' perceptions of these academic domains concerning the performance of their peers (the same others) from the gender perspective. Additionally, it examines students' perspectives on the opinions of their parents and teachers (their significant others) regarding girls' and boys' performance in math and reading. Furthermore, the study investigates whether students hold gender-stereotypical attitudes toward professions related to math and those that heavily rely on reading skills. The survey method was used to conduct this study. A sample of 531 students in compulsory education participated in this study, completing a paper-based questionnaire consisting of 14 items evenly distributed between mathematics and reading. The findings indicate that around half of the respondents believe that girls and boys perform equally well in both mathematics and reading and that parents and teachers hold the same views regarding the performance of their children/students in these academic domains. However, among the remaining portion of respondents who expressed gendered views, a higher percentage favored boys as being more proficient in math, while girls were seen as superior in reading skills. This study emphasized the need to address and mitigate these gender stereotypes, to ensure that students of both genders can pursue their careers successfully without any limitations.

Keywords: *Compulsory education, gender stereotyping, mathematics achievement, reading skills.*

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Introduction

There is an endless global debate surrounding the inclusion of gender views as predictors of students' performance in mathematics and reading. The traditional approach that favors boys as more successful in mathematics, coupled with the declining participation of girls in mathematical sciences as education levels increase (Beilock & Maloney, 2015), and the continuous underrepresentation of women in many math-related professions (Ceci & Williams, 2011) have contributed to the formation of "a seemingly commonly held stereotypical view of mathematics as a boys' subject" (Hargreaves et al., 2008, p. 19). Similarly, the general perception that girls enjoy reading more than boys (Merisuo-Storm, 2006) and have higher interest and motivation for reading (Schaffner et al., 2013) has led to the "reading is for girls" stereotype (Muntoni et al., 2021, p. 190).

Gender stereotypes are defined as prescriptive "beliefs about the characteristics that men and women are likely to have, including skills, preferences and personality traits" (Espinoza & Strasser, 2020, p. 865). The extent to which people hold gender-related stereotypes varies across countries and cultures. Influenced by cultural beliefs on gender roles in the community "children readily classify social behaviors and even intellectual tasks as either masculine or feminine in nature" (Reilly et al., 2019, p. 447). If not addressed properly through education, these early perceptions among children can potentially develop into gender biases in adulthood.

It is encouraging that several recent studies indicate that previously observed gender gaps in student performance, which favored boys in mathematics and girls in reading during the 1970s (Fennema & Sherman, 1976; Maccoby & Jacklin, 1974) is narrowing, especially in mathematics (Mullis et al., 2020). However, it is worth noting that some researchers still assert that boys outperform girls in mathematics (Borgonovi et al., 2021), while others argue that boys underperform girls in reading (Kim et al., 2015; Muntoni et al., 2021).

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Gender differences in mathematics and reading attainment among students are complex and reliant upon various cognitive and affective factors (Casey et al., 1990; Pennington et al., 2021), which are positively correlated with each other (Ganley & Lubienski, 2016). While both cognitive and affective factors are significant, a majority of research has focused on assessing gender-achievement gaps in internationally standardized tests, primarily addressing cognitive factors such as understanding, application skills, and reasoning. On the other hand, fewer studies have evaluated affective factors such as attitudes and beliefs. The emphasis on cognitive factors has often overshadowed the significance of affective factors, which primarily pertain to students' perceptions rather than their mathematical knowledge and comprehension. Consequently, studies examining affective factors have often been deemed less substantial and more challenging to quantify compared to cognitive factors (H. Forgasz & Markovits, 2018; Pennington et al., 2021). As a result, there is a scarcity of research concerning boys' and girls' perceptions of mathematics and reading skills, despite their crucial importance for success in both academic domains. The situation holds true even within the Kosovo context.

Tracking gender perceptions of students regarding mathematics and reading is of significant importance. Even a minor gender disparity among students in these academic domains during the early years of schooling can potentially lead to a widening gap in subsequent years, eventually resulting in substantial disparities when it comes to career choices (Ganley & Lubienski, 2016; Merisuo-Storm, 2006). Particularly in the context of mathematics, the early gender gap among students can leave a lasting impact on their subsequent educational choices. Furthermore, it can contribute to the underrepresentation of women in math-related professions, which, in turn, is often associated with their disadvantaged position in the labor market and lower wages (Blau & Kahn, 2017). Recognizing the concerns expressed by numerous researchers, this study intends to raise teachers' awareness regarding gender perception of mathematics and reading among students in Kosovo. It aims to encourage educators to effectively address these differences through learning strategies and social activities, to support the development of competencies among both boys and girls in these academic domains. Promoting the full realization of students' human potential and nurturing mutual support between genders in their endeavor for improved outcomes in both academic domains impact the overall quality of education. Moreover, this approach contributes to addressing the existing low participation of women in the workforce (22.0 %) and combating the high unemployment rate of youth (38.0 %) in Kosovo (Kosovo Agency of Statistics, 2022). As key change assets, teachers can play a crucial role in advancing gender equality through education, serving as catalysts for building a bias-free, economically sustainable, peaceful, and prosperous world.

Literature Review

Despite considerable work to ensure equality in compulsory education, gender stereotypes persist among students, parents, and teachers in various countries, with boys being perceived as superior in mathematics and girls as superior in reading (H. Forgasz & Markovits, 2018; Muntoni et al., 2021). Drawing from the social identity theory (Tajfel & Turner, 1979), these gender stereotypes can be attributed to students' reflections about these academic domains, their intergroup comparison of their peers' achievements, and their interactions with parents, teachers, and the broader community. Consequently, many researchers have investigated some elements of explanatory models to track gender differences in mathematics and reading based on social identity theory. These elements encompass students' confidence levels about these academic domains, their beliefs regarding gender-based achievements among their peers, and their perceptions regarding parents' and teachers' perspectives on the success of girls and boys in mathematics and reading (H. Forgasz & Markovits, 2018; Muntoni et al., 2021).

The higher confidence of boys in their math capabilities, and the higher confidence of girls in reading skills (Else-Quest et al., 2010; Marinak & Gambrell, 2010) along with similar gender biases demonstrated by parents and teachers (Furnham et al., 2002) are crucial affective and social factors that can influence gender stereotypes in math and reading. In particular, parents, as primary caregivers, bear the responsibility of addressing gender stereotypes, given that "by age 4-5, children want to show mastery of their gender roles" (Kone, 1996, p. 11). Moreover, cross-cultural studies have revealed "that parents impart, and children take on, the view that boys are good at mathematics from a very young age" (McCoy et al., 2022, p. 344), while girls, too, are often perceived as performing better in reading from an early age (Marinak & Gambrell, 2010).

Living within a community where gender stereotypes persist regarding mathematics and reading can potentially impact students' motivation to engage with these academic domains. The absence of effective measures to address these stereotypes through education may discourage girls from pursuing careers in math-related fields and restrict boys from considering professions that heavily rely on reading skills.

Gender Differences in Mathematics

The advantage of boys in mathematics performance was so dominant during the 1970s that even one of the most widely used questionnaires for assessing students' attitudes toward mathematics, namely the Fennema-Sherman Mathematics Attitudes Scale (Fennema & Sherman, 1976), provided only two alternatives as answers, mathematics as a male domain or a neutral domain. This perception of boys' superiority in math persisted for a long time.

A comprehensive meta-analysis conducted by Hyde et al. (1990), examining over one hundred articles published between 1963 to 1988, confirmed that more boys than girls recognized mathematics as a masculine subject. Furthermore, these researchers reported that perceptions concerning gender differences in mathematics achievement vary with students' age, with such perceptions being more widespread among secondary school students than their younger counterparts. Subsequent research, using more advanced research methods, revealed that perceptions regarding gender differences in math emerge as early as Grades 1 and 2 (H. J. Forgasz, 1992) and grow throughout the following school years (Gibbs, 2010).

A crucial part in shaping students' attitudes and perceptions of mathematics lies in their beliefs about themselves as learners of math, as well as the expectations held by parents and teachers regarding their mathematical capacities (H. Forgasz & Markovits, 2018; LaLonde et al., 2003; Lindberg et al., 2010). Some researchers claim that girls often exhibit lower confidence in mathematics compared to boys, even when their performance is equally good. Notably, H. J. Forgasz (1992) discovered that girls in Grade 2 exhibited less confidence in math than their male counterparts, despite their teachers recognizing their equal success in mathematics. A higher confidence of boys in math was also found in middle school students. A study on students' self-concept in mathematics, involving 3,000 Grade 9 students in the UK, indicated that "boys ha[d] significantly higher self-concept scores than girls" (Ireson et al., 2001, p. 315). The same pattern persists among mathematically talented youth, with boys exhibiting higher confidence than girls in math (Hargreaves et al., 2008).

As for parents and teachers, numerous studies highlight their tendency to associate "natural mathematical" ability more with boys than girls (Fennema et al., 1990; Lindberg et al., 2010). A study conducted by Hyde et al. (2008) revealed that parents and teachers tend to estimate boys' math skills higher than those of girls, thereby indirectly fostering higher self-esteem in boys regarding their mathematical capacities. When parents in another study were asked to recommend their children as gifted in mathematics, the results showed that almost two-thirds (64.3 %) of the selected children were boys, while approximately one-third (35.7 %) were girls (Freeman, 2004). A similar perception of math is manifested among teachers. Even in cases when some variables were under control, Cimpian et al. (2016) found that "teachers consistently rate girls' mathematical proficiency lower than that of boys with similar achievement and learning behaviors" (p. 1).

Although numerous national and international studies have examined the gender performance of students in mathematics during compulsory education in Kosovo (Mula & Hodnik, 2020; Mullis et al., 2020; Schleicher, 2019), there is a shortage of research on students' gender perception of mathematics in primary and lower secondary schools. These levels are crucial as they represent a critical period in which gendered views about mathematics may emerge, and, if not addressed adequately, have the potential to further expand in the upper grades.

Gender Differences in Reading Skills

Since the early 1970s, the documentation of gender disparities in reading performance has been a significant area of interest for researchers exploring gender and literacy. In this regard, Maccoby and Jacklin (1974) were among the pioneers who argued that gender gaps in verbal ability and language were "well established" in favor of girls (p. 351). They claimed that a gender gap favoring girls in reading emerges around the age of 11. The advantage that girls exhibit in reading during primary school (Marinak & Gambrell, 2010) persists into middle and high school (McKenna et al., 2012) and continues further into adulthood (Kutner et al., 2007).

A considerable amount of literature shows a prevalence of more positive attitudes toward reading among girls compared to boys (Muntoni et al., 2021), and reveals that girls tend to rate their language skills more positively than boys (Kim et al., 2015). A comparative study involving adolescents from 11 European countries revealed that girls "like reading more and receive more satisfaction than boys" (Garbe et al., 2010, p. 17). The presence of these positive attitudes toward reading among girls contributes to their superior reading skills compared to boys and, consequently, boosts their reasoning skills.

Since "social interactions with others about books and stories foster wide, frequent reading" (Gambrell et al., 1996, p. 22), the involvement of parents, teachers, and the wider community plays a significant role in cultivating students' interest in reading. Even though this is equally important for both girls and boys, studies reveal that "parents of daughters rated their child as more competent in English than parents of sons" (Eccles et al., 1990, p. 187). On the other hand, when children were asked about their home environment, they reported that their mothers read more than their fathers and played a more significant role in teaching them to read, likely due to their closer proximity (Millard, 1997). This difference in parental involvement, with more mothers serving as role models, may influence students' perception of reading as a more feminine activity, consequently fostering a higher interest in reading among girls compared to boys. Regarding teachers, there are studies indicating that they tend to consider girls as more competent readers than boys (Muntoni & Retelsdorf, 2018).

In general, cultivating a strong foundation and positive perception of reading skills is crucial for children, as it establishes the ground for success in all school subjects, including math. A longitudinal study involving approximately 4,000 students, conducted by Hernandez (2011), shows "that those who don't read proficiently by third grade are four times more likely to leave school without a diploma than proficient readers" (p. 3). Therefore, more than in any other area,

parents and teachers should encourage children and students of both genders to succeed in reading comprehension, recognizing its fundamental role in shaping their future career prospects.

Methodology

Research Aim

This study aimed to explore the gender perceptions of students in Kosovo's compulsory education regarding mathematics and reading. Specifically, it intended to analyze students' gender perceptions of mathematics and reading in the Albanian Language, which is their native language, in different grade levels (Grade 4 and Grade 8), among both girls and boys, and across urban and rural school areas. This research study was guided by the following research questions:

1. To what extent are gender disparities in attitudes and beliefs about mathematics present among Grade 4 and Grade 8 students?
2. Are there any gender differences in students' perceptions of mathematics based on gender and school area?
3. To what extent are gender disparities in attitudes and beliefs about reading present among Grade 4 and Grade 8 students?
4. Are there any gender differences in students' perceptions of reading based on gender and school area?

Methods

The survey was used as a research method for this study. The questionnaire, designed to conduct the survey, consisted of 14 items, evenly distributed between math and reading. The initial seven items belonging to mathematics were adapted from previous research (H. Forgasz & Markovits, 2018; H. Forgasz et al., 2014). To comprehensively evaluate students' perceptions of reading skills, an additional seven items specifically related to reading were incorporated into the questionnaire. The design of the reading items followed an analogy approach, wherein the word "mathematics" was substituted with "reading" (e.g., "Who are better at mathematics from your perspective? Girls/Boys/Same" was transformed into "Who are better at reading from your perspective? Girls/Boys/Same").

Each part of the questionnaire, about mathematics and reading, comprised seven items grouped into three distinct categories. The first category included items 1-3, aimed at assessing students' gender beliefs regarding the success of their peer group (the same others) in mathematics and reading, respectively. The second category included items 4-5, designed to assess students' beliefs concerning the opinions of teachers and parents (significant others) regarding the success of girls and boys in math and reading. The final category encompassed items 6-7, intended to assess students' gender beliefs regarding individuals who possess mathematics or reading as a key professional feature. To ensure the questionnaire's comprehension, a pilot test was preliminarily conducted with four randomly selected students, two from Grade 4 and two from Grade 8.

Sample and Data Collection

The research sample consisted of 531 students from Grades 4 and Grades 8, selected from six schools in two major municipalities of Kosovo. Initially, two out of seven main municipalities in Kosovo were identified: Prishtina, the capital city of Kosovo located in the eastern part, and Gjakova, located in the western part of Kosovo. Subsequently, three schools were randomly selected from each municipality, with two schools representing urban areas and one school representing a rural area. Within each of the six selected schools, the school principal randomly selected two classrooms for both Grade 4 and Grade 8. The study was conducted over the course of one week, with all respondents from the same municipality completing a paper-based questionnaire on the same day. The distribution of students per grade and gender can be found in Table 1.

Table 1. Number of Students per Grade and Gender

		M	F	Total
Grade	4	126	129	255
	8	144	132	276
Total		270	261	531

Analyzing of Data

The completed questionnaires were collected, and the data was entered into a database using the Statistical Package for Social Studies (SPSS). As the variables were categorical in nature, a cross-tabulation analysis with Pearson chi-square was conducted. The measure of effect size, such as Cramer's V for the chi-square test, was calculated to assess the strength of the association between variables. The analysis was performed separately for each school domain, grade level, student gender, and school area.

The students' results are presented using the percentage frequency distribution based on the response rates for each of the seven items. The response rates varied from 526 to 531 for mathematics and from 527 to 531 for reading. Tables displaying the statistically significant differences in students' responses and the corresponding Cramer's V results, categorized by grade level, gender, and school area, are presented in respective tables along with students' results.

Results

The students' results are presented in two sections: 1) Students' gender perception of mathematics and 2) Students' gender perception of reading skills.

Students' Gender Perception of Mathematics

The results of this section are presented in three parts. Initially, the findings pertaining to items 1-3 which examine students' gender beliefs about the mathematics achievements of their peers are presented. This is followed by the results about items 4-5 presenting students' beliefs regarding the gender perception of teachers and parents, which are related to the success of girls and boys in math. The final part presents the results related to the last two items, 6-7, that elicit students' beliefs about individuals working with mathematics.

Students' Gender Beliefs of Mathematics Achievements of Their Peers

The students' responses belonging to items 1-3 are presented in Table 2, disaggregated by grade (Grade 4 and Grade 8), gender (M - Male and F - Female), and school area (U - Urban, and R - Rural). The percentage frequency distribution of responses to these items with chi-square (χ^2) and Cramer's V tests results are shown in the same table.

Table 2. Percentage of Answers to Items 1-3 About Math

Item		All N=531	Grade 4 n = 255	Grade 8 n = 276	Sig.	M n=270	F n=261	Sig.	U n = 415	R n = 116	Sig.
1. Who are better at mathematics from your perspective?	Girls	19.0	18.4	19.6	ns	13.7	24.8	$\chi^2 = 62.8$ $p < .001$ $V = .345$	19.1	19.0	ns
	Boys	35.8	40.4	31.5		52.0	19.0		34.4	41.3	
	Same	44.8	41.2	47.8		34.3	56.2		46.5	39.7	
2. Who has more difficulty in learning mathematics?	Girls	27.3	34.1	21.0	$\chi^2 = 13.5$ $p < .05$ $V = .160$	38.7	15.6	$\chi^2 = 36.4$ $p < .001$ $V = .263$	23.8	39.7	$\chi^2 = 11.6$ $p < .05$ $V = .148$
	Boys	20.9	21.6	20.3		16.2	26.0		21.3	19.8	
	Same	51.2	43.9	57.6		45.0	58.4		54.6	40.5	
3. For whom do you think it is more important to learn math?	Girls	9.8	9.4	10.1	ns	10.8	8.9	$\chi^2 = 18.1$ $p < .001$ $V = .185$	9.0	12.9	$\chi^2 = 17.9$ $p < .001$ $V = .184$
	Boys	15.3	16.5	14.1		21.6	8.9		12.2	26.7	
	Same	74.0	72.9	74.6		67.6	82.1		78.8	60.3	

According to the data in Table 2, less than half of students (44.8 %) believe that there is no gender disparity in their peers' performance in mathematics (item 1). On the other hand, slightly over half of them (51.2 %) think that both genders face comparable challenges in learning mathematics (item 2). Among the remaining respondents who hold gendered beliefs about mathematics achievement, a higher percentage consider mathematics as a male domain. Indeed, more respondents identified boys as better performers than girls in math (35.8 % compared to 19.0 %), and believed that boys struggle less than girls in acquiring it (20.9 % compared to 27.3 %). When it comes to the importance of learning mathematics (item 3), 74.0 % of respondents consider it equally important for both girls and boys. The other portion of respondents believes that learning mathematics is more important for boys than for girls (15.3 % compared to 9.8 %).

The comparison of results by grade level shows that a higher percentage of students in Grade 4 compared to those from Grade 8 hold gendered views about math (58.8 % compared to 51.1 %). In both grades, gendered views were in favor of boys as better performers in mathematics, with a greater difference in Grade 4 (40.4 % compared to 18.4 %) than in Grade 8 (31.5 % compared to 19.6 %). The same pattern of gendered views associated with grade level can be seen in items 2 and 3, with a higher percentage of Grade 4 students compared to those of Grade 8 believing that girls struggle more than boys in acquiring mathematics and that it is more important for boys than for girls to learn it.

When disaggregated by gender, the differences of students' results in all three items are statistically significant. However, Cramer's V results show that there is a moderate association between students' gender and their gender beliefs of mathematics achievements of their peers (item 1) and the difficulties of boys and girls in learning it (item 2). Furthermore, there is a weak association between the students' gender and their perception of the importance of learning mathematics by students of different genders (item 3).

The results in Table 2 show that the majority of boys considered mathematics as a male subject (52.0 %), whereas girls' perception was more gender-neutral, with the majority of them (56.2 %) believing that both genders were equally good in mathematics. A higher confidence of boys in mathematics is apparent, with 52.0 % of them believing they are better in

math compared to 13.7 % who thought that girls are better. On the other hand, even though girls identified themselves too as better performers in math, the difference in the percentage of girls' responses in favor of their gender is lower compared to that of boys, with only 24.8 % of them identifying themselves to be better in math compared to 19.0 % of those that favored boys. The majority of boys (67.6 %) and girls (82.1 %) consider that mathematics is equally important to be acquired by both genders. Yet, it is interesting to note that among the remaining respondents who hold gendered views (a minority in each group), half of the female students think that it is more important for girls to learn mathematics, while the other half considers it more important for boys (8.9 % for each gender). As regards male students, they consider the acquisition of mathematics to be more important for boys than for girls (21.6 % compared to 10.8 %).

The analysis of responses belonging to items 1-3 based on respondents' school area reveals that a higher percentage of students in rural schools compared to those in urban schools hold gendered views. Furthermore, a higher percentage of students in rural schools believe that boys are better performers in mathematics compared to girls, that girls struggle more in learning mathematics, and that it is more important for boys to learn mathematics. Although the differences of students' results are statistically significant in two out of three items, the results of Cramer's V indicate that there is a weak association between the school area and variables related to these items.

Students' Beliefs About Teachers' and Parents' Opinions Regarding Their Math Capabilities

Similar to the presentation of results in the first part, the percentage frequency distribution of results belonging to items 4-5 by grade level, gender, and school area, with chi-square (χ^2) and Cramer's V tests results, are presented in Table 3.

Table 3. Percentage of Answers to Items 4-5 About Math

Item		All N=531	Grade 4 n = 255	Grade 8 n = 276	Sig.	M n=270	F n=261	Sig.	U n = 415	R n = 116	Sig.
4. Who are better at mathematics from the teachers' perspective?	Girls	29.4	20.6	37.8	$\chi^2 = 19.2$ $p < .001$ $V = .191$	24.0	35.5	$\chi^2 = 37.4$ $p < .001$ $V = .266$	30.5	26.3	$\chi^2 = 13.2$ $p < .05$ $V = .158$
	Boys	18.1	21.8	14.9		28.0	7.8		15.0	29.8	
	Same	51.8	57.3	47.3		48.0	56.6		54.5	43.9	
5. Who are better at mathematics from the parents' perspective?	Girls	22.4	25.4	20.1	$\chi^2 = 8.0$ $p < .05$ $V = .124$	17.4	28.1	$\chi^2 = 23.9$ $p < .001$ $V = .213$	20.9	28.7	ns
	Boys	24.3	28.2	21.2		33.0	15.6		23.6	27.8	
	Same	52.4	46.4	58.7		49.6	56.3		55.5	43.5	

Statistically significant differences were found in both items 4 and 5, disaggregated by grade level and by gender, and additionally in the case of item 4 by school area. Although the differences are statistically significant, a moderate association was found between the gender of participants and variables related to both items, and a weak association was found in the other two cases, when results were analyzed by grade level and school area.

The results in Table 3 show that around half of the respondents think that both teachers and parents (51.8 % and 52.4 % respectively) consider girls and boys to be equally good at mathematics. However, among respondents who believe that teachers and parents are not gender-neutral, a major portion believe that teachers favor girls as better performers than boys in mathematics (29.4 % compared to 18.1 %), and, contrarily, they believe that parents consider boys to be better than girls in mathematics (24.3 % compared to 22.4 %).

When analyzed by grade, gender, and school area, the results show that around half of the respondents (varying from 43.5 % to 58.7 %) think that parents and teachers believe that boys and girls are equally good at mathematics. While, out of the respondents who hold different opinions on teachers' perception of the success of girls and boys in mathematics, a higher percentage of Grade 4 students, males, and students in rural schools believe that teachers favor boys. As for parents' perception, a higher percentage of answers from both grade levels, males, and urban schools were in favor of boys.

Students' Beliefs About Individuals Working With Mathematics

The results of the respondents regarding items 6-7 categorized by grade level, gender, and school area with chi-square (χ^2) and Cramer's V tests results, are presented in Table 4.

Table 4. Percentage of Answers to Items 6-7 About Math

Item		All N=531	Grade 4 n = 255	Grade 8 n = 276	Sig.	M n=270	F n=261	Sig.	U n = 415	R n = 116	Sig.
6. Who is better as a math teacher, a female or a male teacher?	Female	50.9	53.9	48.2	ns	45.8	56.4	$\chi^2 = 15.7$ $p < .001$ $V = .173$	53.8	40.9	$\chi^2 = 40.4$ $p < .001$ $V = .276$
	Male	15.2	13.0	17.1		21.0	8.9		9.9	33.9	
	Same	33.9	33.1	34.7		33.2	34.6		36.3	25.2	
7. What do you think, which person in the photo uses math at work?	Female	20.7	19.9	21.4	$\chi^2 = 27.3$ $p < .001$ $V = .228$	18.5	23.1	ns	21.9	16.4	ns
	Male	42.4	53.4	32.4		43.9	40.8		39.8	51.7	
	I don't know	36.9	26.7	46.2		37.6	36.1		38.3	31.9	

Over half of the respondents (50.9 %) favored females as better math teachers than males, compared to only 15.2 % that favored males as better math teachers. Choosing females as better math teachers than their male counterparts was done by students of both grades and, in a statistically significant difference, by students of both genders and those from urban and rural schools.

As for item 7 which asked students to identify if the person in photo A (female) or the person in photo B (male) uses math in their job or they do not know it, the results in Table 4 show that only 36.9 % of the respondents chose the third alternative ("I don't know"). For the rest of the students (63.1 %), who were not gender-neutral, mathematics was more likely to be considered a masculine job (42.4 %) than a feminine one (20.7 %). The large attribution of mathematics as a male job was done by students of both grades, both genders, and both school areas.

Students' Gender Perception of Reading

The presentation of results pertaining to reading follows the same path as in the case of mathematics. Initially, the results related to students' gender beliefs about the reading achievements of their peers are presented. The other part comprises results from students' responses related to their beliefs about the gender perception of teachers and parents regarding their success in reading. The final part provides the results expressing students' beliefs about individuals whose job prominently involves reading.

Gender Beliefs of Students About the Reading Skills of Their Peers' Group

Students' responses belonging to items 1-3 are presented in Table 5 categorized by grade, gender, and school area. The percentage frequency distribution of responses to these items with chi-square (χ^2) and Cramer's V tests results are shown in the same table.

Table 5. Percentage of Answers to Items 1-3 About Reading

Item		All N=531	Grade 4 n = 255	Grade 8 n = 276	Sig.	M n=270	F n=261	Sig.	U n = 415	R n = 116	Sig.
1. Who are better at reading from your perspective?	Girls	39.7	39.4	40.2	ns	31.6	48.4	$\chi^2 = 28.4$ $p < .001$ $V = .231$	41.3	34.5	$\chi^2 = 16.7$ $p < .001$ $V = .178$
	Boys	8.7	6.7	10.5		14.0	3.1		6.0	18.1	
	Same	51.4	53.9	49.2		54.4	48.4		52.7	47.4	
2. Who has more difficulty in mastering reading skills?	Girls	12.2	12.6	11.9	ns	12.8	11.7	$\chi^2 = 9.1$ $p < .05$ $V = .131$	8.2	27.2	$\chi^2 = 33.9$ $p < .001$ $V = .253$
	Boys	8.3	9.9	6.9		11.7	4.7		7.5	11.4	
	Same	79.1	77.5	81.2		75.5	83.6		84.3	61.4	
3. For whom do you think it is more important to master reading skills?	Girls	9.6	11.9	7.6	ns	14.4	4.7	$\chi^2 = 16.5$ $p < .001$ $V = .177$	7.3	18.3	$\chi^2 = 15.7$ $p < .001$ $V = .173$
	Boys	39.9	42.2	38.4		35.0	45.7		39.3	43.5	
	Same	49.7	45.8	54.0		50.6	49.6		53.4	38.2	

It is worth emphasizing that the differences in students' results in all three items regarding gender and school area are statistically significant. Moreover, variables are weakly associated in all cases, except when analyzed by gender in case of item 1, and by school area in case of item 2, in which they are moderately associated. The data above shows that over half of the respondents (51.4 %) believe that students of both genders are equally good at reading skills. The same

perception is held, although in a higher percentage, by students of Grade 4 compared to those of Grade 8 (53.9 % compared to 49.2 %), by boys compared to girls (54.4 % compared to 48.4 %), and by students in urban schools compared to those in rural schools (52.7 % compared to 47.4 %). On the other hand, those who hold gendered views about reading skills (most of them by grade level, gender, and school area) think that girls are better at reading skills (item 1). The strong confidence exhibited by girls as being better than boys in reading is obvious, as 48.4 % of female respondents agreed with this statement, while only 3.1 % of them were in favor of boys. The superiority of girls in reading is also supported by male respondents, with 31.6 % favoring girls compared to 14.0 % of those favoring boys in this regard. Although girls are identified as being better than boys in reading skills, it appears that this label is not easily earned. Surprisingly, students from both grades, of both genders, and from both school areas identified girls as having more difficulties than boys in mastering reading skills (item 2).

When asked about the importance of mastering reading skills, half of the respondents believed that mastering reading was equally important for both genders. On the other hand, among the other half of students who had a contrasting viewpoint, a vast majority (by grade, gender, and school area) indicated that it was more important for boys to master reading skills.

Students' Beliefs About Teachers' and Parents' Opinions Regarding Their Reading Skills

Similar to the previous part, the percentage frequency distribution of results pertaining to items 4-5 by grade level, gender, and school area, with chi-square (χ^2) and Cramer's V tests results, are presented below.

Table 6. Percentage of Answers to Items 4-5 About Reading

Item		All N=531	Grade 4 n = 255	Grade 8 n = 276	Sig.	M n=270	F n=261	Sig.	U n = 415	R n = 116	Sig.
4. Who are better at reading from the teachers' perspective?	Girls	39.7	31.7	47.6	$\chi^2 = 14.0$ $p < .05$ $V = .163$	32.7	47.7	$\chi^2 = 40.2$ $p < .001$ $V = .276$	41.6	34.5	ns
	Boys	10.5	11.5	9.8		18.6	2.3		10.9	9.5	
	Same	49.0	56.7	42.5		48.7	50.0		47.4	56.0	
5. Who are better at reading from the parents' perspective?	Girls	30.5	36.7	26.7	$\chi^2 = 16.5$ $p < .001$ $V = .158$	22.1	39.8	$\chi^2 = 35.2$ $p < .001$ $V = .258$	28.9	37.4	ns
	Boys	10.0	13.9	7.0		16.2	3.5		9.5	12.2	
	Same	58.8	49.4	66.3		61.6	56.6		61.6	50.4	

Nearly half of the respondents (49.0 %) believe that teachers consider both genders equally good in reading skills, whereas more than half of them (58.8 %) have the same perception when asked about parents' perspectives. The perception that teachers consider both genders equally good in reading skills is supported to a larger extent by students of Grade 4 (56.7 %), females (50.0 %), and students in rural schools (56.0 %). As for parents' perception about their children, a higher percentage of students in Grade 8 (66.3 %), males (61.6 %), and those in urban areas (61.6 %) believe that parents think both girls and boys can master reading skills equally. However, among the rest of the respondents who have a contrasting opinion, a vast majority of them, regardless of grade, gender, or school area agree that teachers and parents consider girls more proficient in reading compared to boys.

Students' Beliefs About the Individuals Who Have Reading as a Key Feature in Their Job

Results of the respondents in items 6-7 categorized by grade level, gender, and school area with chi-square (χ^2) and Cramer's V tests results, are presented in Table 7.

Table 7. Percentage of Answers to Items 6-7 About Reading

Item		All N=531	Grade 4 n = 255	Grade 8 n = 276	Sig.	M n=270	F n=261	Sig.	U n = 415	R n = 116	Sig.
6. Who is better as a language and literature teacher, a female or a male teacher?	Female	53.3	60.7	46.9	$\chi^2 = 11.4$ $p < .05$ $V = .147$	50.0	57.2	$\chi^2 = 34.5$ $p < .001$ $V = .256$	51.6	60.5	ns
	Male	9.8	6.7	12.4		17.0	1.9		9.9	8.8	
	Same	36.7	32.5	40.7		33.0	40.9		38.5	30.7	
7. What do you think, which person in the photo uses reading as a key feature in their work?	Female	38.0	47.8	29.0	$\chi^2 = 20.8$ $p < .001$ $V = .199$	33.1	43.2	$\chi^2 = 16.8$ $p < .001$ $V = .178$	37.0	41.4	ns
	Male	23.6	18.2	28.6		30.9	16.0		24.5	20.7	
	I don't know	38.3	34.0	42.4		36.0	40.8		38.5	37.9	

Only 36.7 % of all respondents believe that the gender of a teacher does not matter in being good as a language and literature teacher. This perception is held in a higher percentage by students of Grade 8, girls, and urban students. Among the students that are not gender-neutral, a vast majority of them (53.3 %) believe that females are better as language and literature teachers compared to male teachers (9.8 %). This pattern of substantial difference is characteristic for both grades, both genders, and both school areas.

As for the possibility to make a judgment from a photo, the data in Table 7 reveals that 38.3 % of the respondents answered that they cannot judge from the photo whether a person has reading as a key feature in their job (item 7). However, among the remaining respondents, the majority (38.0 %) believed that having reading as a key feature in their job is more suitable for photo A (depicting a female figure), while the other portion (23.6 %) chose photo B (depicting a male figure). The perception of females being more associated with reading as a main characteristic of their job is accepted by students of both grades, both genders, and both school areas.

Discussion

This study investigated whether gender stereotyping about mathematics and reading exists among students in compulsory education in Kosovo. The findings from this study reveal both positive aspects and concerning trends related to gender stereotypes in these academic domains among Grade 4 and Grade 8 students in two out of seven main municipalities in Kosovo. Approximately half of the respondents perceived girls and boys to be equally successful in learning mathematics and reading and also thought that teachers and parents are gender-neutral regarding girls' and boys' capabilities in these academic domains. However, a major concern for the system of compulsory education poses the other portion of respondents (around half of them), who were not gender-neutral. Within this group, there is a large gap between those who identified boys as better performers in math and those who identified girls as such (35.8 % compared to 19.0 %). Even a larger gap exists between those who recognized girls as better performers in reading and those who identified boys as such (39.7 % compared to 8.7 %). These gaps show that stereotyping mathematics as a male domain and reading as a female domain is largely spread among students in compulsory education. The situation is worrying, as a simple comparison of student perception of the same grade (Grade 4) in a similar test related to gender perception of students about mathematics conducted in Israel (H. Forgasz & Markovits, 2018) shows that Israeli students are more gender neutral about math (61.8 %) in comparison to students in Kosovo (41.2 %).

A comparison of students' results by grade reveals that Grade 4 students are more gender-biased about mathematics performance compared to those in Grade 8. These results are different from similar studies claiming that gender perception widens at higher levels of education (H. Forgasz & Markovits, 2018; Gibbs, 2010). Although differences between Grade 4 and Grade 8 students who hold gendered views in math are small (58.8 % compared to 51.1 %) and non-significant, additional studies with larger samples are needed to explain why this is the case in Kosovo. On the other hand, the situation is different in the case of reading. Similar to other countries in which the gender gap in reading widens across school years (McKenna et al., 2012), a higher percentage of Grade 8 students hold gendered views about reading compared to those in Grade 4.

Analysis of results by gender reveals statistically significant differences in students' responses in almost all items related to mathematics and reading. Furthermore, the results show that the gender of students is moderately associated with their gender beliefs about mathematics and the reading achievements of their peers. This moderate association of the gender variable is also attributed to students' beliefs about the gender perception of teachers and parents regarding their success in both academic domains. As in other research (Hargreaves et al., 2008; Marinak & Gambrell, 2010), the results of this study reveal a firm confidence of boys in mathematics capabilities and a strong confidence of girls in reading skills. In this regard, more than half of boys considered themselves better than girls in mathematics (52.0 % compared to 13.7 %), whereas only one-fourth of girls expressed the belief that they perform better than boys in math (24.8 % compared to 19.0 %). As for reading, girls considered themselves superior to boys (48.4 % compared to 3.1 %), and this was echoed by boys, too. It is important to note that the majority of those that held gendered views about mathematics, representing both genders, considered themselves as being better performers in math. On the contrary, in the case of reading, as in many other countries, the majority of the respondents from both genders accepted that girls undoubtedly are better performers than boys. Regarding the gender perception differences about math and reading among students attending urban and rural schools, the results indicate that students of rural schools carry stronger gendered views about both academic domains than their counterparts in urban schools.

When students were asked about the perspectives of teachers and parents (referred to as significant others) regarding the success of girls and boys in math and reading, their answers revealed the same pattern of gender perception as in the case of the peer group. The perception expressed by students of both genders is that teachers and parents consider their gender as more successful in math, whereas in the case of reading, the respondents of both genders expressed that teachers and parents consider girls as more successful in reading.

The study further investigated students' perceptions of teaching skills that both female and male teachers of math and language possess. Results revealed that over half of the respondents expressed a preference for female teachers over male ones in both academic domains, with 50.9 % compared to 15.2 % in math and 53.3 % compared to 9.8 % in the case

of reading. This substantial difference is also evident when responses are disaggregated by grade, gender, and school area. This difference may be attributed to the fact that the majority of teachers (61.9 %) in Kosovo's compulsory education are females (Ministry of Education, Science, Technology and Innovation, 2022), with the vast majority concentrated in primary schools (Grades 1-5). As regards students' perceptions of individuals who incorporate math and reading as key features in their work, a larger proportion of respondents from both genders associated mathematics with males, while reading skills were more commonly linked to females. It is worth emphasizing that half of the respondents expressed a reduced tendency toward gender-stereotyped perceptions regarding mathematics and reading skills when referring to their peers (the same others), and teachers and parents (the significant others). However, the inclination toward gendered perception rises when it comes to other people in wider society, with 60.0 % exhibiting gendered views. This phenomenon potentially indicates that students' perceptions are shaped by observations of societal norms and experiences. Additionally, these perceptions may be shaped by the portrayal of gender models presented in various media, where men are often depicted as role models in mathematics and science-related careers, while women are more commonly associated with professions such as school teachers, social workers, etc., that have reading and communication as key features in their jobs.

Conclusions

This study examined students' gender perceptions regarding mathematics and reading from three perspectives that are crucial in shaping students' attitudes. These perspectives include the intergroup comparison of boys' and girls' achievements within their peer groups, perceptions regarding their parents' and teachers' expectations toward boys' and girls' capacities in these academic domains, and their critical opinion about the portrayal of people about different genders in various media and the wider community. The results indicate that gendered views are largely present among students in compulsory education. In contrast to other countries, the students' gendered views of mathematics in primary schools are more exhibited than those in lower secondary schools. In the case of reading, however, the same pattern as in other countries follows, with the trend expanding in upper grades. As the study revealed that almost half of the respondents exhibit gendered views about math and reading, it is crucial to take concrete actions toward raising teachers' awareness of different learning strategies that contribute to creating a more gender-neutral perception among students regarding these academic domains. This should be a primary objective for all stakeholders who strive to build a bias-free and socially just society.

Recommendations

The results, revealing that a high percentage of students have gendered views regarding mathematics and reading, call for additional studies to further investigate the factors causing these views and to propose subsequent actions to address them. If students in compulsory education who exhibit gendered views regarding mathematics and reading do not change their viewpoints soon, their perceptions of gender stereotypes may potentially develop further, limiting them in pursuing their careers associated with math or reading skills. This could be even more emphasized in cases when students do not belong to the gender group that is recognized as excelling in these academic domains.

The responsibility for mitigating these gendered views among students in compulsory education should be shared among all stakeholders: parents, teachers, educational institutions, and the wider community. Yet, it is primarily the teachers' responsibility to examine and address gender issues that are present "among boys and girls learning within the same mathematics classrooms" (Lubienski & Pinheiro, 2020, p. 2), and in classrooms where reading comprehension takes place. Teachers should be supported in using various teaching and learning strategies that aim at mitigating the high prevalence of gendered views among students (Samuelsson & Samuelsson, 2016). By implementing a more inclusive approach, educators would ensure there is room for the development of full potential among girls and boys in both domains, which could later translate into opportunities to pursue successful careers in math-related fields as well as in jobs that heavily rely on reading skills, without any limitation.

This study involved students from two out of seven main municipalities in Kosovo. Although these two municipalities are located in two different parts of Kosovo and can be considered representative of its context, similar studies with more municipalities included and a larger sample size are recommended, as they would offer the possibility of generalizing the results. Since there is a weak to moderate association between students' gender perceptions associated with grade, gender, and school area regarding these school domains, it is recommended to conduct future studies related to additional influential factors, such as teaching methods, learning environment, the socio-economic status of families (i.e., family incomes, parents' education level, number of siblings in the family), etc. Moreover, for a more comprehensive analysis of the factors influencing students' gender perceptions, it would be advisable to focus studies on a single academic domain. This would provide a clearer overview of the situation and allow for the planning of more targeted actions.

Limitations

Due to the complexity and large scope, this study solely employed an explicit measurement of students' gender perceptions regarding mathematics and reading. This was implemented by asking for responses to explicit questions in the questionnaire, to which participants responded via self-reporting. Future studies should additionally organize

individual and focus group interviews, to gain a comprehensive understanding of the prevalence of factors influencing gender stereotypes of mathematics and reading in Kosovo.

Conflict of interest

The authors declare that there is no conflict of interest.

Authorship Contribution Statement

Mula: Conceptualization and design, data analysis/interpretation, statistical analysis, drafting manuscript, critical revision of the manuscript, supervision, final approval. Sylhasi: Data acquisition, data analysis/interpretation, statistical analysis, drafting manuscript, technical support. final approval.

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