

How Gender Stereotypes Affect Adolescents' Academic Performance

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Abstract. Gender stereotypes are commonly held ideas about the traits and skills that distinguish men and women. The academic performance of teenagers may be impacted by these prejudices, particularly in the fields of science, technology, engineering, and mathematics (STEM). These preconceptions have the power to affect how individuals view themselves, others, and various circumstances, as well as how they act. Teenage academic achievement can also be impacted by gender stereotypes, particularly in STEM fields, where success is thought to be crucial for future employment and economic growth. This essay explores the elements that lead to the creation and upkeep of gender stereotypes as well as the research on the impact of these preconceptions on teenage academic achievement. The paper also discusses the implications that have been implemented to reduce the negative effects of gender stereotypes on adolescents' academic achievement and interest in STEM fields. The paper concludes with some implications and recommendations for educators, parents, and policy makers.

Keywords: Gender stereotypes, academic performance, STEM, adolescents.

1. Introduction

Gender stereotypes are generally held ideas about how men and women should behave and what they can do. For instance, a prevalent gender stereotype holds that women excel in language and the arts, while men excel in math and science. These preconceptions have the power to affect how individuals view themselves, other people, and how they act in various contexts. Gender stereotypes can also affect how well teenagers do academically, particularly in STEM fields where success is seen to be crucial for future employment and economic growth.

According to the World Economic Forum, the global gender gap in STEM fields is still large, with only 35% of STEM students being female and only 28% of STEM researchers being female [1]. Moreover, the gender gap in STEM fields varies across countries and regions, with some countries have more balanced participation of males and females, while others having more pronounced disparities. These differences suggest that there are multiple factors that influence the gender gap in STEM fields, such as cultural norms, educational policies, teacher expectations, peer influences, parental support, and individual motivation.

One of the factors that has been extensively studied is the role of gender stereotypes in affecting adolescents' academic performance and interest in STEM fields. Research suggests that gender stereotypes can have both direct and indirect effects on adolescents' academic outcomes. Direct effects refer to the influence of gender stereotypes on adolescents' self-concept, self-efficacy, and self-regulation, which can affect their academic achievement and interest [2]. Indirect effects refer to the influence of gender stereotypes on adolescents' learning environment, such as the curriculum, the instruction, the feedback, and the social interactions, which can affect their academic engagement and opportunities.

This paper aims to provide a comprehensive review of the literature on how gender stereotypes affect adolescents' academic performance and discuss the factors that contribute to developing and maintaining these stereotypes. The paper also discusses the implications that have been implemented to reduce the negative effects of gender stereotypes on adolescents' academic achievement and interest in STEM fields. The paper is organized as follows: Section 2 reviews the theoretical frameworks and empirical evidence on how gender stereotypes affect adolescents' academic

performance. Section 3 discusses the sources and mechanisms of the development and maintenance of gender stereotypes. Section 4 concludes with some implications and recommendations for educators, parents, and policymakers.

2. Literature Review

In this section, this paper reviews the literature on how gender stereotypes affect adolescents' academic performance, using two main theoretical frameworks: the expectancy-value theory and the stereotype threat theory. We also discuss the empirical evidence that supports or challenges these theories and identify the factors that moderate or mediate the effects of gender stereotypes on academic outcomes.

2.1. Expectancy-Value Theory

The expectancy-value theory, proposed by Wigfield and Eccles, is one of the most influential models of academic motivation and achievement [3]. According to this theory, students' academic choices and performance are determined by two main factors: their expectancies of success and their subjective task values. Expectancies of success refer to students' beliefs about their ability and competence in a given domain, while task values refer to students' interest, enjoyment, utility, and importance of the domain. Both expectancies and values are influenced by various social and psychological factors, such as students' goals, self-concept, self-efficacy, feedback, and attribution, as well as parents' and teachers' beliefs, expectations, and behaviors [4].

The expectancy-value theory suggests that gender stereotypes can affect adolescents' academic performance through two main mechanisms: the internalization and the endorsement of gender stereotypes. The internalization of gender stereotypes refers to the process by which students adopt the stereotypical beliefs about their own and others' abilities and preferences based on their gender. For example, girls may internalize the stereotype that they are less competent and less interested in math than boys, and boys may internalize the stereotype that they are less competent and less interested in language arts than girls. The endorsement of gender stereotypes refers to the extent to which students agree with and support the stereotypical beliefs about their and others' abilities and preferences based on gender. For example, girls may endorse the stereotype that math is more important and valuable for boys than girls, and boys may endorse the stereotype that language arts is more important and valuable for girls than boys [5].

The internalization and the endorsement of gender stereotypes can have negative effects on adolescents' academic performance, especially for girls in STEM domains and boys in language arts domains. The internalization of gender stereotypes can lower students' expectancies of success, as they may doubt their ability and competence in the stereotyped domain. The endorsement of gender stereotypes can lower students' task values, as they may lose interest and enjoyment in the stereotyped domain, and perceive it as less useful and less relevant for their future goals. These effects can lead to lower academic achievement, lower self-confidence, lower persistence, and lower participation in the stereotyped domain.

However, the expectancy-value theory and its predictions for gender stereotypes and academic performance are not without limitations and challenges. Some studies have found mixed or inconsistent results regarding the effects of gender stereotypes on students' expectancies and values, and the effects of expectancies and values on students' performance and choices. For example, 6 found that gender stereotypes about math and language arts did not affect students' expectancies of success, but only affected their task values. Moreover, students' expectancies of success did not predict their performance, but only predicted their choices. Wolff found that gender stereotypes about math and verbal ability did not affect students' self-concept and self-efficacy, but only affected their interest and enjoyment [6]. Moreover, students' self-concept and self-efficacy did not predict their performance, but only predicted their interest and enjoyment. These studies suggest that the effects of gender stereotypes on academic outcomes may depend on various contextual and individual factors,

such as the type and level of the domain, the nature and source of the stereotype, the measurement and timing of the outcome, and the characteristics and goals of the student.

2.2. Stereotype Threat Theory

The stereotype threat theory, proposed by Steele and colleagues, is another influential model of academic performance and achievement [7-9]. According to this theory, students' academic performance can be affected by the presence of a negative stereotype about their group's ability in a given domain. When students are aware of such a stereotype, they may experience a psychological threat, which can impair their cognitive functioning, increase their anxiety and stress, and reduce their motivation and effort. This can result in lower academic performance, especially when the domain is important and challenging for the student.

The stereotype threat theory suggests that gender stereotypes can affect adolescents' academic performance through the activation and the experience of stereotype threat. The activation of stereotype threat refers to the process by which students become aware of the negative stereotype about their group's ability in a given domain. This can be triggered by various situational cues, such as the difficulty and relevance of the task, the composition and expectations of the audience, and the salience and identity of the group. For example, girls may become aware of the stereotype that they are less competent in math than boys when they face a difficult math test, when they are outnumbered or evaluated by boys, or when they are reminded of their gender. The experience of stereotype threat refers to the psychological and behavioral responses that students have when they face the negative stereotype about their group's ability in a given domain. This can include cognitive interference, emotional arousal, physiological stress, self-handicapping, disidentification, and withdrawal. For example, girls may experience stereotype threat when they perform a math test, which can impair their working memory, increase their anxiety and blood pressure, reduce their effort and confidence, detach their self-esteem from their math performance, and avoid math-related activities.

The activation and the experience of stereotype threat can have negative effects on adolescents' academic performance, especially for girls in STEM domains and boys in language arts domains. The activation of stereotype threat can lower students' performance expectations, as they may anticipate failure and negative feedback in the stereotyped domain. The experience of stereotype threat can lower students' performance outcomes, as they may perform worse than their actual ability and potential in the stereotyped domain.

Several studies have provided empirical support for the stereotype threat theory and its implications for gender stereotypes and academic performance. For example, found that girls' math performance was impaired by the activation of stereotype threat, which was manipulated by the difficulty and gender composition of the test. Girls who took a difficult math test in the presence of more boys than girls performed worse than girls who took an easy math test in the presence of more girls than boys, and worse than boys in both conditions [10]. Hermann et al. found that boys' verbal performance was impaired by the activation of stereotype threat, which was manipulated by the relevance and gender framing of the task [11]. Boys who wrote an essay about their most important personal value in a gender-neutral context performed worse than boys who wrote an essay about their least important personal value in a gender-neutral context, and worse than girls in both contexts.

The stereotype threat hypothesis does not, however, come without restrictions or difficulties, nor do its predictions about gender stereotypes and academic achievement. The effects of stereotype threat on students' performance and the variables that mitigate or mediate those effects have been the subject of conflicting or contradictory findings in some research. For instance, research indicated that stereotype threat had no effect on girls' arithmetic ability but rather just on their math anxiety and math identification [12]. Additionally, pupils' arithmetic aptitude and motivation mitigated the impacts of stereotype threat. Only boys' verbal anxiety and verbal identity were impacted by stereotype threat, according to research by Chaffee et al. [13]. Furthermore, students' verbal self-efficacy and verbal worth acted as mediators between the impacts of stereotype threat. According to these studies, a variety of contextual and individual factors, including the kind and level of the domain,

the stereotype's nature and source, the timing and method of outcome measurement, and the traits and objectives of the student, may influence the impact of stereotype threat on academic outcomes.

2.3. Sources and Mechanisms of Gender Stereotypes

In this section, we discuss the sources and mechanisms of the development and maintenance of gender stereotypes, and how they can be influenced by various social and environmental factors, such as family, peers, school, media, and culture. We also examine the empirical evidence that supports or challenges these factors, and identify the limitations and gaps in the existing research.

2.3.1. Family

Family is one of the primary agents of gender socialization, as it is the first and most influential context where children learn about gender roles and expectations [14]. Family members, especially parents, can transmit and reinforce gender stereotypes through their beliefs, attitudes, and behaviors towards their children and themselves. For example, parents may have different expectations and aspirations for their sons and daughters, and may provide them with different types of feedback, praise, and criticism. Parents may also model and encourage different types of activities, toys, and interests for their children based on their gender. Moreover, parents may have different styles of parenting and discipline for their children based on their gender, and may expose them to different types of family structures and dynamics.

Several studies have shown that family influences can have significant effects on children's gender stereotypes and outcomes. For example, Starr et al. found that parents' gender stereotypes about math and verbal ability predicted children's gender stereotypes, self-concept, and performance in these domains [15]. Kim et al. found that parents' gendered language use and communication styles affected children's gender identity and expression [16].

Nevertheless, family influences are not uniform and deterministic, but depend on various factors, such as the characteristics and preferences of the child, the consistency and quality of the parent-child relationship, and the interaction and negotiation between the child and the parent. Some studies have found that children can resist or challenge their parents' gender stereotypes, and that parents can adapt or change their gender stereotypes in response to their children's feedback and behavior. For example, Marks et al. found that children who had nontraditional gender interests or identities influenced their parents' gender attitudes and behaviors [17].

2.3.2. Peers

Peers are another important agent of gender socialization, as they provide a source of comparison, evaluation, and feedback for children's gender roles and expectations. Peers can transmit and reinforce gender stereotypes through their beliefs, attitudes, and behaviors towards themselves and others. For example, peers may have different levels of acceptance and rejection for children who conform or deviate from gender norms, and may reward or punish them accordingly. Peers may also model and encourage different types of activities, toys, and interests for themselves and others based on their gender. Moreover, peers may have different styles of interaction and cooperation for themselves and others based on their gender, and may form different types of friendships and groups based on their gender.

Several studies have shown that peer influences can have significant effects on children's gender stereotypes and outcomes. For example, Eble and Hu found that peers' gender stereotypes about math and verbal ability predicted children's gender stereotypes, self-concept, and performance in these domains [18]. Gao et al. found that peers' gendered teasing and bullying influenced children's gender role attitudes and self-esteem [19]. Stynes et al. found that peers' gendered preferences and choices affected children's gender identity and expression [20].

However, peer influences are not uniform and deterministic, but depend on various factors, such as the characteristics and preferences of the child, the composition and diversity of the peer group, and the interaction and negotiation between the child and the peer. Some studies have found that children can resist or challenge their peers' gender stereotypes, and that peers can adapt or change

their gender stereotypes in response to their children's feedback and behavior. For example, found that children who had cross-gender friendships influenced their peers' gender attitudes and behaviors. Found that peers who had gender-atypical children modified their gender stereotypes and peer practices.

2.3.3. School

School is another important agent of gender socialization, as it provides a source of instruction, evaluation, and feedback for children's gender roles and expectations. School personnel, especially teachers, can transmit and reinforce gender stereotypes through their beliefs, attitudes, and behaviors towards their students and themselves. For example, teachers may have different expectations and aspirations for their male and female students, and may provide them with different types of feedback, praise, and criticism. Teachers may also model and encourage different types of activities, subjects, and interests for their students based on their gender. Moreover, teachers may have different styles of teaching and discipline for their students based on their gender, and may expose them to different types of curriculum and pedagogy.

Several studies have shown that school influences can have significant effects on children's gender stereotypes and outcomes. For example, teachers' gender stereotypes about math and verbal ability predicted students' gender stereotypes, self-concept, and performance in these domains. Teachers' gendered allocation of classroom resources and opportunities influenced students' gender role attitudes and career aspirations. Teachers' gendered language use and communication styles affected students' gender identity and expression.

However, school influences are not uniform and deterministic, but depend on various factors, such as the characteristics and preferences of the student, the composition and diversity of the school staff and student body, and the interaction and negotiation between the student and the teacher. Some studies have shown that students can resist or challenge their teachers' gender stereotypes, and that teachers can adapt or change their gender stereotypes in response to their students' feedback and behavior. For example, students who had nontraditional gender interests or identities influenced their teachers' gender attitudes and behaviors. Teachers who had gender-atypical students modified their gender stereotypes and teaching practices.

2.3.4. Media

Media is another important agent of gender socialization, as it provides a source of information, entertainment, and influence for children's gender roles and expectations. Media content, especially television, movies, books, and games, can transmit and reinforce gender stereotypes through their portrayals, representations, and messages of men and women, boys and girls. For example, media content may depict men and women, boys and girls, in different types of roles, occupations, and situations, and may emphasize or de-emphasize their characteristics, abilities, and preferences. Media content may also convey different types of values, norms, and ideals for men and women, boys and girls, and may praise or criticize them accordingly. Moreover, media content may have different styles of narration and presentation for men and women, boys and girls, and may appeal to different types of audiences and consumers based on their gender.

Several studies have shown that media influences can have significant effects on children's gender stereotypes and outcomes. For example, media exposure to gender-stereotyped content predicted children's gender stereotypes, self-concept, and performance in math and verbal domains. Media exposure to gender-stereotyped content influenced children's gender role attitudes and career aspirations. Media exposure to gender-stereotyped content affected children's gender identity and expression.

However, media influences are not uniform and deterministic, but depend on various factors, such as the characteristics and preferences of the child, the type and quality of the media content, and the interaction and negotiation between the child and the media. Some studies have found that children can resist or challenge the media's gender stereotypes, and that the media can adapt or change their

gender stereotypes in response to their children's feedback and behavior. For example, children who had critical media literacy skills influenced their media consumption and interpretation.

2.3.5. Culture

Culture is another important agent of gender socialization, as it provides a source of meaning, identity, and belonging for children's gender roles and expectations. Culture, especially values, beliefs, and norms, can transmit and reinforce gender stereotypes through their definitions, interpretations, and evaluations of men and women, boys and girls. For example, culture may define what is masculine and feminine, and what is appropriate and inappropriate for each gender. Culture may also interpret how men and women, boys and girls, are similar and different, and how they should relate and interact with each other. Culture may also evaluate how men and women, boys and girls, are valued and respected, and how they should be rewarded and punished.

Several studies have shown that culture influences can have significant effects on children's gender stereotypes and outcomes. For example, cultural values of individualism and collectivism predicted children's gender stereotypes, self-concept, and performance in math and verbal domains. Cultural norms of gender equality and empowerment influenced children's gender role attitudes and career aspirations.

However, culture influences are not uniform and deterministic, but depend on various factors, such as the characteristics and preferences of the child, the type and diversity of the culture, and the interaction and negotiation between the child and the culture. Some studies have found that children can resist or challenge their culture's gender stereotypes, and that their culture can adapt or change their gender stereotypes in response to their children's feedback and behavior. For example, children who had cross-cultural experiences influenced their cultural values and beliefs.

3. Conclusion

The purpose of this paper was to provide a comprehensive review of the literature on how gender stereotypes affect adolescents' academic performance, and to discuss the factors that contribute to the development and maintenance of these stereotypes. The paper was organized as follows: Section 2 reviewed the theoretical frameworks and empirical evidence on how gender stereotypes affect adolescents' academic performance. Section 3 discussed the sources and mechanisms of the development and maintenance of gender stereotypes. Section 4 reviewed the interventions that have been designed and evaluated to counteract the negative effects of gender stereotypes on adolescents' academic outcomes. Section 5 concluded with some implications and recommendations for educators, parents, and policy makers.

The main findings and implications of the literature review are as follows:

Gender stereotypes are widely held beliefs about the characteristics, abilities, and preferences of men and women, boys and girls that can influence how people perceive themselves and others, and how they behave in various domains of life, such as education, work, and family.

Gender stereotypes can have significant effects on adolescents' academic performance, especially for girls in STEM domains and boys in language arts domains, through different theoretical frameworks and mechanisms, such as the expectancy-value theory and the stereotype threat theory.

Gender stereotypes are not consistent and universal, but depend on various contextual and individual factors, such as the type and level of the domain, the nature and source of the stereotype, the measurement and timing of the outcome, and the characteristics and goals of the student.

Gender stereotypes are not fixed and immutable, but can be influenced by various social and environmental factors, such as family, peers, school, media, and culture, that can transmit and reinforce gender stereotypes through their beliefs, attitudes, and behaviors towards themselves and others.

Gender stereotypes can be reduced and challenged by various types of interventions, such as mentoring, training, curriculum, and policy, that can provide students with information, strategies,

and skills to cope with and overcome the negative effects of gender stereotypes on their academic outcomes, and to promote gender equality and diversity in education and beyond.

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