

SOCIAL INEQUALITY IN ACADEMIC SUCCESS

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Abstract

Educational success is not equally distributed among university students. Although access routes to higher education have expanded, most students still come from more affluent backgrounds. This study examines current students and their trajectories through university. Academic performance is operationalised as students' mean grade to date. Using data from a quantitative questionnaire, linear regressions were estimated to identify factors associated with academic success. Significant associations were found for the grade achieved in the university entrance qualification, school type, dropout intention, and growing up in a single-parent household.

1 Introduction

Attending university has become a common route for young adults leaving school. Around every second person now decides to pursue higher education (Kracke et al., 2024). Routes into higher education have changed, allowing individuals to qualify through work experience rather than solely through a university entrance qualification (Fachabitur/Abitur) (Dahm & Kerst, 2019). Opening universities in this way was seen as an opportunity to strengthen exchange between tertiary education and the labour market. Individuals who had not previously considered university accessible were given new opportunities to begin studying. An increase in student numbers might be expected to increase the diversity of students' social backgrounds, but only 2.5% of all students did not qualify through the usual route of a university entrance qualification (Kroher et al., 2023). Additionally, 69% of students grew up in an academic household with at least one parent holding a university entrance qualification. Parents' education is one of the key components explaining university attendance. 17% of German students have a migration background, making them a minority on campus. Why does this divide persist if access to university is formally available to most people? This study examines differences in academic success in relation to social inequality. Is there a reason why so many people decide against attending university? Is this decision shaped by the expectation that they are unlikely to succeed?

Most students at German universities come from academic families and possess more university-related cultural capital (Heil et al., 2019). High discrepancies between a student's social origins and the conventions at university can lead to dropping out (Heil et al., 2019). International students are more likely to drop out of university, men are less likely to reach a degree compared to

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women, and children whose parents have lower education are less likely to attend university (Becker, 2011; Heublein et al., 2017; Zimmermann et al., 2021). These patterns may indicate that the university experience is not the same for all students but rather that there are significant differences in who performs well at university. There has been plenty of research detailing the cumulative disadvantages children from non-academic families face in the education system (Bachsleitner et al., 2022). This pattern is likely to continue into university life. Examining the effects at this level is especially important as university degrees have become more common these days, potentially leading to higher social inequality in the long run.

The focus of the study is on factors contributing to social inequality at university such as parents' education, growing up in a single-parent household, prior school grades, and the type of school attended. A comprehensive survey of students of computer science and social sciences at a university in North-Rhine Westphalia was conducted, which asked students about personality, integration at university, prior school performance, and sociodemographic characteristics. Survey data were matched with performance data from the examination office to analyse possible factors of social inequality affecting academic success. The main question of this paper is how academic success is impacted by social inequality. This is done by examining different explanations of educational attainment and identifying the factors of social inequality within them. On this basis, hypotheses about effects on academic success are formulated. Academic success is operationalised using the mean grade across all examinations. The impact of relevant factors on educational attainment is examined empirically. Variables are compared in their strength for explaining the difference in academic success. Finally, possible further research is proposed. A preliminary version of this work was presented as a poster at the Annual Conference of the German Society for Higher Education Research 2025.

2 Theories

Several theories attempt to explain differences in educational success among university students. To explain why students drop out, Tinto (1975) introduced a model focusing on integration into the university system. He distinguishes between social and academic integration, arguing that university is a new social field which necessitates a specific integration. At university there are different rules for acting, talking, and interacting with peers and professors. Understanding these internalised rules as well as behaving along with them can be especially difficult if this is the first time you encounter them. If you do not have parents who already studied, you will not have encountered the very specialised rules that impact university experiences. Integration into university will be more difficult, leading to higher dropout intentions.

Further explaining the way integration can be more difficult for some students, the capital theory attempts to explain these class differences (Bourdieu, 2012). It posits that there are a variety of capitals humans use to navigate in society. For integration at university, cultural, social, and economic capital are key, therefore parents transmit their own capital to their children to give them better opportunities. Since not all parents have the necessary capital, students are less likely to be successful at university. A lack of relevant capital can be one reason for failing at university. This is also related to the habitus which refers to class-specific behaviour that is internalised in childhood. Growing up in a certain social class leads to specific actions and attitudes we do not actively think about. Interacting with people from different social classes can lead to difficulties if there are big discrepancies in the habitus. University can be viewed as a very specific social world with many unspoken rules. Students who do not have an academic background might struggle to fit in.

Students' social background affects educational attainment (primary effects) as well as educational decisions (secondary effects) leading to disadvantages for students from lower social backgrounds (Boudon, 1974). The resources at home determine the achievements children reach in school. Parents with higher education are more likely to spend their resources on their children's education. They might spend a lot of time reading to them or already teaching them to read or write. Still, even if children from disadvantaged backgrounds reach the same level of educational achievement as children from higher social classes, their socioeconomic status impacts their educational decisions. The decision-making process can be quite different due to subjective

assessments of benefits, costs and risks associated with each educational path. While children from academic families need to attend university to maintain their parents' social class, children from non-academic families would already be moving upwards on the social ladder. This means that the incentive to attend university is not the same across all social classes. On the path through the educational system there are many selection processes, leading to different educational trajectories. Thus, some children do not get the option to attend university since they go to a school that will not grant them the necessary qualifications (Bachsleitner et al., 2022; Kracke et al., 2024). The German school system is characterised by an early transition into secondary school after four years of primary school leading to higher social inequality.

The time spent at university is characterised by many small decisions leading to the level of academic success that is reached. The different decisions students make in similar situations can be explained by the subjective expected utility (Heublein, 2014). Each student has subjective expectations regarding their academic performance. How likely does the student think it is that they will successfully finish their studies? Students also form individual estimates of the expected benefit of getting their diploma. Is the diploma worth the time they put into studying? Additionally, students will think about alternative courses of action. Which realistic alternatives are there to studying? Based on their subjective expectations and assessment students will choose their route through university, i.e. continuing their studies or dropping out. Students might perceive getting their bachelor's degree as more important if their parents also have that level of education. Similarly, they might think it more likely that they will be successful.

For the German case specifically Heublein et al. (2010) confirm that the integration into the structures of university and having interpersonal connections with other students plays a role in performing well at university. Integration into the social circle at university can be an important step for students who did not grow up with people with university degrees. The amount of knowledge students start university with can also be considered a factor as well as the social origin. Parents' education plays a role in the choice of field of study (Heublein et al., 2010).

With widening participation in higher education schools need to provide more knowledge to their students to offer them equal opportunities (O'Sullivan et al., 2019). The first year of university is especially important for retention since early academic success gives an incentive to keep studying. Support therefore needs to begin early (Westrick et al., 2021). Simply increasing educational opportunities does not reduce inequalities in academic success between students of low and high socioeconomic status (Liu et al., 2022). Instead, quality indicators may be important, for example teacher-student ratios, the proportion of disadvantaged children or supportive quality learning environments. Grade point average, ECTS credits, and gender are among the most consistent predictors of academic performance and are mediated by factors like self-efficacy, prior education, finances and academic engagement (Kocsis & Molnár, 2025).

Students with higher self-efficacy are more likely to successfully finish their studies (Sarcelletti & Müller, 2011). Self-reflexivity as well as other psychosocial dispositions are relevant for the academic trajectory at university (Baalmann et al., 2020). These factors can be especially important when it comes to everyday decisions at university. Attending lectures and interacting with other students is a regular activity impacting academic success (Ifenthaler & Yau, 2020).

Usually, dropout is not caused by a single factor but rather multiple factors that coincide (Heublein, 2014). Difficulties with social integration can lead to lower self-efficacy which in turn leads to a dropout due to both happening together. Developing social capital at university is not only important for successfully completing one's degree but also for creating a professional network for finding employment (English et al., 2021).

Increasing numbers of students are leaving university without a degree, especially in the field of computer science (Heublein et al., 2017). This is not only a problem for the students who do not receive a qualification for their studies but also universities since they receive financial support from the state based on their graduation rate.

Research so far has shown that there is social inequality among those who leave university without a degree. Men are less likely to finish their degree as well as foreign students (Falk et al., 2022). Students from non-academic households are also less likely to finish their degree (Isleib, 2019). Dropping out can be related to feeling like they do not fit into the university system for those

students (Heil et al., 2019). Non-traditional students are more likely to drop out, primarily because of financial difficulties or poor academic performance (Herrmann, 2022).

Dropping out of university is not necessarily the opposite of academic success (Ülpenich et al., 2023). Rather, it depends on whose perspective we are examining. Possible dimensions of academic success include: „academic achievement, satisfaction, acquisition of skills and competencies, persistence, attainment of learning objectives, and career success” (York et al., 2015, 9). One’s individual idea of success is also relevant since every student has a different goal in mind (Heil et al., 2019). While some students might perceive certain skills as most important, others might be more focused on their job opportunities when they finish university. From the institution’s perspective, degree completion is most relevant since universities are financially dependent on high success rates (Bornkessel, 2018). For this purpose, the analysis considers all grades that students have received at university to date and uses their mean as an indicator of academic success. Although it is possible to complete a degree with low grades, students with higher grades are generally viewed as more successful. Especially if students are planning to also do a master’s degree, certain grades are necessary to get into the programme.

In the German context, it is important to examine the different school forms students attended beforehand. These school forms differ in how they prepare pupils for further education. While the Gymnasium is explicitly preparing for university, comprehensive schools are more likely to focus on vocational training (Isleib & Woisch, 2018). Apart from those two school forms, no other school immediately leads to the university entrance qualification. Students wanting the necessary qualification for university must spend more years to reach this qualification, which is why most students have attended the Gymnasium. In this study, 72.2% of respondents received their qualification at a Gymnasium.

Single-parent households are becoming more common, raising questions about the impact this has on the children growing up with only one parent. While there has been little research specifically on university, there are several articles discussing education in general. In Germany, parental separation has a substantial negative effect on the probability of attending the Gymnasium as well as on school grades in German and Mathematics (Grätz, 2015). Interestingly, these negative effects were limited to children with low-educated parents. Children with highly educated parents are not negatively affected by parents’ separation in educational outcomes. Especially the father’s education matters for the extent of a compensatory effect of social origin.

It is established that children from single-parent households are less successful at school since they are in a specific risk situation (Peuckert, 2012). According to PISA data there is a substantial achievement gap in mathematics between children from single-parent households and those from two-parent households (Woessmann, 2015). When controlling background factors, the achievement disparity gets smaller but still exists. Growing up in a household where the father is absent is found to negatively impact educational outcomes, specifically mathematics scores (Radl et al., 2017). Students living in two-parent households reach higher GPAs compared to students in single-parent households (O’Malley et al., 2015). This is most likely due to social or relational resources lacking in the home environment. Students from single-parent households recently going through divorce do not only show lower academic performance but are also likely to be more withdrawn, sad or anxious (Iqbal et al., 2021). Anti-social behaviour occurs more often and their development in interpersonal behaviour is more likely to be lacking. Students with divorced parents are found to have a higher intention of dropping out and lower academic success (Baalmann & Feldhaus, 2020). Interestingly, boys seem to suffer stronger negative consequences from growing up in a single-parent household (Barajas, 2011; Garg et al., 2007; Wasserman, 2020). This could be due to missing gender role models in a household or differences between boys and girls in response to parental inputs. Parental separation is especially detrimental for father involvement, which is even more reduced for girls (Grätz, 2017).

Single-parent households are more likely to suffer from economic instability, especially since most single parents are female. Around a third of single-parent households in Germany are in danger of poverty (Zartler & Berghammer, 2023). Poverty is one of the key contributors to lower educational achievements as well as dropping out of school (Jones et al., 2018). Due to the time constraints of providing an income as well as caring for a child alone, single parents have less opportunity to help their child with problems in school (Zartler & Berghammer, 2023). The children are missing out on

the resources of the parent who leaves since parental separation complicates the transmission of human capital (Bernardi & Boertien, 2017). The more resources the leaving parent has, which is usually the father, the more resources the child loses access to. All these risk factors interact with each other, creating a unique challenge for single-parent households. Since 25.32% of respondents answered that they grew up in a single-parent household, it is a significant portion of students who are impacted by this specific constellation of risk factors. Examining the influence of growing up with a single parent is important to distinguish this specific pattern of factors from other factors of social inequality.

3 Method and data

Panel data were collected over three years in the BMBF-supported project “Responsible Academic Performance Prediction” (RAPP). Students at a German university were questioned about their university life as well as their living situations. For this research, we examined two distinct fields of study, social sciences and computer science. Enrolment in social sciences is limited by a numerus clausus and only a few students leave the university without a degree. In contrast, computer science is open to anyone and there is a high number of dropouts. With these opposite fields of study, the study attempts to account for possible influences on university trajectories. Studying with lower school grades is assumed to be less likely to be successful.

The constructs self-efficacy (Beierlein et al., 2014) and self-reflexivity (Knispel et al., 2021) were used in the survey to assess how students rate their own skills. To measure the social integration students were asked about their social network, specifically if they know people who can help them in specific situations, i. e. moving or writing applications. Students were asked about their intention to drop out and whether they grew up in a single-parent household, as this may be associated with lower academic success. Participants also reported their parents’ highest level of education which was recoded according to the ISCED. The students self-reported the grade of their university entrance qualification.

Three waves were collected at the beginning of 2022, the end of 2022, and the end of 2023 via the platform Tivian. With multiple data points, it was possible to follow students during their whole university trajectory. The first questionnaire was thus spread among students at the beginning of their studies. The aim was to reach students in the first, third, fifth and seventh semester. The study was promoted in different classes, forums as well as messages on the university portal. Additionally, there was a raffle to encourage students to participate. The questionnaire asked about personality traits, student behaviour, social origins, sociodemographic markers and the self-reported likelihood of dropping out of university. In addition, students were asked for permission to match these answers with their existing data on educational attainment at the examination office. From this, we obtained direct information on taken classes, collected ECTS, withdrawals from exams and received grades. Using this data, we can quantify the academic performance of the students. For the main variable we use the aggregation of all grades students have received up until data collection. The grades range between 1 (best grade) and 5 (worst grade, meaning failing the exam), with additional distinctions of .3 and .7. For the aggregation the average grade was calculated to ensure a simple but meaningful main variable. While the grades are weighted differently at university, this varies considerably by field of study; in contrast this operationalisation is always easily applicable.

After data cleaning, 399 students remained in the sample, 53.38% studying computer science and 46.62% social sciences. 24.06% of the sample grew up in a single-parent household, 72.18% attended a Gymnasium with only 27.82% going to any other school form. The average grade of university entrance qualification is 2.22 with a standard deviation of 0.58, grades ranging from 1 to 3.7. Since there is a numerus clausus for studying social sciences, any grades lower than around 2.2 are likely to be reported by students of computer science.* For the variable withdrawal from exam the numbers of withdrawals were added up, ranging from 0 to 8 and the average being 3.69 (SD: 0.82). Further descriptive details of the dataset can be found in the appendix.

Linear regressions were estimated for the mean grade. This was done with three models to differentiate the various dimensions impacting academic success.

* The average for computer science is 2.34 and for social sciences 2.09.

4 Results and discussion

Table 1 displays the results of a linear regression on the mean grade at university. In Model 1, psychosocial dispositions and social integration were included. Those three variables can explain 12.2% of the variance in the mean grade. The social network has a positive impact on the mean grade the larger the social network, the better the grade. Self-reflexivity is positively associated with students' grades as well; the higher students rate this the better their grades are. Lastly self-efficacy is positively related to better grades. If students report high self-efficacy, they are more likely to have good grades.

Table 1. Linear regression on the mean grade at university

	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>
Intercept	4.781*** (0.285)	4.069*** (0.336)	2.521*** (0.338)
Social network	-0.095** (0.029)	-0.061* (0.029)	-0.019 (0.025)
Self-reflexivity	-0.189+ (0.102)	-0.145 (0.103)	-0.152+ (0.089)
Self-efficacy	-0.249*** (0.070)	-0.172* (0.068)	-0.119* (0.059)
Dropout intention		0.064** (0.021)	0.042* (0.019)
Withdrawal from exam		0.101* (0.043)	0.093* (0.037)
Field of study (Ref. computer science)		-0.322*** (0.092)	-0.205* (0.080)
Single-parent household			0.229** (0.086)
Parents' education			-0.003 (0.037)
Attending Gymnasium			-0.490*** (0.081)
Grade of university entrance qualification			0.646*** (0.065)
N	399	399	399
Adj. R ²	0.122	0.196	0.414

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In Model 2 study-related variables were added, specifically the self-reported dropout intention, the number of withdrawals from exams, and the field of study. All variables have a significant relation to the mean grade. The higher the dropout intention is, the worse the grades are. Similarly, with higher numbers of withdrawals, the grades get worse. For the field of study students in computer science are found to have significantly lower grades than students in social sciences. With these additions, the model explains 19.6% of the variance in grades.

In Model 3 the variables can explain 41.4% of the variance in mean grade, showing that the added variables play an important role. In the final model, the following variables were added: growing up in a single-parent household, parents' education, attending the upper secondary school track and the grade of the university entrance qualification. Apart from parents' education, all factors have a significant impact on students' grades. Growing up in a single-parent household leads to significantly worse grades at university compared to students growing up in a two-parent household. Attending the upper secondary school track is associated with higher grades compared to any other school form. Lastly, the better the grade of the university entrance qualification the better the grades at university.

The final model shows that there is a wide variety of variables significantly impacting academic success. Both self-reflexivity and self-efficacy can have a positive effect on academic performance. Students who believe that they are in control of their lives are more likely to receive higher grades. The dropout intention can also be linked to academic success although the direction of causality is not clear. It would be both possible that bad grades lead to higher dropout intentions or that high dropout intentions mean students spend less time preparing for exams and receive worse grades. If students withdraw from exams more often, they are likely to perform worse in those examinations. The field of study also needs to be considered for university grades, since there are different patterns for computer science compared to social sciences. This could be either due to differences in grading practices or examination difficulty. Another possibility is that students in the social sciences perform better in general since they need a certain grade to get into the programme. Sociodemographic variables are relevant. Growing up in a single-parent household can be linked to lower academic success, while controlling for school performance. Depending on school form we also find differences in academic success. Attending a Gymnasium leads to significantly higher academic performance. The same pattern was found for the grade achieved in the university entrance qualification. Good grades in school are correlated with good grades in university.

The results of the linear regression are especially interesting concerning the question asked at the beginning of this paper. At university, independent effects of social inequality remain, next to the reproduction of the cumulative effects during the school trajectory. Parents' education does not have a direct effect on the grades in university. This is most likely due to the high correlation between parents' education, the school form the students attended as well as the grade of their university entrance qualification. Interestingly, both the school form and the grade have an independent effect on university grades, implying that these are two separate effects. The grade can be a proxy for educational success at school and integration into the educational system. The school form might indicate how much preparation students received in school for attending university. Effects of social inequality could also be at play here, since the choice of school form is strongly correlated to parents' education.

5 Conclusion

The aim of this study was to examine the role of social inequality for academic success. While there is substantial evidence on school education and university applications, there is less comprehensive evidence on university trajectories. This study focused on the path through university and specifically the grades students receive each semester. For this purpose, data was collected at a German university in two different fields of study, matching the questionnaires to students' specific exam results. The average grade from all received grades was used to provide an indicator of academic achievement.

In particular, attending a Gymnasium, the grade achieved in the university entrance qualification, and growing up in a single-parent household have strong impacts on the grade students

receive at university. At the same time, there are significant differences between the areas of study; grades are, on average, higher in the social sciences than in computer science. The personality-related indicators are less influential, although there are effects for self-reflexivity and self-efficacy. Additionally, a bigger social network can also positively impact academic success. While the variables do not explain as much variance as other factors, they also need to be considered when examining academic success. Knowing other students and being able to ask them for help might not be the main factor determining one's success at university, but it can make many processes easier.

Dropout intention also has a significant association with university grades. Lastly the number of withdrawals from examinations has an impact on the mean grade.

When it comes to early detection of students at risk of dropping out of university, the self-reported intention to drop out can be an easy and reliable indicator. Social inequality appears to be particularly evident among students from single-parent households and their lower academic success. Another relevant marker found in this study is the explicit preparation for university that happens at the Gymnasium which can be seen in the higher success rates of those students. Students coming from any other school form show lower academic achievement. Additionally, the social inequality which can be found in the decision about which school type to attend as well as the grade of leaving school is being reproduced at university. In the final model there is no effect for parents' education, but this is most likely due to the interaction with the school form and the final grade. Like any other transition in the educational system the social inequality accumulates. The difficulty of showing the exact relation and isolating it from other factors at play is due to the prior selection processes on the way to university. Many students are from households with high socioeconomic status, only motivated or talented students from other groups find their way to university.

This study indicates that despite the efforts of opening universities to more people, right now most students are still coming from the Gymnasium and have highly educated parents. Even though good grades from school are not necessary for all areas of study and you do not need to have a traditional university entrance qualification to study anymore, it seems to still be unlikely to get to university without either and be successful as well. The cumulative effect of each selection process in the educational system is relevant at this stage, since many people do not even reach the necessary qualification for university.

Another disadvantage found in this study focuses on students from single-parent households. While there have been findings pointing in this direction, this is an indication of such an effect at a German university. The explanation for this effect is most likely due to the precarious situation single parents often find themselves in. Single parents are mostly women and therefore often have lower levels of education. Additionally, there is only one parent at home who can transmit capital to their child. Single-parent households are also more likely to suffer from poverty which can have detrimental effects on children's educational trajectory. The fact we can isolate this effect at university is an indication of the different life situations these children experience and how they may affect their lives in the long term. More research is needed to provide more detailed knowledge on this relation.

While this paper examined the differences between growing up in a single-parent versus two-parent household, these are not the only possible constellations. Children in the foster care system are especially at risk of having low educational aspirations and thus reaching lower educational achievements. Compared to low-income children, children in foster care score significantly lower on both aspirations and expectations (Kirk et al., 2013).

Another limitation of this study is that the sample included only two fields of study at one university, meaning that these results are not necessarily the same for other fields or at other universities. Only a small part of students participated in this study meaning that the results cannot be generalised. Participants are likely to be more successful than those who did not participate and might be systematically different from each other. Since the survey was mostly promoted in university classes, those who attend them regularly were more likely to participate.

The results of the study show that social inequality can impact the entire education system up to tertiary education and effects can still be observed within universities themselves. The difference between the areas of study is especially interesting since educational success is higher for the area that has a numerus clausus. While we cannot know if this is due to the selection processes into a

certain area, we should take further steps to find out more since the effect can be isolated from school form and the school-leaving grade.

The findings of this study lead to possible implications for universities in Germany. Most universities offer a wide range of support, however, in this case, it does not seem that the students who need it most are finding and using it. A mentoring programme at the beginning of university for students whose parents did not study can be an opportunity to help with the onboarding process and provide a contact person who is knowledgeable about university life. Someone close to their own age is necessary for students to be comfortable asking questions they perceive as concerning basic academic knowledge. The Gymnasium already offers explicit preparation for university, but comprehensive schools could do so as well. Giving students the opportunity to at least think about studying is already an important step. In addition, there could also be measures taken at universities, like a mandatory consultation if students report a high dropout intention or are not consistently collecting ECTS.

Comments

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Appendix

Variable	Coding	Min	Max	M	SD
Social network („Gibt es jemand auf dessen Rat sie sich verlassen können?“)	N numbers of contacts	0	7	6.04	1.55
Self-reflexivity	1 – does not apply at all 5 – applies completely	1	4	2.96	0.52
Self-efficacy	1 – does not apply at all 5 – applies completely	1	5	3.71	0.76
Dropout intention	0 – does not apply at all 10 – applies completely	1	10	3.01	2.16
Withdrawal from exam	N numbers of withdrawals	0	8	3.69	0.82
Field of study	0 – Computer science 1 – Social sciences	0	1	-	-
Single-parent household	0 – no 1 – yes	0	1	-	-
Parents' education (average)*	100 – no qualification 244 – qualification at secondary level I 344 – qualification at secondary level II 645 – Bachelor or equivalent program 844 – doctorate	-1.77	2.44	-0.03	1.02
Attending Gymnasium		0	1	-	-

* The classification is done according to the ISCED: <https://www.datenportal.bmbf.de/portal/de/G293.html>, last checked: 23 February 2026

Appendix (*continued*)

<i>Variable</i>	<i>Coding</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>
Grade of university entrance qualification	Average grade	1	3.7	2.22	0.58
Mean grade		1	5	2.72	0.92