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Introduction

According to current PISA (Programme for International Student Assessment) statistics, no other countries show a greater gender gap in mathematics and science than Austria. In science, boys are half a school year ahead of girls, who show drastically lower interest and motivation in science classrooms. The opposite is true for girls when it comes to reading abilities. For a long time, both the reasons for this gender gap and possible steps to overcome it have been discussed. Some have suggested returning to mono-education in science and mathematics classrooms, which has been met with a lot of criticism. Others claim that through conducting gender-sensitive lessons, this problem can be reduced. Both way, there is consensus among scholars and researchers involved in this debate that the key to addressing this issue is teacher training programs, which currently still widely lack education about student gender sensitivity. Teachers often treat student genders differently and according to gender stereotypes, without noticing. Thereby, such a classroom can have a profound impact on the students, as the behavior of educators leaves marks on their learners, which often happens unconsciously. Therefore, teachers must start to reflect on their classroom practices and the ways in which they construct gender identities in their classrooms, as well as treat their male and female students.

Reasons for such student gender gaps in achievement are hard to pinpoint and not only to be found in schools. Our society also plays a big role in this, as expectations towards male and female children are put upon them from day one. Later on in their lives, certain school subjects, science fields and career choices are often associated with one gender or another. A big part of this problem is the gender-wage gap, which still exists in most countries around the world and is caused by the small fraction of women working in STEM (Science, Technology, Engineering and Mathematics) related fields. Candidates within those fields are rare and therefore highly requested, which, as a result, ensures excellent payment compared to other, not-science related academic fields. As most of those candidates are male, this circumstance further causes the gender pay gap to widen. Therefore, the problem is not only an educational, but also a societal one.

This thesis aims at contributing to a body of research looking to discover possible explanations for the gender gap in achievement and motivation within science and language classrooms from a linguistic point of view. A discourse analysis of transcriptions of an EFL (English as a Foreign Language) and a CLIL (Content and Language Integrated Learning) Biology classroom, as representatives of language and science classrooms, will be completed in order to identify student-gender specific linguistic patterns and behaviors within teacher-student and student-teacher interaction. The goal is to unveil tacit processes brought about by the language use of the teacher and the students, which can contribute to the development of different learning opportunities and motivation of male and female students within those classrooms.

Generally, this thesis is divided into two parts. In order to depict the significance of the matter, in the first chapter I will give an overview of existing gender gaps within secondary and higher education and explain how they are related to our society as a whole. In the second chapter, connections between language and gender, a topic area that has been researched for over 50 years now, will be explained in order to arrive at a fundamental understanding of their complex interrelations and the impact this can have on men and women. The third chapter of the thesis will turn to the relations of language and gender within a specific context, namely the classroom. Studies on different attitudes and expectations towards male and female learners will be reviewed and psychological processes involved will be explained briefly in order to reach a comprehensive overview of explanations for gender gaps in student achievement and motivation. In the fourth chapter, I will turn to the linguistic aspect in detail, presenting research on student-gender specific language behavior within teacher-student and student-teacher interaction. This section will later serve as reference point for a comparison of the findings of this thesis in the discussion part of the thesis.

In the second, empirical part of the thesis, I will then analyze transcripts of three EFL and three CLIL biology lessons according to different features of classroom discourse, including teacher attention, teacher questions, praise, criticism and target language use, as well as the students' linguistic space, student questions and

interaction initiations, student responses and interruptions. I will compare the data across the two student genders and across the two different classrooms. The findings will be presented in detail first and then summarized in the discussion part of the thesis.

I hope that my findings will be of help for other (future) educators, who are willing to reflect on their teaching in order to ensure they are creating equal learning opportunities for all student genders, regardless of their subject or country. We as teachers have tremendous impact on our students and therefore, raising awareness of these issues in the classroom, as well as among colleagues is an important step towards reducing gender gaps in education.

1. Gender Gaps in upper secondary and higher education (and why they matter)

Over the past decades, most OECD countries have managed to narrow or completely close long-standing gender gaps in several areas of education. In most countries, male and female learners now have equal opportunities of entering higher education and it has been demonstrated that differences in performance are not caused by innate gender-specific aptitudes (OECD 2015: 3). However, as the OECD report of 2015 points out, new gender gaps are opening. Young men are significantly more likely than young women to have low levels of skills and poor academic achievement, and are more likely to leave school early, often with no qualifications. Meanwhile, in higher education and beyond, young women are under-represented in the fields of mathematics, physical science and computing, but dominate the fields of (...) humanities" (OECD 2015: 20).

PISA Statistics of 2012 show that the gender gap in test performance is still intact when comparing reading and mathematics scores. In all participating nations, female students outperformed their male peers in reading scores by an average of 38 points, which can be equated with one year of school. At the same time, male students continue to outperform female learners in mathematics and science (OECD 2015: 24). Those statistics are in so far relevant, as longitudinal studies have revealed that students' performances in reading, science, and mathematics are

strongly correlated to their choice of subjects in higher education (e.g. Salvi Del Pero & Bytchkova 2013: 30). Gender distributions in higher education confirm this assumption: Young women are underrepresented in the fields of physical science, mathematics and computing, whereas young men are scarcely found in languages and humanities (OECD 2015: 20).

Looking at gender gaps in education in an Austrian context, gender differences in performance have in fact increased over the past decade. Between 2003 and 2012, the gender gap in PISA mathematic scores favoring boys significantly widened: While there was no observable difference in performance in 2003, boys outperformed girls by an average of 22 points 9 years later (OECD 2015: 24). Looking closer at female students' performance in science and mathematics, the 2015 OECD report concludes that girls are still outperformed by boys when it comes to 'thinking like a scientist', e.g. formulating situations mathematically (OECD 2015: 30). Meanwhile, boys are still out-performed by girls in reading (OECD 2012: 1).

In February 2015, on the occasion of the 650th anniversary of the foundation of the University of Vienna, the Gender Equality and Diversity Unit published its fifth issue of their brochure "Gender im Fokus - Frauen an der Universität Wien" ("Focus on Gender - Women at the University of Vienna"), gender distributions across different departments were analyzed. Heinz Engel, the president of the University of Vienna, reports that within the last decade, the proportion of female professors has continuously increased and amounted to 26% in 2015. However, looking at STEM (science, technology, engineering and mathematics) studies, he points out that still only a few female scientists can be found in those fields (Hosner et al. 2015: 3). The report revealed that a 'Leaky Pipeline' is still intact at the University of Vienna, meaning that there are structures and practices in employment that make reaching higher positions more difficult for women than for men, especially in the STEM area. Even though overall, there are more female students at the University of Vienna, a continuous decrease in females can be observed in higher positions at the university, including postdoctoral fellows, lecturers, and professors (Hosner et al. 2015: 89). After reviewing a great array of literature on this topic, Jacob Blickenstaff identified the following 9 explanations for the leaky pipeline in STEM careers:

1. Biological differences between men and women.
 2. Girls' lack of academic preparation for a science major/career.
 3. Girls' poor attitude towards science and lack of positive experiences with science in childhood.
 4. The absence of female scientists/ engineers as role models.
 5. Science curricula are irrelevant to many girls.
 6. The pedagogy of science classes favors male students.
 7. A 'chilly climate' exists for girls/women in science classes.
 8. Cultural pressure on girls/women to conform to traditional gender roles.
 9. An inherent masculine worldview in scientific epistemology.
- (Blickenstaff 2005: 371-372).

Blickenstaff suggests that in order to overcome this 'chilly climate' for female learners in STEM classrooms, "individual actions by sympathetic teachers will help women to break down the filter of the STEM pipeline and result in equal participation, which will be good for STEM and good for society in the long run" (Blickenstaff 2005: 384). What Blickenstaff refers to here is the societal problem of unequal distribution of males and females within STEM fields. Graduates of these subjects are highly demanded in the labor market and occupations in these fields are among the most highly paid, which further contributes to the gender wage gap (OECD 2012: 13). In Austria, this gender wage gap was again brought to the attention of the public on October 12th, 2016, which marked "Equal Pay Day" in this year, a day that symbolically marks the day from which on women work 'for free', compared to men until the end of the year. In Austria, the wage gap still accounts for 18 percent, which is the second biggest wage gap in Europe (Tragler 2016: 1).

As already mentioned, it has been shown that performance in reading and science strongly influences student's choice of studies in higher education. What is essential to understand is that performance is not only influenced by cognitive skills but also, and maybe even more importantly, by different non-cognitive variables, including student motivation, enjoyment of subject, behavior in the classroom and attitudes towards and self-concept in these subjects (Driessen & Van Langen 2013: 80).

Over the past few decades, researchers have suggested a myriad of different explanations trying to identify reasons for the differences in student motivation and enjoyment of certain school subjects of male and female students, including neurological, psychological and sociological approaches. The most prominent of

these approaches will be discussed later in this thesis to identify possible differences between male and female students based on variables other than language.

2. Language and Gender

The relationship between language and gender has been discussed for quite some time now. To understand this relationship, one has to first understand what language is able to 'achieve' in people's minds and society as a whole. The following chapters aim at giving an overview of how language and gender are intertwined in a social and linguistic context.

2.1 Language and social change

The literature offers two approaches towards language and social change, which can be considered two opposite ends of a spectrum. One approach, which is often referred to as the 'weak' one, is the language-as-mirror approach, meaning that "language simply reflects society, so that social divisions on gender ground are reflected in patterns of language use" (Talbot 2010: 15). To exemplify this within a gender context, Talbot refers to the common distinction between the now outdated honorific titles for women, Miss and Misses and their male counterpart, Mister. Talbot explains that addressing a woman with either title reflects the "significance a society attaches to the marital status of a woman, whereas this status is irrelevant for a man" (Talbot 2010: 15).

The second, stronger view, suggests that "language does not just reflect gender divisions; It actually creates them (...). In this view, languages embody different world-views and our consciousness is constrained, even created by the language we have" (Talbot 2010: 15). This approach towards language creating reality is often referred to as the Sapir-Whorf hypothesis, also known as Linguistic Relativity or Whorfianism, which, simplistically speaking, assumes that the structure of a certain language can influence its speaker's world-view and thereby creates a certain reality (Boroditsky 2011: 63). Sapir himself explains this as follows:

Human beings do not live in the objective world alone, nor alone in the world of social activity as ordinarily understood, but very much at the mercy of the particular language which has become the medium of expression in their

society (...). The fact of matter is that the 'real world' is to a large extent unconsciously built up on the language habits of the group. No two languages are ever sufficiently similar to be considered as representing the same social reality (Sapir 1929: 209-2010).

Although this hypothesis initially met a lot of criticism, a substantial amount of empirical research of the last few decades has supported the assumption that language influences thought (Boroditsky 2011: 63).

The crux of the matter is what Sapir refers to with the word 'unconsciously': when we speak and use certain names for certain things, we usually do not reflect on what connotations these names entail and what kind of reality we create by using them. Talbot suggests that by pointing out certain language patterns, we can raise awareness of their effects and thereby possibly bring about social change, assuming that "before behavior can be changed, there must be awareness that a situation exists warranting alteration" (Talbot 2010: 16).

2.2 Language and Gender: Some early stereotypes

One of the earliest and most influential works on the interrelations between language and gender was Robin Lakoff's *Language and Woman's place* (1975), which is most noted for its investigations of gender differences in language use. As the title suggests, Lakoff argued that due to the way women speak, are expected to speak and are spoken of, they will never be able to hold powerful positions in (U.S.) society, since their language use constantly creates and re-creates a subordinate position in society (Lakoff 1972: 45). With regard to gendered discourse in schools, Lakoff explains an issue that comes with being a female speaker:

If a little girl 'talks rough' like a boy, she will normally be ostracized, scolded, or made fun of. In this way society, in the form of a child's parents and friends, keeps her in line, in her place. This socializing process is, in most of its aspects, harmless and often necessary, but in this particular instance - the teaching of special linguistic uses to little girls - it raises serious problems, though the teachers may well be unaware of this (Lakoff 1972: 47).

Lakoff's work addressed important issues regarding gendered speech. However, her analysis seemed to classify female speech in different societal contexts as deficient

and inferior to male language, something for which Lakoff has been widely criticized (Sunderland 2006: 14). Nevertheless, this paper was an influential starting point for an ongoing discussion. Researchers of different academic fields, including linguistics, sociology, and psychology, have been investigating possible explanations for the gender differences in language use. Starting from the deficit approach, as suggested by Lakoff, the dominance and difference approach emerged later on, followed by the performativity approach towards language and gender, which will be discussed in the following. The theories and approaches presented here are surely incomplete and oversimplified but should offer an overview of the major starting points for the interest in the connections between language and gender.

2.2.1 The (female) deficit approach

Retrospectively, early pre-feminist theories on language and gender have been described as arguing for a 'deficit' approach, i.e. they took for granted that female language use is deficient compared to male language. The Danish linguist Otto Jespersen dedicated a chapter called "The Woman" of his monograph *Language: Its nature, origins, and development* to claims about gender differences in language. Based on "impressionistic 'data' (and literary texts)" (Sunderland 2006: 5), Jespersen found that

Women have smaller vocabularies, show extensive use of certain adjectives and adverbs, more often than men break off without finishing their sentences, because they start talking without having thought out what they are going to say and produce less complex sentences (Jespersen 1922: 251).

Interestingly, Lakoff's perspectives on female speech were quite similar. Creating a binary distinction between male and female speech, she identified features of women's language that seemed to be deficient compared to the 'male norm' (which at first sight seems somewhat paradoxical, since Lakoff was writing from a feminist standpoint herself). Lakoff's findings have been summarized by the following ten features of female speech, which she relates to women's lack of confidence:

1. Lexical hedges or fillers, e.g. you know, sort of, well, you see.
2. Tag questions, e.g. she's very nice, isn't she?
3. Rising intonation on declaratives, e.g. it's really good?
4. 'Empty' adjectives, e.g. divine, charming, cute.

5. Precise color terms, e.g. magenta, aquamarine.
 6. Intensifiers such as just and so, e.g. I like him so much.
 7. 'Hypercorrect' grammar, e.g. consistent use of standard verb forms.
 8. 'Superpolite' forms, e.g. indirect requests, euphemisms.
 9. Avoidance of strong swear words, e.g. fudge, my goodness.
 10. Emphatic stress, e.g. it was a BRILLIANT performance.
- (Holmes 2001: 286)

According to Lakoff, it is only natural that women communicate with this kind of unassertive speech, since they live in a male-dominated society and are therefore pressured to show 'typical' feminine qualities, like sub-ordination to men and weakness also in their speech (Lakoff 1975: 47). Although Lakoff's work has been widely criticized, it did open the floor for following research on gender and language and, as Bucholtz (2004: 11) points out, in addition to gender, Lakoff also paid attention to class, social justice and power in relation to language, which are also important variables that one needs to consider when talking about the relations between gender and language.

2.2.2 The (male) dominance approach

Five years after *Language and Woman's Place* was published, Dale Spender, a secondary school teacher, published her book *Man Made Language*, which would pave the way for what is now considered the male dominance approach. Aiming at a broader audience, Spender too investigated differences in male and female speech, but from a more radical feminist perspective (Sunderland 2006: 14). Spender argued that both gender differences in language use and the sexism embedded in the English language contribute to "women being effectively silenced" (Sunderland 2006: 14). She focused on how males dominate the conversation in mixed-gender talk, interrupt their interlocutors and successfully continue to talk about topics they bring up (Sunderland 2006: 14). Talbot explains that generally, the dominance approach is based on the assumption that "language patterns are interpreted as manifestations of a patriarchal social order" (Talbot 1998: 131). Spender argues that these linguistic patterns reinforce male dominance and power and traces the origin of these patterns back to the fact that most theories, and therefore language, was "man-made", as the title of her first publication suggests:

Males - who have created the world, invented the categories, constructed sexism and its justification and developed a language trap which is in their interest (...). Males (...) have produced language, thought and reality. Historically, it has been the structures, the categories and the meanings which have been invented by males- though not of course by all males - and they have then been validated by reference to other males. In this process women have played little or no part (Spender 1980: 142-143).

Spender also conducted research on student gender in classroom discourse that correlates with these arguments, as she found a 'silence of girls' in her classroom. Her research in the educational context will be discussed in detail later in this thesis. In accordance with Spender's arguments, Zimmerman and West found that "there are definite and patterned ways in which the power and dominance of men in other contexts are exercised in their conversational interaction with women" (Zimmerman and West 1975: 105). They trace the source of this issue back to the fact that men are economically more advantaged and that this advantage is transferred into the conversation (Zimmerman and West 1975: 125). Similarly, Pamela Fishman argues that gendered language differences found in informal conversations are "manifestations of the larger social order in everyday interaction" (Fishman 1978: 131). She investigated private conversations between opposite-sex couples and found that females were eager to keep up the conversation and supported their husband's topics. She therefore concluded that "Just as there is an unequal division in labour in the workplace on sexual grounds, so the 'labour' in private conversations is divided unequally" (Talbot 2010: 99).

2.2.3 The (cultural) difference approach

Many theories on gender specific language use claim that men and women speak differently, as they have established a different relationship to language, due to the way they were socialized (e.g. Coates 1996, Holmes 1995, Tannen 1991). These theories fall under the difference or socialization approach, for which Maltz and Borker's 1982 paper, "A cultural approach to male-female miscommunication" is considered most influential (Sunderland 2006: 19). They suggest that boys and girls are brought up in different sociolinguistic subcultures, which leads to miscommunications between males and females:

We argue that American men and women come from different sociolinguistic subcultures, having learned to do different things, with words in a conversation, so that when they attempt to carry on conversations with one another, even if both parties are attempting to treat one another as equals, cultural miscommunication results (Maltz and Borker 1982: 200).

The cause of this miscommunication is explained with Gumperz' concept of 'interethnic communication' (Gumperz 1987). That is, any issues between individuals of groups that belong to different cultures "are the result of differences in systems of conversational inference and the cues for signalling speech acts and speaker's intent" (Maltz and Borker 1982: 201). As men and women are considered as belonging to different sub-cultures, this approach does not only apply to different ethnicities but also to different genders (Sunderland 2006: 19).

In contrast to the dominance approach, researchers adhering to the difference approach do not criticize women's language, but rather describe it and evaluate it positively (Sunderland 2006: 20). For example, Jennifer Coates, another prominent advocate of the difference approach, aims at challenging the picture of women as 'victims' of male dominance in conversation or as deficient language users and instead praises female talk: "All-woman conversation (...) has as its chief goal the maintenance of good social relationships" (Coates 1989: 98, quoted in Sunderland 2006: 20). Drawing on Maltz and Borker's research, Deborah Tannen wrote *You just don't understand*, which popularized the controversy over gender differences and fostered more research on these issues. However, Eckert and McConnell-Ginet point out the pitfalls of Tannen's work:

While all of this work ultimately emerged from feminist impatience with male-dominated and male-serving intellectual paradigms, it also appealed to a popular thirst for gender differences. And in the end, this research is frequently transformed in popular discourse - certainly to the horror of the researchers - to justify and support male dominance (Eckert & McConnell-Ginet 2003: 2)

Sunderland also indicates that there is now an abundance of popular publications that "not only embrace but enthusiastically promote the notion of 'gender differences'" (Sunderland 2006: 20). Popular examples of such non-academic books

with typically polarizing titles are John Gray's *Men are from Mars and Women are from Venus* (1992) and Allan and Barbara Pease's series including *Why Women Can't Read Maps and Won't Stop Talking* (1999), *Why Men Don't Listen and Women Can't Read Maps* (2001), or the most recent addition, *Why Men Want Sex and Women Need Love* (2010). Self-evidently, such works are to be enjoyed with care. What is also essential to understand here is that the dominance and the difference approach are not to be understood completely separate from one another. As Eckert and McConnell-Ginet point out, "issues of differences and issues of dominance were inextricably linked. And many of the early studies of difference were clearly embedded in a dominance framework" (Eckert & McConnell-Ginet 2003: 2).

Considering these three approaches towards language and gender, it becomes evident that they all represent a rather simplifying approach towards the workings of language. Mary Talbot points out an important issue that needs to be understood when analyzing male and female speech:

[W]e cannot expect to find a simple checklist itemizing men's and women's language on the basis of linguistic forms (...). A one-to-one correlation of form and function is impossible. A single linguistic feature can function in different ways, according to the context of interaction it's being used in. We need to shift from itemization of linguistic features to an examination of the dynamics of interaction (Talbot 2010: 47).

2.2.4 The performativity approach

As Talbot points out, there is more to gendered language than the difference/dominance approaches would allow for, as these approaches are based on the assumption that men and women are passively shaped (Talbot 1998: 157). However, it is important to understand that "[p]eople are not just acted upon; they are active in their own construction. They are busily involved in the construction of gender identities, especially their own. They perform their gender identities" (Talbot 1998: 157). What Talbot is referring to here is the concept of gender as a performance, for which Judith Butler's *Gender Trouble: Feminism and the Subversion of identity* is a key text. Butler's work is in keeping with the postmodern view that "identities of all kinds are not fixed and stable attributes of individuals, but are constructed in particular contexts through particular practices" (Cameron 2005: 288). Inspired by a such a postmodern feminist approach that calls into question the

sex/gender distinction based on biological facts, Butler sees gender as a social construction that is repeatedly produced and reproduced when it is performed: "Gender is the repeated stylization of the body, a set of repeated acts within a highly rigid regulatory frame that congeal over time to produce the appearances of substance, of a 'natural' kind of being" (Butler 1990: 32). According to this approach, gender is not something one acquires once and for all, but rather an on-going construction that we produce by our actions, which culturally understood as gendered. (Cameron 2005: 486). Although Butler does not speak about language and gender explicitly, following research began to focus on the ways in which gender is performed through language (Cameron 2005: 491). Victoria Bergvall for example analyzed verbal interaction among engineering students, focusing on how gender identities were constructed in the classroom discourse and in group discussions. Since engineering was and still is a traditionally masculine domain, Bergvall observed that female engineering students are faced with a conflict:

They are caught up in conflicting demands to which they must respond. On the one hand, there is a social need to behave in stereotypically 'feminine' ways, if they wish to take part in heterosexual social and sexual relationships (in other words, the men will only date 'proper' women). On the other hand, if they are going to succeed in their studies, they must assert themselves and their views, which is liable to put them in a competition with fellow students (Bergvall 1996: 31).

Bergvall found that female engineering students performed the act of being feminine, by using speech patterns that were expected by them, i.e. showing cooperativeness, supportiveness, tentativeness, etc. - and at the same time they presented themselves as being competitive and assertive, which are speech patterns typically associated with masculinity (Talbot 1998: 160). As Talbot points out, within the dominance or difference approach, these women would simply fall into the category of aberrations, since they do not adhere to a 'typically female' language use. The performativity approach however refuses to accept "dichotomous differences expected under polarized, categorical roles of feminine and masculine, but on the fluid enactment of gender roles in specific social situations" (Bergvall 1996: 175). Cameron points out that studies like Bergvall's show that gender is not only performed differently in subcultures and communities, as suggested by the

difference approach. Rather, "gendered performances can be found in the repertoire of every group, and indeed every individual subject" (Cameron 2005: 493).

So far, we have looked at language and gender from a general perspective. Although research on language and gender has been around for almost five decades now, most people are unaware of the impact that language can have on their world-view and on their construction and reconstruction of reality. Therefore, it is highly important to raise awareness of these issues if we want to change the way language deals with gender. One context in which we can raise awareness of these issues is the classroom. The remainder of this thesis will focus on gender issues within a specific context, namely said classroom. I will provide an overview of issues concerning student gender within the classroom and discuss studies concerned with student-gender specific language behavior that will later serve as methodological models for the discourse analysis of this thesis.

3. Student Gender in the Classroom

Concern over gender-specific issues within an educational context started as soon as boys and girls were allowed to attend the same schools after the World War II, when equality in education became increasingly important (Nielsen and Davies 1997: 125). Over time, the focus of the public debate has shifted repeatedly, as at different points in time, either boys or girls were 'losing out' or 'falling behind'. In the following, these concerns will be revisited.

3.1 The moral panic: Who is outperforming whom?

The earliest studies concerned with inequalities within co-educational settings focused on the assumption that primary school teachers, who were mostly female, were incapable of catering to their male students' learning needs (Nielsen and Davies 1997: 125) and that their classroom practices "may be hindering boys' natural psychological and intellectual development" (Sunderland 2000: 48). Nielsen and Davies summarize that up until the second-wave feminist movement starting in the 1960, "girls were, apparently, as invisible to the researchers as they were to the teachers" (Nielsen and Davies 1997: 126). In the course of the women's movement

during the 1970s, feminist researchers focused on female learners in the classroom to show that these presumed advantages of female students did not exist. One particularly influential contribution to this body of research was Dale Spender's finding that female learners receive considerably less of the teacher's attention than their male peers within co-educational classrooms (Spender 1982). Such studies revived the discussion about co-education in general, but also started a discussion about gender equality issues in school, their inclusion in teacher education programs and fostered the invention of programs like GIST (Girls into Science and Technology) that aim at encouraging female students to choose science subjects in schools (Sunderland 2000: 48).

During the 1990s, the trend of overachieving boys reversed and girls started outperforming boys (Baeman et al. 2006: 249). A great concern over the underachieving boys rose, originally in the U.K., but soon in other countries as well, making the debate an international one. Nielsen and Davis point out that this concern over 'failing boys' raised a lot more instantaneous attention than did the discourse on the 'silence of girls' in the 70s and 80s (Nielsen and Davis 2008: 166-167). This preoccupation with male underachievement in education has also been harshly criticized by Epstein, who called this concern as an "anti-feminist moral panic" (Epstein 1998: 96). Nevertheless, in this debate it is important to understand that generally, performance levels in secondary education exams of both male and female students have been rising consistently, making this a matter of poorer performance of male students in relation to female students, rather than an overall failing of boys (Baeman et al. 2006). Moreover, some recent studies show hardly any gender gaps within secondary education, including Gorard's review of examinations in the U.K. He found that in GCSE and A-level exams, there were no significant gender gaps since records like these have existed. Gorard also points out that small gender gaps (favoring girls) only exist within the very highest performance levels, which means that only a small number of students are affected by the gap (Gorard 2002: 236). Therefore, Gorard concludes that there is "no empirical justification for the recent annual panics about the underachieving boys" (Gorard 2002: 236).

Nevertheless, it has been repeatedly pointed out that boys are still over-represented in special education classrooms, which also contributes to a gender gap favoring girls (Beaman et al. 2005: 356). Backe-Hansen and Ogden found that 70 percent of students in special needs classrooms in Norway are male (Backe-Hansen & Ogden 1996: 140). Similarly, a survey of special education needs provision in OECD countries found that male students are "consistently over-represented (...) in both special schools and in special classes in mainstream schools" (Benjamin 2003: 98). Skarbrevik found similar results within Norwegian elementary and lower secondary classrooms and suggests that an existing gender bias against male students is the cause for these unbalanced numbers, since teachers are more likely to refer 'disruptive' students to special needs classrooms, and these disruptive students are more likely to be male (Skarbrevik 2002: 97).

Looking at gender gaps in a more detailed manner, boys are currently outperformed by girls in terms of reading achievement, while girls are outperformed by boys in mathematics in most OECD countries (Dee 2005: 1). These gaps have raised the question whether differences in performance can be explained with different cognitive skills in male and female learners or whether other processes are responsible for such performance gaps. Over the years, two main schools of thought have emerged from this research: the nature and the nurture approach. Some argue that gender gaps in achievement are the result of biological differences between the genders (nature), while others claim that cultural and social gender inequalities cause these differences (nurture). The following section will take a look at some aspects of both of these approaches.

3.2 Student Gender differences: nature or nurture?

Advocates of the nature approach often argue that innate differences in male and female brains gaps (e.g. Cahill 2005, Gallagher and Kaufmann 2005), difference in spatial ability (e.g. Lawton and Hatcher 2005) or difference in learning strategies (e.g. Kucian et al. 2005) account for most of the gender gaps. In the following, some of the most prominent studies following the nature approach will be presented.

3.2.1 Nature: Gender differences in Cognitive Development and Learning Styles

Since the reasons for gender differences in academic achievement in favor of girls are not completely understood (Spinath et al. 2014: 231) and correlations between measures of educational achievement and measures of intelligence are strong (e.g. Gustafsson and Unheim 1996), looking at gender-specific cognitive abilities might offer explanations for the gender gap in achievement. Psychologists, educators and physiologists have explored differences between men's and women's intelligence, based on biology, for over a century now. Early, meanwhile outdated research focused on measurable physical differences between male and female bodies and found that the different sizes of men's and women's brains explain "female intellectual inferiority" (Blickenstaff 2005: 371). Later, IQ tests showed that there are no differences in overall intelligence between males and females. More recent research focused on different kinds of gender-specific intelligence and brought forward the nowadays universally accepted belief that men have better mathematical and spatial skills, while women show greater verbal ability (Blickenstaff 2005: 371). Due to the fact that arithmetic abilities have been interpreted as resulting from higher spatial abilities, these three differences are usually reduced to two (Ardila and Rosselli 2011: 1-2).

Some early studies on different, gender-related intelligences, have identified a greater verbal ability in females and explain this through processes of evolutionary psychology, claiming that while men had to rely on spatial skills for hunting, women were the ones who had to rely on their communication and social skills in order to survive, which is why they developed superior abilities in that domain (Cameron 2005: 500). Some studies on male and female brain development partially support this theory, as it has been shown that the part of the brain, in which most of the speech functions are located, develops earlier in women (Sunderland 2000: 205). Nevertheless, evidence for female superior verbal ability is heterogeneous and most meta-analysis on this issue shows that the gender differences in this area are practically not existent (Hyde and Linn 1988: 64).

In contrast to the gender gap in verbal abilities, the gender gap in spatial abilities has been reported with more consistency (Ardila and Roselli 2011: 3). In most studies, males outperform females in spatial tasks such as geographical orientation and navigations strategies (e.g. Parsons et al. 2004, Iachini et al. 2005). However, these studies also showed that differences are small and vary drastically according to testing procedures and age of participants. In a 1990 meta-analysis of such research, Susan Vogel reports that

the specific nature of these differences varies by age, specific measure, magnitude, and variability within the groups (...). Although differences in visual-spatial ability were larger than verbal ability differences, gender differences did not account for more than 1% to 5% of the group variance (Vogel 1990: 44).

Although evidence for the differences in abilities between males and females is not consistently shown throughout the research, there is consensus among researchers that both biological and environmental determinants are responsible for these variations. Among such biological differences, different brain functions and brain structures of males and females have been pointed out. Generally, those differences in brain development are attributed to the influence of androgens and ovarian hormones (i.e. progesterone and estrogen) on the brain development (Ardila and Roselli 2011: 4). Early research has identified specific gender differences in male and female brains. Gurian and Stevens summarize some of the most important findings related to verbal and spatial abilities in the following:

Girls have, in general, stronger neural connectors in their temporal lobes, (...) which lead to more sensually detailed memory storage, better listening skills, and better discrimination among the various tones of voice. (...) The hippocampus (...) is larger in girls than in boys, increasing girls learning advantage, especially in the language arts (Gurian and Stevens 2004: 22).

In contrast, boys use more cortical areas that are dedicated to spatial and mechanical functions, which make them want to move objects and themselves through space more. In addition, they have lower levels of serotonin and oxytocin, which makes them more impulsive (Taylor 2002, quoted in Gurian and Stevens 2004: 22). However, a recent study investigating a database of 1400 MRIs (Magnetic Resonance Imaging) showed that although gender differences in the brain are

currently of high interest, a distinct categorization of brains into male/female is not possible. The research team found that "most brains are comprised of unique 'mosaics' of features, some more common in females compared with males, some more common in males compared with females, and some common in both females and males" (Joel et al. 2015: 15468). The researchers came to the conclusion that only a minimal number of brains show consistent features on one pole of this "maleness-femaleness - continuum" (Joel et al. 2015: 15468).

Interestingly, most of the literature dealing with gender-related differences in cognitive functions is concerned with young adults and only few studies have focused on such differences in children. In a series of longitudinal studies, Bornstein et al. investigated children from age one to six and found that gender differences in language performance only occurred within year 2 through 5, which suggests that gender-related differences in language abilities is restricted to a certain age range (Bornstein et al. 2004: 267). Likewise, Ardila and Rosselli found no evident gender differences in verbal fluency, memory and figure type recognition in 233 children aged 5 to 12 (Ardila and Rosselli 2011: 6) and Fenson et al. found only small differences in the effects of gender on vocabulary production and comprehension in a sample of 1803 1- and 2-year olds, favoring females (Fenson et al. 1994: 160). In summary, differences in children's cognitive abilities related to gender are still under controversy and no specifically male and female brain features have been identified.

Apart from different brain activities, gender-specific learning styles have also been suggested to influence male and female cognitive functions. A considerable body of research has been created focusing on different learning styles, which are considered to be main factors that determine the success of learning (Shabani 2012: 127). One branch of this research aims at describing learning style preferences of male and female learners, especially in the context of TEFL (Teaching English as a Foreign Language) and TESL (Teaching English as a Second Language). Several definitions for learning styles have been offered. Shabani summarizes that in general, a student's learning style preference (LSP) refers to "the way he/she responds to stimuli in a learning context, and to the student's specific way of

acquiring knowledge" (Shabani 2012: 127). Other prominent definitions include "the way a person processes, internalizes, and studies new and challenging material" (Dybvig 2004: 1) or "consistent pattern of behavior and performance by which an individual approaches educational experiences" (Keefe & Languis 1983: 1).

Regardless of the exact definition of learning styles, there is consensus among educators and researchers that both the students' and the teachers' awareness of such individual preferences among learners can help in guiding learners through learning processes and that "without sufficient knowledge about students' style preferences, teachers are not likely to provide the required instructional variety to match the diversity that exists among students in a class" (Shabani 2011: 127). Felder and Brent also stress the importance of an awareness of such learning styles: "The more thoroughly instructors understand the differences, the better chance they have of meeting the diverse learning needs of all of their students" (Felder and Brent 2005: 57). Since this also applies to co-educational classrooms, understanding and catering to male and female learning styles can contribute positively to the students' learning processes and is therefore an important issue to be aware of as an educator.

One of the earliest and most influential typologies of male and female language learning styles was offered by Rebecca Oxford, summarized in the following table:

<i>Learning Styles</i>	<i>Description</i>	<i>Learning Styles</i>	<i>Description</i>
FEMALES		MALES	
Field-dependent	Sensitive to social context in learning	Field-independent	More detached, logical in learning
Global	Tends towards overall impression	Local	Prefers structured, deductive learning
Right-hemisphere	Prefers intuitive responses to learning	Left-hemisphere	Prefers analytical learning
Auditory	Prefers to converse, discuss, do group work	Tactile	Prefers manipulative objects
Reflective	Pauses before answering, more accurate	Kinesthetic	Prefers total body involvement

Table 1: gender differences in language learning styles according to Rebecca Oxford (2003).

Oxford bases the differences in language learning styles on brain lateralization, as well as socialization as main causes for gender differences in learning styles. Studies that followed Oxford's work show heterogeneous results and were not always able to identify gender-specific learning styles. For example, Jones, Reichard and Mokharti investigated learning styles of 105 community college students and report no significant gender-related learning style differences (Jones et al. 2003: 373).

Nevertheless, there is now some general consensus among researchers that boys and girls prefer to learn differently, despite the fact that the reason for this difference is not always clear (Aliakbari & Tazik 2011: 657). One of the most recent large-scale studies related to this issue was conducted by Maubach and Morgan and found four major gender-related learning style characteristics that support Oxford's categorization of learning style preferences, namely "a male willingness to take risks (...) [and] to speak spontaneously in the foreign language, a greater male confidence about asking questions of the teacher to aid their own understanding; and the female students interest in reading and presenting well-organised written work" (Maubach and Morgan 2007: 46). In his review on literature dealing with biological

cognitive differences between men and women, Blickenstaff points out the danger of emphasizing biological differences within a public discourse, especially when it comes to finding explanations for the low number of women in STEM fields:

[T]here is very little difference in scientific and mathematical ability, and certainly not enough to explain the under-representation of women in STEM careers. There is a danger in continuing to emphasize biological differences between men and women because the tendency is to then argue that if unalterable biological differences exist, then no action need to be taken to improve the situation for women (Blickenstaff 2005: 373).

Similar results were presented by another recent meta-analysis tackling this controversial issue, which was conducted in 2013 by two Dutch researchers, Driessen and Van Langen, who analyzed student gender differences in primary, secondary and special needs education. They investigated the differences in three areas: cognitive abilities, which were determined by achievement test scores, non-cognitive competences, such as motivation, behavior and school career outcomes, including subject choice and type of secondary education. Basing their research on Dutch and international large-scale databases, they found that "there are hardly any differences with regard to language and mathematics proficiency. However, the position of boys in terms of educational level and attitudes and behaviour is much more unfavourable than that of girls" (Driessen and Van Langen 2013: 67). The analysis showed that differences in test scores were not (fully) caused by cognitive differences, but by other, non-cognitive processes, causing male learners to seemingly fall behind female students (Driessen and Van Langen 2013: 67). In the following, several of these non-cognitive processes that can influence girls' and boys' academic achievement, following the nurture approach, shall be discussed in order to offer a comprehensive overview of variables that can cause differences in behavior and performance between male and female students.

3.2.2 Nurture: Socialization, self-esteem, competition and the stereotype threat

Following the performativity approach towards gender differences (see 2.1.4), Spinath et al. suggest that "girls are somewhat better adapted to today's school

environment than boys, and this can partially explain why they often outperform boys in academic contexts" (Spinath 2014: 239). In the following, the influence of different socialization processes in male and female students shall be discussed to explain why and how girls are believed to be better adapted to schooling.

Explanations of the gender differences following the nurture approach involve the process of socialization. Burton defines socialization as

the way individuals learn roles and expectations for both themselves and also for others in society (...). It is through socialization that individuals come to realize not only their place in the larger social order and what is expected of them by that social order, but also what they should expect from themselves" (Burton 1986: 1).

Based on these roles, girls and boys acquire different behaviors and attitudes towards education (Persaud 2013: 1). One major issue related to this difference in socialization is male students' disengagement with education, as research shows that boys have poorer attitudes towards schooling than girls and such differences in attitude are often named as causes for boys' higher amount disciplinary problems in school (Fenning & Rose 2007: 539). Studies conducted in the Caribbean support this theory, as they have found that boys often "construct a hard, macho, male image, which runs counter to academic ethos of school and militates against their educational motivation and performance" (George 2009: 20). Moreover, these studies showed that students are channeled into 'gender-appropriate' subjects, and as they consider languages as 'female' subjects, male learners are therefore disadvantaged in these classrooms (George 2009: 20). Brophy claims that socialization also takes place within the classroom, suggesting that

[t]eachers socialize students by communicating behavioral norms and expectations related to gender roles (...). This is accomplished through subtle yet systematic (but often unconscious) differential treatment of boys and girls - treatment communicating the expectation that certain characteristics and behavior are associated with boys, and that other characteristics are associated with girls (Brophy 1985: 117).

Boys typically see schooling as 'feminine', because on the one hand, most teachers are female, and on the other hand, there is a "poor fit between the culturally prescribed male gender role and the student role" (Brophy 1985: 118). A growing number of studies has been dedicated to this idea of the 'ideal' students and show

that teachers usually define the ideal student as female (Younger et al. 1999: 327). This is due to the fact that the role of the ideal student correlates with most 'typically female' characteristics, such as being "compliant, conformist and willing to please" (Myhill 2002: 350).

However, Myhill argues that being an 'ideal' student may not necessarily benefit girls after they leave school, as these very attributes of a conforming, obedient learner can be considered a disadvantage in the workplace: "Few company executives, politicians, lawyers, and so on would be described as compliant and conformist, though their *Pas* may well be!" (Myhill 2002: 350). Baeman et al. suggest that this concept of the ideal student being female has consequences for classroom discourse, especially for boys (Baeman et al. 2006: 355). This is supported with evidence by Trent and Slade: Summarizing observations on 1800 male students, they found that this phenomenon marginalizes male learners. The researchers found that "[m]ost girls get treated better, but so do boys who find it easy or necessary to comply and conform, and who quietly get work done" (Trent & Slade 2001: ix). Baeman et al. summarize this problem as follows:

The message here is that for boys who do not conform to the ideal 'female' student model, and who are seen as deviating from the norm, school becomes an increasingly aversive environment. Pathologizing boys' behavior is a significant threat to productive classroom interactions between teachers and their students and ultimately to equal educational opportunity (Baeman et al. 2006: 356).

As a result, the concept of the 'ideal' student is in fact harmful for both student genders. In addition to such teacher attitudes towards male and female students, some studies have shown that teachers also have different expectations towards male and female students according to different school subjects. Duffy et al. point out that students may be treated differently by teachers in different subject classrooms (Duffy et al. 2002: 581). In fact, Worrall and Tsarna found that "teachers hold higher expectations of males in the sciences and females in the languages" (Worrall and Tsarna 1987: 300). After observing and analyzing Austrian lower- and upper secondary High School mathematics classes, Helga Jungwirth found that both male and female teachers showed "gender-specific practices" (Jungwirth 1991: 268) which they applied in interactions with male and female learners. She found one of

the most common gender-specific practices within the interaction with male students is "The Concealing of Failure" (Jungwirth 1991: 273):

In the course of teacher-boys interactions, episode have been reconstructed in which the failure becomes a little mistake, a mere error or a sudden lack of concentration (...). The teacher contributes to this concealment of failure by giving clues and information to help the boy in the subsequent course of the interaction. It looks, however, as if the teacher is just expressing aloud the idea the boy himself has in mind (Jungwirth 1991: 262).

This practice only appeared in interaction with male students, which led to the impression that the male students were overall more competent in mathematics than female learners were. Jungwirth further points out that most of the research on mathematics classrooms suggests that female learners receive "too little attention and too little support in the mathematics classroom to develop a lasting interest in mathematics" (Jungwirth 1991: 264). Besides socialization, other psychological variables such as self-confidence and motivation can affect learners' investment in their cognitive skills and their test performance (Niederle and Vesterlud 2010: 136). In line with this view on test scores stands Spinath's research on the impact of intelligence, motivation and personality on school achievement in a sample of 1353 Austrian 8th graders. The study showed that "over and beyond intelligence, personality and motivation play important roles in school achievement. Therefore, they are promising candidates to explain some of the observed sex differences in school achievement" (Spinath et al. 2010: 485). In the following, several psychological processes that can occur in a co-educational context will be briefly discussed.

3.2.3 Tacit psychological processes related to student gender in a co-educational context

Another approach towards explaining the differences between male and female learners is through tacit psychological processes related to gender within classrooms, including student's self-concept in certain subjects, competition within academia and a social psychological phenomenon called the Stereotype Threat. In the following, these concepts shall be explained shortly.

Studies have shown that students who have the most participation in the classroom also show higher academic achievements than students who participate less frequently (e.g. Sandler and Hall 1986). Christ (1996: 23) suggests that student-gender specific classroom interaction may be causing the development of a lower self-esteem in female learners. Studies have shown that especially in secondary schools, as girls undergo puberty, speaking up in front of others raises anxiety in many girls (Corson 1996: 130). Howe (1997: 4) argues that gender differences within whole-class interaction contribute to female learners' inhibition to speak. Howe points out that even though different student gender treatment in classroom discourse might not negatively influence the girls' achievements, it does affect their "public confidence" (Howe 1997: 8), meaning that they are inhibited to speak in whole-class situations. Howe explains that this is problematic, as classrooms are, just as work places, "public forums" (Howe 1997: 8), in which students can practice skills which they will need later on in the 'real world' of work: "To achieve positions of influence within the work context (and to use these positions effectively once they have been achieved), it is usually necessary to display one's problem-solving and managerial skills on a fairly public stage. It is necessary in other words to speak out in meetings and to debate in front of an audience" (Howe 1997: 8). Howe therefore warns about the fact that classroom interaction possibly provides girls and boys with dissimilar opportunities to practice these skills and that, as boys dominate the discourse more, they are offered more opportunities to do so (Howe 1997: 8).

Regarding boys' confidence, it has been shown that boys are generally more overconfident of their performance than girls are, especially in mathematics. Moreover, male and female students with identical math scores have very different evaluations of their own ability (Niederle and Vesterlund 2010: 137). Niederle and Vesterlund suggest that the dominant stereotype that boys are better at math can be used to explain this gap in confidence between the two student genders and suggest that this stereotype is even further strengthened by the reality that the majority of math teachers is male (Niederle and Vesterlund 2010: 137).

A psychological phenomenon that can be used to explain this difference in achievement between girls and boys is the Stereotype Threat, a concept first

introduced in 1995 by two American social Psychologists, Steele and Anderson. They define Stereotype Threat as "being at risk of confirming, as self-characteristic, a negative stereotype about one's group" (Steele and Anderson 1995: 797). Although their original study investigated Stereotype Threat in Afro-Americans, this concept can be applied to several different groups, including gender groups. Spencer et al. were the first to investigate the effect of Stereotype Threat in a classroom. In their experiment, they tested female and male college students with identical achievements in mathematics. In one condition, they told the participants that in the past, the math test they were about to take had shown significant gender differences. In the other condition, the participants were told that the test had shown gender fair results, i.e. female and male participants had allegedly shown equal results. As expected, there were only minimal gender differences in the latter condition. When participants expected gender differences, female participants achieved significantly lower scores than male participants (Spencer et al. 1999: 1). Spencer et al. offer the following explanation for this effect: "When women perform math, unlike men, they risk being judged by the negative stereotype that women have weaker math ability. We call this predicament stereotype threat and hypothesize that the apprehension it causes may disrupt women's math performance" (Spencer et al. 1999: 4). Several following studies were able to identify the impact of the Stereotype Threat on female learner's math performance and some also point towards the role of parents in contributing to the effect: "Mothers that support the stereotype that males are better at math underestimate their daughter's math abilities (...). This is particularly problematic for female learners' confidence, as their self-evaluation of their academic ability is more reliant on their parents' evaluation than their actual academic achievements" (Niederle and Vesterlund 2010: 137-138).

Interestingly, some studies have found that the achievement gap in mathematics between males and females increases in countries in which gender equality is not (yet) achieved, which further supports the hypothesis that women's perception of their performance has a strong influence on their actual performance (Guiso et al. 2009: 1164). For example, Guiso et al. compared PISA scores of 2003 across different OECD countries and found that in countries with higher gender equality,

such as Norway, the USA and Sweden, "the math gender gap disappears [and] girls' comparative advantage in reading widens" (Guiso et al. 2008: 1164-1165). The researchers measured the degree of gender equality by using different values, including the World Economic Forum's Gender Gap Index (GGI) and the Political Empowerment Index (PEI) that indicates women's participation in politics. In countries where women are less emancipated, such as Turkey and Korea, the gender gap in math and reading performance is larger (Guiso et al. 2008: 1164). However, they also found that "in countries with a higher GGI index, girls close the gender gap by becoming better in both math and reading, not only closing the math gap alone" (Guiso et al. 2008: 1165). Guiso's study therefore can also be considered evidence for the fact that overall, girls achieve higher grades than boys, regardless of the class subject, which is an important detail to remember in the gender gap debate.

Besides the effect of the Stereotype Threat, Niederle and Vesterlud suggest that the effect of competition and incentives is also a variable that contributes to the gender gap in math scores, since males and females respond differently to competitive pressure (Niederle & Vesterlud 2010: 131). One of the most important studies offering clear evidence for the fact that gender differences in performance can be generated by incentive schemes was presented by Gneezy, Niederle and Rustichini in 2003. The researchers conducted a series of experiments in which participants were asked to solve mazes on a computer for 15 minutes. To add competitive pressure, the researchers had the participants compete in tournaments, in each participating three men and three women. The participants were told that the best performance in each group would be rewarded with \$3 for each maze, while the others would have to leave empty-handed. The researchers report that "using tournament incentives in mixed gender groups resulted in a significant increase relative to the benchmark in performance of male participants, but not of female participants. As a result, we observe a significant gender gap in tournaments" (Gneezy, Niederle & Rustichini 2003: 1070). The study showed that the gender gap was three times greater when men and women competed against each other, compared to a condition in which the participants received piece-rate payments for solving the mazes. By comparing the results to single-gender tournaments, the

research team found that women in this study were not unable or unwilling to perform well under competition in general, but rather performed poorly competing against men (Gneezy, Niederle & Rustichini 2003: 1071).

Niederle and Vesterlud use these findings to explain why female learners perform poorly in math tests compared to male learners: "Due to the way tests are administered and rewards are allocated in academic competition, there is reason to suspect that females are failing to realize their full potential or to have that potential recognized by society" (Niederle and Vesterlud 2010: 131). They conclude that the competitive pressure within academia leads to an exaggeration of the underlying gender gap in math skills (Niederle and Vesterlud 2010: 140). This is especially problematic, as research has shown that amid equally talented learners, male students are a lot more likely to choose college majors with a high proportion of math content and drop-out rates of females in such majors are a lot higher (e.g. LeFevre, Kulak & Heymans 1992, Weinberger 2005).

Further explanations for this can be found by investigating reasons cited by women for dropping science courses. In 2002, the National Science Foundation funded a report that investigated women's experiences in college engineering programs. The report revealed that a lot of female students choose to exit engineering programs not because of their lack of ability, but because of a low self-confidence and a negative interpretation of their grades (Goodman Research Group 2002: 89). The researchers conclude that "women's confidence must be recognized as a major factor in persistence" (Goodman Research Group 2002: xi). The report also addresses an important issue that goes beyond engineering programs, stating that "[t]he decline in young women's self-confidence (...) is a societal problem that extends far beyond undergraduate engineering departments, and a tough one to solve" (Goodman Research Group 2002: xi). The researchers suggest that in order to help increase a student's self-confidence, educators must ensure that "she feels that someone believes in her (...) abilities, cares about her, and wants her to be part of a community" (Goodman Research Group 2002: xi). Moreover, in order to tackle this problem on a societal level and to increase female engineering students'

confidence, one has to foster their resilience and as an educator or mentor, show sensitivity towards this issue:

Sensitivity to students' self-confidence by faculty, advisors, and mentors will help (...). [R]esilience emerges in a child during difficult times when an adult (not necessarily a parent) serves as a mentor or helper to the child; this is true for young adults as well (...). [S]essions for faculty and staff on topics such as gender equity, creating more inclusive environments, and sensitivity training-updated for this decade-are still needed (Goodman Research Group 2002: 178).

As demonstrated in the previous sections, there are many different approaches towards explaining the differences in motivation and achievement in science and language classrooms between male and female students, including biological, sociological and psychological reasons. As briefly mentioned in 3.2.3, teachers have different attitudes towards students in different classroom subjects. Some studies suggest that this is due to the fact that boys are believed to be better at science and girls are believed to be better in languages (Sunderland 1995: 174). In the following section of this thesis, research relating to these claims shall be reviewed.

3.3 The issue of classroom subject: language vs. science

Most teachers believe that girls and boys have different learning and subject preferences (Goddard Spear 1987: 287) and that boys are better at sciences, while girls are better language learners (Sunderland 2000: 205). In the following section, research tackling these assumptions shall be discussed in order to show that in fact, male and female learners are not as different as educators might think, especially when it comes to their learning strategies and subject preferences.

3.3.1 Are boys better scientists?

When talking about 'science' classrooms, one needs to be aware of the fact that different (natural) sciences, which typically include biology, chemistry and physics, are challenging in different ways (Benke 2012: 213). However, in public debates, different natural sciences taught in schools are often grouped together under the term "the sciences". PISA also joins chemistry and physics together as "Physical Sciences" and publishes the scores for those subjects in a bundle (OECD 2007: 71). In many countries, up until upper secondary education, an umbrella subject of

natural sciences is taught, meaning that there is no designated differentiation between biology, chemistry and physics within the classroom discourse. This is often legitimized by the fact that all of these sciences are based on the same methodology. They all operate with positivistic paradigms and knowledge in those fields is accumulated by causal relationships between empirical evidence (Benke 2012: 213). Benke points out that this positivistic methodology and the way through which we encounter the world using those sciences, influences the didactic elements used in science classrooms. Therefore, didactic methods used in science classrooms mostly include experiments, group work, methodological reflexions and explorative learning (Benke 2012: 214). As boys' learning style preferences (see 3.2) are more in line with those methodologies, teachers consider science classrooms to be more attractive to male learners (Goddard Spear 1987: 287). This general perception of boys' superiority in science is partly based on outdated assumption about cognitive and biological differences between men and women (see 3.2.1).

In 2012, Gertraud Benke published a meta-analysis for which she combined PISA statistics from 2003 and 2006 with results from the large-scale quantitative study TIMSS (Trends in International Mathematics and Science Study) from the year 2000 and found a number of differences between boys and girls concerning test scores, motivation and behavior in the science classroom (Benke 2012: 221). To understand her findings, one must first understand how PISA tests operate. The PISA framework distinguishes between three components of scientific core competencies that are considered essential for acquiring 'scientific literacy': explaining phenomena scientifically, evaluating and designing scientific enquiries and interpreting data and evidence scientifically (OECD 2013: 2).

Benke found that although generally, the differences between girls and boys vary strongly across nations, female learners were on average better than males in interpreting data, while boys outperformed girls at explaining phenomena. Content-wise, male learners showed higher performances with physical and chemical issues; there were no significant score differences between males and females in biology and health issues (OECD 2009: 22). On the whole, male learners showed greater differences in performance within their group, meaning that the proportions of the

highest and lowest achieving boys are greater than the percentage of the highest and lowest achieving girls.

One of the most important insights Benke gained from the data was that although generally, boys and girls achieved similar scores across different school types and countries, looking at single classrooms, boys do show higher scores in both TIMSS and PISA statistics. Therefore, she concludes that gender stereotypes regarding natural sciences are reconstructed on a daily basis within those classrooms (Benke 2012: 222). In 2006, PISA tests focused specifically on science, i.e. over half of the tasks were science-related. In Austria, no significant differences in test scores between male and female students could be found in this year. However, it has been shown that girls do better in knowledge about sciences, (e.g. characteristics of a scientific experiments) and boys do better in knowledge in the sciences (e.g. how wind power creates energy) (Schwantner 2007: 2). The largest gender gap can be observed in physics, where boys over-performed girls by 45 points, which was the biggest gender gap between boy and girls in all participating nations (Schwantner 2007: 3).

Pisa tests not only capture test scores, but also measure certain concepts of students' self-assessed motivation and engagement for subjects, including emotional, motivational and behavioral factors and values. Schwantner points out that students' engagement plays a crucial role in acquiring competencies. The relation between achievement in natural sciences and engagement in science classrooms is considered to be reciprocal, i.e. the more students are open to scientific learning processes, the more they will learn and their achievement in turn influences their engagement (Schwantner 2007: 1).

According to Schwantner, central elements in student engagement are motivational components, which can be distinguished into intrinsic and extrinsic components: Intrinsic motivational components include interest, enjoyment and self-concept; extrinsic components are the perceived use of science in their daily lives and for careers (Schwantner 2007: 1). According to the OECD, developing and supporting those intrinsic and extrinsic motivational components is an essential goal of education in order to meet various scientific challenges, such as climate change,

renewable energies and fighting diseases like HIV and cancer: "The goal of science education is therefore to foster a fundamental and persistent interest in the sciences on the one hand and prepare them for a career in the sciences (Schwantner 2007: 3).

Generally, boys have been shown to have a higher instrumental motivation for engaging in science subjects, i.e. they are more motivated than girls to pursue science as they consider it important to reach a goal in society in the future (Berk 2012: 223). This also seems to be true for the Austrian educational context. Within PISA statistics, Austrian students stand out due to their significantly low motivation of female students in science classrooms. Austrian female students have consistently shown the lowest indication of personal use of sciences across all European countries. 18% of female learners are considered part of the "risk group", while only 9% belong to the top scorers. Boys on the other hand have about the same amount of top and bottom students in sciences (15% and 11% respectively). (Schwantner 2007: 3). Looking at student's motivation for science subject in detail (table 2), the data from 2009 shows that with the exception of two instances, girls in all school types rate themselves significantly lower on the scale compared to boys in their instrumental and future-oriented motivation, the trust in their own competencies and their self-concept in science classrooms. The biggest difference between attitudes towards science classrooms can be observed in the estimation of self-concept in science classrooms:

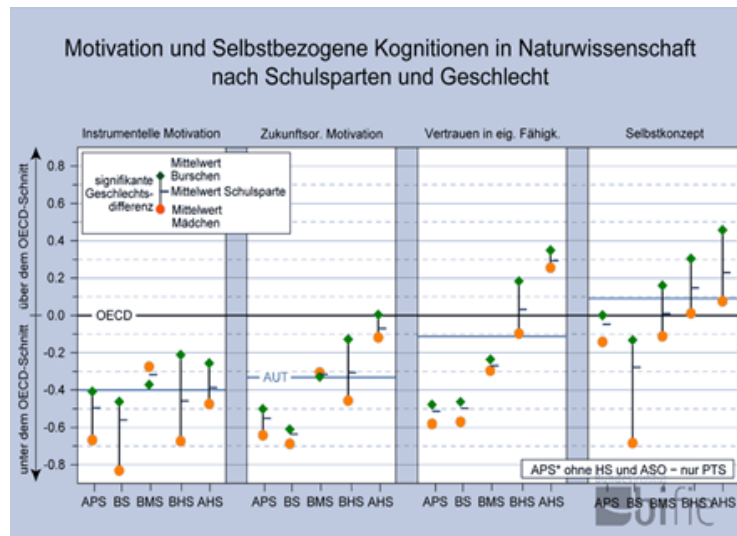


Table 2: motivation and self-concept in science according to school types and student gender according to PISA statistics 2009

The OECD report on the findings on the 2012 PISA test scores found similar results and concludes that regarding this difference in motivation towards science, "[g]ender gaps in drive, motivation and self-beliefs are particularly worrying because these factors are essential if students are to achieve at the highest levels" (OECD 2015: 23). As these statistics point out, looking at students' motivation towards science seems to be an important factor that influences both students' performance as well as their engagement in the school subject. Brickhouse et al. reinforce this correlation between the students' self-concept and their involvement in science as follows:

How students engage in school science is influenced by whether and how students view themselves and whether or not they are the kind of person who engages in science. It is therefore crucial to understand students' identities and how they do or do not overlap with school science identities (Brickhouse et al. 2000: 441).

As shown in the literature, boys are not necessarily better at science, but they do show more interest and motivation for science-related issues, which is important to remember when teaching within a co-educational context. Females have lower motivation and do not consider themselves 'belonging' into the sciences, which is also why programs such as GIST have been installed.

3.3.2 Are girls better language learners?

Early studies on gender differences in specific intelligences report a higher verbal intelligence in girls. In their acclaimed study *The Psychology of Sex Differences*, Maccoby and Jacklin established the belief that females are biologically verbally superior to males (Maccoby & Jacklin 1974: 75). The idea that such superior verbal abilities are innate stems from evolutionary psychology, which proposes that many differences between males and females are 'hard-wired', as Cameron explains:

[W]omen are said to have superior language and communication skills because of the survival advantage conferred on early humans if females were good at empathizing, social networking, and nurturing, whereas males had the spatial skills for hunting and the lack of empathy that would enable them to be aggressive in competing for resources (Cameron 2005: 500).

More recent research on gender differences in brain mapping found evidence that support this theory: The left hemisphere of the brain, responsible for most speech functions, develops earlier in females (e.g. Macaulay 1978: 355, Sunderland 2000: 205). However, gender gaps in verbal ability still remain a controversial issue, since findings are not consistently showing a superior verbal ability in women (see 3.2.1).

Nevertheless, girls are often considered the better language learners, and this belief is based on dominant ideas about brain lateralization and girls' socialization (see 3.2). However, evidence on the girls' superior language learning is inconsistent. Addressing previous research on second language learning, Ekstrand concludes that gender differences are only small and appear "on the most superficial level" (Ekstrand 1980: 251). Regarding specific aspects of second language learning, several early studies agree on the fact that females are more likely to achieve native-like pronunciation (Kahlke 1996: 21). Concerning vocabulary and listening tasks, no significant gender differences have been reported (e.g. Sunderland 2000: 206). A meta-analysis of 165 studies conducted by Hyde and Linn in 1988 showed no superiority in verbal ability in either gender (Hyde and Linn 1988: 53).

Although girls achieve better grades in foreign language classroom than boys (Christ 1996: 22), this does not necessarily mean that they are also better language learners. Hertel presents evidence for this claim, in a study on foreign language competitions. The data showed that 75% of participants were female learners. Although the male

participants' school grades in foreign languages were significantly lower than the grades of the girls, more boys than girls came out of these competitions as winners. Therefore, Hertel concludes that neither girls nor boys are better at second language learning and that school grades are not necessarily an indicator for the actual language proficiency (Hertel 1996: 37). Kahlke suggests that girls do better in language classes, since language learning is a process that requires more continuous effort and commitment than learning sciences for example, and girls become, through socialization, more adaptable and ready to learn (Kahlke 1996: 19). Moreover, Kahlke suggests that due to the way girls are socialized, female students are more compatible to the requirements of language classrooms, since language learning requires a certain amount of imitation and adaptation (Kahlke 1996: 20). Ellis argues that the socialization of females focusses more on empathy, which is essential for language learning and makes it easier for girls to identify themselves with another language (Ellis 1994: 204). While this claim is still debated, some studies do show that male students feel more anxiety within a second language classroom: Kitano (2001: 549) interviewed U.S. students enrolled in Japanese courses at universities and found that "male students' anxiety levels were negatively correlated with their self-perceived ability to perform various tasks in spoken Japanese, whereas female students did not show this tendency" (Zheng 2008: 7). Also, in their study, Campbell and Shaw (1994) revealed a significant interaction between gender and foreign language anxiety: Male students were more anxiety-ridden in using a foreign language in the classroom than their female counterparts after a certain amount of instruction in that foreign language. Campbell and Shaw also report on "foreign language anxiety", which is a lot higher in males than in females and increases over time (Campbell and Shaw 1994: 74). Chavez suggests that males might shy away from oral discourse in which they are not able to dominate, which they feel is the case for language classrooms (Chavez 2000: 1044). As mentioned earlier, teachers often believe that boys are more attracted to the methodologies of science classrooms, while girls are believed to be more interested in languages. However, studies have reportedly revealed that overall, this belief does not hold to be true in most cases. Drawing on reports of both teachers and students,

Goddard Spear found that in fact, "teachers believe that boys' and girls' preferences for subject characteristics are more dissimilar than they actually are. Girls' preferences are closer to those of boys and to the characteristics associated with school science than teachers realize" (Goddard Spear 1987: 287)

Goddard Spear's findings correlate to a hypothesis that is often neglected when talking about gender differences and gender inequalities. In 2005, Janet Shibley Hyde published her results of a meta-analysis of 46 studies investigating differences in psychology between men and women and found that "[g]ender differences can vary substantially in magnitude at different ages and depend on the context in which measurement occurs. Overinflated claims of gender differences carry substantial costs in areas such as the workplace and relationships" (Shibley Hyde 2005: 581). Shibley Hyde points out that her gender similarities hypothesis stands in conflict with the more common difference hypothesis, which claims that men and women are fundamentally different, which is what the media usually portrays (Shibley Hyde 2005: 582). She warns that within the ongoing gender-gap debate,

It is time to consider the costs of overinflated claims of gender differences. Arguably, they cause harm in numerous realms, including women's opportunities in the workplace, couple conflict and communication, and analyses of self-esteem problems among adolescents (Shibley Hyde 2005: 590).

Therefore, the gender similarities thesis is an important factor to keep in mind not only when talking about differences between men and women in general, but also within this very specific context of differences between male and female students.

3.3.3 A case for single-sex classrooms?

Considering that some studies found a reinforcement of gender stereotypes especially within science classrooms (Niederle and Vesterlund 2010: 137), advocates of single-sex education argue that girls and boys would perform better if they received instructions that target their differences in learning styles (e.g. Sax 2005, Gurian, Stevens & Daniels 2009). Others hold the view that due to the dominance of male students, classrooms should be separated by gender in order to support female students: "The reasoning goes that, in single-sex classrooms, girls can develop self-confidence in mathematics and science; that is, single-sex

classrooms are empowering to girls (...). This view is consistent with social psychologists' emphasis on the crucial importance of social context and social interaction influencing students' behavior" (Pahlke, Shibley Hyde & Allison 2014: 1043).

However, studies on the effect of single-sex classrooms show varied results. In a cross-country analysis of single-sex schools, Fryer and Levitt found that in Middle Eastern countries, the gender gap in math performance is not existent, which causes them to theorize that there is a causal relationship between the absence of the gender gap and single-sex schooling (Fryer and Levitt 2009: 7). Evidence from studies in the U.S. and other Western countries are still inconclusive: While evidence of some studies suggest that female students that attend single-sex schools are more inclined to enter science later on, other studies were not able to duplicate these findings (Niederle and Vesterlund 2010: 141). Within Austrian higher education, Jungwirth found that among female students of mathematics, science and technology, the majority has previously attended a single-sex school (Jungwirth 1992: 263). Going beyond the academic achievement alone, Dale investigated social outcomes for girls and boys in the U.K., comparing co-educational and single-sex schools. Dale claims that co-education is more natural for students and that both genders have more positive attitudes towards each other. As adults, they are more likely to support gender equality and live in happier marriages (Dale 1974: 35). Although Dale's study has been criticized for not being representative, more recent statistics support the claim that men who attended single-sex schools are more likely to get divorced than men who attended co-educational schools (Sullivan et al. 2011: 137).

To thoroughly investigate this issue, Erin and Allison conducted a meta-analysis of 184 studies, representing 21 countries and 1.6 million students, investigating the effects of single sex classrooms versus coeducational settings on a variety of variables, including mathematics and science performance, attitudes, educational aspirations, gender stereotyping and self-concept. The meta-analysis showed that differences between students of single-sex classrooms and coeducational settings were only trivial or not statistically significant at all (Pahlke, Shibley Hyde & Allison

2014: 1042). They explain that most of the studies showing an advantage for students in single-sex classrooms were uncontrolled, i.e. the participants had not been assigned randomly and the researchers have not controlled for selection effects, which led to "erroneous conclusions" (Pahlke, Shibley Hyde & Allison 2014: 1044). They conclude that "results from the highest quality studies, (...) do not support the view that SS [single-sex] schooling provides benefits compared with CE [coeducational] schooling" (Pahlke, Shibley Hyde & Allison: 1044).

So far, we have looked at general differences between male and female language use, student-gender specific attitudes and behaviors in different classrooms and widespread beliefs about the differences between girls and boys in classrooms. As for the following sections of this thesis, I will focus specifically on linguistic aspects of student gender-specific behavior, including features of teacher-student and student-teacher interactions in order to create a basis for the discourse analysis.

4. Student gender-specific language behavior

Decke-Cornill and Volkmann (2007) date the beginnings of the raising interest in the correlations between classroom interaction and gender back to the 1950s, when Meyer and Thompson published their study on *Teacher Interactions with Boys, as contrasted with Girls* (1956) and found that female and male teachers offer more attention to their male pupils than their female ones: "They listened to them longer, gave them more feedback, both approving and disapproving" (Decke-Cornill & Volkmann 2007: 77). The majority of research investigating student gender in classroom discourse was conducted in the 1970s and 1980s, which was due to the rise of feminist movements and the correlating interest in gender equality within education. Early research was mostly concerned with the dominance of boys in classrooms in terms of quantitative measure, i.e. the amount of talk and the amount of teacher attention they receive. Joan Swann summarizes the core findings of these two decades as follows:

While there are quiet pupils of both sexes, the more outspoken pupils tend to be boys (...). Boys are] most likely to call out (...). Teachers give more attention to boys than to girls. Topics and materials for discussion are often

chosen to maintain boys' interests (...). Teachers accept certain behavior (such as calling out) from boys but not from girls (...). "Disaffected" girls tend to opt out quietly at the back of the class, whereas disaffected boys make trouble (Swann 1992: 51-52).

However, it is important to understand that, as Brophy pointed out early in the debate, teachers respond to a student's behavior and not to a student's gender per se: "Male versus female differences in classroom experience are due almost entirely to gender-role related differences in the behaviour of the students themselves and not to any general tendency of either sex to treat boys and girls differently" (Brophy 1985: 132).

In the following, an overview of the literature on student gender-specific linguistic behavior will be presented. Different quantitative and qualitative features of classroom discourse will be discussed, so as to offer an understanding of the complex mechanisms that influence classroom discourse and that can create or erase learning opportunities for both student genders. The different studies presented will also serve as a basis for the methodology of the research for this thesis.

4.1 Teacher-student interaction

Different perspectives have highlighted the role of teacher-student interactions in student's motivation and engagement (Stroet et al. 2013: 66). Early research has focused on the amount of teacher attention towards learners and found that it is mostly unequally distributed among male and female learners. Some researchers have however pointed out that not the amount, but rather the kind of teacher attention is essential for student engagement and motivation. In the following, research on the amount and different kinds of teacher attention will be reviewed.

4.1.1 Amount of teacher attention

Early research on the amount of teacher attention to female and male students has revealed that teachers speak significantly more to their male students than to their female students: One of the most prominent researchers in this field was Dale Spender, who was skeptical about these previous findings concerning teacher attention and therefore started investigating her own classrooms, being certain that

she was offering an equal amount of attention to both student genders. However, after analyzing videotapes of her lessons, she found that "[o]ut of ten taped lessons (...) the maximum time [she] spent interacting with girls was 42% and on average 38%, and the minimum time with boys 58%" (Spender 1982: 56). What is especially interesting about Spender's findings is the great disproportion of teacher attention to the student genders. She concluded that when it comes to equal treatment of students, her own perceptions were unreliable: "It is nothing short of a substantial shock to appreciate the discrepancy between what I thought I was doing and what I actually was doing" (Spender 1982: 56).

Although Spender has been criticized for her methodology (Decke-Cornill & Volkmann 2007: 78), several following studies have confirmed her findings. Allyson Julé found that the teacher in her study paid more attention to her male students, which also included significantly more questions. In one average lesson, she found that "[t]he most often used utterance by the teacher is questioning (79 occurrences). She generally directs her questions to the class as a whole (67 times), then specifically to the boys (11 times) and only once directly to a girl" (Julé 2005: 31). So in terms of quantity of questions, boys were offered significantly more questions than girls in this classroom.

Sadker and Sadker point out the main problem that arises from an unbalanced teacher attention for both genders in the classroom: "As teachers use their expertise to question, praise, probe, clarify, and correct boys, they help these male students sharpen ideas, refine their thinking, gain their voice, and achieve more. When female students are offered the leftovers of teacher time and attention, morsels of amorphous feedback, they achieve less" (Sadker and Sadker 1995: 13).

Jane Sunderland points out that such imbalanced amount of attention often has been explained by the simple fact that boys dominate in language classrooms, which is a very simplified suggestion (Sunderland 2010: 160). She argues that the amount of teacher attention alone cannot be seen as a valid indicator for successful learning opportunities. Therefore, she claims that one must distinguish between "amount of attention and kind of attention (...); some attention, like being told off, could hinder learning" (Sunderland 2000: 161). Her own research showed that teachers offered

more attention to male learners in terms of amount of words. Nevertheless, most of this attention consisted of non-academic solicits, such as asking the male students to close a window or telling them off (Sunderland 2000: 162). Sunderland points out that this kind of attention can hardly be seen as "better attention" (Sunderland 2000: 162) and explains that "[i]f the teacher does feel that boys are getting more of his or her attention, he or she should thus not assume that this means the boys are getting better learning opportunities. (Though it may be that girls are being deprived of such opportunities)" (Sunderland 2000: 162). Deborah Tannen agrees with this suggestion and points out that an analysis of quantitative features of gender-specific language in general is by far not "nuanced enough to capture the dynamics underlying gender-related or any other linguistic patterns" (Tannen 2005: 341). In a qualitative analysis of teacher attention towards male and female learners, Kelly found that "boys (...) get more instructional contacts, more high level questions, more academic criticism and slightly more praise than girls" (Kelly 1988: 20). She concludes her meta-analysis on the issue as follows: "It is now beyond dispute that girls receive less of the teacher's attention in class [...]. It applies to all age groups [...] in several countries, in various socioeconomic groupings, across all subjects in the curriculum, and with both male and female teachers" (Kelly 1988: 20).

4.1.2 Teacher questions

Generally, teacher questions are considered a powerful, if not the most powerful tool for teachers (Postman 1979: 140). McCormick and Denato suggest that questions in a classroom are "[a] fundamental discursive tool for engaging learners in instructional interactions, checking comprehension and building understanding of complex concepts" (McCormick and Denato 2000: 182). Additionally, they evaluate teacher questions as "dynamic and discursive tools to build collaboration and to scaffold comprehension and comprehensibility" (McCormick and Donato 2000: 197). Therefore, questions can be considered one of the most important linguistic features for creating learning opportunities for the students. Postman and Weingartner go so far as to claim that "[t]he art and science of asking questions is a source of all knowledge" (Postman and Weingartner 1969: 89). When analyzing questions within classroom discourse, the most important goal is to establish their

functions within the discourse so as to be able to assess what they contribute to the learning process, as Dalton-Puffer (2007: 94) points out. Findings on teacher questions indicate that a higher number of teacher questions is related to a higher-level of student achievement and that high cognitive questions, encouraging critical, independent thinking, can enhance learning (Pearson and West 1991: 22).

Some of the earlier mentioned studies on the different treatment of student gender have also taken teacher questions into consideration. In terms of the nature of teacher questions, Kelly found that male students were asked more 'high level questions' than girls were (Kelly 1988: 29). However, Kelly's findings stand in conflict with Jane Sunderland's research. Using the linguistic concept of "solicit" (Bellak et al. 1996) Sunderland investigated what the teacher asked the students to do and say and analyzed whether student gender influenced the kind of solicits. To do so, she specified different kinds of solicits: "A solicit might be phrased as an interrogative ('What is the German word for train?'), or it might not, (the German word for train - Susan'); it could also be intended to elicit non-academic behavior ('Can you close the window please')" (Sunderland 2000: 161-162). Her findings show that the teacher asked the girls more complex, academic questions than the boys: " [i]n relation to boys, girls were asked a greater proportion of academic solicits to which they were expected to respond in the target language] (...) and a greater proportion of questions which required an answer of more than one word" (Sunderland 2000: 162).

Based on her findings, Sunderland proposes a highly interesting possibility; She argues that within this specific classroom, "the teacher was actually treating - or, arguably, constructing - the girls as the more academic students (...). [W]hile boys may appear to dominate the classroom in one sense, girls may dominate it in another" (Sunderland 2000: 216). A closer look at the kinds of questions the teacher raised towards male students supports this proposition, since Sunderland found that the large quantity of questions towards male learners was in fact caused by the large sum of disciplinary and non-academic solicits (Sunderland 2000: 162). This observation also stands in line with Kelly's argument that the high amount of teacher questions to boys is "most marked for behavioral criticism" (Kelly 1988: 29).

In a more recent study, Chavez found that female students were more likely to be addressed in complete sentences than male students by the teacher, which Chavez considers more "authentic or even 'difficult'" (Chavez 2000: 1044).

Most of the mentioned studies did not focus on teacher questions according to student gender per se and therefore did not work with a refined distinction between different kinds of teacher questions. Hence, in this section of the paper, I will take a closer look at different kinds of teacher questions to later analyze them in the transcripts. The purpose of an analysis of teacher questions is that this different kinds of teacher questions foster different learning processes for students which means that if a teacher was to raise a more 'high level question' to one student gender, this would imply that the teacher is challenging this student gender more and thereby possibly creates a better learning opportunity for that student gender, which disadvantages the other student gender. The literature shows that teacher questions can be categorized in a variety of ways. Since research on the kinds and functions of teacher questions is substantial, I will not go into too much detail, but discuss three major approaches towards the categorization of questions, which later be investigated in the data.

One of the most influential categorizations of teacher questions was introduced by Hugh Mehan, who distinguishes between display questions and referential questions (Mehan 1979: 287). His distinction is based on the kind of information that the questioner seeks, that is, this categorization suggests a distinction between "information seeking questions" and "known information questions" (Mehan 1979: 285). Questions to which the answer is already known by the questioner, i.e. 'known information questions' are classified as follows: "When a known information question is asked, the questioner already has the answer or at least has established the parameters in which a reply can properly fall. The questioner is testing the knowledge of the respondent" (1979: 285-286). Here, the questioner, i.e. the teacher, is not interested in actually receiving new information, but rather testing the student whether or not they know something (Dalton-Puffer 2007: 95). Referential questions, on the other hand, are 'information seeking questions', which means that the person who asks the question is looking for information s/he does

not already know. Regarding the function of these two kinds of questions, Dalton-Puffer points out that

[s]ince this is taken to be the 'normal' purpose of a question, they are also referred to as 'real' or 'authentic' questions (...). Referential questions are frequently seen as more 'natural' and are expected to generate student answers that are somehow qualitatively better (more authentic, more involved, longer, and more complex) than answers to display questions. (...) Answers to display questions, on the other hand, are seen as notoriously restricted, quite often consisting only of one word (Dalton-Puffer 2007: 95-96).

The following examples, taken from Tsui (2001: 132) illustrate the difference between display and referential questions:

Display questions:

T: Last week we were reading 'Kee Knock Stan' [title of a story]. What is 'Kee Knock Stan'? Janice.

P: I cannot understand.

T: Yes.

Referential questions:

T: What do you think the postman at the post office would do?

P: I think I would divide it if the letters are to Hong Kong or other places.

T: Yes, I think that's a sensible way, right? Good.

Thompson points out an important communicative advantage of referential questions. Since they can be personal, (e.g. Do you have any pets?), they relate to the learner's personal lives and views (Thompson 1997: 101). Thereby, these types of referential questions engage the learners more into the conversation and can foster a higher motivation in the learning process: "One great advantage of this is that it allows the learners to have some degree of control over the input, which may well lead to increased motivation and more investment by the learners in the learning process" (Thompson 1997: 101). Even though referential questions give the students the possibility to answer in longer, more complex ways, which would open up better learning opportunities, several studies report that in general, teachers usually use substantially more display questions (e.g. Long and Sato 1983, Musumeci 1996).

Another wide-spread distinction of teacher questions is the categorization into open and closed questions, as introduced by Barnes (1969). Open questions are questions with which the questioner gives the respondent some sort of freedom for his or her answer, while closed questions ask for simple answers that consist of one word. This ensures that the control over the conversation maintains with the questioner and makes them "quick and easy to answer" (Dalton-Puffer 2007: 97). Closed questions are typically limited to yes/no questions, whereas open questions usually start with words like what, how, where, who and ask for longer, more complex answers. The following examples (Dalton-Puffer 2007: 97) illustrate these two categories:

Closed questions

did anybody of you try to dive already?
was that a four-star hotel?
do you think do you really think that parents know what their kids are doing just by calling them?
are they really gods or are they monsters

Open questions

who fought against whom in the First World War?
how was it under water?
what would be the result of dropping a hundred percent of my products, martin?
who are the rich men in an early society?
why the cold war was going so long?

However, Dalton-Puffer also points out that when analysing classroom discourse, it is often difficult to distinguish between those two, for example because although the question seemed to be open, sometimes the questioner was looking for a particular answer. Therefore, she suggests that the "analysis of open/closed questions therefore needs to proceed in a qualitative, context-sensitive manner" (Dalton-Puffer 2007: 98). One very common form of closed questions are yes/no questions. According to Thompson, their main functions are to check for general comprehension, also for weaker learners. Thompson suggests that

Yes/no questions are generally easier for learners to answer, and (...) teachers can therefore direct those questions at weaker learners, or use yes/no questions to check basic understanding of a text or situation before moving on to wh-questions to elicit more detailed information (Thompson 1997: 100-101).

Thompson further points out that one advantage of yes/no questions is that by asking them, the teacher can help shy students with becoming more active in classroom interaction: After they have already answered a yes/no question, they are much more likely to answer a follow-up wh-question, which requires a longer answer, since they have already 'invested' in the conversation (Thompson 1997: 101).

Another distinction can be made between questions that address different registers of the classroom, namely the instructional and regulative register (Christie 2000: 185). If the purpose of a question is to organize tasks, conduct administrative things or get the student's attention, they belong to the regulative register. These questions do not target language or content learning, but rather non-academic tasks. Questions that aim at conveying knowledge are part of the instructional register (Dalton-Puffer 2006: 190). It is important to make this distinction, since these questions evoke answers that offer different opportunities for language use (Dalton-Puffer 2007: 99) and thereby give or take learning opportunities.

4.1.3 Teacher support

Empirical research has highlighted the role of teacher support in student engagement. Marks found that in elementary, middle and High School levels, "teacher support was positively associated with student engagement" (Marks 2000, quoted in Lietaert et al. 2015: 500). In a more recent analysis of 71 related studies conducted since the 1990s, Stroet et al. also found a strong positive correlation between teacher support and student engagement and motivation (Stroet et al. 2013: 65). Lietaert et al. explain that educators can support students in a variety of ways:

Teachers can support students' needs by providing autonomy support (i.e., indicating the relevance of learning materials, providing choices, stimulating initiative), structure (i.e., providing clear guidelines and expectations, thorough assistance, competence-relevant feedback), and involvement (i.e., affective support, warmth, taking the perspective of the students)" (Lietart et al. 2015: 500).

One of the most powerful types of teacher support is praise, which can be used by teachers as a tool for engaging and motivating learners. Several different definitions of praise can be found in the literature, including the following: "To commend the worth of or to express approval or admiration" (Brophy 1981: 5); "Verbal or physical behaviors indicating the positive quality of a behavior over and above the evaluation of accuracy" (Kalis, Vannest, & Parker 2007: 22); and "Any verbal statement or gesture indicating teacher approval of a desired student behavior. The statement or gesture needs to be beyond confirmations of correct academic responses" (Reinke, Lewis-Palmer, and Merrell 2008: 319). Generally, research has found that praise is very likely to reinforce and encourage a student's participation and willingness to talk in class (Menzel & Carrell 1999: 32).

After reviewing research on teacher praise from the last four decades, Jenkins et al. found that instances of teacher praise are commonly divided into two categories: behavior-specific and general praise. They explain that "General praise is any praise statement (...), whereas behavior-specific praise is a praise statement that specifically indicates the desired student behavior (e.g., I like the way Michael is sitting quietly in his chair)" (Jenkins et al. 2015: 464).

Several of the previously mentioned studies on student gender specific behavior have also investigated the distribution of teacher praise between male and female learners. In Julé's study, within an average lesson, the teacher praised her students four times: "once to the whole class and three times to a boy, never directly to a girl" (Julé 2005: 32). Similarly, Mahony found that "three boys to one girl received praise and encouragement" (Mahony 1985, quoted in Julé 2005: 27). Kelly's meta-analysis did not mirror these strong discrepancies in gendered praise. However, she concluded that generally, "boys (...) get (...) slightly more praise than girls" (Kelly 1988: 29).

More recent psychological research on the effect of praise has revealed that the amount and type of praise can affect student motivation and by extension, student achievement (e.g. Robins and Pals 2002, Chalk and Lewis 2004, McLellan 2005). However, as Persaud points out, hardly any research on praise has been done specifically to investigate gender differences (Persaud 2013: 4). The researcher

conducted psychological research, investigating the extent to which type, amount, source and interpretation of teacher praise and reprimand impact student motivation and achievement of male students in contrast to female students on two Caribbean islands. The study revealed seven major findings, summarized in the following:

praise and criticism do affect student's motivation (...), teachers praise male students less than female students (...), male students are more likely than female students to negatively interpret teacher praise (...), [and] sincere praise from same sex teachers is more likely to positively motivate students" (Persaud 2013: vii).

Therefore, Persaud's research conflicts findings of previous research on the distribution of praise among male and female learners, as this study suggests that females are praised more frequently than males.

4.1.4 Criticism

Criticism is not only a relevant factor in student motivation, but also plays an important role in accounting for higher portions of teacher attention, which was highlighted by Brophy and Good, who investigated elementary school classrooms (1970: 370). Moreover, the researchers argue that rather than a teacher bias towards boys, male learners bring "criticism upon themselves" (Brophy and Good 1970: 373), as they show frequent disruptive behavior. Baeman et al. point out that male learners "engage in more externalizing behaviors than girls, the very behaviors that are likely to be viewed unfavourably by teachers" (Baeman et al. 2006: 356). Therefore, a higher amount of behavioral criticism is in fact not surprising, but still problematic, as it, in a way, marginalizes boys within the classroom discourse (Baeman et al. 2006: 356).

Kelly's meta-analysis supports this theory, as she found that the high amount of teacher attention towards male students was mostly "marked for behavioral criticism" (Kelly 1988: 23), meaning that male students were criticized for their behavior and not for their subject-related input. The analysis showed that female learners received only 35% of total teacher criticism, of which 80 percent was addressing their behavior. 78% of behavioral criticism was directed towards male

learners. Unlike Brophy and Good, Kelly found that not only the high amount of behavioral criticism contributed to higher teacher attention towards males, but that boys also received more academic criticism than girls, as well as more praise and more high-level-questions. (Kelly 1988: 21). In a more recent study on gender-specific classroom interaction, Duffy et al. found that in mathematics, as well as language/literature classes, both male and female teachers were more likely to criticize on academic responses of male learners than of females and they were also more likely to "criticize the conduct of male students" (Duffy et al. 2001: 591). Persaud suggests that praise and criticism play an essential role in student motivation and subsequently in student achievement (Persaud 2013: 4), which stands in line with most earlier research on this issue. Concerning gender-specific criticism, her research showed that "teachers use the same types of praise but different types of criticism for male and female students" (Persaud 2013: vii).

4.1.5 Target language use

There is still much debate about the use of the first language (L1) and the target language (TL) within the foreign language classroom and there is a continuum of perspectives on the use of the target language, as Macaro (2005: 64) points out. Advocates of the TL consider the L1 to have little communicative or pedagogical value (Moeller & Roberts 2013: 22). Based on Krashen's (1982) concept of Comprehensible Input, supporters of the TL argue that the target language will be mastered when learners are exposed to substantial amounts of comprehensible target language. A large body of research (e.g. Larsen-Freeman 1986, Lightbown 1991, Turnbull 2001) has highlighted the importance of TL input in the learners' TL development and a direct positive correlation between the teacher's use of the TL and the learners' achievement has been established (e.g. Carroll 1975, Wolf 1977). Moreover, MacDonald (1993) and Wong-Fillmore (1985) have argued that using the target language results in increased student motivation, as they realize its instantaneous usefulness (Moeller & Roberts 2013: 22). Although the teacher's use of the target language is a highly important tool, sometimes the only authentic target language input for the students and most teachers agree that the TL should be "the predominant language of interaction in the classroom" (Macaro 2000: 68), several

studies have shown that the amount of TL use varies greatly across teachers and classrooms (e.g. Duff and Polio 1990). In a qualitative analysis of teachers' target language use and their students' proficiency levels, Dickson (1992) found that it is not the amount of TL that is relevant, but rather the quality of TL exposure. Researchers following this approach argue that by using the first language as a scaffolding tool and frame of reference, language can be produced more easily and language develops from input to intake, which results in a greater understanding of the target language (Thornbull 2001: 533). Especially within CLIL classrooms, the L1 plays an important role. As most CLIL classrooms are multilingual settings in which learners usually share at least one common language, many argue that it is natural for them to use all linguistic resources they have at hand, including the L1, especially when facing demanding tasks (Lasagabaster 2013: 2). Gierlinger (2007: 79) observed that the use of the mother tongue in CLIL settings also varies considerably, depending on the instructor's assessment of the classroom context. His study revealed that CLIL teachers mostly use the L1 for disciplinary measures and instructions, in order to clear up misunderstandings and to achieve a fuller comprehension of the content (...). Chavez argues for a natural use of the target language: "if we want our students to associate the L2 with genuine communication, we need to incorporate it in equally genuine ways in our classrooms. And genuine inclusion will rely on norms which develop naturally" (Chavez 2003: 194-195).

Relating target language use to student gender, Jane Sunderland observed in her study that "[i]n relation to boys, girls were asked a greater proportion of academic solicits to which they were expected to respond in [the target language]" (Sunderland 2000: 162). Sadker and Sadker (1995: 106) found that male students tend to talk more to the teacher than female students do, including talking in the target language and therefore use the target language more than female students do.

The previously presented research has been related to teacher-students interaction only. However, as teacher-student interaction is not a one-way street, looking at student-teacher interaction will help understand the complex dynamics of classroom discourse a bit better, which is what the next section of this thesis is aimed at.

4.2 Student-teacher interaction

Several studies have found that differences in utterances between male and female student are significantly influencing classroom discourse (e.g. Chavez 2000: 1019, Rashidi and Naderi 2002: 35). In the following, different features of student-teacher interaction that have been investigated in previous literature will be reviewed to again serve as models for the research section of this thesis.

4.2.1 Linguistic Space

Pat Mahony uses the term 'linguistic space' to refer to the amount of talk one occupies within oral discourse (Mahony 1985). Concern over unequal distribution of linguistic space between student genders stems from the assumption that the amount of talk within a classroom is proportional to the amount of learning opportunities. Allyson Julé explains the issue as follows: "Learning and language learning happen through talk. It is, therefore, crucial if some students (often boys) have opportunities to talk in classrooms, while other (often girls) claim disproportionate access to the linguistic space of the room" (Julé 2002: 49). Feminist research in the 1990s has pointed out that female students do not receive enough speaking time in classrooms (e.g. Gilligan 1992, Sadker and Sadker 1994). Likewise, Sadker and Sadker found that within language classrooms, male learners have the tendency to speak more to the teacher than their female peers do, including talking in the target language (1995: 106). Similarly, Allyson Julé found a considerable disproportion of linguistic space in ESL classrooms. In one of her most significant studies, she observed a Punjabi Sikh ESL classroom in British Columbia for six months and found that, from the linguistic space that all learners occupied within the classroom discourse, male students took up 88.3 percent, while girls occupied 11.7 percent, which amounts to a 9:1 ratio of linguistic space in favor of male learners (Julé 2005: 30). In fact, she pointed out that "[t]he linguistic production of all children is minimal, but the girls in particular appear almost non-existent in the classroom discussions" (Julé 2005: 30). Julé therefore talks about the 'silence of girls' and sees this silence as partly caused by the teacher responses they received to their comments (Julé 2002: 37). Similar findings were presented by Brooks, who investigated verbal participation of males and females among graduate students.

Interestingly, the study showed that a difference in linguistic space between male and female learners was only found in female professors' classes: "In male professor's classes, no significant differences were found in number of times male and female students spoke or in duration of their speech (...). However, in female professors' classes, male students spoke significantly more" (Brooks 1987: 687). The researcher suggests that male students only dominate the linguistic space in female-led classrooms, since male students attribute higher status to male professors, which lowers their dominant behavior (Brooks 1987: 688). More recent studies on the proportions of amount of talk of male and female students also confirm that male students occupy more talk in language classrooms. Rashidi and Naderi found that

male students initiated more exchanges with their teachers (...) and gave more feedback to their teachers (...). Boys are more likely than girls to create conditions where their contributions will be sought by teachers, and they are more likely than girls to push themselves forward when contributors are not explicitly selected" (Rashidi and Naderi 2012: 35).

Shomossi et al. also found that within language laboratory courses, males occupied a greater volume of contributions and holding the floor longer than female participants (Shomossi et al. 2008: 180). However, they point out that the disproportionate amount of male talk in classroom discourse is not necessarily the male students' 'fault': "boys make themselves relatively prominent, suggesting that teachers' choices may be a reflection of 'visibility' rather than gender per se" (Shomossi 2008: 180). This also relates to the research of Swann and Graddol, who found that after raising a question to the whole class, teachers generally select the student who raises their hand first, and this student is very likely to be male (Swann & Graddol 1988: 50).

Looking at test scores, female learners do significantly better in language classrooms, so it could be argued that linguistics space might not have any influence of student performance. It might be the case that female learners benefit from the quality of interactions with the teacher, rather than the quantity of it, as Sunderland points out: "While boys may appear to dominate the classroom in one sense, girls may dominate it in another" (Sunderland 2000: 163). Sunderland also reports that

female learners make use of strategies to compensate for the lack of involvement, such as talking to and asking the teacher after the lesson (Sunderland 2000: 233).

4.2.2 Student Questions & Interaction Initiations

Early research on student questions stressed its importance in the learning process: "questioning can be a central feature in promoting the development of conceptual abilities, analytical techniques, and the synthesis of ideas" (Napell 1976: 82). Most studies found that students ask a lot less questions than educators would expect (Pearson and West 1991: 22). Regarding gender differences, only limited research on gender-related differences is available and these studies show heterogeneous findings.

Pearson and West investigated college classrooms and found that in general, students asked an average of 3.3 questions per hour, that male instructors were asked more questions by both student genders than female teachers and that male students were asked more questions than female students. For their study, they borrowed a popular coding system created by Good et al. (1987) to analyze different kinds of questions. They distinguished between the following nine types of student questions:

<i>Academic questions</i>	
<i>Explanation</i>	request meaning or reasons that help in understanding a concept, idea, task, or procedure.
<i>Information</i>	seek specific, factual, academic information.
<i>Clarification</i>	request clarification of information, procedures, comments, or tasks provided by the teacher or others.
<i>Non-task curiosity</i>	display academic curiosity unrelated to the immediate task.
<i>Non-academic questions</i>	
<i>Procedural</i>	concern classroom procedures.
<i>Diversion</i>	divert the teacher's or other's attention from the task at hand.
<i>On-task attention</i>	related to the immediate task and intended primarily to draw attention to the individual student or to "show off".
<i>Off-task attention</i>	unrelated to the task and intended primarily to draw attention to the individual student or to "show off". These questions differ from those in the diversion category in that they are intended to draw attention to the student, not to divert the teacher's or class's attention from the task at hand.
<i>Confirmation</i>	seek confirmation of a completed student response, procedure, or task.

Table 3: Kinds of student questions according to Good et al. (1987).

However, Good et al. they did not find any difference in types of questions asked by male and female learners in their original study (Good et al. 1987: 185). In an analysis of a mathematics classroom, Becker found that compared to males, females asked more public questions (i.e. intended to gain an answer that is relevant for the whole class) and asked for individual help more often (Becker 1981: 51). Likewise, Younger et al. found that of all questions or requests to help raised by students, 70% were raised by girls: "Regardless of the subject, girls interacted more inquisitively with the subject matter being taught, participated more in the enquiry process, and showed more interest and intellectual curiosity" (Younger et al. 1999: 338).

Focusing not only on questions but on initiated interaction in general, Dart and Clarke investigated 24 science classrooms in Brisbane and found that overall, male learners had more interactions with the teacher than female learners (Dart & Clarke

1988: 46). However, they also found that in fact, girls were the ones who initiated more interactions compared to boys and that the largest amount of interactions between teachers and male students was, as suggested by other studies, in the 'behavioral' area. Therefore, they suggest that one needs to be careful when looking at amount of student-teacher interaction in terms of numbers or percentages, as these "add to the literature supporting sex bias in science classrooms" (Dart and Clarke 1988: 46).

Different results were presented by Irvine, who analyzed students' initiating behaviors in 63 classrooms and found that male students initiated more interactions (Irvine 1986: 14). Irvine pointed out that these interactions usually resulted in more verbal feedback from the teacher and suggested that these findings support Brophy and Good's theory that

high-achieving boys assert themselves through positive initiating behaviors, such as dominating class discussions by answering questions without being recognized. Low-achieving boys initiate through more negative behaviors, such as misbehaving and violating rules and norms (Irvine 1986: 16).

Irvine concludes that both, high-and low achieving boys demand recognition by the teacher, which leads to a disproportionate amount of feedback to boys, which leads to an "obscurity of female students and the dominance of male student in teacher-student classroom interactions" (Irvine 1986: 17). Similar results were reported by Rashidi et al., who found that in Iranian foreign language classrooms, male students initiated conversations significantly more often than female students (Rashidi and Naderi 2012: 34), which further contributed to the larger portion of oral distribution of male learners in the class.

4.2.3 Student Responses

Regarding volunteered student responses, Sunderland observed in her study that "when the teacher asked a question without naming a student to answer it, the 'average girl volunteered significantly more answers in [the target language] than did the 'average boy'" (Sunderland 2000: 163). In contrast, Julé found that male learners were the "usual and consistent responders" (Julé 2005: 32) and that boys were usually the ones to call out answers. In Becker's study, females and males

showed equal amounts of attempts to answer teacher questions and also the quality of the questions did not show any gender-related differences (Becker 1981: 45). In a more recent study in an Iranian context, Rashidi and Rafieerad found that male students were generally more willing to interact with their teachers and volunteered more to answer teacher questions, even if they did not know the answer to the question (Rashidi and Rafieerad 2010: 93). Likewise, Monika Chavez' points out that female more than male learners report that they would only answer teacher questions if they were sure their answer was correct (Chavez 2000: 1035). Rashidi and Naderi found that while boys started more exchanges with the teacher on their own, girls preferred to be called on first before speaking (Rashidi and Naderi 2012: 30). Regarding the length and complexity of answers, they found that females provide longer responses in which they use new grammar and vocabulary items they have recently learned (Rashidi and Naderi 2012: 35). However, females would also switch to their native language more often than males: "While boys insisted on speaking in the target language and making them understood (they did not mind how much time they took), girls quickly switched to the native language and tried to end the conversation" (Rashidi and Naderi 2012: 35).

4.2.4 Interruptions

Yang defines interruptions as "situations in which one person intends to continue speaking, but is forced by the other person to stop speaking" (Yang 2001: 2). Being interrupted can have different causes and consequences, e.g. interruptions can be considered to provide feedback in a conversation (Stainton 1987: 3), as an attempt to take the floor (Yang 2001: 2) or they can be face-threatening (Goldberg 1990: 892). Several classifications of types of interruptions have been established. Stainton for example distinguishes between four kinds of interruptions: simple interruption, butting- in interruption, silent interruption and overlap (Stainton 1987: 80). Yang distinguishes between interruptions according to their competitiveness: "speakers can compete for speech space and they can also compete for topic or idea" (Yang 2001: 2). According to Yang, interruptions can also show a speaker's willingness to reinforce or support the main speaker's point (Yang 2001:

2). Likewise, Goldberg distinguishes between power and rapport interruptions (Goldberg 1990: 890). Gamito suggests that

the role of the interruptor is to gain control over the topic; it can be claimed that it is a way of gaining power. Nevertheless, the interruptee's aim is to either let the interruptor take the floor, and therefore, lose control over his/her topic, or stay on-topic and take the interruption as a mutual and shared interaction (Gamito 2006: 373).

Gamito also points out that generally, teachers and students are aware of turn-taking rules in lessons and that students know that there are certain patterns within classroom discourse (Gamito 2006: 373). Therefore, if there are students that continuously interrupt, it needs to be determined whether these interruptions are rapport interruptions, power interruptions and whether they are accepted by the teacher (Gamito 2006: 373).

Studies on classroom discourse and mixed-gender conversations have shown that male learners tend to interrupt classroom discourse more than female students do (e.g. Zimmerman & West 1975: 105) and most researchers attribute this behavior to the male student's desire to control the classroom discourse (Julé 2002: 27). However, Deborah Tannen points out that one cannot causally relate the act of interrupting to one interactional goal, and proposed that 'interruption' is a too harsh word, as it implies that the speaker is purposefully violating conversational rights (Tannen 2005: 342). She therefore proposes to rather speak of "speech overlap", which can also show that "enthusiastic listenership" (Tannen 2005: 342).

The research literature concerned with differential treatment of male and female students has had different foci over time. An important finding is that the kind of teacher attention is more significant than the amount of teacher attention for learning opportunities, which now provides the opportunity for a more detailed analysis of student-gender specific classroom interaction than earlier studies allowed. The idea that discourse patterns within classrooms can purely be characterized by gender has turned out to be too simplistic, as more variables play a role in classroom interaction. Also, what needs to be kept in mind here is that the studies presented were conducted in different decades and within different lingua-

cultural contexts, where gender roles possibly vary and may be constructed in subtly different ways.

5. Methodology

As in most of the previously presented studies on student gender-specific language, the method used in this thesis is an application of discourse analysis. In a broad sense, discourse analysis is the "study of the language of communication" (Hatch 1992: 1) concerned with the "relationship between language and the contexts in which it is used" (McCarthy 1991: 5). Discourse analysis emerged in the 1960s and has been applied by different disciplines, including sociology, psychology, philosophy and linguistics. Discourse analysts investigate how written and verbal language is used within different contexts, ranging from informal conversation to highly formal types of talk (Yoshida 2008: 1). Patterns that emerge out of the analyzed data illustrate how language is socially, cognitively and linguistically intertwined (Hatch 1992: 1).

Discourse analysis has also been brought into classrooms in order to investigate types of teacher-student relationships, teacher- and student output and procedures within classroom discourse (Yoshida 2008: 1). Early research on the relationship between language and gender in the classroom discourse recognized relevance of discourse analysis for revealing patterns of gendered discourse, as Jane Sunderland point out: "Discourse analyses have shown the extent to which discourse is gendered, and indeed the proliferation of work here may be precisely because of the ability of discourse analysis to challenge traditional essentialist and reductionist understandings of gender" (Sunderland 2006: 53). The general aim of this thesis is to identify student gender-specific linguistic behavior within two different classrooms.

5.1 Data and setting

The data investigated for this thesis are transcripts of six lessons led by the same teacher within an 8th grade Austrian junior high school ("Hauptschule"). Transcripts are especially helpful for this discourse analysis, as they allow the data to be examined and reexamined over and over again and can be interpreted by other

researchers as well (Swann 1992: 67). To obtain a more holistic picture of the lessons and to identify the male and female students in the lessons which were not identified in the transcripts, I also worked with the correlating auto-recordings of the lessons. The lessons were conducted between March 19th and March 26th, 2012, audio-taped and transcribed. Three lessons are English lessons and three lessons are CLIL Biology lessons:

Lesson	Date	Duration	Number of students
EFL1	March 19th, 2012	42:14 minutes	9 male, 15 female
EFL 2	March 20th, 2012	38:34 minutes	9 male, 15 female
EFL 3	March 26th, 2012	44:30 minutes	9 male, 13 female
CLIL 1	March 19th, 2012	43:08 minutes	9 male, 15 female
CLIL 2	March 20th, 2012	42:09 minutes	8 male, 15 female
CLIL 3	March 26th, 2012	37:22 minutes	9 male, 15 female

As the teacher and the students were the same the same in all six lessons (except for English lesson nr. 3, where 2 female students were not present), and the time frame in which the data was collected was relatively short, the comparability of the results was high and not influenced by any personal variables. The transcripts were coded according to the following conventions:

Tf: Teacher, female
Lf: Learner, female
Lm: Learner, male
Ls: Learners, collective
XXX: unidentified student

5.2 Research questions

Generally, the main aim of this thesis is to identify student gender-specific language behavior within two different classrooms, led by the same teacher. I am comparing linguistic data from an EFL to a CLIL biology classroom in order to find out whether or not male and female students are treated and behave differently within these

classrooms. As I am looking at several different quantitative and qualitative aspects of classroom discourse, I will be investigating a number of research questions related to teacher-student and student-teacher interaction, which have been mentioned before in the literature review, including the following:

Teacher-student interaction:

Comparing the science and the language classroom,

- Do boys and girls receive different amounts of teacher attention?
- Do boys and girls receive different kinds of teacher attention, including teacher questions, teacher praise and criticism?

Student-teacher interaction:

Comparing the science and language classroom,

- Do boys and girls occupy different amounts of linguistic space?
- Do boys and girls behave differently regarding interaction initiation, responses and interruptions?

In more detail, the following aspects of classroom discourse were investigated:

- The amount of words the teacher directed to either a male or female student
- The distribution of different types of teacher questions directed to male and female students, including open vs. closed questions, referential vs. display questions and instructional vs. regulative questions.
- The amount and different kinds of teacher praise towards male and female students (academic vs. behavioral)
- The amount and kinds of criticism towards male and female students (academic vs. behavioral)
- The amount of words male and female students occupied within classroom discourse
- The amount and kinds of interaction initiation of male and female students (academic vs. non-academic)
- The amount, length and language of volunteered student responses
- The amount and length of student unsolicited student comments

6. Findings

6.1 Teacher-student interaction

6.1.1 Amount of teacher attention

Counting the number of words the teacher used talking directly to either a male or female students, the data revealed the following distribution of teacher attention: In the EFL classroom, the teacher offered 131.88 words to the average male learner and 74.75 words to the average female learner. A similar distribution is shown by the data of the CLIL Biology classroom, where the average male student received 100.58 words, whereas the average female student received 49.86 words. Therefore, the teacher paid double the amount of attention to male students than to female students, as illustrated in Figure 1 below:

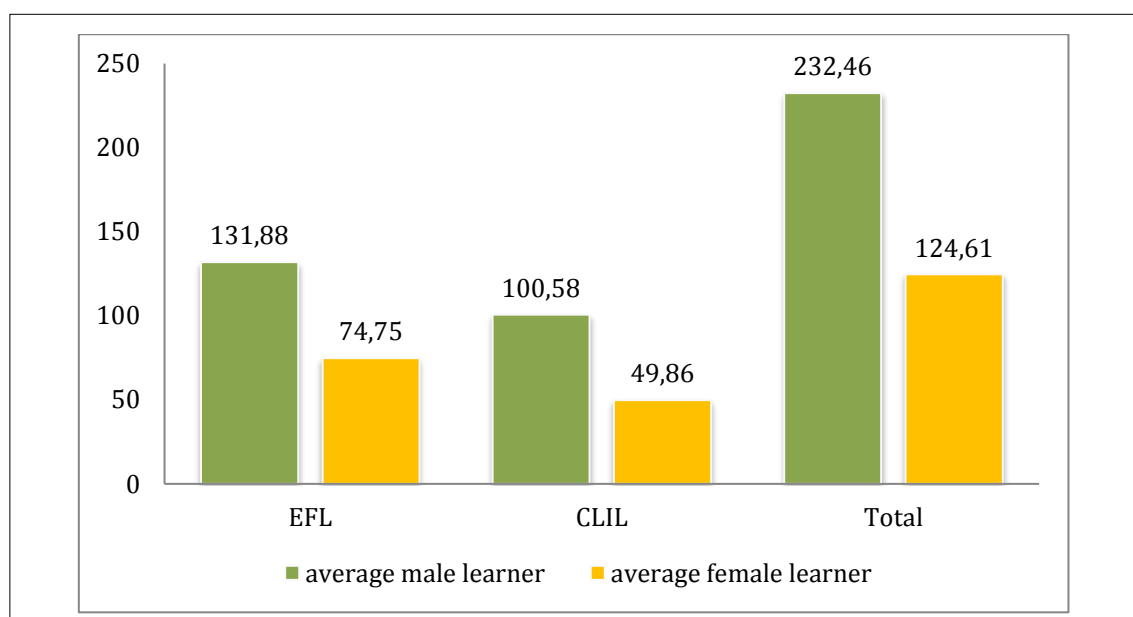


Figure 1: Amount of teacher words towards the average male and female learner

Interestingly, both classrooms show very similar proportions of teacher attention towards male and female students. In both classrooms, the teacher spent significantly more time interacting with male students than with female students, namely 63.8 % and 66.9% respectively, as shown in Figure 2:

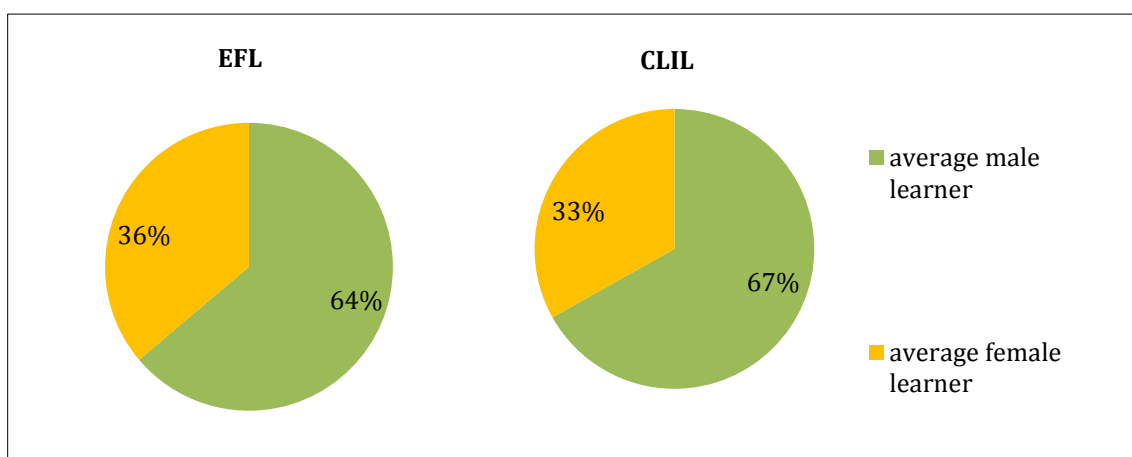


Figure 2: Percentage of teacher words towards the average male and female learner

Although the percentage of teacher attention towards male students is slightly bigger in the CLIL classroom (about 3%), this difference can only be considered to be minimal. Therefore, it cannot be concluded that boys received a lot more attention in the science classroom than in the language classroom.

6.1.2 Teacher questions

I investigated the data according to the following research questions:

- *Quantitative analysis*: How many questions does the teacher aim at male vs. female students within the English vs. CLIL Biology lesson?
- *Qualitative analysis*: What kind of questions does the teacher aim at male vs. female students within the English vs. CLIL Biology lesson?

To distinguish between different kinds of questions, I based my analysis of the distinction of teacher questions presented in the literature review, including

- referential vs. display questions (Mehan)
- open vs. closed questions (Barnes, Dalton-Puffer)
- instructional vs. regulative questions (Christie)

Summarizing the data from the EFL classrooms, the data showed that teacher posed a total of 116 questions to the students. That is only questions that were directly asked at a specific student and not the whole class. The average male student received a total of 6.77 questions during the three lessons, whereas the average female student received 3.9 questions. Overall, the results amount to a proportion of 36.25% of teacher questions directed at female learners and 63.75% to male

learners. In the CLIL Biology classroom, the teacher directed a total of 75 questions directly at specific students. The average male learner received 3.8 questions, whereas the average female student received 2.6 questions, which means that the difference between the amount of questions posed to male and female students in the CLIL classroom is slightly smaller than in the EFL lessons. Overall, male learners received 59% of the teacher questions in the CLIL Biology classroom, whereas female learners received 41%. Combining the data of all three lessons, the average male learner received 5,3 questions classroom, while the average female learner received 3,2 questions. Graph 3 illustrates the proportions of teacher questions directed at the average male and female student:

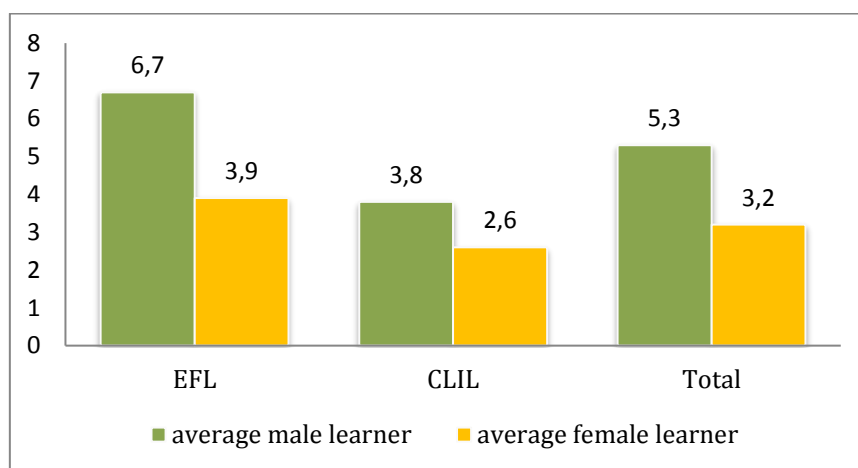


Figure 3: Weighted amount of teacher questions towards male and female students

Overall, male learners received more questions than female learners in almost all lessons. The gender difference is bigger in the EFL classroom than in the CLIL classroom. Although both student genders received more questions in the EFL classroom, the difference between the amount of questions across the two classrooms is significantly bigger for the average male student. Combining the data from both classrooms, male learners on average received more than double the amount of teacher questions.

Referential vs. Display Questions

In both the EFL and the CLIL classroom, the average male student received significantly more referential and display questions than the average female student, which is hardly surprising, as male students received more teacher questions overall.

Both student genders were asked more display questions than referential questions in both classrooms, except for male students in the EFL classroom. Examples of referential questions found in the EFL classroom are 'How was your weekend?', 'What do you think?' and 'Could you imagine to become a Goth?'. Instances of referential questions in the CLIL classroom include 'Was sagst du?', 'Where do you have to go now?', and 'What did you talk about?'.

Regarding the relative amount of referential and display questions, the data revealed the following distribution:

	<i>Referential Questions</i>		<i>Display Questions</i>	
	male	female	male	female
EFL	38 (53.5%)	31 (47.7%)	33 (46.5%)	34 (52.3%)
CLIL	9 (25.7%)	8 (20%)	26 (74.3%)	32 (80%)

Table 4: referential vs. display questions directed at male and female students in the EFL and CLIL classroom

Of the posed questions to male students in the EFL classroom, 53.5% were referential questions and of the posed questions to female students, 47.7% were referential. In the CLIL Biology classroom, the proportions of referential and display questions are very different: Only 25.7% of the questions to male learners and 20% of the questions to female learners were referential questions. Overall, female students received less referential than display questions in both classrooms, although the difference is a lot more significant in the CLIL classroom. Male students received more referential questions than display questions in the EFL classroom and significantly less referential questions in the CLIL classroom. Compared to male students, female students also received smaller proportions of referential questions in both classrooms, with a small but significant difference of 5% in both cases.

Open vs. Closed Questions

Looking at the weighted numbers of open and closed questions towards male and female students, the data revealed the following distribution: The average male student received slightly more open questions than the average female student in both the EFL and the CLIL classroom and significantly more closed questions in the EFL classroom, which again correlates with the higher amount of teacher questions overall.

Looking at the relative amount of open and closed questions, the following distribution could be observed in the data:

	<i>Open Questions</i>		<i>Closed Questions</i>	
	male	female	male	female
EFL	27 (44.3%)	38 (69%)	34 (55.7%)	17 (31%)
CLIL	16 (45.7%)	20 (48.8%)	19 (54.3%)	21 (51.2%)

Table 5: open vs. closed questions directed at male and female students in the EFL and CLIL classroom

Of all questions posed to male learners in the EFL classroom, 44.3% were open, while 55.7% of questions to female learners were open. Examples of open questions in EFL classroom were 'Why not?', 'What do you think?', and 'What does that mean?'. In the EFL classroom, 45.7% of questions to male learners and 48.8% of questions to female learners were open. Instances of open questions in the CLIL classroom include "What have you found out about arteries?", "Wie kommts dazu, wenn's ned grad vererbt is'?" and "Can you explain the word once more?". Overall, males received greater proportions of closed questions as opposed to open questions in both the EFL and the CLIL classroom. Girls on the other hand received more open questions than closed ones in the EFL classroom and more closed than open ones in the CLIL classroom. The percentage of open questions towards female students was higher in both classrooms, compared to the percentage of open questions to male students.

Instructional vs. Regulative Questions

In both classrooms, the teacher offered more instructional questions than regulative questions to both student genders. The difference is very similar for both student genders, as they received about 3 times as much instructional questions as regulative questions in the EFL classroom and about 1.6 times as much in the CLIL classroom. Examples of Instructional Questions in the EFL classroom include "What sports do you normally do?", "What do you mean?" and "What is the article about?". Instances of instructional questions in the CLIL classroom were: "What about Plasma?", "What are waste substances?" and "What is important for you to know?". Overall, both male and female students received significantly greater proportions of instructional questions in both the EFL and the CLIL classroom. Interestingly, the proportions of regulative and instructional questions are very similar in both classrooms for both student genders, as illustrated in the following table:

	<i>Instructional Questions</i>		<i>Regulative Questions</i>	
	male	female	male	female
EFL	46 (75.4%)	41 (74.5%)	15 (24.6%)	14 (25.5%)
CLIL	23 (65.7%)	24 (60%)	12 (34.3%)	16 (40%)

Table 6: instructional vs. regulative questions directed at male and female students in the EFL and CLIL classroom

Summarizing the findings related to different kinds of teacher questions, the data revealed the following: In both the EFL and the CLIL classroom, male students received greater proportions of referential and closed questions than female students did. Regarding instructional questions, there were no significant differences between the student genders, as both student genders received similar greater proportions of instructional questions compared to regulative questions in both classrooms.

6.1.3 Teacher praise

In the EFL lessons, the teacher offered praise 11 times overall, six times to a girl and five times to a boy. In the CLIL lessons, the teacher praised the students 13 times, female learners 8 times, male learners four times and the whole class once. All

instances of praise were general (Jenkins et al. 2015: 464) and most of them referred to correct student answers. Generally, praises were rather short. Examples of teacher praise include "genau, super", "good, thank you" and "so hab ich mir das gedacht, ja, very good".

Figure 4 shows the distribution of teacher praise towards male and female students in both classrooms:

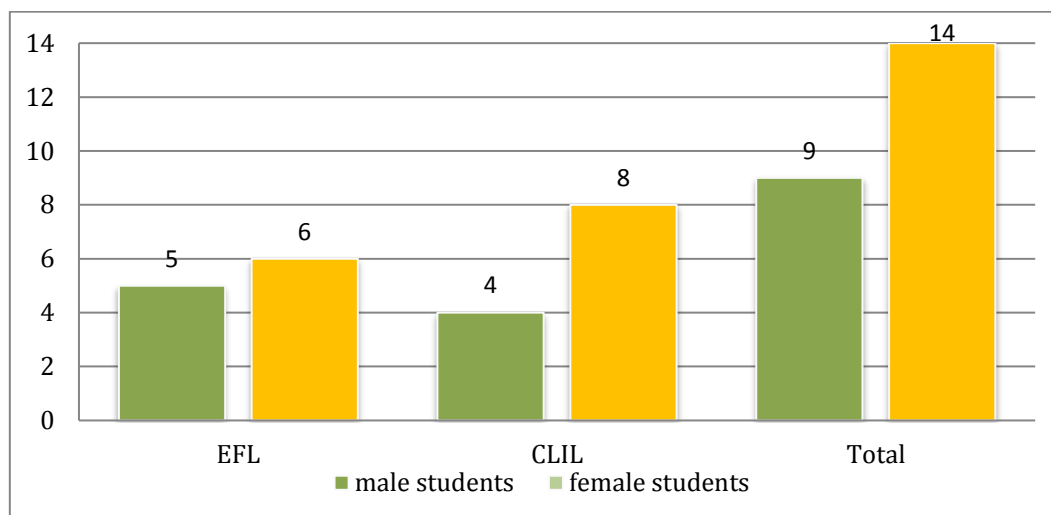


Figure 4: Total amount of teacher praise towards male and female learners

Overall, female students were praised more frequently in both classrooms. The data revealed that the average female student was praised more frequently (0.18 times) than the average male learner in the CLIL classroom, who received praised 0.15 times. The opposite was true for the EFL classroom, where the average male students received praise 0.18 times and the average female learner only 0.14 times. However, as the instances of praise were so rare overall and the differences between the weighted numbers are so small, it is debatable whether or not these differences are actually statistically significant. Nevertheless, looking at the relative amount of

teacher praise towards male and female students the data shows more sound results, illustrated in Figure 5:

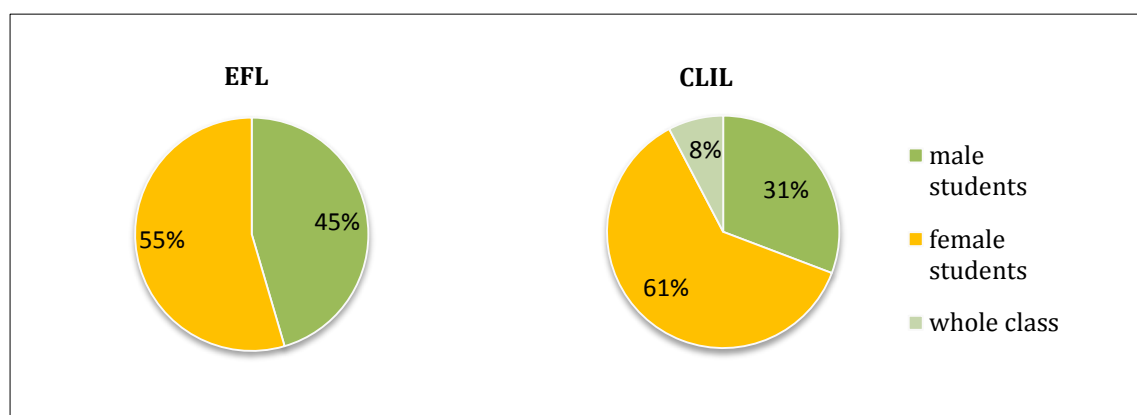


Figure 5: Relative amount of teacher praise according to student gender and classroom

Both in the EFL and CLIL classroom, female students received greater proportions of the teacher praise, 55% in the EFL classroom and 61% in the CLIL setting.

6.1.4 Criticism

In the EFL lessons, male students received criticism 5 times, female learners once. In the CLIL classrooms, the teacher criticized a student from both genders once. All instances of criticism were related to the students' behavior (as opposed to academic criticism). Examples include "Maximilian, hör jetzt bitte auf, sonst muss ich mit deiner Mama reden", "What are you doing, put the calculator away, I asked you to do exercise two" and "ich hab gesagt ich will von dir keine Äußerungen mehr hören, hör jetzt auf".

The teacher criticized male students significantly more frequently than female students in the EFL classroom, while in the CLIL classroom, there is no difference between the total amount of teacher criticism towards male and female learners. However, after weighing the numbers, it becomes evident that the average male learner received significantly more teacher criticism than the average female learners, as Figure 6 demonstrates:

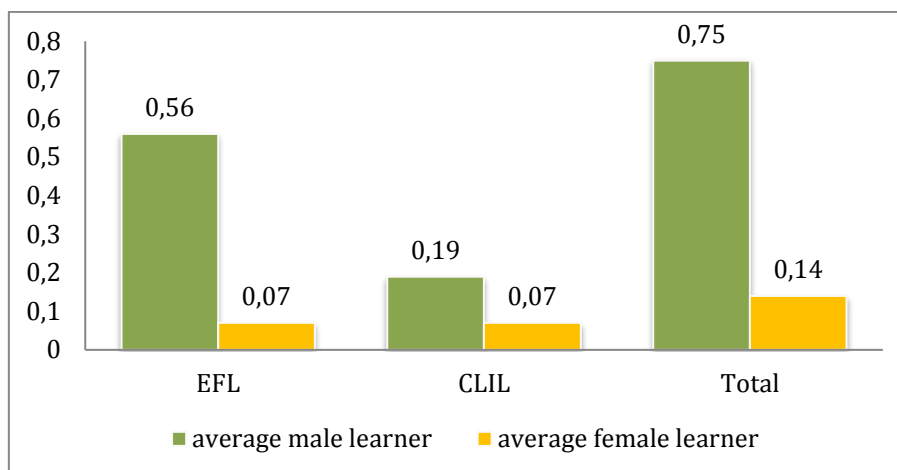


Figure 6: Weighted amount of instances of criticism towards male and female students

Again, it is debatable whether or not these small numbers are significant. The relative amount of criticism offers more sound results. However, looking at the relative amount of teacher criticism, the data shows that the substantial majority of 83% of (behavioral) criticism was directed to male learners in the EFL classroom. Comparing the relative amount of teacher praise and criticism, the combined data of both classrooms offers rather sound results: Female students received the majority of 58% of teacher praise, while male students received 75% of criticism overall.

6.1.5 Target Language Use

Overall, while talking directly to specific students (as opposed to whole class), the teacher used significantly more target language in the EFL classroom than in the CLIL classroom, as shown in Figure 7 below:

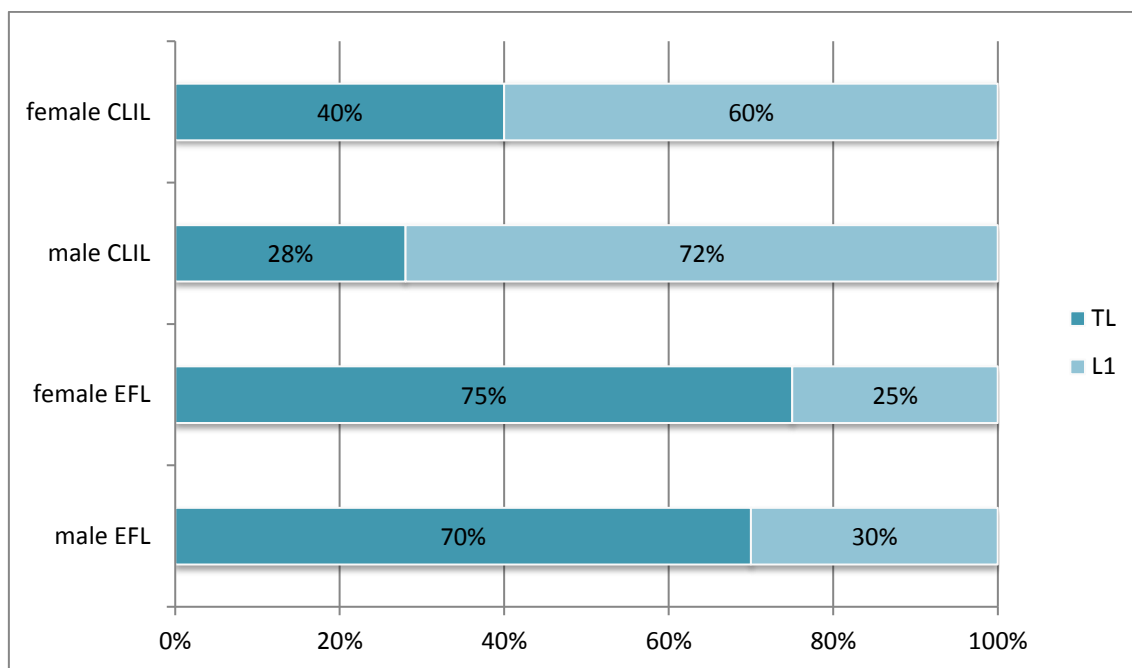


Figure 7: proportions of the teacher's target language use towards male and female learners in the EFL and CLIL classroom

In both classrooms, the teacher also used more target language when talking to female students: In the EFL classroom, the teacher used the target language in 75% of the time when talking to female students and in 70% when talking to male students. In the CLIL classroom, the teacher spoke to female students in the target language in 40% of the time, while she used the target language in 28% of the turns with male students. Although the teacher used more target language while speaking to female students in both classrooms, the difference is considerably larger than in the CLIL classroom.

6.2 Student-teacher interaction

6.2.1 Linguistic Space

In order to determine the linguistic space of male and female learners in the English and CLIL Biology classrooms, I used Jane Sunderland's method and her concept of the 'average boy' and the 'average girl' in order to arrive at valid results. Therefore, I counted the number of words learners used within classroom discourse and divided this number by the number of male and female students in each lesson to determine the number of words the 'average boy' and the 'average girl' used within the discourse. Here, I did not distinguish between the speaker's interlocutor, but

simply counted the number of all words uttered. Due to the nature of the transcript, I did not include the number words that were said when a student was asked to read material out loud, since for most instances, the transcripts just said "student reads text" and I was not able to determine an exact number of words from the audio-recordings. I did take fillers (e.g. ähm, äh, mhm, etc.) into consideration, since these linguistic devices were sometimes used to hold the floor or as minimal responses, which are both significant features of oral discourse (Maltz and Borker 1983: 202). Contractions (e.g. *it's*, *we're*, *couldn't*, etc.) were counted as two words, unintelligible utterances were not included, since it was impossible to determine the exact number of words; dates (e.g. nineteen-eighty-one) accounted for one word.

Overall, the data revealed only minimal differences between the two classrooms in terms of gender-specific linguistic space. Figure 8 demonstrates the distribution of the weighted linguistic space in both classrooms:

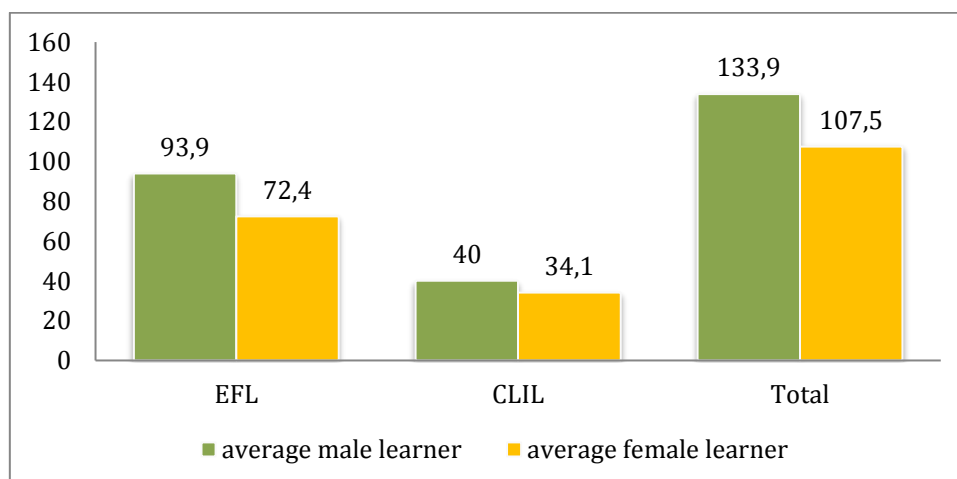


Figure 8: Number of words per average male and female student

In the EFL classroom, the average male student spoke 93.9 words, whereas the average female student uttered 72.4 words. In the CLIL classroom, the average male spoke 40 words, while the average female learner said 34.1 words.

Looking at the percentage of the students' linguistic space, male learners slightly dominated in both classrooms, occupying 56.4% of the students' linguistic space in the EFL classroom and 52.2% in the CLIL classroom, which means that the difference in linguistic space in favor of male students was minimally bigger in the

EFL classroom. Typically, in both the English and CLIL Biology classroom, the teacher took up a vast majority of the linguistic space, with 73,88 % and 85.7 % respectively.

6.2.2 Student questions/ Interaction Initiation

For the analysis of student questions, I counted and categorized student questions found in the data. Interaction initiations other than questions (e.g. raising hand, eye-contact) were not included in the analysis, since they were not evident in the transcripts or the audio files. For the analysis of different kinds of student questions, I used Good's coding system of student questions in order to gather categorize the questions. Although the framework has been criticized for being too global, this typology of student questions is appropriate for exploratory analyses, as Pearson and West (1991: 26) point out.

Concerning the amount of questions, students asked relatively few questions in both classrooms, which correlates with the little linguistic space they occupied compared to the teacher. Figure 9 compares the total and weighted amount of student questions in both classrooms:

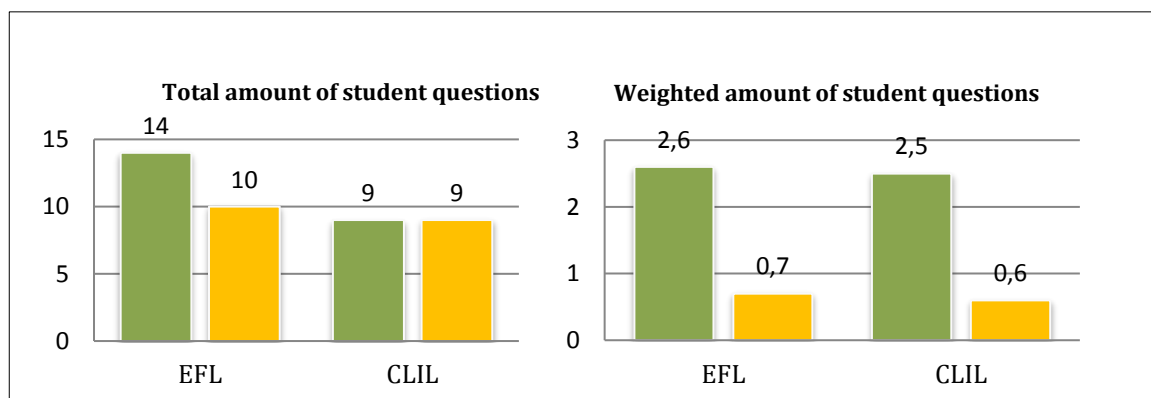


Figure 9: Total and weighted amount of student questions

In the EFL classrooms, 24 questions were posed by students, 14 of which were asked by male students and 10 by female students, which means that average male student asked 2.6 questions and the average female student asked 0.7 questions in the three lessons. In the CLIL classroom, students asked a total of 18 questions, with both student genders each asking 9 questions. Overall, the average male student asked 1

question, while the average female learner posed 0.61 questions, which correlates with the slightly higher amount of linguistic space of male students in this classroom.

Concerning different types of questions, the data revealed the following distribution:

	EFL		CLIL	
Question type	Asked by males	Asked by females	Asked by males	Asked by females
<i>Information</i>	2 (14%)	3 (30%)	1 (11%)	3 (33%)
<i>Clarification</i>	2 (14%)	3 (30%)	3 (33%)	3 (33%)
<i>Procedural</i>	7 (50%)	3 (30%)	1 (11%)	2 (22%)
<i>Diversion</i>	3 (22%)	1 (10%)	-	-
<i>non-task curiosity</i>	-	-	4 (44%)	1 (11%)
Total	14	10	9	9

Table 7: types of student questions asked by male and female students in the EFL and CLIL classroom

No questions were observed that were coded as explanation, confirmation, on-task attention, off-task attention or confirmation. Looking at questions posed by male students, what stands out is the high amount of procedural questions and diversion questions in the EFL classroom and non-task curiosity in the CLIL classrooms. In both classrooms, female students asked significantly more information questions and significantly less procedural questions than male students. Figure 10 illustrates the distribution of academic and non-academic questions in both classrooms:

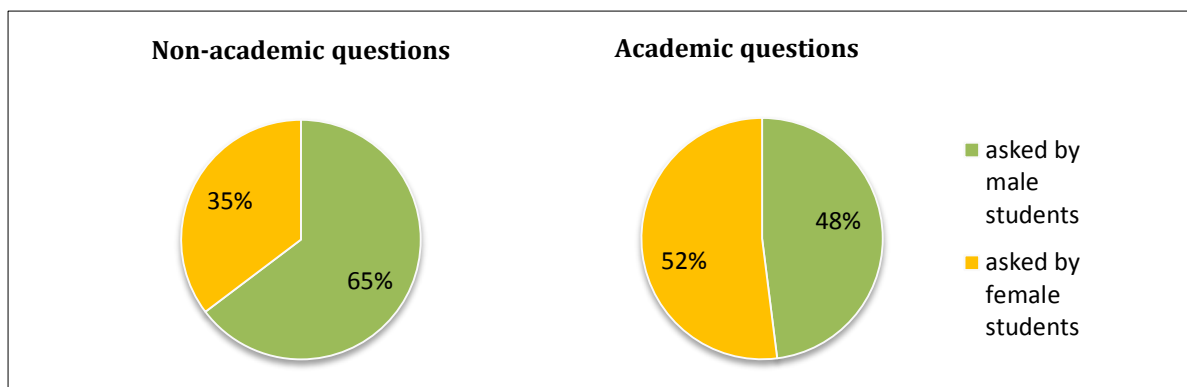


Figure 10: proportions of academic and non-academic questions asked by male and female students

Of all non-academic questions, 65% were raised by male students and of all academic questions, 52% were raised by female students. In summary, the data shows that in both classrooms, but especially in the EFL classroom, male students asked significantly more non-academic questions about classroom procedures or about information not related to the task, while female students asked slightly more academic questions about on-task information.

6.2.3 Student responses

During the three lessons in the EFL classroom, the teacher offered 66 questions to the whole class, of which 28 were answered by male students and 38 by female students. On average, a male student volunteered 2 times, while the average female student volunteered 2.66 times. In the CLIL classroom, the differences between boys and girls were much less significant: The teacher posed a total of 85 questions to the whole class. Male students voluntarily responded 32 times, female students volunteered 53 times. The average male student responded 1.21 times, while the average female student did so 1.19 times. Figure 11 shows the number of words used per volunteered response in both classrooms:

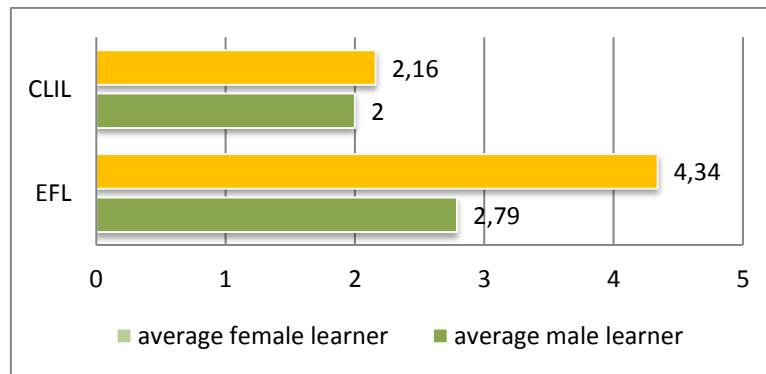


Figure 11: average number of words per volunteered response

In the EFL classroom, female students' volunteered responses contained 4.34 words on average, while male students only used 2.79 words. In the CLIL classroom, the difference between a male and female volunteered turn is hardly significant, as a female turn occupied 2.16 words, while male students used 2 words per turn.

Figure 12 shows the proportions of target language and first language male and female students used while responding:

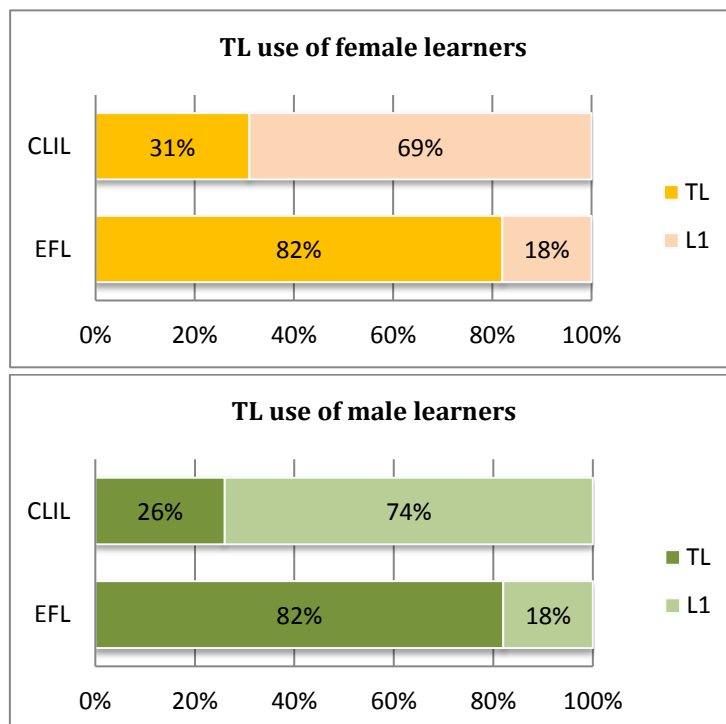


Figure 12: proportions of TL and L1 use of male and female students

Excluding the instances where the teacher specifically asked for a translation into German, female students responded in the target language 82% of the time, while

male students used the target language in 92% of the turns in the EFL classroom. Interestingly, the proportions of target language and first language in the CLIL classroom are almost reversed for both student genders: Female students used the target language in 31% of the turns, male students in 26% .

Overall, in the EFL classroom, female students answered more frequently, using more words than male students did. In the CLIL classroom, the differences between the frequency of volunteered answers and the amount of words used per turn used by male and female learners are almost identical. In terms of target language use, both student genders used the target language the majority of the time in the EFL classroom and only sporadically in the CLIL classroom. In both classrooms, male students used the target language more often than female students when answering teacher questions.

6.2.4 Unsolicited student turns

As the transcripts did not show any interruptions and it was impossible to detect the student gender of an interrupter in the audio-files, I was only able to investigate unsolicited student responses that were either thrown into a dialogue between two other people or took away the teacher's or another students' turn, as the following example of a male student who is interrupting a dialogue between the teacher and a female student:

Extract 1

Tf: XXX, you know a word?
Lf: I am thinking of one
Tf: you are thinking
Lm: **hm jo genau**

In the EFL classroom, male students uttered such unsolicited comments 13 times and female students 12 times. The average male student did so 1.44 times, while the average female learner spoke without being asked to 0.84 times, which means that the average male student spoke unsolicited 1.7 times more often than the average female student. Very similar results were revealed by the data from the CLIL classroom, where the average male student commented 1.8 times more often than

the average female student without solicitation. Figure 13 shows the weighted amount of unsolicited comments by student gender and classroom:

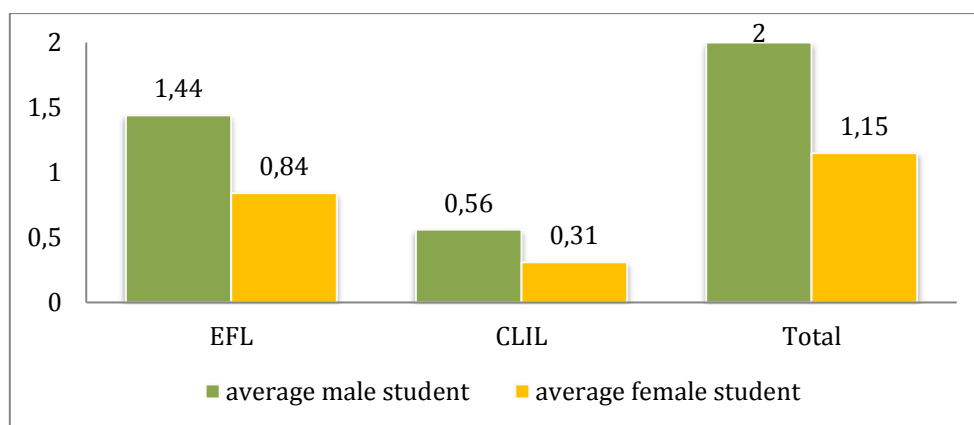


Figure 13: weighted amount of unsolicited comments by student gender and classrooms

The data shows that male students contributed more unsolicited turns than female students in both classrooms. As the difference between the average amount of male and female students is very similar in the EFL and CLIL classroom, it cannot be concluded that this applies more to one classroom than to the other.

7. Summary of Findings and Discussion

As there were several variables under analysis (male vs. female, EFL vs. CLIL), the findings can be summarized according to the following four categories:

1. Differences between male and female students that occurred in both the EFL and the CLIL classroom.

- Male students received more teacher attention than female students did, including more teacher questions.
- Boys occupied more linguistic space than girls, which includes asking more questions and initiating more interactions with the teacher.
- Male students received greater proportions of referential and closed questions and more criticism than female learners did, while
- Female students received more interactions in the target language with the teacher and more teacher praise than male learners did.

- Girls asked more academic questions, while boys uttered more unsolicited comments than female learners did.

2. Differences between male and female students that only occurred in the EFL classroom.

- Female students volunteered more responses and used more words while doing so
- Male students used more target language than female students did when they volunteered.

3. Differences between male and female students that only occurred in the CLIL classroom.

- Male students received more instructional questions than female students did
- Females used more target language when volunteering than male students did

4. Differences between the CLIL and EFL classroom that occurred for both student genders.

- In the EFL classroom, the teacher offered more words to the students, asked more questions, used greater proportions of the target language than in the CLIL classroom and criticized the students more than in the CLIL classroom.
- In the CLIL classroom, the teacher asked greater proportions of academic questions and praised the students more than in the EFL classroom.

Most of the gender differences found belong to the first category, i.e. there were more similarities than differences between the EFL and CLIL classroom in terms of gender-specific teacher-student and student-teacher interaction. Therefore, it can already be concluded that the data did not reveal any significant findings that support the claim that female students behave or get treated differently than male students in language classrooms than in science classrooms or that the opposite is true for male students. In the following, the findings will be summarized according to the four categories and discussed in relation to the related literature. Although the fourth category is not part of the research question, the data did reveal some interesting differences between the EFL and CLIL classroom, which is why they should be briefly mentioned.

7.1 Differences between male and female students that occurred in both the EFL and the CLIL classroom

In terms of teacher-student interaction, the data revealed quantitative and qualitative differences in student-gender specific linguistic behavior in both the EFL and the CLIL classroom. Quantitatively, it could be observed that male students received more teacher attention than female students did (63.8% in the EFL classroom and 66.9% in the CLIL classroom). Averaging the teacher attention of both classrooms, male students received the majority of 65.35% of the teacher's attention, which correlates with previous studies on the amount of teacher attention, such as Spender's analysis of her own lessons, which revealed a rather similar proportion of at least 58% (Spender 1982: 56). As the teacher paid more attention to boys in the EFL as well as in the CLIL classroom, the data also supports Kelly's findings, which revealed that "girls receive less of the teacher's attention (...) across all subjects in the curriculum" (Kelly 1988: 20). The observed higher amount of teacher attention towards male student also correlates with Irvine's research, from which he concluded that both, high- and low achieving boys demand recognition by the teacher, which leads to a disproportionate amount of feedback to boys, and to a "obscurity of female students and the dominance of male student in teacher-student classroom interactions" (Irvine 1986: 17), which also seems to be the case here: The teacher spent great proportions of speaking time answering off-task questions asked by male students, drifting away from the topic, as demonstrated by the following example:

Extract 2

Tf: Was ist aus Elfenbein beim Klavier, XXX?

Lm: die Tastatur

Tf: genau

Lm: *des muarss jo vui teia sein oda?*

Tf: *najo wenn du a Klavier kaufst is es scho sehr teuer ? natürlich jo*

Lm: *seins jetzt aiso no* aus Elfenbein?

Tf: *na de sein sicher net* alle aus Elfenbein, des war früher so, de haben *halt no Stil ghobt*

Lm: *wie is des* im Musikzimmer?

Tf: *des im Musikzimmer hot* glaub ich auch Elfenbein, ich weiß es jetzt gar nicht, wer ma as nächste Mal schauen? okay also worum geht's in dem Lied jetzt, in einem Satz, auf Deutsch, XXX

Even though one must keep in mind that teacher attention does not necessarily lead to more learning opportunities (Sunderland 2000: 161), it cannot be denied that when female learners are left with the remaining teacher attention, they are deprived from such (Sadker and Sadker 2010: 13). Since male learners also received more teacher questions in both classrooms, (63.75% in the EFL classroom and 59% in the CLIL classroom), the data further stands in line with Allyson Julé's study, as she also found that boys receive the majority of teacher questions (Julé 2005: 31). As teacher questions are considered a powerful tool for "checking comprehension and building understanding of complex concepts" (McCormick and Denato 2000: 182) and therefore create learning opportunities, one could argue that in this case, male students in this study were advantaged by the teacher in this regard.

Even though the quantitative analysis of teacher-student interaction revealed some significant differences between male and female students, the qualitative look at the nature of teacher attention revealed more differentiated findings: The data showed that in both classrooms, male students received greater proportions of referential and closed questions than female students did. Since referential questions are considered to be of communicative advantage compared to display questions, as they relate to the students' personal views and thereby "lead to increased motivation and more investment by the learners in the learning process" (Thompson 1997: 101), male students were slightly advantaged in this regard, as they received 5% more referential questions than female students in both classrooms. However, they were also asked a larger share of closed questions, which are typically "quick and easy to answer" (Dalton-Puffer 2007: 97) and ensure that the control over the conversation stays with the one who asks the question. Most of the male students' answers to the closed questions were simple one or two-word utterances, as in the following example:

Extract 3

Tf: okay so we have ? XXX?
Lm: red cells
Tf: and?
Lm: white cells

Tf: and?
Lm: the platelets
Tf: the platelets, right. And what do we have?
Lm: **Plasma**

Female students received a greater proportion of open questions, which means that they were allowed for more freedom in their answers more frequently than male students were. Nevertheless, female students sometimes answered to open questions with short comments, which contributed to their overall smaller linguistic space, as in the following extract:

Extract 4

Tf: mhm okay, can you imagine to be a Goth?
Lf: No
Tf: No, why not?
Lf: too black, I don't like
Tf: okay, you don't like the color ? XXX, can you imagine to become a Goth?
Lf: No

Therefore, although the teacher offered male learners more questions that are considered to raise their investment, she simultaneously held more control over their answers. Whether or not this happened intentionally cannot be answered here. Nevertheless, she offered female students more autonomy in their responses in both classrooms, although they did not always utilize this freedom to their advantage. Moreover, the teacher used a larger share of the target language when interacting with female students than with male learners in both classrooms. Therefore, one could argue that within the observed settings, girls were considered to be more competent in their language production, which is a view that many teachers hold, as suggested by Worrall and Tsarna (1987, quoted in Duffy et al. 2002: 581). Moreover, it could also be observed that female students received the majority of teacher praise. As such, the data stands in line with Persaud's study, which also showed that males get praised less frequently than female students (Persaud 2013: vii). As teacher praise is considered to be a powerful tool for reinforcing student participation and their willingness to talk (Menzel & Carrell 1999: 32) and can affect

student motivation and by extension, student achievement (Persaud 2013: 4), it can be concluded that the teacher was helping female students more than male students in this regard. Moreover, in both classrooms, but especially in the EFL classroom, male students received significantly more behavioral criticism than female students did. Brophy and Good have argued that boys bring "criticism upon themselves" (1970: 373), as they show a more frequent disruptive behavior, which also seemed to be the case in the EFL classroom. The teacher commented on male student's behavior several times in one lesson, as in the following example:

Extract 5

Tf: XXX, **hör jetzt bitte auf, sonst muss ich mit deiner Mama reden.**

(...)

Tf: XXX, **ich möchte von dir nicht mehr hören, das Zwischenreden, hör auf bitte.**

(...)

Tf: be quiet please and finish now.

Considering the fact that females received significantly more praise and hardly any criticism, it can be suggested that, compared to male students, female students acted more according to the concept 'ideal' students in both classrooms, acting "more compliant, conformist and willing to please" (Myhill 2002: 350). Another interesting example of this occurred in an EFL lesson, in which the teacher asked the students to do an exercise for homework and immediately mentions that students who would complain about it (most likely having specific students in mind), should do the exercise twice, which induced two male students simultaneously to 'defend' themselves right away:

Extract 6

Tf: (...) but for Thursday, please do this exercise. **Die Jammerer machens doppelt**

Lm: **I hob nix gsogt**

Lm: **I hob a nix gsogt**

Again, it is important to highlight that being 'ideal' students does not necessarily benefit female learners and at the same time, such a concept marginalizes male students, who do not conform to this concept (Baemann et al. 2006: 356) which is why the idea of the ideal student is harmful for both student genders.

As for the students' linguistic space, the data showed that the average male student occupied slightly more speaking time in both the EFL and the CLIL classroom. In the CLIL classroom, the difference is rather small with a difference of 4%, while in the EFL classroom, the difference amounts to almost 10%. In this regard, the findings of this study support most of the previous findings on boys dominating the talking time in class (e.g. Gilligan 1992, Sadker and Sadker 1994). However, those early feminist studies found significantly larger gaps between girls' and boys' speaking time, which could not be observed in these classrooms. Although the data did show that the students occupied significantly less speaking time than the teacher, as it is the case in most classrooms, one can hardly speak of a "silence of girls" (Julé 2002: 37) here. As the teacher in the observed classrooms was female, one could also argue that the findings support Brooks' claim that in female-led classrooms, male students dominate (Brooks 1987: 687). Although male students did have more speaking time in both classrooms, one needs to keep in mind that a higher amount of linguistic space does not necessarily cause more learning opportunities (Sunderland 2000: 163). Therefore, looking at the different kinds of student-teacher interactions allows for more differentiated insights into gender-related processes within the classroom discourse. The data did show that male students initiated more interactions with the teacher than female students did. In this regard, the findings of this study supports Irvine's claim that male students initiate more interactions (Irvine 1986: 14) and Rashidi and Nadering's findings on frequent conversation initiation by male students (Rashidi and Naderi 2012: 34), as they found that male learners "create conditions where their contributions will be sought by teachers" (Rashidi and Nideri 2012: 35). It could also be possible that in these classrooms, male students simply felt more comfortable speaking up publicly than girls were, as suggested by Corson (1996: 130).

Taking a closer look at the differences in male and female students' interactions, it can be argued that in both classrooms, girls acted more according to the concept of the 'ideal' student, constructing themselves as being more 'academic' than male students, since boys uttered more unsolicited comments and asked more non-academic questions, including diversion and procedural questions, while girls asked greater proportions of academic questions. Therefore, it can be concluded that the discourse in these classrooms correlates with Jane Sunderland's research, in which she suggests that "while boys may appear to dominate the classroom in one sense, girls may dominate it in another" (Sunderland 2000: 163).

7.2. Differences between male and female students that only occurred in the EFL classroom:

In the EFL classroom, female students answered more frequently to a question that was directed to the whole class and used 1.6 times more words than male students while doing so. In the CLIL classroom, no differences in the frequency of volunteered responses could be observed. These findings support Sunderland's research that also revealed that the average girl volunteers more responses than the average boy does (Sunderland 2000: 163), as well as Rashidi and Naderi's study, which showed that female learners provide longer answers in which they use new grammar and vocabulary (Rashidi and Naderi 2012: 35). The same study also revealed that they would switch to their L1 more often than male students, which was also the case in the EFL classroom, but not in the CLIL setting: Females 'only' used the TL in 82% of their volunteered responses, while male students did so with a frequency of 92%. This is especially interesting, as the data also showed that the teacher used more target language when talking to her female students in both classrooms (see 7.1).

7.3. Differences between male and female students that only occurred in the CLIL classroom:

Since instructional questions, as opposed to regulative questions, are aimed at conveying knowledge and offer different opportunities for language use (Dalton-Puffer 2007: 99), male students were slightly advantaged in this regard in the CLIL classroom, as they received 5% more instructional questions than female students did. In the EFL classroom, there is no difference in the relative amount of regulative

and instructional questions between male and female students. Therefore, one could argue that in the CLIL Biology classroom, the teacher was attempting to share knowledge to male students more than to female students, which correlates with the common view of teachers that boys are more suitable for 'the sciences' (...). However, as the difference of instructional questions in this science classroom is rather slim and we do not know whether or not the teacher adheres to this view, this remains a rather risky claim. Nevertheless, in one of the CLIL Biology lessons, the teacher specifically asked a male student to research further information related to the content, which she was unsure about and actually called him a scientist:

Extract 7

Lm: *owa Null negativ kau ma glaub i jeden übertrogn aber nur söwa kau ma nur Null negativ kriagn*

Tf: Jo Jo

Lf: *owa mei* Papa [?]

Tf: *Aiso do bin i ma jetzt wirkli net sicher des glaub i fost nicht aber do miarss ma nochschauen (...) XXX, unser Wissenschaftler tut des auskundschaften bitte mit den Blutgruppen*

In the same lesson, the teacher publically announced that she wanted to show a short video clip about the human blood system, but decided not to, since a female student "almost fainted" last time they watched a video showing blood, implying that this female student is not able to deal with this matter:

Extract 8

Tf: (...) hand the papers on please ... no film about **blood weil du bist ja damals fast** almost fainted ... **fast in Ohnmacht gefallen ja** almost so are there discussions about blood?

Therefore, one could argue that in this lesson, the teacher constructed the male student as being the 'better scientist'. In contrast, in one of the EFL classrooms, the teacher asked a girl to look up vocabulary she is unsure about, in a way that implied that she usually turns to this student to look up vocabulary:

Extract 9

Tf: (...) holy confirmation, perhaps yeah, this is **Konfirmation für die Evangelischen** but ja okay, XXX she looks it up in the dictionary **Firmung** confirmation I would say
(Lf looks something up in the dictionary)
Lf: confirmation

In another EFL lesson, she discussed the usefulness of fashioning mind maps with two female students. These examples again show a construction of female students are the more 'ideal', academic students, "better adapted for today's school environment than boys" (Spinath 2014: 239).

7.4 Differences between the CLIL and EFL classroom for both student genders:

The data showed some consistent differences between the EFL and CLIL classroom that appeared for both student genders: In the EFL classroom, the teacher offered more attention to her students in terms of number of words, including more teacher questions, compared to the CLIL classroom. The proportion of regulative questions was significantly higher and the teacher also used significantly more target language and criticized her students more. Moreover, students occupied significantly more linguistic space than in the CLIL classroom. In the CLIL Biology classroom, the teacher asked more academic questions and praised the students more than in the EFL classroom.

Conclusion

The classroom can be considered a microcosm of our society, in which young adults learn a lot about their roles and identities, be it directly or indirectly. As Jane Sunderland points out, everything students learn, they learn through language (Sunderland 2000: 150). Therefore, looking at the language use of teachers and students can tell us a lot about the way we construct identities and convey hidden meanings, including issues related to gender. Although the presented study revealed findings that do not correlate entirely with the initial hypothesis, I hope that my thesis will contribute to a deeper understanding of how student gender can influence the classroom discourse. The literature presented and the analyzed data

show that boys and girls act differently and get treated differently in classrooms, most possibly without teachers noticing. I hope to be able to raise awareness of gender issues in the classroom, especially among fellow educators, as we should be able to provide both student genders with equal learning opportunities in order to support them as good as we can within a co-educational context. Especially modern teacher-training programs could be fruitful frames in which the topic of student gender and related issues should be addressed. Although there is some focus on gender issues in general, such as teaching material that 'does gender', there is hardly any mentioning of such tacit processes that occur on a daily basis and are related to student gender. One of the most important insights the literature showed is that most teachers are unaware of the fact that they treat male and female students differently or they think they are conducting gender-equal lessons, when in fact they are not. Of course, the issues and processes related to student gender are highly complex and intertwined with many other variables, such as age, socioeconomic status and ethnicity, as several studies have suggested. Nevertheless, I hope that this thesis will stimulate teachers to reflect on their own teaching practices in order to achieve a more gender-fair classroom discourse, regardless of the subject or the content.

As this was an explorative study with a small sample size of classroom transcripts, its findings should be interpreted in that context. Information on the students' academic achievements or their engagement in the two classrooms was not available, which is why no causal relationships between their linguistic behavior and their achievement or motivation can be claimed. As the gender of the teacher was female, a comparison with an analysis of the same classroom features in a classroom led by a male teacher would be interesting and useful for further research on this topic.

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German abstract

Die vorliegende Diplomarbeit befasst sich mit dem Einfluss des sozialen Geschlechtes auf den Unterrichtsdiskurs und die daraus resultierenden Lernmöglichkeiten für weibliche und männliche SchülerInnen. Im Zuge einer Diskursanalyse wurden verschiedene linguistische Variablen innerhalb zweier unterschiedlicher Unterrichtskontexte (EFL und CLIL) untersucht, um etwaige Unterschiede zwischen dem naturwissenschaftlichen und dem fremdsprachlichen Unterricht deutlich zu machen. Die zu untersuchenden Variablen wurden aus dem Literaturteil gewonnen, die den ersten Teil der Arbeit darstellt und bestehende Studien zu diesem Thema vergleicht. Für die Analyse wurden Transkripte von insgesamt sechs Unterrichtsstunden einer 4. Klasse Hauptschule herangezogen, die von derselben Lehrerin unterrichtet wurden. Die Ergebnisse zeigen, dass weibliche und männliche SchülerInnen linguistisch anders behandelt wurden, sich im Hinblick auf die untersuchten linguistischen Variablen jedoch mehr Unterschiede zwischen den beiden Unterrichtskontexten als zwischen weiblichen und männlichen SchülerInnen fanden.