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The Impact Mechanism of Gender Stereotypes in Education on Students' Academic Choices and Academic Performance

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Abstract:

As society progresses, people's understanding and definition of gender are becoming more diverse. New generations no longer stereotype male and female behavior, leading to a gradual weakening of the influence of gender stereotypes. However, due to their longevity, these stereotypes are difficult to completely eradicate, and widespread social discourse and schooling are deeply influenced by them. This raises questions about educational equity. Despite decades of efforts to promote educational equity, significant gender disparities in academic achievement and career paths in key academic fields remain a persistent challenge. While classroom gender stereotypes are widely recognized as a key contributing factor, the psychological mechanisms that translate these environmental cues into tangible outcomes warrant a more in-depth, integrated review. This article argues that the erosion of academic self-concept and self-efficacy is the primary psychological mechanism through which classroom gender stereotypes operate. By integrating literature from educational and social psychology, this review demonstrates how the threat of gender stereotypes can weaken individuals' self-concept and self-efficacy, thereby impairing cognitive performance and fostering avoidance behaviors that lead to gendered major selection. Therefore, effective interventions must go beyond simply addressing external biases to actively build and protect students'academic self-concepts as a cornerstone of educational equity.

Keywords: Gender stereotypes; educational equity; academic self-efficacy; academic performance.

1. Introduction

In recent years, society has made significant efforts to promote educational equity. Educational equity means that individual or social factors, such as gender, ethnicity, or family background, should not be barriers to achieving educational potential, and that all individuals should be able to achieve at least a basic minimum level of skills [1]. This suggests that achieving educational equity helps provide individuals with more development opportunities and tap into their potential, thereby providing a diverse workforce for social development and promoting social stability, highlighting its profound importance. However, gender disparities persist in certain areas. For example, in STEM fields, despite recent increases in the number of women earning graduate degrees, the number of female faculty members in STEM departments has remained largely unchanged. Furthermore, female faculty members in these fields face challenges such as unfriendly and threatening academic environments, as well as hostile and uneasy workplace tensions, such as sexual harassment and discrimination [2].

In the pursuit of educational equity, classroom gender stereotypes in school education are a key driver and influencing factor. They are generally defined as widely accepted fixed views of men and women in social life, often unfounded by objective experience. These stereotypes influence how people view men and women, leading to bias [3]. Teachers who engage in gender stereotyping may adopt different teaching methods based on student gender in daily instruction, class organization, and classroom management, engaging in discriminatory practices against boys and girls, such as being less tolerant of boys' misbehavior and separating boys and girls from each other in activities. Furthermore, teachers who hold gender stereotypes may also engage in gender-stereotypical teaching behaviors, such as encouraging students to behave according to their gender [3].

A review of the relevant literature reveals several research gaps in this area. For example, while scholars acknowledge the impact of stereotypes on students' academic performance, the specific mechanisms remain unclear. To address this gap, this review examines the psychological mechanisms through which classroom gender stereotypes affect students' cognitive performance. First, it will discuss "how classroom stereotypes erode academic self-concept" as the core mechanism, deeply explore the manifestations of external information that influence students' internal beliefs, and further review empirical research in three dimensions: cross-sectional research, longitudinal research, and experimental research to demonstrate the damage that gender stereotypes have on students' self-concept. Finally, by analyzing the impact of the weakened self-concept on academic performance and academic choices, it will reveal the negative impact of gender stereotypes and address the paper's central question, forming a logical chain of "gender stereotypes- self-concept and self-efficacy-students' academic performance and academic achievements."

2. The Core Mechanism: How Stereotypes Erode Academic Self-Concept

2.1 Theoretical Foundations

Academic self-concept, self-efficacy, and academic motivation are three key psychological constructs that significantly influence students' academic performance [4]. A study of 398 senior high school students in Nigeria, for instance, confirmed this strong correlation. Academic self-concept is an individual's understanding of their unique characteristics, encompassing their perception of academic ability and self-worth. This perception is deeply influenced by society [5]. A positive academic self-concept can enhance an individual's well-being, self-perception, and self-esteem, improving their overall quality of life [4]. Self-efficacy is closely related to self-concept. It is the conviction that one can successfully execute the behaviors required to produce desired outcomes, which is only the individual's subjective judgment of themselves, not objective ability itself. It is a powerful predictor of final task performance and also moderates other determinants of performance [6]. It has the most significant impact on academic performance, as students with high academic self-efficacy are less intimidated by difficulties and view challenges encountered in completing complex tasks as opportunities for growth and mastery [4]. Compared to self-concept, self-efficacy is a more narrowly defined construct, primarily derived from past experiences, but both possess multidimensional and hierarchical structures [7]. Academic motivation is the force that inspires and maintains goal-directed behavior and is categorized into intrinsic motivation, extrinsic motivation, and amotivation [4]. Even without external motivation, students with strong intrinsic academic motivation will independently devote more time to completing tasks, choose more challenging tasks, and adopt more in-depth and effective learning strategies [4].

2.2 The Process of Internalization

In school education, gender stereotypes primarily manifest in the classroom. First, they stem from teachers' differing expectations of boys and girls: teachers expect boys to

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have higher intelligence, spatial cognition, and abstract logical thinking abilities, while assuming girls will inevitably face difficulties in their studies. However, this fixed, single, or overly simplified categorization fails to consider other factors, such as abilities, interests, and traits, which can negatively impact individual development. Textbook content, both illustrations and text, also clearly perpetuate gender stereotypes that prioritize males over females and emphasize gender differences in social status, allowing these stereotypes to take root in students' minds. In addition to this, because the proportion and level of female teachers in high schools and universities are generally lower than those of male teachers, this has fostered the perception that female teachers are less capable than male teachers. This perception or bias among teachers can also unconsciously influence students [8]. Second, students are also deeply influenced by gender stereotypes from their peers. For example, when interacting with the opposite sex, girls, influenced by their peers, are less confident in their relative ability in mathematics. When girls realize they will have to interact with boys who major in mathematics, they avoid this field, further reinforcing the stereotype that girls should choose literature. Because friendship networks are highly gender-homogeneous, girls are more likely to form friendships with classmates who choose literature, perpetuating stereotypes. Furthermore, influenced by gender stereotypes, both male and female students systematically overestimate their comparative advantage in gender-stereotyped areas, regardless of their actual abilities. This leads many students to miss out on opportunities in certain professional fields [9].

2.3 Empirical Evidence of the Impact

A. Cross-sectional studies have shown that starting at ages 7-8, girls' self-evaluation of their math abilities, or perceived self-efficacy, is lower than that of boys, despite no gender differences in math grades or teacher evaluations. A six-year study in Spain of 1,500 students aged 14 to 19 also found that "girls tend to underestimate their abilities in technology and mathematics, despite performing better than boys. In contrast, boys tend to overestimate their skills in these same subjects." The study concluded that there are significant gender differences in perceived ability in science, technology, and mathematics. These findings reveal cross-national variations in gendered self-efficacy. However, in Spanish, unlike mathematics, girls' self-efficacy is significantly higher than boys' [10].

B. Longitudinal studies have demonstrated that students' self-concept declines during the transition from early schooling to secondary education, and this difference widens as students advance through higher grades [11]. Furthermore, their self-concept develops differently across multiple dimensions: dimensions such as mathematics, language, physical ability, parent-child relationships, and same-sex relationships decline linearly and monotonically with secondary school grade. Self-esteem follows a cubic curve, reaching its lowest point in ninth grade, then gradually rising until eleventh grade, but then declining again in twelfth grade. Physical appearance follows a U-shaped pattern, reaching its lowest point in ninth grade before improving again in late adolescence [12].

C. Experimental studies: One study showed that when teachers discuss their gender role values in class, they influence students' own perspectives. This is because students unconsciously incorporate these values into their cognition, which in turn affects their learning motivation and self-concept. For example, in mathematics, girls who were exposed to traditional gender role education for more than one year showed decreased academic performance. This is because teachers who uphold traditional gender role values may demonstrate these values through short-term behaviors in daily interactions (e.g., ignoring questions from female students and paying more attention to male students). Their stereotypes can be passed on to students without long-term accumulation, resulting in lower self-efficacy and learning confidence among girls [13].

The above evidence reveals how students' self-concepts are eroded by gender stereotypes and the external environment during their growth. This is not merely an internal psychological state, it has tangible and detrimental consequences for students' academic performance, primarily reflected in their behavior under pressure and their long-term educational trajectory. From the perspective of performance under pressure, the erosion of self-concept caused by stereotypes directly reduces students' self-awareness and psychological adjustment abilities, leading to severe self-doubt and anxiety, resulting in actual performance far below their true abilities, thus forming a closed loop of self-denial. From a long-term educational perspective, students with damaged self-concepts tend to actively avoid areas associated with "stereotype threat," forgoing certain learning opportunities and gradually deviating from the development path that their potential supports.

3. The Behavioral Consequences of Diminished Self-Concept

3.1 The impact on academic performance

When students with already fragile self-concepts enter

high-stakes assessment situations, external stereotypes can trigger internal doubts, leading to anxiety and decreased performance. A study examining gender stereotypes and academic achievement in a sample of 342 sophomores from eight public high schools in Udi Educational District, Enugu State, Nigeria, found that boys, the group conforming to the stereotype of being "good at math," experienced a positive enhancement in their self-concept and academic performance among middle school students, but this effect was particularly pronounced among boys. Because gender stereotypes deprive female students of rights and privileges, they face a weakened self-concept and limited academic performance. Martin et al. also noted that negative stereotypes about group members can create cognitive and emotional burdens, hindering academic performance and perpetuating negative expectations [14]. For example, in STEM subjects, girls are more likely to benefit less from positive biases due to the negative expectations of their teachers. This hinders their academic development and leads to "performance gap under pressure." One study confirmed that girls perform worse than boys on high-pressure STEM exams, but better on other tasks. This is because the unstable psychological state and fragile self-concept caused by gender stereotypes affect their confidence and make it difficult for them to achieve academic success. Girls also feel disappointed by the discrepancy between their daily performance and test scores. Consequently, students who need to cope with anxiety and depression actually perform worse in school, creating a vicious cycle of "poor performance, psychological setbacks, and a self-perception that success is difficult" [15]. Moreover, during the process of mathematics teaching, female teachers are more likely than male teachers to underestimate students' mathematical performance, which may reflect their own lack of confidence in mathematical assessment. Female teachers play an unconscious role in transmitting gender stereotypes, reinforcing gender inequality in the field of mathematics [16]. In short, gender stereotypes can affect students' confidence and their self-concept, which can lead to a decline in their academic performance and make them doubt their own abilities.

3.2 The impact on academic choices: Viewing "avoidance" as a rational outcome of low self-efficacy

Students choose a major or course based not only on their interest but also on their judgment of their ability to succeed. When self-efficacy is low, avoidance is a rational self-protective strategy. When students are influenced by and internalize gender stereotypes, this identification with gender stereotypes affects their self-perceptions, namely, their competence beliefs and sense of belonging, which in turn impacts their learning motivation and efficacy. Competence beliefs encompass students' perceptions of their current abilities and their self-efficacy for future success. Students in groups with negative stereotypes, such as women in STEM courses, may perceive themselves as incompetent if they see signals of inferior ability, leading to lowered self-belief. A sense of belonging refers to students' perceptions of how well they fit in with the people and environment around them and whether they have positive relationships. If girls feel they lack the same abilities as boys in a particular field, this identification may reduce their sense of academic belonging [17]. Research has found that students with greater self-confidence in school are more likely to clarify their interests, abilities, and goals and actively participate in activities related to professional exploration. In contrast, when self-efficacy is low, students may engage in less exploration and planning related to that field, leading to avoidance behaviors [18]. In short, when students' beliefs in ability and sense of belonging are deficient due to gender stereotypes, their academic self-efficacy also declines. This ultimately leads to a decrease in their motivation to plan or study in related fields, leading to avoidance behaviors.

4. Conclusion

The impact of gender stereotypes in the classroom is not directly manifested, but rather is transmitted gradually through a logical chain: "stereotypes → erosion of self-concept → leading to negative outcomes." These external biases gradually internalize into self-doubt, which in turn affects students' cognitive performance, reducing their academic self-concept and sense of learning self-efficacy, further impacting their academic performance, trapping them in a vicious cycle of self-doubt. Furthermore, this can also, to a certain extent, undermine students' self-confidence, leading them to deliberately avoid related subjects or fields, thus limiting their academic choices. In this process, "self-concept" is not simply an intermediate link; it is the core hub that determines whether gender stereotypes cause substantive harm. It is precisely because of the collapse of self-concept that stereotypes can transform from "external biases" into "self-imposed constraints."

Therefore, since the core of the problem lies in "self-concept," interventions should directly address this area. For example, we should implement "growth mindset" interventions in the classroom and conduct "attribution reshaping training" for students, guiding them to attribute failure to controllable factors (such as effort and strategy) rather than uncontrollable inherent abilities. Teachers should also provide feedback based on process and effort, rather than

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on talent. In this way, the impact of gender stereotypes will gradually be reduced. This has contemporary significance in breaking down social cognitive biases, promoting educational equity, and stimulating individual potential. To a certain extent, it will help create a social culture of gender equality, inject momentum into promoting diverse and inclusive social development, and provide more talent for national development, such as scientific and technological progress and industrial upgrading.

In the long term, with the continued advancement of thought and the implementation of relevant interventions, everyone will have the opportunity to develop a positive self-perception in a society free from the erosion of gender stereotypes. Freed from the constraints of external labels such as gender, people can freely explore their own possibilities in a society unaffected by prejudice. Individual thought and collective development will resonate in an open and diverse environment.

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