

Martina Endepohls-Ulpe*

GENDER STEREOTYPES AND THEIR GENDER-SPECIFIC IMPACT ON ACADEMIC ACHIEVEMENT

Abstract: After decades of research into disadvantages for girls in the educational system, “male underachievement” has recently become a frequently discussed topic in the social sciences. A glance at explanations for the development of gender differences in academic achievement reveals that the disadvantages for males and females are explained differently to some extent, but that gender stereotypes seem to play an important part in most popular theoretical approaches. This article gives an overview of actual gender differences in academic achievement in Europe. Following a short description of the nature and functioning of stereotypes in general, and of gender stereotypes in particular, the article discusses the current state of empirical research on the most important theoretical explanations for gender differences in academic achievement and the role gender stereotypes play in these theories. Finally, open questions – and thus fields for further research – are outlined.

Key words: gender stereotypes; gender differences; academic achievement.

1. Introduction

The issue of gender differences in academic achievement has been extensively broached in the social sciences since the 1970s, with numerous publications examining disadvantages for women and girls (see Hannover 2004). However, following publication of the “shocking” – at least for some countries – results of the first PISA survey in 2000, deficits in male academic achievement became a focus of attention. While the focus shifted, discussions about “male underachievement” were not new. Such discussions had taken place since the late 1980s in the United Kingdom and in several non-European English speaking countries, resulting in numerous publications, many of them in popular science, where boys were presented as the newest victims of the educational system (for an extensive discussion see Mills 2003; Weaver-Hightower 2003). In the meantime in Europe we can find attempts to improve boys’ achievements at school or decrease male drop-out rates, e.g. in Belgium, Ireland, Portugal, Sweden, and Austria (EURYDICE/EACEA, 2010).

*Martina Endepohls-Ulpe – Akademische Direktorin, Institut für Psychologie, Universität Koblenz-Landau, Campus Koblenz, endepohl@uni-koblenz.de

Explanations for the development of gender differences in academic achievement are complex, and differ depending on whether they refer to disadvantages for females or males. The aim of this paper is to examine especially the role of gender stereotypes, which is regarded as crucial in the process of the development of gender differences in behavior.

This paper begins with an overview of actual gender differences in academic achievement in Germany and in other European countries, based in part on the results of recent surveys on student assessment like PIRLS or PISA. Following a short description of the nature and functioning of stereotypes in general and of gender stereotypes in particular, the actual state of empirical research on the most important theoretical explanations for differences in academic achievement and the role gender stereotypes play in these theories will be discussed. Finally, open questions and fields for further research will be outlined.

2. Gender differences in academic achievement

2.1. School leaving certificates and levels of graduation

In general it can be stated that boys' school graduations and results are lower than girls'. In Germany for example there are three different types of secondary schools with different levels of graduation. The higher the level of graduation that can be attained, the greater the percentage of girls at that specific type of school (BMBF, 2007/2008a, b).

In the United Kingdom, where one can witness an increasing public interest in comparing the effectiveness of different schools, girls get better marks than boys at the end of grade 10, a phenomenon which has already been observed and discussed as early as in the 1980s. It should be noted that in both the UK and Germany the levels of graduation for both sexes have improved dramatically since the 1970s (Endepohls-Ulpe 2011; Connolly 2004), but for boys this effect is not as high as for girls. Similar observations have been documented for several other European countries (EURYDICE/EACEA, 2010).

However, with respect to choices of courses of study or occupations and occupational careers, this situation does not seem to have any detrimental effects for males. In the meantime, while there is a slightly higher proportion of women in tertiary education in many European countries, after finishing their courses of study most of the young women finish their academic career, and in fact women are strongly underrepresented in higher academic levels (see EURYDICE/ EACEA, 2010).

2.2. Gender differences in academic competencies

2.2.1. Reading achievement

In PIRLS (Progress in International Reading Literacy Study) 2006, girls in the fourth grade on average showed better reading achievement in nearly all the participating countries. However, mean differences between reading competences of young girls and boys varied. There are countries where there are no differences (e.g. Germany), countries where differences are very small, and countries like the United Kingdom where they are great (Blossfeld et. al. 2009). When we take a look at the reading achievements of older students, the gender differences are more stabilized. In PISA 2009 the mean difference in reading achievement between girls and boys of all participating countries was 39 points in favor of girls (the smallest difference was in Chile (22); the greatest difference in Finland (55), and in Germany the difference was 40) (Naumann, Artelt, Schneider & Stanat 2010) All former PISA surveys have detected similar differences. However, in spite of their poorer reading abilities boys' self-concept/self-esteem with respect to this domain is as high as that of girls. There seem to be differences in interest and engagement in reading activities which are crucial for boys' lower achievement (Naumann et al. 2010)

2.2.2. Mathematics

In the field of mathematics gender differences are neither as high nor as stable as in reading. When differences are found, boys usually do better than girls.

For younger students small or no differences are usually noted (see EURYDICE/ EACEA, 2010). Results for older students from PISA and TIMSS show better achievement for males, but not in all countries. PISA 2006 detected better competencies in mathematics for boys in approximately half of the European countries, depending on the stream or tracks attended. Females tended not to perform as well as boys in nearly all countries (EURYDICE/ EACEA, 2010). In contrast to the finding that boys' self-concept in reading does not seem to be correlated with lower competences, the lower achievement for girls in mathematics seems to be strongly correlated to girls' lower self-concepts of their mathematical abilities. In addition, even if their achievement is low boys show better self-concepts of their mathematical abilities than girls (Bos et. al. 2008).

2.2.3. Science

In science gender differences are smaller and less stable than in mathematics. In addition, the results from different assessment studies are not consistent.

Whereas TIMSS results frequently report differences in favor of boys, PISA reports do not find so many differences (EURYDICE/ EACEA, 2010). In spite of equal or nearly equal achievement, girls' self-concepts and self-efficacy in science seem to be lower than that of the boys in nearly all European countries (*ibidem*).

3. Nature and content of gender stereotypes

The current state of discussion in social psychology regards stereotypes in general as inevitable by-products of everyday processes of perception and judgment (Fiske, 1998). They are always generated wherever a group of people forms a distinct social unit (Hamilton & Sherman 1994). They are "...the beliefs, shared by members of one group, about the shared characteristics of another group." (Wright & Taylor 2003: 433). A precondition for the use of stereotypes is that a person is categorized as a member of a certain group.

Gender is one of the central social categories relevant to the perception and the assessment of other people, and the individual person as well. In most cases the categorization as male or female is unequivocal. Hence, the expectations surrounding a particular social environment connected to gender play a significant role with respect to the emergence of numerous traits and behavior patterns. Gender stereotypes can be found with respect to physical characteristics, personality traits, role-related behaviors, occupational preferences, specific competencies, and emotional dispositions (Deaux and LaFrance 1998: 793). Central features of gender stereotypes are e.g. the constructs "agency vs. communion" – characterizing men as independent, assertive, and initiating, and women as caring, emotionally expressive and responsive to others (*ibidem*: 795). These constructs also have occupational connotations, as people also describe employed workers as "agentic" and homemakers as more "communal," thus associating certain roles in society with one gender. The same is true for certain kinds of professions: Professions from the field of STEM e.g. engineer, are seen as "agentic," whilst social professions e.g. social worker or teacher, are seen as "communal" and are strongly connected with the female gender.

Gender also is often correlated with status and power: Males and activities associated with men are considered more valuable and more prestigious than females and activities associated with women. This circumstance also has the consequence of differentiated expectations with respect to performance: Men are expected to perform better than women and as a consequence they get more opportunities to show off their achievements and can initiate more actions to do so (*ibidem*: 2003). Power refers to a person's actual control over resources and the outcomes of other persons. There are several social levels of analysis where men as a group are associated with having more power than women: society,

organizations, marital relationships, and individual traits. These differences in turn lead people to construct identities and demonstrate behaviors that are consistent with such expectations.

4. Gender stereotypes in explanatory theories and models for gender differences in achievement

4.1. Biological differences

Used for decades to underpin the thesis of females' intellectual inferiority, biological explanations continue to be discussed in the context of gender differences in achievement (see Quaiser-Pohl 2012a). But interestingly at present they are frequently used to support the development of interventionist measures to foster boys' learning and to change methods of instruction at school in favor of boys. Boys are said, e.g., to have different learning styles and different needs with respect to physical activity, which the schools are blamed for not taking into account (e.g. Birkenbihl 2005).

Congenitally biological explanations do not operate with stereotypes as explanatory constructs for the development of gender differences. But they are an interesting example of the way in which gender stereotypes influence scientists and channel their scientific research. This can be noted from the beginning of research on intelligence in the 19th century, when authors like, e.g. Francis Galton in his work "Hereditary genius," simply included only men in their studies (cf. Silverman & Miller 2009). Even with emerging proof of the inferior academic achievement of males in certain areas, there were hardly any voices in educational sciences which seriously postulated that males actually were incapable of achieving certain things due to a lack of ability, as was previously held to be the case for women. Instead, schools, and especially female teachers, have been blamed for not doing their work properly, or even for discriminating against boys (see also Mills 2003; Weaver-Hightower 2003).

4.2. Identity development

Cultivating a gender-related identity is an important task for children, one which they need to master during the course of their development. In order to fulfill this task children and adolescents tend to engage in activities which fit their self-concepts as a male or female. Thus boys avoid activities and behaviors which are regarded as female e.g. working diligently, cooperating with teachers, etc., and girls avoid activities and subjects which are stereotyped as male and which are often

said to be too difficult for females. This is especially true for subjects and activities found in the field of STEM (Hannover 2004), which have been frequently demonstrated to be associated with the male gender (e.g. Hannover & Kessels 2002).

Girls at the beginning of puberty show lower self-esteem, lower confidence in their own abilities, and have lower expectations to succeed than boys, especially in domains which are stereotyped as male. Besides, girls more often attribute high achievement to causes like good fortune or accidental luck, while they attribute failure to a lack of abilities (Rustemeyer & Jubel 1996; Ziegler & Stöger 2004).

4.3. ‘Stereotype threat’

For girls, stereotypes are postulated to directly affect their performance in male connoted tasks by a phenomenon designated as “stereotype threat.” It has been frequently proven that group members perform poorer on a particular task if they have been confronted with a negative stereotype towards their group with respect to achievement in certain activities. This negative impact of stereotypes is explained by an anxiety that one will confirm the stereotype, which puts additional pressures on the member of the targeted group, and has a negative impact on performance (see Wright & Taylor 2003).

Hence, when a task is designated as a typical-male one, this will have a negative effect on the achievements of females performing this task (see Steele 1997). This has been shown in experimental studies, especially for mathematical and spatial tasks (e.g. Neuburger, Jansen, Heil & Quaiser-Pohl 2012; Spencer, Steele & Quinn 1999). It has been shown as well that teachers have stereotyped beliefs about the abilities of male and female students. They think that girls’ abilities in the field of STEM are lower than boys’, and by expressing these gender-stereotyped beliefs about students’ abilities they often create a ‘stereotype threat’ for girls in their classes (Rustemeyer & Jubel 1996; Tiedemann 1995; Ziegler, Kuhn & Heller 1998).

There have been a series of experiments which demonstrate the impact of stereotype threat on achievement in different domains and for different societal groups, e.g. with respect to intelligence, low socio-economic status, or athletic performance for black and white men (Corizet & Claire 1998; Stone et al. 1999 both c.f. Wright & Taylor 2003). But there are some contextual conditions which have been identified as crucial for this negative impact of stereotype threat to occur (Keller 2008; Wright & Taylor 2003).

- The test of the particular ability must be demanding and close to the performance limit of the group members;
- Group members must be aware that their achievement will be assessed;
- The stereotype must be relevant to performance and group identity must be salient;
- Group members must be strongly identified with the tested domain.

Interestingly, recent experimental attempts to explain the lower achievement of boys in reading as an outcome of ‘stereotype threat’ have failed. In studies carried out by Eckert & Imhof (2011, 2012), the conditions of stereotype threat even enhanced the reading performance of male secondary school students (grade 8). Identification with the domain turned out to be a strong predictor of reading achievement for both girls and boys (Eckert & Imhof 2012). Explanations for these contradictory effects of stereotype threat in the reading domain for males are still to be found. Probably some of the contextual conditions, which are basic for stereotype threat, did not apply to the situation of boys in the experimental settings.

4.4. Children’s cultures of masculinity and femininity

When children act in groups, gender differences in children’s behavior appear to be more explicit than when observed individually. They tend to play in same sex groups very early and in these groups they develop separate “cultures” of activities and rules regarding systems of interaction, which are also influenced by stereotypical ideas of what males or female are like or how they should behave. Male groups often tend to develop forms of masculinity which oppose the demands of schools with respect to achievement and social cooperation. For them being masculine is mainly connected with power, dominance, and physical strength (Budde 2005; Connolly 2004; Francis 2000). These school-opposing cultures of masculinity seem to emerge predominantly in male groups with a lower socio-economic status (Connolly 2004; Francis 2000), maybe due to the lack of emphasis on achievement and education in low SES families (Connolly 2004). Another explanation could be that boys with a lower SES choose dimensions from the male stereotype (power, physical strength, aggressiveness), on which they estimate their chances to succeed to be better than in the field of academic achievement. Girls, regardless of their social background, more frequently develop activity and interaction systems which comply with the demands made by schools and with achievement at school.

4.5. Interaction with teachers

The different “gender cultures” girls and boys develop in classes also lead to differing ways of interaction with teachers, which in turn have consequences for the learning process and the results achieved. Due to their greater overall activity and lack of discipline, boys get more attention and more academic and social intervention from their teachers. These processes have been labeled by feminist social researchers as the “hidden curriculum”. They point out that it results in discrimination against girls, who do not get enough attention from their teachers and

learn that their contributions to the instruction process are not so important. But there are also authors who postulate that boys get worse marks as a consequence of their uncooperative classroom behavior and that they hinder their own process of learning by provoking time-consuming disciplinary activities by their teachers (Frasch & Wagner 1982; Younger, Warrington & Jaquetta 1999).

Another aspect of the “hidden curriculum” are teachers’ gender stereotypes concerning children’s abilities and differences in interaction behavior in classes correlated with these stereotypes. The fact that teachers still have gender stereotypes concerning abilities in the field of STEM, as well as in language or reading, has recently been demonstrated by two studies with primary school teachers (Endepohls-Ulpe 2012; Schirner, in press). These stereotypes in favor of boys in the field of STEM apparently influence teachers’ behavior in mathematics and science classes in a way that enhances the learning process for boys and discriminates against girls: Boys are called upon more often and get more positive feedback in class from teachers, who see differences in favor of boys, a process which in turn leads to more initiative behavior of boys (Frasch & Wagner 1982; Schirner, in press). But surprisingly, teachers’ stereotypes in favor of girls in reading and language do not seem to have any noticeable effects on their teaching behavior (Schirner, in press), and in turn girls’ behavior in the classes of those teachers does not differ from their behavior in classes of teachers without stereotypes in favor of girls (ibid.).

4.6. The “feminization” of the teaching profession

In nearly all countries in Europe a majority of the teachers are female, especially in the early years of schooling (EURYDICE/ EACEA, 2010). This leads to a lack of male role models for boys and is also said to lead boys to define school as something ‘feminine’ and to oppose the requests of instructors (Rohrmann 2007). There are even authors who postulate a discrimination against boys by their female teachers in primary school, e.g. by giving them worse marks or not recommending them for attendance in upper secondary school in spite of their sufficient aptitudes (for an overview, see Neugebauer 2011). The consequences of a lack of male role models for young boys are not yet clear. Faulstich-Wieland (2011) postulates that boys in early education do not need male role models in order to develop models of “masculinity” with typical stereotyped features, like physical strength and dominance, but they do need them to learn that men have multifaceted personalities and varying ways of shaping their lives, attitudes which will help to reduce constricting gender stereotypes .

However, a lot of empirical evidence has been collected recently against the thesis that female teachers have a negative impact on boys’ achievement (Hadjar 2011). In countries with a higher percentage of male primary school teachers,

boys' reading achievements are not necessarily higher (Blossfeld et al. 2009). Nor are boys better in reading when their teachers are male, and when taught by a female teacher they do not stereotype reading as a female activity (Sokal, Katz, Chaszewski & Wojcik 2007). Boys in general do not do better at school when taught by male teachers, nor do girls do better when taught by females, but both boys and girls show more positive attitudes towards school in general when they are instructed by females (Carrington, Thymms & Merrel 2008). Interestingly, boys in primary school in general do not seem to feel as much at ease at school as girls do, regardless of whether their teacher is male or female (Bos et. al. 2005 cf. Rohrmann 2007).

There are also studies showing evidence against the thesis of active discrimination of boys by female teachers. Quite the contrary, male teachers seem to judge girls as well as boys more severely than female teachers do, for example at the end of primary school when recommendations for different tracks of secondary schools are given (Neugebauer 2011). Furthermore, male teachers seem to have gender stereotypes concerning boys' lack of reading abilities which are even more definite than those of female teachers (Endepohls-Upe 2012).

4.7. Lack of competent female role models in STEM

The fact that there are only few competent female role models in the field of STEM is one cause for girls' retreat from that field, which has frequently been proved empirically (see Quaiser-Pohl 2012b). Teachers in science subjects are mostly men. In addition female teachers in science frequently doubt their own qualifications, and in primary school girls – but not boys – with female teachers who question their own mathematical abilities fall back behind girls who are taught by teachers who believe in their own competencies. (Beilock, Gunderson, Ramirez & Levine 2010).

Interestingly, voices that claim more male role models in subjects like language and reading are scarce. Indeed, there are attempts in pre- and primary schools to get male adults, like fathers or grandfathers, to read to children (as regards Germany, see Engelhardt 2006).

5. Discussion

When we look at the content of gender stereotypes we can state that domain specific gender differences in achievement go along with the central constructs of "agency" and "communion". Boys do better in the "agentic" fields, i.e. mathematics and sciences, and girls in the "communion" fields, i.e. reading and language.

Regarding the role of these constructs with respect to interests and school-related choices of subjects, these stereotypes seem to impact boys and girls in a similar way. The perceived gender appropriateness of certain school subjects and courses of study pushes children and adolescents to engage in the ‘gender appropriate’ activities.

As far as the dimensions of status and power are concerned, which in their positive aspect are associated with the male gender, the academic self-concepts of boys and girls reflect gender stereotypes as well. However, the lower achievement of males in the educational system does not match the stereotype of male dominance and competence. Ironically, exactly these constituent parts of the male stereotype could be responsible for boys’ difficulties in achievement. Being dominant in interactional processes and opposing achievement demands is not compatible with being a good student, and leads to conflicts with teachers. Conversely, being decent, obedient and cooperative may lead to better educational results for female children and adolescents. Thus, what is the normal and expected “male” and “female” behavior - for adults - may create difficulties for boys and advantages for girls at school. However, the results of Connolly (2004) show that achievement can also be part of a boys’ culture of masculinity, in particular for boys with a higher SES – a circumstance which fits in with the fact that a lot of boys are doing well at school. But when the possibilities to achieve are low or are associated with too many costs, then especially boys with a lower SES background choose ways to enhance their status which have the effect of hindering their process of learning.

The features of high power and status connected with being male may, on the other hand, protect boys against the negative impact of ‘stereotype threat’ when performing female stereotyped activities. Hannover (2002) demonstrated that women were not much more confident in their success than men when confronted with female stereotyped tasks, but men were much more confident of their success than women when facing male stereotyped tasks. Perhaps for boys a belief in their own innate capability limits the risk of stereotype threat when they are faced with female stereotyped tasks. And maybe the same process with respect to the different aspects of the male stereotype protects male students from being treated differently by their teachers in language classes. The fact that the self-concepts of primary school boys with respect to reading do not seem to be afflicted by their teachers’ negative stereotypes points in the same direction. But in the long run, being confronted with the stereotype of boys as bad readers may contribute to boys’ well documented de-identification with the domain.

Explanations for boys’ deficits in achievement are rarely connected with the notion that boys are not capable of achievement. A great many of the arguments in this discussion, which is often conducted in a very emotional way, blame schools and especially female teachers for treating boys wrongly or even actively discrim-

inating against them. The contradiction between the idea of lower achievement and the supposedly innately high male abilities probably influences the debate.

There are still a lot of questions which still have to be examined in this complex field of interacting factors. For example, with respect to boys' reading achievement the impact of the fact that activities connected with language are stereotyped as female is not quite clear. Do male students really think that reading is a female activity? And if so, why does 'stereotype threat' actually enhance boys' reading performance? What do teachers' stereotypes of boys' reading abilities mean for boys' interest in and motivations for reading in the long run? Do boys develop cultures of masculinity that hinder them from reading? And what do programs to further boys' reading competencies, which are run under the precondition of boys' general underachievement in this field, do for their motivation to read?

With regard to the "male underachievement" concerning school certificates and grades, a fact that is often neglected in the discussion is that socio-economic status and ethnic origin affect achievement considerably more than gender. (Deutsches PISA-Konsortium 2004, c.f. Budde 2008). Socio-economic status and immigration can even interact with gender (see Endepohls-Ulpe 2012), as the gender gap is greater for certain ethnic groups. Thus differences in gender stereotypes between people of different SES and different ethnic backgrounds, and their possible impact on achievement and behavior, needs to be further examined.

Finally, the question remains why, in spite of numerous pedagogical efforts to enhance girls' and women's interest in the field of STEM, are females still dramatically underrepresented in this domain in most European countries? (Ziegler, Schirner, Schimke&Stöger 2010). And why, in spite of a diminishing gender gap in achievements, are girls' mathematical self-concepts still lower and their math anxiety higher? (Else-Quest, Hyde & Linn 2010). These issues still have to be clarified. An interesting approach is delivered by the gender stratification hypothesis (ibid.), which combines the aspects of male power, gender segregation, and development of gender stereotypes, postulating the development of different contents of gender stereotypes and different impacts of stereotypes in societies which are strongly stratified by gender versus those societies with more gender equality.

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Martina Endepohls-Ulpe

STEREOTYPY ZWIĄZANE Z PŁCIĄ SPOŁECZNO-KULTUROWĄ I ICH WPŁYW NA OSIĄGNIĘCIA NAUKOWE

Streszczenie. W artykule zaprezentowano przegląd stanowisk dotyczących różnic w osiągnięciach naukowych między kobietami i mężczyznami w Europie. W tekście znalazły się wyjaśnienia dotyczące funkcjonowania stereotypów i ich natury, w szczególności zaś stereotypów płci. Odniesiono się również do aktualnych badań weryfikujących najważniejsze teoretyczne sposoby wyjaśniania różnic w osiągnięciach naukowych związanych z płcią społeczno-kulturową i znaczenia stereotypów płci w tych teoriach.

Słowa kluczowe: stereotypy płci, różnice płci, osiągnięcia naukowe.