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Cultural capital and the perception of feedback

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Keywords: Perceived Feedback, Cultural Capital, Student Perspective, Educational Inequality, Gender

Cultural capital and the perception of feedback

Abstract

This study draws on the concept of cultural capital to determine whether the cultural capital of students is related to their perceptions of classroom interactions, specifically teacher–student feedback practices. The analysis of new data in “Feedback and Cultural Capital,” a Danish survey of feedback practices among 14- and 15-year-old students ($N = 1,101$) showed a positive and practically linear relationship between the cultural capital of the students and the amount of feedback they perceived in lower secondary mathematics classrooms. Drawing on Bourdieu’s theory of cultural reproduction in education, I argue that this inequality stems from either or both of two mechanisms: differences in treatment by teachers and/or differences in the perceptions of students. I link both mechanisms to the cultural capital of the students. Furthermore, the results indicated that the relationship was stronger for boys than for girls. The implications of the findings for practice and policy are discussed.

Keywords: perceived feedback, cultural capital, student perspective, educational inequality, gender

Introduction

Pierre Bourdieu's theory of cultural reproduction has been widely used to explain inequalities in education. In his theoretical framework, cultural capital is identified as a crucial axis in the creation of such inequalities (Bennett and Savage 2004). According to this framework, cultural capital is transmitted from parents to their children. Moreover, in the field of education, because cultural capital is recognized and rewarded by teachers, it is thus advantageous for children who have high levels of cultural capital (Bourdieu 1977; Bourdieu and Passeron 1990). The theory of cultural capital has fostered a considerable amount of literature that investigates its underlying mechanisms. This research can broadly be categorized into three groups: 1) research that examines how cultural capital is transmitted from one generation to the next; 2) research that estimates the direct effects of cultural capital on educational performance and educational attainment; 3) research that investigates the educational mechanisms that facilitate the transmission of cultural capital to educational success. Although both the intergenerational transfer of cultural capital and the effects of cultural capital on educational success seem well established (see Jæger and Breen 2016 for an overview), the mechanisms by which cultural capital is converted to educational success have received much less attention. This aim of the present study is to determine whether teacher–student interactions inside the classroom play a role in the conversion of cultural capital to educational success.

I propose a theoretical framework that describes two different but potentially interrelated mechanisms that could help explain how the cultural capital of students might lead to educational success. This theoretical framework will then serve as the frame of interpretation for the empirical analysis performed in this study. The *first* of the two mechanisms is the systematic misrecognition of cultural capital as an academic ability that affects how teachers perceive, rate, and treat their students (Bourdieu 1977). Students with high levels of cultural capital are systematically perceived by their teachers as better in terms of classroom skills, language, and ability; moreover, they are treated accordingly. Therefore, because of the language and general appearance of students with high levels of cultural capital, teachers treat these students in a more sophisticated fashion than they treat students with less cultural capital. The *second* mechanism consists of the way students perceive and understand their teacher's communication. Bourdieu (1977, 494) characterized the practice in the education system as “an implicit pedagogical action, requiring initial familiarity with the dominant culture” to be effective. If a pedagogical action is directed at students who possess high

levels of cultural capital, they will profit the most from teacher–student interactions, which then will lead to their educational success. Both mechanisms can exist independently or synchronously.

Previous studies in the literature focused on how teachers rated students according to their level of cultural capital (Dumais 2006; Jæger 2008) and on how the student’s cultural capital leads to his or her different treatment by teachers (Calarco 2014). However, the literature on the effectiveness of teachers’ communication is sparse, and I have not been able to locate any empirical evidence regarding between–student differences in the perceptions of teacher communication. By focusing on teacher–student communication, the aim of this paper is to extend the existing literature by shedding light on the ways in which students’ cultural capital is converted daily into educational success in the classroom.

I draw on the concept of feedback, which is a crucial part of the teachers’ communication process. In recent decades, there has been a growing interest in the concept of feedback in educational research, and many studies have found that feedback is one of the most important factors that affect student learning (Hattie and Timperley 2007; Black and Wiliam 1998; Kluger and DeNisi 1996; Shute 2008). However, most of these studies do not allow for between–student differences in the effects of feedback on learning outcomes. Instead, all students are assumed to benefit equally from the feedback practices in the classroom. Nevertheless, by considering the concept of pedagogical action, the effectiveness of feedback might be found to be related to the cultural capital of the student. Several authors have accordingly called for further research on the role of students’ socioeconomic and cultural backgrounds in relation to feedback practices (Hattie and Gan 2011; Black and Wiliam 1998; OECD 2008).

In this study, I seek to determine whether the distribution and effectiveness of feedback are mediated through students’ cultural capital. In the empirical literature, cultural capital is primarily operationalized using arts-based items and is thus closely related to the content of subjects in the humanities and arts. In this study, I also use arts-based items to measure students’ cultural capital. I choose to conduct the study in mathematics classes in lower secondary education. Doing this ensured that the measure of cultural capital did not measure the students’ mathematical abilities as well. I use new data in the Danish Feedback and Cultural Capital (FECC) study, which includes extensive measures of both perceived feedback in mathematics classrooms and the cultural capital of students. Denmark is an interesting country for the study of the role of cultural capital in teacher–student interactions. There is

no tracking in Denmark, and the explicit goal of a recent school reform is to reduce the significance of the students' social and cultural backgrounds on their learning outcomes.

I explore students' perceptions of the amount of feedback they receive to observe whether their cultural capital is related to these perceptions. Based on the review of the literature presented above, I hypothesize that a positive relationship exists between the cultural capital of the students and the amount of teacher–student feedback perceived. I expect students who possess high levels of cultural capital to report that they have perceived a larger amount of feedback than those with lower levels of cultural capital. To ensure that my measure of perceived feedback measures the same construct with the same accuracy for students with both high and low levels of cultural capital, I validate the measure using Rasch modeling.

Thus, this study is in the field of cultural reproduction, but it extends the previous research by combining it with the field of educational research on didactics and the effectiveness of feedback. Combining these two fields of research has the potential to lead to new insights into the mechanisms that create inequality inside the classroom.

The remainder of this article is organized as follows. In the next section, I elaborate the theory of cultural reproduction and cultural capital as well as the concept of feedback. I then present a review of the empirical literature. In the following section, I describe the data collection, the methodology, and the measures used in this study. I then present the findings and discuss the results. Finally, I conclude and discuss the implications of the findings for practice and policy.

Theory and literature review

Cultural capital

The theory of cultural reproduction concerns how the assets of parents are transmitted to their children, by which they reproduce the family's privileged position. Bourdieu (1997) used the notion of capital to account for the ways in which this position is maintained. He also introduced three different species of capital: economic, social, and cultural (Bourdieu and Wacquant 1992). Economic capital refers to the resources that are immediately and directly convertible into money (wealth, property, etc.); social capital consists of social connections and, in some instances, is convertible into economic capital; cultural capital is defined as the familiarity with the dominant culture and the ability to master the codes and language of the educated (Bourdieu 1997). According to Bourdieu, the capital of the parents

is passed on to the child as an asset that leads to his or her successful outcome (Bourdieu 1977).

The “exchange rate” of each type of capital is not stable but varies according to time and space (Jæger 2009; Bennett et al. 2009). In the educational system, or the “field” of education (Bourdieu 1997, 47), cultural capital is acknowledged the most. Moreover, it is a means of cultural exclusion because the education system, according to Bourdieu, assumes that all children possess cultural capital. Consequently, a pedagogical action is ineffective if the child does not hold much cultural capital (Bourdieu and Passeron 1990) which makes it more difficult for these students to succeed in the education system (Sullivan 2002; Jæger and Breen 2016; Bourdieu 1977).

According to the theory of cultural capital, linguistic and cultural competence, as well as familiarity with the “culture” that comprises cultural capital, “can only be produced by family upbringing when it transmits the dominant culture” (Bourdieu 1977, 494). A central point is therefore that the cultural capital of the child is formed outside the education system, which Bourdieu (1997, 48) described as “the domestic transmission of cultural capital.”

In the introduction, I presented two mechanisms that might generate the relationship between cultural capital and educational success. In this section, I will elaborate these mechanisms by reviewing previous empirical studies that investigated these connections. The *first* mechanism involves the teachers’ perceiving, rating, and treating the students, consciously or unconsciously, according to their level of cultural capital. The assumption is that teachers misrecognize cultural capital as academic brilliance, which prompts differentiated treatment of these students and results in their preferential treatment by the teachers. There is some evidence of a positive relationship between teachers’ ratings of capacities such as classroom, academic, and language skills and the cultural capital of the student (Jæger and Møllegaard 2017). In a US study by Dumais (2006), the author found that elementary school children with high levels of cultural capital were rated higher in terms of classroom skills. Based on data obtained in British longitudinal study, Jæger (2008) found that teachers rated students aged 7 to 11 years with high levels of cultural capital as having higher skills in numbers and language than students with low levels of cultural capital had even when their test performances were the same. However, the evidence is ambiguous, as several studies did not show any relationship (Jæger and Breen 2016).

Other studies investigated how students used their cultural capital actively in the classroom to receive favorable treatment from their teachers (Lewis-McCoy 2014; Calarco 2014). Based on data in a longitudinal study in the US, Calarco (2011) found that middle-class

students (from the third grade to the fifth grade) used their cultural capital to negotiate with their teachers for attention, whereas working-class students showed respect for their teachers by not seeking help.

The second mechanism that could be expected is the differentiated perception by the students of the feedback in the classroom in relation to their levels of cultural capital. According to Bourdieu (1977, 494), the distance between the language of the school and the language of the students determines the effectiveness of the pedagogical action in class. He described the language of the school as being characterized by elegance and naturalness, whereas the language of students is shaped by the cultural capital in their homes. This description implies that feedback is effective in proportion to the level of cultural capital of the students. Thus, it is the most efficient for students who have high levels of cultural capital. I have not been able to locate any empirical studies on the relationship of the cultural capital of the students to their perceptions of teaching. Based on Bourdieu's theoretical framework, I hypothesize that a positive relationship exists between cultural capital and perceptions of feedback in the classroom.

Based on the students' perceptions of teacher–student feedback, I construct a direct measure of the total effect of the two mechanisms described above. If I find a relationship between the amount of perceived feedback and the cultural capital of the students, that relationship might then be the outcome of either or both of the two mechanisms.

Feedback

In the pedagogical context, feedback can be defined as teacher–student information that can be used by the students in the ongoing learning process (Black and Wiliam 1998; Shute 2008), including both formal and informal teacher–student communication in class. The literature on the effectiveness of feedback on learning outcomes concludes that feedback has enormous potential in promoting student learning (Hattie and Timperley 2007; Black and Wiliam 1998; OECD 2008) although the previous findings are ambiguous. In their review of the effectiveness of feedback, Kluger and DeNisi (1996) found that more than one-third of the reported effect sizes were negative. In another review, Shute (2008) observed unclear findings and stated that there were no obvious patterns in the results. Despite these ambiguous findings, the research on between–student differences in the effectiveness of feedback is sparse, which has led to several calls for studies on this topic (Hattie and Gan 2011; Perrenoud 1998; OECD 2008). The present study contributes to the existing literature

by considering the perspective of students in examining feedback practices. Using the student perspective allows me to measure whether teacher–student feedback is equally distributed and/or equally perceived by the students. I build on the simple assumption that to be effective, feedback has to be perceived by the students in the first place (Ilgen, Fisher, and Taylor 1979). Whether teacher–student communication is perceived as feedback depends on its distribution and perception, which, as I hypothesize, depends on the cultural capital of the student.

Data collection in the Danish context

To explore the relationship between the cultural capital of students and their perceptions of feedback, I used data in the FECC survey, which surveyed 1,101 students (ages 14–15 years) in 58 classes in 13 lower secondary schools in Denmark. Because the survey includes extensive questions on both students perception of feedback and on their cultural activities, it was relevant for use in the present study. The survey design included all students in the sampled classes, and the response rate was high (89%). These students answered a questionnaire that included items on family background, cultural consumption, and their perceptions of different aspects of their mathematics lessons, including teacher–student feedback. The sample means varied slightly from the population means in the selected variables,¹ but I expect that the relationship between cultural capital and perceived feedback in this sample will be similar to that found in the Danish population of students aged 14 and 15 years.

In Denmark, the educational culture is egalitarian in the *folkeskole* (public schools) that most students attend.² Although the private school sector is increasing, social segregation occurs mainly in large cities. Overall, the *folkeskole* still retains a heterogeneous student body in terms of the social background of the students.³ In recent years, the *folkeskole* has intensified its focus on the inclusion of all children, differentiated learning goals, and the belief that every child must fulfill his or her full potential. Because of the focus on all-inclusive schools and heterogeneous student bodies, Denmark provides an interesting case for

¹ A comparison of sample and population means in selected variables is available upon request.

² For more information, see <http://eng.uvm.dk/primary-and-lower-secondary-education/the-folkeskole>.

³ The intraclass correlation (ICC) on social background in Denmark is .16 based on data in PISA 2015. The OECD average is .26. An ICC of .16 indicates that a large proportion of the between–student variation in social background is within schools not between schools.

studying the role of students' cultural capital to determine whether this school system fulfills its goals or whether it gives preferential treatment to those who have the highest levels of cultural capital. Although the Danish school system has been described as egalitarian, cultural capital has been found to play a role over and above the influence of socioeconomic status and the educational level of the parents in choosing secondary education (Jæger 2009).

Furthermore, the Danish educational system is suitable for studying the relationship between cultural capital and perceived feedback. There is no tracking and little to no ability sorting in the Danish school system until the age of 16. Furthermore, a large percentage of the student population attends public schools (77% in the eighth grade and 68% in the ninth grade). These conditions produce classrooms that are heterogeneous in terms of parental backgrounds and the students' abilities. By choosing a country with heterogeneous classrooms, I avoided potential spurious relationships that might occur if the teaching style were associated with school tracking or ability grouping. Student ability has been found to be associated with cultural capital (e.g. DiMaggio 1982). Therefore, it might have biased the results of the present study.

While mathematics as a school subject has a natural focus on numbers, calculations, and solid facts, mathematics in lower secondary education in Denmark has a strong focus on the process of solving mathematical problems, and an effective argument is rewarded even if the result might be wrong. The relations between teachers and students are known to be informal, trusting, and cooperative (Lindenskov and Andresen 2010). These conditions promote many teacher–student interactions including communication. Hence, feedback is a central component of teaching.

Measures

In this study, the two measures of interest are students' cultural capital and the feedback perceived by the students. Both measures are treated as latent variables, and they are measured indirectly using several questions on the student questionnaire. In the following, I will explain briefly how I operationalized the concepts into questionnaire items by drawing on Bourdieu's theoretical framework presented above, and then I construct the two empirical scales to represent these measures. At the end of the section, I will describe the rest of the variables used in the analysis.

Cultural capital scale

Bourdieu's concept of cultural capital is not clearly defined theoretically or empirically (Sullivan 2002; Lamont and Lareau 1988; Winkle-Wagner 2010). Consequently, the empirical literature on cultural capital has used a wide array of indicators of activities outside of school to capture the cultural capital of the child. These indicators include the passive exposure to cultural capital (e.g., musical instruments, art, and books in the home), active investment by the parents (e.g., taken to museums and art galleries), reading habits (i.e., other than schoolwork), and cultural communication (e.g., discussions of politics and TV), as well as other examples. Furthermore, cultural capital is understood to exist in three forms: the embodied state (i.e., long-lasting dispositions of the body and mind), the objectified state (i.e., cultural goods such as paintings, books, art, instruments, etc.), and the institutionalized state (i.e., educational credentials).

In a literature review and discussion of how the concept of cultural capital has been used in empirical research, Sullivan (2002) argued that many studies used a convenient strategy to operationalize cultural capital using the indicators readily available in datasets, whereas other studies used either too few indicators or too narrow indicators. Most researchers agreed to include only non-school dimensions in the scale (DiMaggio 1982). However, which particular non-school dimensions to include in the scale has been controversial. Some researchers have argued for separating the different dimensions of cultural capital (De Graaf 1986; Crook 1997), and other researchers have used many dimensions in one scale to capture the full spectrum of the theoretical concept (Karlson and Jæger 2015).

In the present study, my scale encompasses activities in a non-school context. I follow the recommendation of Karlson and Jæger (2015), and I include a broad range of dimensions. However, I distinguish between the passive exposure to cultural capital and the active engagement in cultural activities, using only the latter as an indicator of the cultural capital of the child. I thus follow the interpretation of Sullivan (2002), according to whom the formation of cultural capital requires active participation in the dominant culture (p. 155). I use the cultural consumption of the child as an indicator of cultural capital (Jæger 2009; Robson 2009). The formation of the cultural capital of the child is highly influenced by his or her parents (Crook 1997), who actively invest in the child through cultural activities (Robson 2009). Nevertheless, I focus on the cultural capital of the student because it comes into play in the classroom. In addition, in line with Bennett et al. (2009), I focus on cultural capital in the embodied state because this form is the most likely to be activated in the classroom

(Jæger and Breen 2016; Bourdieu 1977; Winkle-Wagner 2010). In recent years, school subject-specific versions of cultural capital have been developed, such as science capital (Archer et al. 2015) and mathematics capital (J. Williams and Choudry 2016; Baber 2017). These versions of cultural capital include items that are closely related to school subjects, such as content knowledge (Baber 2017) as well as reading and discussing subject matter outside school (Archer et al. 2015). Although these developments are interesting, the aim of the present study is to explore whether cultural consumption in general—as opposed to subject specific consumption—is related to students’ perceptions.

I developed the indicators of cultural capital to capture cultural consumption in a Danish setting. The indicators are categorized into three dimensions, which encompass the child’s active engagement in cultural communication (Joan C. Williams 2012; Tramonte and Willms 2010), their reading habits (De Graaf 1986), and their cultural outings (DiMaggio 1982) (see Table 1).

-- || Table 1 about here || --

The cultural capital scale consists of nine items that are answered on a five-point Likert scale (1 = several times a week, 2 = several times a month, 3 = once a month, 4 = several times a year, 5 = never or hardly ever). For example, the questions ask how often the respondent discusses politics or school work, how often the respondent visits a museum or art gallery, and how often the respondent reads newspapers or books. I included the observation if there were at least six valid answers to the nine items. Overall, the scale showed acceptable scale reliability with a Cronbach’s alpha of .73.

I was also interested in examining the differences in students’ perceptions of feedback, such as between students with high levels of cultural capital and students with low levels of cultural capital. Therefore, I converted the scale to an ordinal scale with four levels according to their distribution quartiles in the sample from low (1) to high (4) in which the reference category was the lowest category. The students were considered to have high levels of cultural capital if they were among the 25 percent of students with the highest numbers on the continuous cultural capital scale. They were considered to have low levels of cultural capital if they were among the 25 percent at the bottom of the continuous measure.

Feedback scale

Because no existing scale measured perceived feedback, I constructed my own scale. I used five items from the student questionnaire. All five items were answered on a four-point Likert scale indicating of how often the students experienced certain events in their mathematics classroom (Figure 1). I included the observation if there were at least three valid answers to the five items. The scale was validated as a Rasch model (Christensen, Kreiner, and Mesbah 2012) using DIGRAM software (version 3.36.0).

The validation determined that the scale was unidimensional, but it revealed differential item functioning (DIF) in relation to gender and to the cultural capital scale. DIF signifies that there were systematic differences in how the students answered one of the items in the feedback scale compared with their answers to the other items in the scale and that these differences related to their level of cultural capital. This same case occurred in another item in relation to student gender. I adjusted for these differences in constructing the perceived feedback scale. Hence, all items worked equally well for all students in the sample. Furthermore, there were indications of local dependence among some of the items. I adjusted the model accordingly to fit a graphical log-linear Rasch model, which is shown in in Figure 1. After this adjustment, the model had no DIF, and it showed satisfactory fit statistics, which are reported here as the infit statistics used to determine how well the data met the requirements of the proposed model. The infit mean-square statistics fell within the expected range of 1 ± 0.2 . After the validation, I exported the adjusted scores and used them in the “perceived feedback” scale.

--- Figure 1 about here ---

The validated scale was then standardized and centered with a mean of zero and a variation of one.

I also controlled for several demographic and academic characteristics that might be related to teacher–student communication: student’s gender, language spoken at home, country of birth, self-reported grade point average (GPA) in mathematics,⁴ and attendance

⁴ Three times a year, students in eighth and ninth grade in Denmark receive grading from their teacher on their abilities in calculation, problem solving, and verbal argumentation based on their performance in class.

in the eighth or ninth grade. I dummy coded the variables of gender, language spoken at home, country of birth, and grade, whereas I interval-scaled the self-reported GPA in mathematics. Furthermore, I included a dummy variable for each classroom to control for classroom-specific feedback practices.

In the second model, I controlled for the socioeconomic background of the student by including a variable of the highest level of job status of the parents (HISEI) according to the International Socio-Economic Index of Occupational Status (ISEI-08-scale) (Ganzeboom 2010). Socioeconomic background has strong implications for educational inequality, mainly because of mechanisms (e.g., economic resources, social network, power, etc.) that are different from the ones I examine in the present study. Socioeconomic background and cultural capital have been found to be highly correlated (Katsillis and Robinson 1990). Moreover, in several studies, either the effects of socioeconomic background and cultural capital were not separated, they were assumed to be the same (Bourdieu and Passeron 1990; Lewis-McCoy 2014), or socioeconomic background was not controlled for (Aschaffenburg and Maas 1997). Moreover, Katsillis and Robinson (1990) found that the effect of cultural capital on educational achievement disappeared when the father's class position and socioeconomic background were controlled. In this study, I am interested in the isolated effect of each student's cultural capital, net of the effect of his or her socioeconomic background.

I converted the ISEI-scale from the original interval scale to an ordinal scale with four levels. Level one included the 25 percent of the students whose parents had the lowest job status in relation to the highest job status of both parents. Level two included the next 25 percent, and so forth. All data were derived from the students' questionnaires.

Missing values

Overall, some values were missing in the data. The feedback scale had ten observations with missing values, and the cultural capital scale had six observations with missing values. These values were not included in the analysis. To the dummy variables of gender (1 missing), language spoken at home (12 missing), and country of birth (5 missing), I added a third category that represented a non-answer to retain these observations in the analysis. The third category is not reported in the results section. There were 43 missing values in the HISEI variable. These were given the respective mean values of the schools that the students were attending. The GPA variable had 64 missing values, 49 of which were imputed based on eight questions in the questionnaire regarding how confident the students were in solving several arithmetical problems. The rest (15 observations) were not included in the analysis.

Overall, 21 observations were excluded from the original sample (1.9%); thus, 1,101 observations were included in the analysis. See Table 2 for more information about the variables.

--- Table 2 about here ---

Methods

In the multi-level regression model, the feedback scale was the dependent variable and the cultural capital of the students was the independent variable in addition to several control variables. The multi-level model considered the nested structure of the data in which students were grouped in classrooms, and the standard errors were adjusted accordingly⁵. The likelihood ratio test statistics, which compared the multi-level null model to the single-level null model, showed strong evidence of classroom effects ($X^2 = 78$, $df = 1$, $p < 0.01$). These results indicate that the multi-level model was appropriate in this study:

$$\gamma_{ij} = \beta_0 + \beta_1 \text{CulturalCapital}_j + \beta_2 ST_{ij} + \varepsilon_{ij} \quad (1)$$

where γ_{ij} is the perceived feedback of student i in classroom j , CulturalCapital_j is the measure of the level of the cultural capital of student i , ST_{ij} is the student's characteristics, and ε_{ij} is the unobserved characteristics of student i in classroom j . In the second model, the variable HISEI was added to the equation. Both models were calculated using statistical software Stata 14.2.

Results

The multi-level model estimates of the relationship between the cultural capital of the students and the perceived feedback are reported in Table 3. The estimates of cultural capital in Model 1 were interpreted in relation to the reference group, which was the 25 percent of students with the lowest levels of cultural capital. The estimates showed a significant and

⁵ I was not possible to add schools as a third level as there is not enough classroom within each school.

nontrivial association between the cultural capital of the student and the perceived feedback. The coefficient estimate for group four was .46, which indicated that this group of students—those with the highest levels of cultural capital—perceived almost half a standard deviation of more feedback than the group of students in the first quartile when all other independent variables were fixed. The coefficient estimates for the students in the second and third quartiles were .36 and .22, respectively. Both coefficients were statistically significant. In a similar model, the students in the quartile with the highest levels of cultural capital were used as the reference category. The results revealed that this group of students perceived significantly more feedback than the students in the third quartile did. However, the difference between the students in the reference group and those in group two was not statistically significant. These estimates indicate that students' cultural capital may be related to the amount of feedback the students perceive in mathematics in Danish lower secondary classrooms. However, the results showed that the relationship was not linear. The students in group two perceived a larger amount of feedback than the students in group three perceived although the difference was not statistically significant (.13, $p = .09$). Nevertheless, if the two groups of students in the middle of the cultural capital distribution were considered one group of students, the relationship between the cultural capital of the students and the amount of perceived feedback would be linear.

The addition of the HISEI variable to the model (Model 2) did not change the size of the coefficient estimates of cultural capital. The estimates of the relationship between the cultural capital of the students and perceived feedback were similar to the estimates obtained in Model 1, which indicates that the effects of cultural capital were not driven by the socioeconomic status of the parents. The findings of the present study contribute to previous studies, which found an effect of cultural capital on the educational success net of the effect of socioeconomic background (Andersen and Jæger 2015; Puzić, Gregurović, and Košutić 2016) and thus contradicts the findings of Katsillis and Robinson (1990).

Overall, the results confirm the hypothesis of the relationship between cultural capital and perceived feedback. The results indicated that the inequality caused by the cultural capital of the students emerged daily in the classroom in relation to the feedback practices perceived by the students. As described earlier, inequality can be the consequence of either one or both of two different mechanisms: the unequal *distribution* of teacher–student feedback caused by differential treatment and/or between–student differences in how the teacher–student feedback is *perceived* by the individual student. Although both mechanisms could be

explained by the theoretical framework of Bourdieu, it was not possible to determine the degrees to which the two mechanisms contributed to the estimates found in this analysis.

--- Table 3 about here ---

The estimates obtained from the remaining variables also revealed interesting associations. Whether the students were born in Denmark or whether they spoke Danish at home were not associated with the amount of perceived feedback. The GPA in mathematics was negatively associated with the perceived feedback. The estimate was statistically significant; the higher the grades reported by the students, the less feedback the students perceived. This result could be intuited logically: in a classroom with approximately 25 students and only a fixed amount of time, the teacher might give the most attention to the students who were struggling the most to grasp the curriculum. The results were interpreted as a mechanism of compensation.

The estimate of the grade variable (eighth or ninth grade) was not statistically significant. The estimates for the parents' occupational status (HISEI) showed that the quartile of students whose parents had the lowest status of jobs perceived significantly more feedback than the rest of the students net of students' cultural capital. Because the teachers often knew about the parents' jobs, the difference in the amount of perceived feedback might have resulted from the teachers' paying more attention to students whose parents held low-status jobs. If this supposition holds, this difference could also be interpreted as a mechanism of compensation, which would have the potential to close the gap between high HISEI and low HISEI students if the feedback perceived was effective and high quality.

The estimates of GPA and HISEI were both interpreted as compensation, which had the potential to reduce the performance gap. However, the estimates of cultural capital functioned in the opposite direction by creating inequalities in the school system based on the cultural capital of the students.

Finally, the estimate of the dummy variable of female gender indicated that the girls perceived substantially less feedback than the boys did; the statistically significant estimate was -.46. Assuming that feedback is a key component in student learning and progress, this result might explain why boys on average perform better than girls in mathematics in Denmark (OECD 2016). Nevertheless, the literature on gender differences in the perception of feedback is sparse and ambiguous (Carvalho, Santos, Conboy, and Martins 2014; Younger and Warrington 1996; Havnes, Smith, Dyshe, and Ludvigsen 2012; Francis 2000). Theories

of gender difference have received some attention in Bourdieu's theoretical writings. In the book *Masculine Domination* (2002), Bourdieu described that women of today still display a "dismissive demeanour" (p. 28) by keeping their heads down and accepting interruptions and other restraints. The results of the analysis could provide empirical evidence for Bourdieu's theory that girls are submissive in the classroom, and they do not demand as much attention as boys do.

Because of the large difference between boys and girls in the amount of perceived feedback, another analysis was conducted to determine whether the effects of cultural capital differed in boys and girls. In the third model (Table 4), an interaction term was added between student gender and cultural capital to elicit gender differences in the relationship between cultural capital and perceived feedback. To increase the intuitiveness of the interpretation, I used a continuous and standardized cultural capital scale (mean of 0 and a variation of 1) in the interaction model. The coefficient of the interaction in Model 3 was significant at $-.12$. This result indicates that the magnitude of the relationship between cultural capital and perceived feedback is substantively and significantly larger for boys than for girls. The estimate of the relation between cultural capital and perceived feedback in this interaction model was $.23$ for boys and $.12$ for girls. These results are interesting because little has been published on the gender-differentiated returns of cultural capital. DiMaggio (1982) found that the effect of cultural capital on self-reported grades was marginally larger for girls than for boys. However, to the best of my knowledge, no previous study examined the combined influence of gender and cultural capital on classroom interactions, such as teacher–student feedback. My findings suggest that boys receive the largest return on cultural capital in relation to teacher–student feedback.

In summary, the main findings of this study showed that cultural capital was related to the amount of feedback the boys and girls perceived in the classroom, but the relationship was considerably stronger for boys.

Conclusion and implications

Several previous studies found that students' cultural capital was related to educational success. The present study contributes to the existing literature by suggesting *how* this inequality arises. By using a validated perceived feedback scale as the dependent variable in a multi-level regression model, I found an almost linear relationship between the cultural cap-

ital of the students and the amount of feedback they perceived in lower secondary mathematics classrooms in Denmark. The more cultural capital the students had, the more feedback the students perceived. The relationship might be the result of either or both of two mechanisms: differential treatment by the teacher; or differences in the students' perception. Both are related to the cultural capital of the students. In this study, the results of exploratory analysis indicate that the relationship between cultural capital and perceived feedback is much stronger for boys than for girls.

Although cultural reproduction and the consequent inequality of school systems are well established in the literature, the findings of this study revealed micro-level mechanisms that might cause this inequality. By focusing on feedback as a mediating factor in the creation of inequality, practitioners are able to adjust and calibrate their feedback practices accordingly, thus reducing the inequality caused by differences in cultural capital. Considering the perspective of students could ensure that all students perceive the same amount of feedback regardless of their level of cultural capital.

The findings of this study also have implications for policy. The central component of a recent Danish school reform (Danish Government 2013) was to “lower the significance of social background for academic results” (p. 2). Concurrently, in response to the works of John Hattie (2009), most schools across the country have focused on feedback practices in the classroom. However, the findings of this study suggest that the feedback perceived by the students might actually *reinforce* the significance of social background.

In future research, considering the perspectives of both students and teachers combined with classroom observations could contribute to learning about the discrepancies between teachers and students regarding their perceptions of classroom interactions and feedback. Such research could also yield ways to overcome this inequality. Furthermore, such data would allow researchers to distinguish the two mechanisms described in this study, namely differential treatment and perceptual differences, which could lead to valuable contributions to practice. Such insights would have the power to guide teachers in reaching out to all students in their feedback regardless of their cultural capital.

In addition, future research should examine the relationship between cultural capital and the perception of feedback about other school subjects. The findings of a British study on the relationship between cultural capital and teacher-ability ratings suggest that the role of cultural capital in oral ratings is greater than the role of number-works ratings (Jæger 2008; DiMaggio 1982). Thus, the relationship between the cultural capital of the student and his or her perceived feedback might be even more pronounced in oral-oriented subjects.

To conclude, I quote Bourdieu's (1977) words, because they seem relevant for the Danish school system of today: "By doing away with giving explicitly to everyone what it implicitly demands of everyone, the educational system demands of everyone alike that they have what it does not give" (Bourdieu 1977, 494).

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Figure 1. The ‘Perceived Feedback’ Scale as a Graphical Log-linear Rasch Model

	Frequencies			
	Every lesson	Most lessons	Some lessons	Never or hardly ever
Perceived Feedback Scale Items				
A: <i>The teacher tells me how I am doing in mathematics</i>	12	122	690	286
B: <i>The teacher gives me feedback on my strengths and weaknesses</i>	26	192	617	274
C: <i>The teacher helps us to learn from one's mistakes</i>	339	470	246	58
D: <i>The teacher asks questions that makes us think about the assignment</i>	298	463	292	57
E: <i>The teacher tells me what I have to do to get better in mathematics</i>	137	304	469	199
Exogenous variables				
F: Gender				
G: Grade				
H: Cultural capital				

Table 1. Cultural Capital Scale Items

		Frequencies				
		Several times a week	Several times a month	Once a month	Several times a year	Never or hardly ever
Cultural outings	Visits a theatre	1	4	15	253	832
	Visits a museum	0	5	46	591	470
	Visits an art gallery	0	7	52	570	486
Cultural communication	Discusses politics with a family member	159	246	247	224	235
	Discusses school work with parents	317	329	254	111	95
	Discusses ‘stuff’ during dinner	677	210	85	60	76
Reading habits	Reads a book (not homework)	287	222	168	195	236
	Reads a newspaper (also online)	109	171	195	230	404
	Visits a library	42	136	218	395	320

Table 2. Descriptive Statistics

Variable	<i>Mean</i>	<i>SD</i>	<i>min</i>	<i>max</i>
Dependent variable				
Perceived feedback	.00	1.00	-2.48	2.76
Independent variables				
Cultural capital			1	4
Speak Danish at home	.91	.29	0	1
Born in Denmark	.94	.24	0	1
GPA in mathematics	7.35	2.70	0	12
Grade 8 (reference is grade 9)	.50	.50	0	1
Job status parents - highest			1	4
Girl	.48	.50	0	1
Number of students				1,101
Number of schools				58

Table 3. Multi-Level Regression Model Predicting
Perceived Feedback in Mathematics

	Model 1	Model 2
Student level		
Cultural capital		
Level 1 - reference		
Level 2	.36***	.37***
Level 3	.22**	.24***
Level 4	.46***	.49***
Speak Danish at home	.01	.02
Born in Denmark	-.08	-.08
GPA in mathematics	-.05***	-.04***
Grade 8 (reference is grade 9)	.15	.11
Job status parents - highest		
Level 1 - reference		
Level 2		-.17*
Level 3		-.15*
Level 4		-.21*
Female	-.46***	-.46***
Intercept	-.33	-.25
Number of students	1,101	1,101
Number of schools	58	58

Note: Models estimated by maximum likelihood.

† p<0.10; * p<0.05; ** p<0.01; *** p<0.001 (two-tailed tests).

Table 4. Multi-Level Regression Model Predicting
Perceived Feedback in Mathematics, with Interaction.

	Model 3
Student level	
Cultural capital – continuous	.23***
Speak Danish at home	-.00
Born in Denmark	-.08
GPA in mathematics	-.04***
Grade 8 (reference is grade 9)	.14
Job status parents - highest	
Level 1 - reference	
Level 2	-.18*
Level 3	-.17*
Level 4	-.22**
Female	-.46***
Cultural capital # Female	-.12**
Intercept	.03
Number of students	1,101
Number of schools	58

Note: Models estimated by maximum likelihood.

† p<0.10; * p<0.05; ** p<0.01; *** p<0.001 (two-tailed tests).