

Parental Implicit and Explicit Gender Stereotypes, Adolescent Gender Role Identity, and Occupational Gender Segregation: A Systematic Review

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Abstract. Occupational gender segregation is still relatively widespread, and the causes of this phenomenon can often be traced back to one's gender attitudes in adolescence. Parents' hidden gender stereotypes are necessary but seldom investigated family-level factors in the formation of adolescents' gender role identity and career choice. In short, the above studies have shown that parents' unsocialised stereotypes have negatively impacted the adolescents' understanding of gender roles and their desire for different occupations. Research has been carried out in North America, South Asia and East Asia to study implicit associations, cross-sectional surveys and other cross-cultural studies. Based on the above data, it can be seen that parents' unconscious gender stereotypes are associated with the adoption of traditional gender norms by adolescents, thus affecting gender-specific self-efficacy and career aspirations. The two are well-known in the field of STEM (Science, Technology, Engineering and Mathematics) and nursing. Fathers' open expressions and mothers' unexpressed beliefs serve different functions. Although different cultures are present, the mediating effect of gender role identity is still relatively strong in all of them. Occupational gender segregation is caused by the unconscious gender bias transmitted from parents in their youth. The three specific countermeasures are to inform parents about this situation, enhance the school's career guidance, and introduce policies that support both parents in having parental leave and children in participating in early childhood education.

Keywords: Gender stereotypes, Gender role identity, Occupational segregation, Adolescence, Parental influence

1. Introduction

Occupational segregation in the world's labour force has also persisted globally. It will make the division of labour at work more uneven and reduce the development prospects of both men and women. Lack of women in engineering and computer science, a shortage of men in early childhood education and nursing, etc., are all issues that start in adolescence [1]. A person's choice of career is often influenced by gender ideas and professional hopes that they form in their teens and is generally under the influence of the three-tier structure of society: family, school and general culture. The reasons for the segregation of gender and work are serious. They limit the choices of young women

in STEM careers, restrict the opportunities for young men in caregiving professions, and reduce the diversity of life paths for young people.

Over the past two decades, researchers have gradually shifted their focus from other institutions to the family as the site of genderisation. Parents may pass on gender stereotypes to their children through direct talk or other means, thus creating a child's first ideas about what men and women should be able to do and what lives they can live. First of all, much previous research has focused on expressed prejudice; nowadays, with the development of tests such as the Implicit Association Test (IAT), scholars have begun to study these less obvious forms of implicit gender bias [2]. Therefore, the changes probably indicate that implicit stereotypes are better predictors of children's development than explicit ones. It may be that the implicit stereotypes are pervasive in daily life and operate unconsciously; thus, they are more difficult for both parents and children to recognise, address and reject.

Research abroad has also found some applications for this idea. Research in North America, South Asia and East Asia has consistently shown that parents' influence on young people's choices of education and employment is greater than that of media and peers; however, the way parents and young people interact also differs among these cultures [1-3]. Systematically review the above research to explore how parents' unconscious gender stereotypes affect the construction of gender role identity in adolescents and, as a result, occupational gender segregation. By combining the research methods and results of many scholars, this paper intends to clarify how parental attitudes influence the occupational outcomes of adolescents and propose some countermeasures.

2. Core concept

2.1. Parental gender stereotypes

This section defines the three core concepts of this study and clarifies their meanings based on the existing literature.

Parental gender stereotypes: Aidy et al. consider these to be parents' general and fixed beliefs about the attributes of men and women, their social roles and abilities [2]. The two types of stereotypes are explicit stereotypes (conscious) and implicit stereotypes (unconscious). Explicit stereotypes are gender-based views that parents intentionally communicate through words. Implicit stereotypes are subconscious biases that exist in daily life, and as a result, adolescents may be led to internalize gender norms about what they should be able to do and which careers are regarded as "suitable".

2.2. Adolescent gender role identity

As defined by Wang and Cheung, this refers to the gender-related self-concept that adolescents construct during a critical period of identity development, including their degree of internalization of and conformity to prevailing gender norms [4]. This identity serves as a foundational cognitive framework through which adolescents interpret their own abilities, assess their career potential, and evaluate the suitability of various occupational paths. It includes adolescents' perceptions of their own "masculine" or "feminine" traits, behaviors, and expected life paths. These perceptions directly influence their academic preferences and future career choices.

2.3. Occupational gender segregation

Chen describes occupational gender segregation as the unequal distribution of men and women across different occupations. It involves two dimensions [5].

Horizontal Segregation: One gender is concentrated in certain areas; for instance, women are generally in nursing, and men are generally in STEM fields.

Vertical segregation: Fewer women are at the top and in senior positions. This will increase the gender pay gap and limit the full potential of people of both genders.

3. Impact of parental gender stereotypes on adolescents' gender role identity and career choices

Parental gender stereotypes are a reason why young people do not consider themselves more openly. Stereotypes can be parents' explicit and implicit beliefs about the world. Stereotypes have slowly changed young people's concepts of gender roles and thus lowered their enthusiasm for study and work. Stereotypes in mathematics, science, engineering and technology (STEM) have been having a strong impact on the division of labour among adolescents in the family, and this is one of the reasons for gender segregation in occupations and workplaces. Research has found that parents of different genders hold different stereotypes about the channels of transmitting values, gender differences, and culture.

Parents' Gender stereotypes directly affect adolescents' Gender-role identity. Traditional gender norms in families are transmitted to children through daily life, and teenagers are thus inclined to believe that "men are more suitable for science and engineering, and women are better suited for the humanities and caregiving professions." Hassan et al. conducted a study on adolescents and found that those with parents holding traditional gender beliefs were more likely to agree with the idea that boys are naturally better at science and girls are better at the humanities or caring professions [3]. Parents also often systematically associate specific cognitive, technical and interpersonal abilities with gender, and thus pass on biased beliefs about these abilities to their children through differential praise, task allocation and stated expectations. Wang and Cheung's research on Chinese families has also found that parents' gender attitudes in their children's early adolescence are related to the children's gender role identity in late adolescence [4]. In addition, this impact is not because of school and peers. Parents' beliefs and expectations at home will shape young people's self-perceptions and their sense of gender roles, thus affecting their sense of self.

At the same time, in mathematics and STEM classes, there are different gender stereotypes for girls and boys. Song and others have found that parents' gender stereotypes affect the difference in behaviour between boys and girls at school [6]. A study of a sample of Chinese high school students found that gender stereotypes in mathematics reduce girls' mathematics self-efficacy beliefs, lower their sense of usefulness of mathematical skills, and diminish their sustained interest in learning mathematics; thus, they are less likely to pursue careers in mathematics [6]. At the same time, for boys, these stereotypes have had the opposite effect; they are more confident in mathematics now and have a good attitude toward learning it as a result. This result is in line with the study by Aidy and others [2]. According to the sample data from Europe and the United States, fathers' open gender stereotypes affect their children more significantly than mothers' unconscious biases do, and mothers' unconscious biases are more likely to shape daughters' attitudes towards school subjects. Cross-country comparisons of East Asia also show that parents' educational backgrounds in STEM and gender stereotypes have a positive effect on adolescents' aspirations to study in STEM, and that

the gender gap is decreasing gradually in areas with higher investment in research and development and more gender equality [1].

The effect of parental gender stereotypes is influenced by the parents' gender and culture. Traditional ideas of the father as the head of the family in Chinese society are also affecting how mothers participate in childcare and, as a result, impacting the children's prosocial behaviour and gender identity [4]. The parents' influence on the career choices of their children is relatively stronger in the more collectivist society of Pakistan compared with that in Western countries. Traditional gender roles restrict the career options for young women directly [3]. Cross-cultural studies show that although the transmission routes of parental stereotypes are the same everywhere, due to different traditional divisions of roles in the "strict father and nurturing mother" model, fathers and mothers have different career aspirations and attitudes towards their children. Based on the above observations, it can be inferred that fathers' clear communication about their own careers and the subtle transmission of gender roles are likely to influence young people's goals and choices for study and work.

In short, parental gender stereotypes lead to the construction of gender roles, which, in turn, create an entire system of internalisation for these family norms; thus, students form their own gender identities and make different career choices. Therefore, the stereotypes of gender in mathematics and STEM education will be expressed differently. Fathers' direct attitudes and mothers' indirect prejudices operate differently in the family. Different cultures will also have different results at the same time.

4. Gender role identity as a direct predictor of career choice

Adolescence and Gender Role Identity Drive Career Choice. Internalised traditional gender roles for girls have reduced their self-confidence in STEM and thus made them less likely to study science and technology. Traditional ideas of manhood are held by boys and thus they are less likely to be interested in "feminine" areas such as teaching, nursing and social work. This section will investigate how changes in family attitudes towards gender development affect the choice of study direction by some adolescents.

Gender Role Identity Affects Career Selection via Self-Efficacy. Self-efficacy is a person's sense of their own capabilities to perform at a certain level. Adolescents who have deeply internalised traditional gender norms are more likely to form gendered self-assessments of their abilities. These self-evaluations may not accurately reflect their actual grades or real-life development abilities. Therefore, girls feel that they are not as intelligent in mathematics and science as boys, even when they have the same academic achievements.

Song and others in a 2019 study surveyed Chinese high school students and found that there was a certain trend [6]. Female students with more prominent gender stereotypes had a lower sense of self in their math ability, showed less interest in learning mathematics, and believed that mathematical skills were not very necessary. Collectively, these reasons have reduced the desire of some young people to study mathematics. Importantly, this effect does not relate to students' actual grades. High-achieving female students were also less interested in STEM careers. They simply thought they were not "the kind" suitable for technical work. Chaulagain has further proposed that the process of genderisation, transmitted by families, schools and other media, systematically directs young boys and girls into different labour sectors from an early age. Thus, horizontal occupational segregation and reduced occupational diversity result [7]. Du has also found that gender stereotypes in mathematics have lowered the self-assessment of female students' own abilities in mathematics and reduced their learning motivation. Therefore, their desire to study abroad for research is also

weakened [8]. Therefore, they are less eager to pursue scientific research. However, the same stereotypes also reinforce the perception of mathematical ability and interest in related careers for boys [8].

Aidy and others have also found that this is the case for Canadian students [2]. Girls' own implicit and explicit gender stereotypes of the subject directly predict their choices of school subjects. These stereotypes are: attitude towards school, self-assessed mathematical ability, and intention to study STEM majors. The higher the association girls have with "men" and "math", the less likely they are to choose a technical field. Therefore, it can be proposed that, as a cognitive system, a person's gender identity influences the choices of vocational training for adolescents by shaping their outlook on life and their desire for different types of work. As a result, they may not be able to make choices based on their actual strengths and development needs.

Gender role identity creates "horizontal occupational segregation", and thus men and women are restricted to different types of jobs. The division starts in adolescence. Adolescents begin to choose high school classes, college majors and future careers currently. Gender stereotypes frequently cause this behaviour.

Based on the large-scale PISA data of East Asian countries, Wang and others have found that by the age of 15, significant gender disparities in attitudes toward STEM careers had already developed: in Singapore and Taiwan, boys were 16 percentage points more likely than girls to wish to study STEM at that time [1]. Therefore, boys were 16 per cent more likely than girls to wish to work in STEM fields. Although the difference is smaller in Mainland China and Hong Kong (1-3.5 percentage points), the same trend still holds there. Boys are more likely to take classes in Science and Technology, and girls are more likely to take classes in the liberal arts.

Not all the STEM fields have shown this gender pattern. Chen surveyed 320 Chinese college students and found that their opinions on which jobs are "suitable for men" and which are "suitable for women" were very consistent [5]. Both male and female students thought that engineering, business, leadership and scientific research were more suitable for men. Nursing, teaching and secretarial work were all considered suitable choices for women at that time. The students' own perceptions of career paths are the foundation for their study plans. Students who accept this gender norms rarely consider jobs outside the traditional roles for men and women.

This is especially true for both men and women; therefore, the problem is more serious. It will push girls out of science and technology to reduce their choices for study. A boy who is strongly identified with traditional masculinity will not be likely to consider careers such as primary school teaching, nursing, or social work - which are often perceived as "feminine" - even if he has the talent or an actual interest in them. This self-exclusion reduces the career options and growth prospects for men unnecessarily, and as a result, the care sector continues to face a long-term labour shortage that requires many people with strong interpersonal and relationship-building abilities.

Not everyone has the same hopes for their role in society or what kind of life they want to lead; with age, people's views on these matters can change. Teenagers have many choices in life, such as which classes to take, which extra-curricular activities to participate in, which university to apply to, and what major to study. At all times, gender identity guides the choices of work for young people according to traditional gender roles.

Hassan and others have shown in a study that parental influence and gender stereotypes account for 69.4% of the difference in career choice among students in Pakistan [3]. Therefore, nearly 70 per cent of the reasons students have for choosing a career are due to parental influence and gender stereotypes.

The main reasons for young people's career choices are gender stereotypes and family-based gender education. Although the media has presented images of women in the workplace and inspired some young people's aspirations for professional life, as Hassan and others have shown, this effect is weaker than that produced by their families. Therefore, the media's reach may be relatively small and general. On the other hand, adolescents are exposed to continuous, emotionally intense, and highly personalised messages and behavioural models for girls and boys at home every day.

The effect of the above selection will be prolonged. If a girl avoids taking advanced mathematics classes in high school because she feels she is "not good at math", it will be difficult for her to choose a STEM major in college later, even if she changes her mind. If a boy has never been motivated to study child development because he believes that teaching is "women's work", he will find it very difficult to change his mind and choose a caregiving-focused life later in life. The above selections will lead people down a predetermined life path.

In short, when adolescents accept traditional gender roles, they are led to believe that certain jobs are suited for certain genders, and thus, they will choose different career paths based on these beliefs. Therefore, occupational gender segregation remains in many parts of the world.

5. Discussion and recommendations

Based on the previous research, parents' unconscious gender stereotypes have influenced the sense of gender identity in young people. Therefore, there will be occupational gender division. Studies around the world have all arrived at this conclusion. Parents' unspoken biases have had a larger impact than what they have said. The above biases will affect the self-esteem and outlook of young people. Chaeraginan believes that the socialisation of gender occurs in childhood. Through family, education and the media, boys are encouraged to study science and engineering or lead, and girls are led into taking care of others or studying the humanities. Thus, the division of labour is still gendered and occupational diversity is limited [7]. Ross-Plourde and others have carried out experiments to find this to be true. Stereotypes about the roles of mothers and fathers have been identified as being more entrenched for mothers. Readers had a longer time to absorb the information about mothers in non-traditional roles. There is a deep-seated implicit bias. On the other hand, people have different ideas about what fathers should do [9].

There are some shortcomings in the current studies that have not been addressed yet. Most of the studies in this area are cross-sectional in nature. The above designs are cross-sectional studies that cannot determine cause and effect. This way cannot determine the time-varying relationships among the main variables, and the impact of confounding factors is also unknown. Few long-term studies have tracked the growth of individuals from early childhood to adolescence and adulthood [4]. Therefore, it is not clear whether the early-life gender attitudes of parents are responsible for the observed gender differences in ability beliefs and occupational outcomes, or if they are merely results of these differences. Therefore, the above causal links have not been clearly demonstrated yet. At present, most of the studies have focused on maternal gender socialisation. The role of fathers in forming a child's idea of gender and career values is also relatively unknown [2]. Recently, more research has shown that fathers are more likely to transmit gender roles. Fathers' expressions and unexpressed gender attitudes also independently affect the career goals and selections of young people to a certain extent. Therefore, this research gap is particularly severe.

Endendijk and others have found that mothers' implicit gender stereotypes are positively correlated with their daughters' implicit gender stereotypes but are not associated with those of their sons. Therefore, it can be assumed that a channel for mother-daughter transmission has arisen at the unconscious level [10]. Qi and Wu believe that both parents' and mothers' education levels have

directly affected their children's school life and studies. Parenting styles and children's attitudes toward learning are the indirect links between the two factors, and thus the family environment affects child development to a certain extent [11]. Xia also found that, at the same time, parental education level is positively correlated with the cognitive school readiness of Chinese preschoolers. Authoritative parenting and family involvement indirectly affected the above index, and it was found that both parental human capital and positive parenting style were also linked to it [12]. Guo and others have also found that the paths by which family socioeconomic status affects children's reading achievement through parental expectations and parent-child communication differ significantly for boys and girls. This shows that gender moderates the impact of family background on development [13]. Based on the above results, Assari believes that the effect of parents' education on the intergenerational transmission of educational attainment is considerably smaller for African American women compared with that of white women. Multiple social identities work together to determine the return on investment in family resources [14].

Adamovic and Leibbrandt have conducted a large-scale study and found that occupationally segregated groups face hiring discrimination. Fewer callback invitations are sent out for male-dominated occupations and vice versa for female-dominated occupations. Therefore, the occupation-based stereotypes of gender persist in the recruitment process at present [15]. Finally, some comparisons will be made abroad to see what other regions around the world consider gender and career development to be about.

Therefore, the following feasible steps can be taken based on the above. First, schools and communities will hold parent education classes. This will help the parents be more aware of their own gender bias [3]. Although many parents promote gender equality, some still live by the old view of men and women. Reveal the hidden biases to start the changes. Second, the school should provide career guidance to help students break free from gender stereotypes and choose careers that are both suitable for them and that they are genuinely passionate about. For example, schools can bring in various role models from society who do not fit the traditional idea of gender, such as male preschool teachers, female engineers and women in senior management. Schools should organise gender-inclusive career exploration activities to introduce all students to many different career paths [1]. Finally, the government will promote institutional reforms to tackle the root cause of occupational gender segregation: intergenerational transmission of gender stereotypes in the family. Set up gender-equal parental leave policies to encourage fathers to participate in childcare, fund community-based gender equality education for parents and children and integrate gender-sensitive frameworks into preschool and elementary school curricula to challenge gender-based ideas of ability at an early age.

6. Conclusion

This review synthesizes research from around the world, demonstrating that parental gender stereotypes have a profound and lasting impact on adolescents' career choices. The evidence suggests that occupational gender segregation is not merely the result of individual choice but is deeply influenced by societal and family factors. These factors begin to take effect in early childhood and continue to develop during adolescence.

Although the circumstances differ, there is a general trend in various countries currently that has limited the exploration of different gender identities and career options for both parents and children. A mother's unconscious gender biases may have a greater impact on her daughter due to the specific role model and close nature of the mother-daughter relationship; at the same time, a father's obvious gender attitude and work habits are more likely to affect a teenager's (regardless of

gender) internalization of wider gender-role expectations and norm beliefs. These early family influences lead young people to choose gender-stereotyped careers and are thus unlikely to change them later in life.

The above links are of interest to scholars and practitioners alike. For the reasons above, although there are attempts to promote gender equality at a high level, occupational gender segregation has not been addressed to the same extent. Based on the above studies, it can be determined that some improvements can be made; for example, help parents be aware of their own gender biases, introduce a wider range of career choices for teenagers, and build a school environment that supports all students pursuing various interests regardless of gender. In short, to reduce occupational gender segregation, the underlying reasons in families need to be addressed.

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