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Social Class and Gender in an Equation of Students' Mathematics Identity[1]

Katarina Mićić[2]
Center for Teacher Education, Department of Psychology, Faculty of Philosophy, University of Belgrade, Belgrade, Serbia
Olja Jovanović
Center for Teacher Education, Department of Psychology, Faculty of Philosophy, University of Belgrade, Belgrade, Serbia

Abstract *Addressing the achievement gap in mathematics across social class and gender is essential, as mathematics is widely seen as a pathway to social mobility and a tool for breaking cycles of inequality. This study adopts a Bourdieusian perspective and the concept of mathematics identity (MI) to investigate the factors that hinder or support disadvantaged students in identifying with mathematics. Thematic analysis of semi-structured interviews with six disadvantaged fourth- and fifth-graders revealed systemic challenges shaping their MI. From their first encounters with school mathematics, these students face barriers that undermine their confidence and foster negative self-perceptions. While they recognize the societal importance of mathematics, they feel personally and academically disconnected from it, resulting in tensions in their relationship with the subject. Rather than following the institutional requirements for developing mathematics competence, these students focus on short-term academic goals. Gender differences also emerge, as boys appear to benefit slightly from aspects of their MI being reinforced by their gender identities, though this advantage comes with added pressures and responsibilities. In contrast, the gender identity of girls from disadvantaged families often further contributes to the negative construction of their MI. Improving mathematics education for disadvantaged students requires teachers to recognize and address systemic barriers, such as implicit rules, biases, and hidden messages, while creating opportunities for all students to find mathematics meaningful and feel a sense of progress. However, true equity goes beyond teachers and demands systemic changes, starting with curriculum developers and teacher education programs, to redefine school mathematics as an inclusive domain for all.*

Keywords: *mathematics identity, social class, gender, cultural capital, inequity.*

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2 katarina.micic@f.bg.ac.rs

Introduction

> *The education system continues to favour those whom it has always favoured—those of higher socioeconomic status and those who know how to work the system and have a "feel for the game"* (Bourdieu, 1990, p. 9).

Mathematics is widely seen as a gatekeeper to social mobility, making inequity in mathematics education a significant concern. It is viewed as essential for accessing higher education, even in fields with minimal mathematical content. Moreover, mathematics qualifications are crucial for many careers and are linked to higher salaries, positioning mathematics education as a major determinant of students' future opportunities (Gates & Vistro-Yu, 2003). However, while mathematics holds the potential to act as a catalyst for social mobility, it more often functions as a mechanism for preserving the status quo, as its curriculum and practices are frequently structured in ways that disproportionately favor those who are already privileged (Gutiérrez, 2013; Jorgensen et al., 2014). The state of mathematics education is especially concerning for students from socioeconomically disadvantaged backgrounds, who will be referred to by the term 'disadvantaged students' in this text. According to the latest PISA results (OECD, 2023), the achievement gap between the most advantaged and disadvantaged students is 93 points across OECD countries (81 points in Serbia), equivalent to over four years of schooling. Additionally, 47% of disadvantaged students, compared to just 14% of their advantaged peers, score below basic proficiency in mathematics. Low socioeconomic status (SES) also negatively impacts aspirations for pursuing mathematics-related careers and further education (Jagannathan et al., 2018; Saw et al., 2018). In explaining these achievement gaps, research has traditionally relied on deficit frameworks, such as the "culture of poverty," which attribute these gaps to a lack of predispositions for success among disadvantaged students and their families (Gutiérrez & Dixon-Román, 2011). The current study adopts a different perspective, aligning with research that takes a social (Lerman, 2000) and sociopolitical turn (Gutiérrez, 2013), focusing instead on the obstacles created by dominant societal and institutional discourses and practices.

Class, gender and mathematics education

The gap between the social, economic, and cultural capital possessed by students and their families and the expectations set by schools has long been recognized as a central force driving the persistence of class-based inequalities in mathematics education and outcomes (Jorgensen et al., 2014). SES is a strong predictor of not only mathematics but other types of literacies as well (OECD, 2023). Among the SES indicators, parental education shows the strongest prediction power (Reardon, 2018). Parents' educational background shapes their interactions with children and the support they provide for school activities (Magnuson, 2007). Parents with higher levels of education tend to exhibit more positive attitudes toward school mathematics and employ more effective motivational practices (LeFevre et al., 2009; Mićić & Baucal, 2022). Furthermore, research highlights that high SES parents are more likely to engage their children in mathematical activities during everyday play compared to their low-SES counterparts (Vandermaas-Peeler et al., 2009). Beyond parental education, financial factors also play a critical role in shaping math achievement. Namely, financial constraints can significantly limit access to enriching extracurricular opportunities, such as private tutoring or summer camps, and restrict the availability of stimulating educational resources, including books, computers, and educational games (Duncan et al., 2014). Parents in low-income households often face significant time constraints, further limiting their capacity to support their children's learning (Davis-Kean, 2005). Moreover, studies have described differences in home cultures and parental practices across social classes and linked them to intergenerational reproduction of class inequalities. For example, Lareau (2018) identified "concerted cultivation" among middle-class parents, involving structured activities to nurture children's talents and align with school expectations, boosting academic success. In contrast, parents in working-class and low-income families often adopt a "natural growth" approach, focusing on meeting basic needs while allowing their children more freedom and less-structured environments for development. Lareau argued that these parenting differences arise not only from income disparities but also from differing cultural beliefs and practices.

These findings are often interpreted through various ideological lenses, each carrying distinct implications for the role of schools and educators. One of the most prevalent interpretations is rooted in deficit ideologies, which attribute social and educational inequalities to perceived shortcomings within individuals and communities that underperform academically (Gorski, 2012). Such ideologies serve to legitimize existing inequalities while shifting the responsibility for students' achievements onto students themselves and their families. However, what these perspectives fail to recognize is the one factor universally shared by those living in poverty: inadequate access to resources and support (Jovanović, 2017) and the way this shapes their (educational) experiences and outcomes. Therefore, in contrast to deficit-based models, certain lines of research shift the focus to the social practices that create and sustain systemic and structural barriers within mathematics education. Drawing on Bourdieu's framework, scholars highlight the non-alignment between the cultural capital of these students and the demands of mathematics education. They argue that children from affluent backgrounds succeed in mathematics because they enter school with the "right" habitus, unlike their disadvantaged peers (Jorgensen et al., 2014; Lerman, 2020). Habitus is a concept introduced by Bourdieu (1984), referring to a set of dispositions, habits, skills, linguistic repertoire and behaviors. According to this view, students from affluent families are successful in mathematics because their home-cultures cultivate habitus that closely align with the practices, rules, and expectations of the mathematics classroom. These practices, rules, and expectations – the field (Bourdieu, 1984) of school mathematics – are a product of social relations that define the mathematics curriculum and didactics, the vision of a successful student and his/her proper behaviour, and other aspects of mathematics education. For example, students from middle-class families are more likely to enter school already familiar with certain pedagogical practices, as they have likely been exposed to informal educational games that follow similar rules (Lareau, 2018). Thus, habitus shaped in affluent families has the form of cultural capital that can be exchanged in the school economy for rewards such as grades and certificates, because it matches its rules. In contrast, disadvantaged students' habitus does not align with the practices of school mathematics, so it must undergo a transformation to be able to achieve success (Zevenbergen, 2000). Therefore, the kind of "virtual school bag" (Thomson, 2002) that students from disadvantaged families bring to school lacks the equipment required in a mathematics classroom. This affects their sense of belonging in the mathematical community and various aspects of their learning, which then becomes reified, reinforcing the perception of a natural (in) ability (Jorgensen et al., 2014).

While this perspective clearly highlights the social structures and dominant social norms and beliefs that create and sustain educational inequalities, it tends to overlook the complexities of identities within underprivileged groups. For instance, the gender gap in mathematics education has long been attributed to the now disproven assumption that boys and girls possess inherently different mathematical abilities. The social nature of this gap has been supported by historical data (OECD, 2023), cross-national and cross-cultural data (Holmlund et al., 2021; Mićić & Blažanin, 2024) and through meta-analyses (e.g., Hyde et al., 1990; Lindberg et al., 2010). Still, compared to boys, girls tend to have less favorable emotional responses to and motivation for mathematics, and they are less likely to pursue further education or careers in mathematics (OECD, 2015). This gap is often attributed to the persistence of traditional values associated with mathematics, such as competitiveness, independence, rationality, rules-following and speed (Mendick, 2005). These values reinforce narratives that align mathematics with male gender roles, thereby limiting the space in which women are seen as capable of succeeding in mathematics (Solomon et al., 2011).

Research focusing on class-based differences in mathematics education and gender-based differences tends to be treated separately, overlooking the experiences of girls from disadvantaged backgrounds in mathematics. A limited number of studies adopting an intersectional perspective reveal that girls from disadvantaged families are among the most disengaged, which negatively affects their math achievement (Cascella, 2024) and STEM aspirations (Saw et al., 2018). These findings underscore the importance of exploring inequalities in education as systems of interaction between social structures, dominant beliefs and norms, and identity constructions that are context-specific, complex, and inextricably linked to these dominant social practices and structures (Winker & Degele, 2011).

Building on this line of thinking, some authors advocate for a more inclusive mathematics education through an analysis of students' mathematics identity (MI). This concept links learning to the cultural context in which it occurs (Radovic et al., 2018), enabling a more comprehensive examination of issues such as low motivation, poor achievement, discontinuation of mathematics education, and disparities among student groups without relying on deficit-based explanations (Grootenboer & Zevenbergen, 2008). Instead, MI helps us understand how societal practices and discursive patterns—found in mathematics curricula, teaching methods, textbooks, and beliefs about mathematics and mathematicians—shape students' self-perception as participants in mathematics education. These factors influence both the process and outcomes of mathematics education (Grootenboer & Zevenbergen, 2006). The next section further discusses the concept of MI.

Mathematics identity and ways of belonging

The concept of MI has gained attention because it provides a framework for understanding disengagement and underachievement in mathematics, viewing these as failures to establish a sense of belonging in the mathematics community rather than a lack of ability (Darragh, 2013). MI emphasizes how a student's sense of self as a member of the mathematics community is shaped by their experiences and the social interpretation of those experiences (Anderson, 2007; Wenger, 1998). This social interpretation includes both the socially constructed discourse that offers narratives, roles, and categories for students to identify with, as well as the feedback they receive from others in the community, such as parents, teachers, and peers. Since many identity-related processes are dynamic, a person's identity is always evolving, shaped by their participation—or lack of it—in the community (Wenger, 1998). An identity mediates a person's interpretations, actions, motivation, behavior and aspirations (Holland & Lachicotte, 2007). Thus, MI impacts a student's approach to learning mathematics by influencing their motivation, selection of learning strategies, time spent in learning, aspiration for continuing mathematics education or pursuing a career that involves mathematics, and so on.

MI research examines how students identify with school subjects, viewing them as role identities shaped by expectations tied to specific domains (Burke & Stets, 2009). MI is influenced by other aspects of identity, such as personal identity (e.g., identifying as smart, rational, or competitive) and collective identities (e.g., class, gender, or ethnicity), which can either support or hinder MI development (Burke & Stets, 2009; Eccles, 2009). Since mathematics curricula, teaching practices, and assessments have historically favored white middle-class males (Gates & Vistro-Yu, 2003), achievement gaps across gender, class, and ethnicity may stem from challenges in identifying with mathematics due to these other identity factors, rather than inherent disparities.

A suitable framework for examining the challenges of identifying with mathematics is Wenger's (1998) concept of "ways of belonging," which describes three processes of identification with a specific community of practice: engagement, imagination, and alignment. Building on this framework, Anderson (2007) outlines three ways of belonging to the mathematical community, or three processes in constructing MI:

Engagement in the mathematical community means actively participating in tasks, working with peers, and interacting with teachers. This involvement helps students understand mathematics and evaluate how well they fit into the community. Their engagement influences both how they see themselves and how others perceive them, shaping their sense of belonging. Students who are recognized for their contributions are more likely to view themselves as capable and valued members of the community, while those who struggle may feel excluded or less competent.

Imagination refers to how individuals see themselves in the wider world, including their connection to the mathematical community beyond the classroom. It depends on how students perceive the relevance of mathematics in their lives, such as its connection to daily activities, personal interests, values, or career goals. Some may view it as essential, while others may see it as unnecessary. The imagination influences how students relate mathematics to their desired and possible future identity, shaping their engagement in the mathematical community.

Alignment is the process by which students adjust their efforts to meet institutional expectations. In the context of mathematics, students take certain actions based on implicit or explicit expectations of what mathematics is and who is considered a good mathematician. For instance, those who view advanced mathematics as valuable and important will follow the recommended pathways, while others may only meet the minimum requirements and may not develop a strong sense of MI. Alignment interacts with both imagination and engagement, influencing how students see themselves and their relationship with mathematics.

The current study

This study aims to explore the interplay of poverty, gender, and students' participation in the mathematical community—factors that are often examined in isolation within mathematics education research. By focusing on the construction of mathematical identity (MI) among students from socioeconomically disadvantaged backgrounds, the study uses the framework of "ways of belonging" in a community as a lens for understanding identity construction (Wenger, 1998), which Anderson (2007) adapted to school mathematics. Additionally, it employs a Bourdieusian perspective, highlighting how the construction of students' MI is shaped by the disconnect between their home cultures and the expectations imposed by the school environment. Moreover, the research investigates how class and gender interact within the context of the mathematics community to shape MI. The aim is to identify both the barriers to participation in the mathematics classroom and the factors that hinder students' identification with the subject, while also highlighting supportive mechanisms that could be leveraged to strengthen students' positive MI. The study is guided by two key research questions: (1) How do disadvantaged students construct their MI through different ways of belonging to the mathematical community? and (2) How do class and gender interact to shape the process of MI construction?

Method

Participants

The study involved six students from disadvantaged backgrounds balanced by gender and grade who were selected from a larger dataset[3]. The participants included

3 Data used in this study were collected as a part of a doctoral project approved by the Ethics Committee (protocol number: 2020-51).

three fourth-grade students (two girls, one boy) and three fifth-grade students (two boys, one girl), all enrolled in three primary schools in peripheral Belgrade areas. SES was approximated using parents' employment status, education level, and the number of books in the household, which has been proved a reliable SES proxy (OECD, 2005). Only students with parental consent and who verbally agreed to participate and be recorded were included.

Data collection

To explore how students construct their MI, interviews were conducted using guidelines for interviewing children (Cohen et al., 2017). The semi-structured interviews followed a four-phase structure: (1) establishing rapport and gathering general information, (2) reflecting on critical incidents that shaped their relationship with mathematics using The Mathematical Life Story approach (Lewis, 2013), (3) discussing their participation in the mathematics classroom as their primary mathematics community, and (4) mapping their MI (Ylvisaker et al., 2008) by exploring their activities, emotions, motivation, and perceptions of others. A similar framework had been successfully applied in a previous study with slightly older participants (Radovic et al., 2017). Conducted in the school setting, the interviews lasted between 23 and 43 minutes, averaging 31 minutes, and were recorded and transcribed verbatim.

Data analysis

Although presented here as a sequence of steps for clarity, the analysis was iterative. Initially, we adopted a deductive approach to the data, drawing upon Anderson's (2007) adaptation of the three ways of belonging (Wenger, 1998) to guide our search for relevant illustrations in the participants' accounts. This framework was further operationalized through reference to existing literature on successful mathematicians (Picker & Berry, 2000; Aguilar et al., 2016; Mićić, 2024), which helped us identify specific behaviors indicative of positive MI alignment. Subsequently, we moved to an inductive phase of analysis, where we sought to explore how the different forms of belonging manifested within the accounts of our participants. This led to the development of a coding scheme, as presented in Table 1. In the third phase, we focused on the development of themes that encompassed the codes associated with each identity aspect. Throughout this stage, we paid careful attention to both the similarities and the differences in the ways our participants articulated their experiences of MI construction. The process of coding was carried out using MAXQDA 24 software.

Table 1
The coding scheme emerging from the analysis

Engagement	Imagination	Alignment
General idea about mathematics	Connection of mathematics with other interests and values	Presence of behaviors of students successful in mathematics:
Perceived mathematical competence	Perceived usefulness of mathematics	– Asked to help others
		– Participate in mathematics contests
Critical experiences shaping MI	Plan for further mathematical education	– Study mathematics a lot
Teacher's, parental, and peers' perception and feedback	Career plan and mathematics	– Are passionate and love mathematics
Distinguished groups in the classroom regarding mathematics and self-positioning within them		– Attend additional lessons
		Actual behaviors and actions regarding mathematics education
		Mathematics learning goals
		Nature of motivation for learning mathematics

Results and discussion

We present and discuss findings from our analysis describing different processes in constructing the identity of a mathematics learner: engagement, imagination and alignment. While many of the obstacles described in our participants' testimonies were directly linked to low SES, we sought to strengthen the reliability of our conclusions by incorporating findings from other studies. This allowed us to differentiate processes specific to this group of students from those that occur universally in the course of mathematics education, regardless of social class.

Engagement: chasing mathematics in the zone of future development

Our participants' experiences with mathematics revealed struggles that led to alienation and a negative self-image as learners. They described mathematics as difficult, confusing, and boring, with some wishing it "didn't exist." While negative attitudes toward mathematics are common (Dündar et al., 2014; Mendick et al., 2008), studies show individual variation, with some students having positive views (Hatisaru & Murphy, 2019; Markovits & Forgasz, 2017; Mićić, 2024). However, students in our study appeared strikingly united in their negative outlook on mathematics, indicating that it is more likely for a student with a disadvantaged background to come to a negative view of the subject. Such a perspective seemed to contribute to a sense of incapability and helplessness when engaging with it. A female fourth grader's testimony illustrates how repeated obstacles and the absence of a sense of mastery undermined her confidence and motivation:

> *I don't look forward to math classes or studying math. (…) It's simply because math doesn't appeal to me. It seems hard and confuses me. (…) All those numbers somehow confuse me. Even when I understand a lesson, there's always something I can't quite grasp, and I never fully understand it. For example, with inequalities, I'm never sure whether I should… when I need to divide if it's already divided, or if I should keep multiplying when it's multiplied. And it's like that with every lesson—there's always something I can never fully get* [Girl K, fourth grade]

The negative relationship with mathematics began when students first encountered a gap between their competence and the subject's demands. For three students, this sense of incompetence started in first grade, while the other three experienced it in second or third grade. A boy explained:

> *Here* [In the first grade compared to preschool] *we worked on some, like, how to put it, a bit more complex things... And then it wasn't really clear to me, and I was a bit confused by that. So, then I started to like it less. Because after a while, it also got boring to do math because it was hard for me."* [Boy A, fifth grade]

A developmental decline in motivation and increasing alienation is a common trend in mathematics education, linked to the rising complexity of the curriculum as students progress through schooling. This trend affects many, though not all, students (Fredricks & Eccles, 2002; Gottfried et al., 2009). In Serbia, this decline is particularly pronounced during the transition from class to subject teaching (Mićić, 2024). Yet, all the interviewed students reported such feelings, with the most concerning finding being that, for them, this process begins much earlier than usual—often with their very first encounter with school mathematics. This finding underscores a systemic issue highlighted in the Bourdieusian accounts of inequity (Jorgensen et al., 2014; Gutiérrez, 2016): the mathematics curriculum places disadvantaged students before a significant initial hurdle. This early inequity sets in motion a vicious cycle of negative experiences, where initial struggles to "understand the game" of mathematics erode confidence and enjoyment, ultimately leading to cumulative disengagement and lower academic achievement throughout their education.

This conclusion is further reinforced by students' testimonies, which reveal how the gap between their competence and the demands of mathematics became particularly evident in the absence of support. One female student shared that her disengagement with the subject began when she encountered mathematics during remote education, a period shaped by the COVID-19 pandemic. The lack of teacher support and her parents' inability to assist her with learning made the subject increasingly difficult and, ultimately, uninteresting. Similarly, a male student described how his disengagement started when his grandfather, who had been his primary source of support in learning mathematics, moved away. Without his grandfather's guidance, he was left to navigate his studies alone, marking the beginning of his academic struggles.

J.: *By third grade, I started forgetting, and it became harder and harder for me...*

I: *What happened in third grade?*

J.: *My grandfather moved away, and I wanted my dad to teach me, but he didn't, he was busy because he had just opened the café. I tried on my own, but I couldn't do it. Mom was helping dad, so I couldn't do it with her either.*

While some students initially sought help from their parents, especially fathers, most eventually relied on external sources. Many recalled receiving tutoring from grandparents, uncles, aunts, neighbors, or friends' parents. The excerpts below highlight that, although family support systems were present, they were often deemed inadequate because they did not align with the methods of institutionalized mathematics. This discrepancy contributed to the students' feelings of incompetence and a sense of disconnection from the mathematical community.

M.: *In second grade, we started doing textual problems. Back then, my dad helped me every day because I didn't really know how to set up a problem. I knew how to calculate it—that part was easy—but I didn't know how to set it up. Then, my dad couldn't help me anymore. The teacher said I had started getting a bit confused because she explained it one way, and my dad explained it a different way. That's why it wasn't clear to me. So, I kept going to additional lessons whenever they were offered.*

In addition to their persistent struggle to keep up with mathematics, the students were often explicitly or implicitly negatively labeled by significant others. They report that their teachers perceive them as "bad at mathematics" or "lazy". This is likely influenced by teachers' stereotypes, which often view disadvantaged students as lacking the necessary abilities or attitudes for mathematics success (Szumski & Karwowski, 2019). Through a Bourdieusian lens, this is a reification of the misalignment of students' habitus and school demands (Jorgensen et al., 2014). The biased outlook shapes teacher-student interactions, reinforcing low achievement and perpetuating a cycle (Spencer & Castano, 2007). In addition, students felt that their parents and peers held low expectations from them as well, solidifying their negative MI.

The findings suggest that students from disadvantaged backgrounds often encountered mathematics tasks that exceeded their current capabilities—tasks situated within their zone of future development—while simultaneously receiving messages from their social environment that they were not expected to succeed. This combination likely contributed to the internalization of a belief that they were incapable of excelling in mathematics. Consequently, none of these students identified themselves as part of the group that succeeds in the subject. They viewed their struggles as insurmountable, leading to a decreased willingness to engage with the mathematics community. However, it is important to note that some of their responses were also influenced by their gender.

It seems that rules for boys and girls in our students' communities of mathematical practice are different, showing once again that mathematics is gendered regardless of social class (Saw et al., 2018). While subsamples of boys and girls were similar in their mathematics achievement, their presentations of their MI differed. Although both groups generally relied more on effort-based discourses (Dweck, 2008) in their explanations of achievement, it seems that girls tended to present their low mathematics achievement as due to stable factors, while boys saw it as a result of changeable, controllable factors. This difference was evident in the way they attribute their performance to a lack of effort or interest (a boy: "*To be better at mathematics I have to study more, but I want to play*") or to a lack of talent (a girl: "*I feel really down and all when I see that I'm not good at math, and I see other kids doing well in math and everything. I just end up thinking, 'Why am I not as good at math as they are?'*"). This difference may reflect societal and interpersonal influences, as research shows the public (Mendick, 2005) and teachers (Di Battista, 2024) often attribute girls' failures in math to stable, internal factors and boys' to unstable, external ones. Our data also indicated that boys experienced greater shame about poor performance and negative MI than girls. This was evident in boys' attempts to sugarcoat their self-presentations, sometimes justifying their poor achievement ("*I could have had grade 5, but I didn't have the will to study.*"), offering more nuanced self-presentation, by including a dimension in which they could be positively evaluated (e.g., "*I belong to a group of students who don't like mathematics but are good at it*") or avoiding negative wording ("*I belong to a group of students who want to improve in mathematics*"). This can be interpreted in light of findings that suggest mathematics ability is often perceived as a male characteristic (Mendick, 2005; Solomon et al., 2011). As a result, poor performance in mathematics may be a heavier burden for boys than for girls, regardless of social class.

Imagination: the paradox of mathematical relevance

The analysis reveals a paradox in how students from disadvantaged backgrounds perceive their connection to mathematics beyond the classroom. On one hand, they expressed little intrinsic interest in the subject, with none of them viewing it as aligned with their hobbies, values, or goals. Their disconnection from mathematics appears more pronounced than what is typically observed in the general population (Boaler, 2002; Cobb et al., 2009; Mićić, 2024). This can largely be attributed to the struggles with school mathematics that have been previously described. However, another obstacle for disadvantaged students in envisioning themselves as members of the mathematics community may lie in their collective identities. Given the elitist stereotype of mathematics as a domain for the middle class (Mendick et al., 2008) and the fact that many students described their parents as also struggling with mathematics, it is possible that some students experience tension between their identity as mathematics learners and their collective class identity (Eccles, 2009), which traditionally does not align with success in mathematics.

However, all but one student recognized mathematics as important and useful, essential in everyday life, and unavoidable in many professions. This recognition of mathematics' general significance, coupled with a lack of personal connection to the subject or confidence in their mathematical abilities, caught our students in a burdened relationship with it. This dynamic reflects what Niss (1994) described as "the relevance paradox" best illustrated by the quote from his study: "Mathematics is useless to me, but at the same time

I know that I am useless without mathematics". It seems that the pressure of the social relevance of mathematics led to nearly all the students feeling they must continue learning mathematics at further levels of education, despite their disinterest and struggles with the subject. A female student explained:

> J*: Well, I wouldn't want to completely remove math. You always need a little bit of math for anything, for everything. So, I wouldn't...*
>
> I*: Why?*
>
> J*: Well, simply because it's necessary in life and in almost every job. That's why I'd keep at least a little math, the most essential parts, but not too much.*

The question about the role of mathematics in students' envisioned careers also revealed a gendered pattern. Two girls expressed the intention to avoid it entirely in their future jobs, while a third believed that basic mathematics would be necessary. In contrast, all three boys felt that mathematics would be an essential part of their work, as illustrated by the excerpt:

> L*: When I grow up, I want to be a truck driver.*
>
> I*: A truck driver? And would you like to have to use math while driving a truck or not?*
>
> L*: To drive a truck.*
>
> I*: But would you like to have to use math as well?*
>
> L*: Yes.*
>
> I*: For what?*
>
> L*: For mileage.*
>
> I*: So, you'll still need to know it. When do you think you'll learn it?*
>
> L*: I don't know.*

Once again, it appears that despite their low interest in mathematics, the boys feel they cannot entirely disregard it. It seems that in the interplay of boys' gender identity and their class identity (Eccles, 2009) the former serves as a protective factor for boys in regard to their mathematics aspirations, stemming from the belief that mathematics is a male domain (Mendick, 2005; Solomon et al., 2011). This gender identity, to some extent at least, supports boys in imagining themselves as members of the mathematics community beyond the classroom. However, at the same time, feeling the discrepancy between this notion of mathematics as something desirable for boys and their difficulty seeing themselves as genuinely belonging to this community seemingly provoked anxiety and shame in the boys, leading them to try to sugarcoat their MI as illustrated earlier. In contrast, the gender norms and expectations surrounding mathematics achievement for girls from disadvantaged backgrounds seem to contribute to their continued disengagement from the subject, both in and outside the classroom, reinforcing their negative MI.

Alignment: doing what those who struggle in mathematics do just enough to get thorough

The interviewed students most often didn't get the chance to walk the pathways of successful mathematics students described in other studies (Aguilar et al., 2016; Mićić, 2024; Picker & Berry, 2000). These students are never asked to help others in class, they don't spend hours working on mathematics problems that provoke their interest, they were never invited to enrichment classes, and except for one student they never participated in a mathematics contest. The student who participated in a contest found it enjoyable despite not performing well, showing that even an opportunity to engage in activities typically associated with successful mathematics learners is valuable.

Instead, school mathematics appeared to position the interviewed students as low achievers within their mathematical communities. Students' efforts are primarily focused on passing the grade or achieving the best possible grade to secure as many points as possible for high school. Engagement with school mathematics marked all of the students as in need of seeking extra help in learning mathematics. The most striking example is the girl who was told that she scored the lowest on an exam and that she was allowed to use a calculator – a gadget that is regularly forbidden in a classroom. Through directing them into these behaviors, which carry specific meanings in the mathematics classroom, the mathematics community implicitly informs students what "kind of people" they are (Anderson, 2007; Gee, 2001). And as a result, students come to view themselves as students who struggle with mathematics, reinforcing their position of non-belonging to the community (Wenger, 1998).

All three boys and only one girl stated they study mathematics not only for the grades, but also because they will need the competence in the future, showing that boys at least to some extent are aligning their actions with the mathematics community outside of the classroom. This once again shows that boys' gender identity and the cultural norm that mathematics is for boys can support their identification with mathematics, while girls are left with no leverage.

Conclusions and recommendations

Our study showed that disadvantaged students face systemic barriers from their earliest encounters with school mathematics, which erode their confidence and foster negative self-perceptions. To add to this struggle, disadvantaged students grapple with the paradoxical relevance of mathematics, recognizing its societal importance while feeling disconnected from it personally and academically. Their positive MI is further inhibited through an alignment with requirements aimed at meeting immediate academic demands rather than with developing a strong mathematics competence. Boys are in a somewhat better position than girls as some aspects of imagination and alignment processes can be based on and supported through their gender identities, but this comes with a burdening responsibility too. It's important to acknowledge that these findings have limited generalizability due to the small sample size and the contextual variations in the meanings and practices of school mathematics. Future research should address these limitations by examining a more diverse sample across different educational settings.

Nevertheless, the study findings provide a strong basis for meaningful recommendations. Improvement of the experience of mathematics education for disadvantaged students starts with teachers' awareness of the issue. Evidence shows that teaching practices moderate the relationship between social class and academic achievement (Radulović et al., 2022), with teaching approaches rooted in constructivist principles helping to mitigate educational inequalities (Gundogan et al., 2020). Teachers need to be mindful of diverse forms of cultural capital and to respond to students' diverse knowledge, skills and experiences. In addition, they should make the "rules of the game" (Jorgensen et al., 2014) explicit, as these might be taken for granted by the majority but remain hidden for disadvantaged students. Our findings highlight the importance of addressing this from the start of schooling, as even the parts of the mathematics curriculum which are considered to be most basic can alienate disadvantaged students and create a difficult-to-break cycle. Further, teachers should be reflective and mindful of their biases which could be influenced by social stereotypes about class and gender. They should thoughtfully provide feedback and be mindful of implicit and explicit positioning and the messages they send to students. Teachers should make opportunities for every student to make progress and to find mathematics relatable and personally meaningful, which will positively impact all three processes of identification with the subject (Anderson, 2007). The perception of mathematics as an exclusive domain for certain social groups should be challenged, both in and beyond the classroom. This can be achieved through more inclusive teaching practices based on the constructivist paradigm, through diversification of mathematics role models, and by promoting cultural diversity within mathematics knowledge and history, for example through showcasing ethnomathematics (D'Ambrosio, 1985).

Although most of our recommendations are directed towards the classroom and teachers, we believe that change must begin at the top—with those who develop school curricula and teacher education programs. To make mathematics more equitable, the mathematics community needs to abandon its elitist views and traditions that prevent so many students from accessing it (Lerman, 1998; Jorgensen et al., 2014). Redesigning mathematics to make it more inclusive would not only benefit disadvantaged students but would also improve the mathematics education experience and outcomes for all students.

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Katarina Mićić
Center for Teacher Education, Department of Psychology, Faculty of Philosophy, University of Belgrade, Belgrade, Serbia
https://orcid.org/0000-0003-2117-9014

Olja Jovanović
Center for Teacher Education, Department of Psychology, Faculty of Philosophy, University of Belgrade, Belgrade, Serbia
https://orcid.org/0000-0001-8860-6717

Društvena klasa i pol u jednačini matematičkog identiteta učenika

Katarina Mićić
Centar za obrazovanje nastavnika, Odeljenje za psihologiju,
Filozofski fakultet, Univerzitet u Beogradu, Beograd, Srbija

Olja Jovanović
Centar za obrazovanje nastavnika, Odeljenje za psihologiju,
Filozofski fakultet, Univerzitet u Beogradu, Beograd, Srbija

Apstrakt *Smanjivanje jaza u postignućima na polju matematike između društvenih klasa i polova od krucijalne je važnosti jer visok nivo matematičke kompetencije povećava mogućnost socijalne mobilnosti. Koristeći Burdijeov teorijski okvir i koncept matematičkog identiteta, ova studija istražuje procese koji ometaju ili podržavaju identifikaciju učenika iz porodica niskog socioekonomskog statusa s matematikom. Intervjuisano je šest učenika četvrtog i petog razreda kako bi se istražili i opisali njihovi matematički identiteti. Rezultati pokazuju da učenici porodica niskog socioekonomskog statusa nailaze na sistemske prepreke u školskom učenju matematike od samog početka, što dovodi do niskog samopouzdanja i negativne percepcije sebe. Ovi učenici prepoznaju društveni značaj matematike, ali se osećaju lično i akademski udaljeni od nje, što stvara tenzije u njihovom odnosu prema ovom predmetu. Ne usaglašavaju svoje ponašanje se institucionalnim zahtevima za uspeh u matematici, jer su usmereni na ispunjavanje kratkoročnih akademskih ciljeva. Dečaci imaju blagu prednost, jer se aspekti njihovog matematičkog identiteta mogu osloniti na njihovu rodnu ulogu, iako to nosi dodatne pritiske i odgovornost. Nasuprot tome, devojčice iz porodica niskog socioekonomskog statusa nemaju nikakvu osnovu na kojoj bi mogle da grade svoj matematički identitet. Poboljšanje matematičkog obrazovanja za učenike iz porodica niskog socioekonomskog statusa zahteva od nastavnika da prepoznaju i adresiraju sistemske barijere, uključujući implicitna pravila, pristrasnosti i suptilne poruke, uz stvaranje prilika da se svi učenici osete kompetentno i dožive matematiku smislenom. Međutim, prava jednakost zahteva sistemske promene, počevši od tvoraca kurikuluma i programa obrazovanja nastavnika, kako bi se uklonile tradicionalne prepreke i matematika redizajnirala kao inkluzivna i pristupačna oblast za sve.*

Ključne reči: *matematički identitet, društvena klasa, pol, kulturni kapital, nejednakost.*