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Social relations and academic success in the German educational system

Abstract

Coleman formulated the thesis that social capital, which is rooted in social relations, provides certain options for action, such as, for example, the accumulation of human capital. Based on this theoretical assumption many authors in international research – mainly in the USA – investigated the effects of different forms of social capital on academic success. Therefore, the paper at hand focuses on the question whether the findings from abroad can be replicated for students in the secondary school system in Germany. Applying data of BiKS-8-14 and multi-level regressions, the effect of relations within and outside the family on school competences and grades is investigated. The results indicate on the one hand that for German students in secondary education their own social relations in school are important and on the other hand that effects vary in their meaning between the different school tracks.

Keywords

Education; Social relations; Social capital; Academic achievement; School tracks

Soziale Beziehungen und Schulerfolg im deutschen Bildungssystem

Zusammenfassung

Coleman formulierte die These, dass soziales Kapital, das in sozialen Beziehungen verhaftet ist, bestimmte Handlungsoptionen ermöglicht, wie beispielsweise die Akkumulation von Humankapital. Ausgehend von dieser These untersuchten viele Autoren – vor allem in den USA – den Effekt verschiedener Formen sozialen Kapitals auf schulischen Erfolg. Dieser Beitrag geht daran anschließend der Frage nach, inwieweit sich die empirischen Ergebnisse auch auf Schülerinnen und

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Schüler in der Sekundarstufe in Deutschland übertragen lassen. Mit Hilfe von Daten aus BiKS-8-14 und mehrebenenanalytischen Regressionsmodellen arbeitet das Papier heraus, welchen Effekt soziales Kapital im Sinne verschiedener Arten von inner- und außerfamilialen Beziehungen für den schulischen Bildungserfolg – gemessen an schulischen Kompetenzen und Noten – hat. Die Befunde weisen zum einen darauf hin, dass für die deutschen Schülerinnen und Schüler zu Beginn der Sekundarstufe vor allem die eigenen sozialen Beziehungen in der Schule bedeutsam sind und zum anderen, dass die Effekte je nach besuchtem Schulzweig variieren können.

Schlagworte

Bildung; Soziale Beziehungen; Soziales Kapital; Schulerfolg; Schulzweige

1. Introduction and theoretical framework

Empirical research has repeatedly revealed the persistence of educational inequalities (e.g., Baumert et al., 2001; Becker, 2004; Prenzel et al., 2004). Current research focuses, amongst other factors, on the underlying mechanisms leading to group specific educational outcomes concentrating on the children's educational environments. Processes within the family and at school are investigated and explain a meaningful amount of variance in academic success. One of the most prominent explanations for the relevance of social closure and its underlying mechanisms for academic success is contributed by the work of James Coleman (1988, 1990). According to Coleman, social capital is the third important resource besides economic resources and human capital as it indicates a child's social background. Coleman explains, that social capital is a resource embedded in social relations between different actors. He distinguishes between certain characteristics of social relations which he regards as driving forces of action and assumes that a sense of trust in the reciprocity of a relation between two actors is especially important. This entails a belief, that the relation is important for both actors and consists of expectations and obligations. Moreover, social relations are utilized as valuable channels for information and produce shared norms as well as sanctions which can be useful in processes of action. Furthermore, for Coleman a social relation needs to be close and also embedded in an appropriate context in order to create social capital.

In line with his general theoretical assumptions, Coleman (1988) emphasizes the relevance of families' social capital for a child to acquire human capital. He distinguishes between social capital within the family and social capital between the family and the family's environment. Within the family, the time parents spend with their children is as important as parental expectations, parental attention or parental effort to care for their children. Further, he also points out that children from families with a privileged social background profit much more from a strong

and close social relation within the family: Parents with a higher human capital can transfer to their children the (positive) experience with education they made themselves and the knowledge about it which parents with a lower human capital cannot do.

Smith, Beaulieu, and Seraphine (1995) broaden the concept of social capital by distinguishing between a structural and a process-related component. On the one hand, certain structural features of a social relation stand for the possibility to interact as well as for the frequency and duration of a social interaction. On the other hand, process-related characteristics of social relations emphasize the qualitative aspect. The number of children in the household, for instance, is a quantitative aspect of parent-child relations whereas discussing school issues displays a qualitative attribute of inner familial relations.

Regarding relations between the family and their academic environment, Coleman (1988) illustrated the importance of social relations between the family and the family's academic environment by revealing the relevance of this relation for the creation of human capital by generating intergenerational closure over many contacts to different actors. A strong and close relationship between parents, children and teachers creates a climate of discipline and trust, which is beneficial for children's learning progresses. Another positive effect of good contacts between students, teachers and parents is the effect of a more efficient support in school-related matters and an enhanced exchange of information, relevant for academic achievement. Moreover, a climate of good contacts and relationships with others helps to establish shared norms and values, for instance, the perception of good grades as a valued and desired outcome. Besides, strong and close relations between parents and teachers foster expectations for rewards, such as better grades for students of committed parents. Due to the fact that social capital is not necessarily connected to the family's economic resources or human capital, this independent function of social capital even allows parents and children of educationally deprived classes to get involved in relations of higher human capital. Hence, children with a less advantageous family background can profit from intergenerational closure as they can compensate for human capital deficits within the family by establishing contacts to other actors.

Many studies followed Colemans' theses and investigated the effect of different forms of social capital on grades or competences (e.g., Israel, Beaulieu, & Hartless, 2001; Smith, Beaulieu, & Israel, 1992; Teachman, Paasch, & Carver, 1997). But the review of literature (see Section 2) shows that there are only few empirical results for Germany. Because of the more stratified German secondary school system the paper at hand takes up the question whether the empirical results from abroad can be replicated for German students. We will distinguish between the social relations between parents and their children inside the family, between parents and school, as well as social relations among the students themselves and students and teachers outside the family. In addition to a mostly neglected aspect in former studies, the work at hand tries to also investigate the connection between social origin and social relations considering the fact that students attend different school tracks.

2. Current state of research and hypotheses

Regarding empirical analyses, Coleman (1988) found significant negative relations between a strong parent-child relation and early school-drop-outs and evidenced effects of the families' structure as well as the number of siblings. He explained this with a weaker relation to the parents and less possibilities of interaction because of less shared time. In consensus with the empirical results of Coleman (1988), other analyses working with these indicators standing for quantitative aspects of parent-child-interaction and data from the U.S. display that children from single-parent households or who have many siblings achieve much worse grades and drop out of school more often (e.g., Astone & McLanahan, 1991; Israel et al., 2001; Smith et al., 1992; Smith et al., 1995). For Germany Schmitt (2009) analyzed the effect of number of siblings and family structure for school grades of students in grade four and found, in line with the results of international research and the theoretical assumptions of Coleman, a negative effect of a higher number of siblings and for children living in single-parent household on school grades.

Therefore we would (1) also for the secondary school system assume that children from single-parent households and a high number of siblings achieve lower academic success than children from a two parent household and with less siblings.

Beyond that, many U.S. authors (e.g., Ho Sui-Chu & Willms, 1996; Israel et al., 2001; Muller, 1993; Teachman et al., 1997) evidenced a positive effect of discussing school issues with parents as a process-related feature of parent-child-interaction on competences, grades and staying in school. Expanding the argumentation on the qualitative aspect of parent-child interaction, not only school-related interaction matters for academic achievement, but also positive effects of everyday interactions can be investigated. Regarding the number of talks about personal issues, no clear effects could be found for the U.S. in cross sectional studies: In the analyses conducted by Coleman (1988) or Smith et al. (1992), leaving school earlier is not influenced by these kinds of interactions whereas Israel et al.'s findings suggest that there is a positive relation between the number of talks on reaching high competences, good grades and staying in school. For Germany, according to Schmitt (2009), children in fourth grade in Germany who reported a positive family climate, common decision making and a respectful treatment go along with higher chances of reaching higher grade levels.

In sum, the review of literature shows no clear results for the quality of everyday interaction between parents and their children. At least no negative effects are shown. Due to the German study evidencing a positive effect in primary education we (2) assume to again find this positive effect of everyday interaction within the family in the secondary school system. The better the relation between the students and their parents concerning everyday issues, the higher the academic success.

In addition, Coleman presumes, however, that the positive effect of an intensive contact with the parents rather applies to children with parents having a higher educational background. It should be noted that all studies mentioned control

for families' human capital. Thus, all effects mentioned in connection with inner-familial social relations belong to the net of families' human capital and hence all children benefit from an intact parent-child relationship. The assumed positive interaction effect of the families' human capital and the different indicators for inner-familial social relations is neglected in most cases. In line with the theoretical assumptions of Coleman we (3) would hypothesize that the interaction effect of the student-parent-relation and the educational background should be positive.

Coleman, Hoffer, and Kilgore (1982) and Coleman and Hoffer (1987) report also that students from catholic schools outperform students from public schools. They assume that this is due to the fact that the bonds between teachers and students, among students and between parents and school are tighter. Authors using data from the U.S. like Israel and Beaulieu (2002) investigated social relations among students and between students and teachers and found that participation in students' organizations and positive student-teacher-interactions correlate positively with student achievement. Also, Carbonaro (1998) found negative effects of class skipping, absenteeism and suspensions on test scores in mathematics and on continuing the educational career. Furthermore, the chance of attending a two-year or a four-year college versus not enrolling in college at all relates to the share of friends with ambitious plans towards their own educational careers (e.g., Perna & Titus, 2005). Schmitt and Kleine (2010) confirm these results for students in primary education in Germany by revealing that a positive student-student-interaction, a high number of friends planning to attend the highest academic school track and positive student-teacher-interaction go along with higher performance levels in fourth grade.

In sum, the results seem unambiguous: Bonds between teachers and students and among students themselves matter for school success. So we would come along with Coleman and assume to replicate the described results for secondary education in Germany: (4) A positive student-student-climate, ambitious friends as well as a positive student-teacher-interaction have a positive effect on academic success.

Complementally, also the relations between parents and teachers need to be considered. Many authors were able to show that parental involvement at school, like volunteering or attending parent-teacher conferences, predicts academic success in the U.S. (e.g., Catsambis, 2001; Kim & Schneider, 2005; Paulson, 1994; Perna & Titus, 2005). In contrast just as many studies find no or a negative effect (Teachman et al., 1997; Hofman, Hofman, Guldemon, & Dijkstra, 1996; Ream & Palardy, 2008; Pong, 1998). Although these results do not add up to a clear picture, a general tendency can be observed: It seems likely that the frequency of parental school contacts tends to have negative associations with academic success, whereas parental commitment like volunteering showed positive correlations in most cases. For Germany Schmitt & Kleine (2010) confirm that having a good contact to school contributes to better school grades in primary education. Therefore we assume (5) that a positive parent-school-interaction has also a positive effect on academic success after transition to secondary education.

In addition for the relations outside the family, Coleman presumes, however, that the positive effect of an intensive contact rather applies to children with parents having a lower educational background. Again, it should be noted that all studies mentioned control for families' human capital, but that interaction effects are mostly neglected. In line with the theoretical assumptions above we (6) would hypothesize that the interaction effect of parent-school- as well as the student-student- and the student-teacher-relation and the educational background should be negative.

3. Data, operationalization and method

3.1 Dataset and sample

In order to test the hypotheses described above, longitudinal data from the research group BiKS "Educational processes, competence development and selection decisions in preschool- and school age" is used (see Kurz, Kratzmann, & von Maurice, 2007; Schmidt, Schmitt, & Smidt, 2009). We refer to data from BiKS-8-14, wave four (spring 2009). At that time, the students were attending fifth grade and the transition into secondary education had taken place about eight months before. Present data includes all students who were tested within class context which implicitly means (due to research design) that they attend one of the following school tracks: the low vocational track (*Hauptschule*), the intermediate vocational track (*Realschule*) or the academic school track (*Gymnasium*). These tracks are hierarchically stratified by their academic requirements. Furthermore, we only use cases with complete information on all relevant variables concerning this study ($N = 939$).

In our subsample, the children are nearly equally distributed in terms of gender: 53 % of the observed students are female and 47 % are male. Due to the sampling design and institutional characteristics, nearly 20 % of the families live in Hesse and about 80 % in Bavaria. With regard to families' educational level, 51 % of the interviewed families reach a college degree ("Abitur") whereas only 19 % reach a lower educational level. In 30 % of the families, the highest educational degree is on a medium level. The clear majority of families are native Germans without migration background (87 %), just some of them (13 %) are immigrants in first generation.¹ Furthermore, most of the children live in two-parent families with not more than two siblings.

¹ The composition of the random samples, therefore, shows a distortion towards parents with a higher education and without migration background. On one hand this can be explained by the higher number of failures in the group of the migrants and educationally deprived families during the previous data collection waves, on the other hand, above all by higher transition rates to the academic track (Gymnasium) (mainly in Hesse) after the third data collection wave. This led to the over-proportional sampling of this type of school and to the fact that more children of highly educated parents and without

3.2 Operationalization of central variables

3.2.1 Independent variables for social relations

Appreciating the state of art, the aim of this paper is to investigate effects of social relations within the family as well as outside the family. For the social relations within the family it is necessary to have information on quantitative and qualitative characteristics of the parent-child-interaction, whereas for the relations between the family and school, the relations between parents and school, between students and between students and their teachers are to be considered.

The quantitative aspect of a parent-child-relation is integrated by two indicators displaying the families' structure, accounting for the theoretical possibility to interact: the number of siblings and the family structure. The qualitative aspect of everyday inner familial interaction can be measured from the student's and the parental point of view with an (nearly) identical scale about student-parent-interaction.² Also relations between the family and their social environment are integrated. Several indicators present the social relations between students (student-student-interaction): "negative reputation in class" and "competition in class" represent the climate among the students which is important for supporting each other and how easy or difficult it is to exchange information. "Educational aspirations of friends" represents the value of academic achievement among the children and their friends whereas "friends in the same kind of school" indicates the possibility to interact as well as the closeness of the student-student-relation. Together with the "student-teacher-interaction", these indicators represent the quality of social relations between the relevant actors in school class. The "student-teacher-interaction" should give an impression about the relation between the student and the teacher and also stand for the exchange of information which promotes mutual trust and more adequate support. Additionally, it is also possible that children with a closer relationship to the teacher get better grades as a result of this closer connection. Furthermore, the "parent-school-interaction" is measured by the parents' contact to school. A good contact to school can contribute to a better relation to the child's teachers but also to other committed parents, who might in turn establish shared norms and values and serve as information channels.

Table 1 provides an overview of the items of the mentioned indicators.

migration background were newly included in the study. For more detailed information compare Schmidt et al. (2009).

- 2 We distinguish between both points of view, because as Paulson (1994) argued, that the perception of the quality of a social relation is subjective and can differ between the partners in a social relation. Following, measuring effects of social relations should always account for possibly differing points of view. With the data at hand it is possible to do this for the qualitative aspect of the parent-student relation, unfortunately not for other variables. With regards to content it would also be possible to work with one difference value instead of individually including both indicators (which have a low correlation) in the following analyses. Anticipating the results of the following analyses, there are no significant effects regarding the difference value.

Table 1: Measuring explanatory variables

Construct
<i>Operationalization (values)</i>
Number of siblings
<i>How many children do you have?</i> <i>Do they live in your household?</i>
Family structure
<i>Do you have a partner?</i> <i>Do you and your partner live in the same household?</i> (1 = single parent; 0 = two parents)
Student-parent-interaction (student's point of view)
<i>We take the time to listen to one another;</i> <i>In our family, we all help and support each other when the chips are down;</i> <i>I have experienced that I can ask for my parents' advice;</i> <i>I prefer to keep my worries under my hat;</i> <i>I can talk with my parents about my worries very well;</i> <i>My parents comfort me whenever I have problems with a certain subject</i> (1 = "not true" to 4 = "true")
Student-parent-interaction (parental point of view)
<i>We take the time to listen to one another;</i> <i>In our family, we all help and support each other when the chips are down;</i> <i>In our family, there is no feeling of togetherness at the moment;</i> <i>In our family, we try to do as many activities as possible together;</i> <i>There are many conflicts in our family at the moment</i> (1 = "not true at all" to 5 = "true at all")
Negative reputation in class (student's point of view)
<i>Frequency of situations in which others trash me in the break;</i> <i>Frequency of situations in which no one would let me join the group</i> (1 = "never" to 4 = "often")
Competition in class (student's point of view)
<i>Some pupils sneer at classmates;</i> <i>Pupils often argue about who is better;</i> <i>Others are secretly pleased when classmates make a mistake;</i> <i>Some pupils try to come off well by bashing others.</i> (1 = "not true" to 4 = "true")
Idealistic educational aspirations of the child's friends (student's point of view)
<i>Which kind of educational degree do your best friends wish for no matter which kind of school they attend and which kind of school performance they show?</i> (1 = "low educational level" to 3 = "high educational level")
Most friends in the same kind of school (parental point of view)
<i>Which school track does the majority of your child's friends attend?</i> (0 = "minority of friends in the same kind of school"; 1 = "majority of friends in the same kind of school")
Student-teacher-interaction (parental point of view)
<i>My child's teachers evaluate my child according to the same criteria as my child's classmates;</i> <i>My child's teachers are as fair to my child as they are to his or her classmates;</i> <i>My child's teachers are stricter to my child than to classmates</i> (1 = "not true at all" to 5 = "totally true")
Parent-school-interaction (parental point of view)
<i>I help organizing school festivities; I am active in the parents' association</i> (0 = "no commitment" to 1 = "full commitment")

Furthermore, Table 2 provides an overview of the descriptive features of the central indicators. Considering the quality of the factor analytically derived indices (arithmetic mean of the sum of the single items) it can be stated that the internal consistencies of the scales “student-parent-interaction (student’s point of view)” ($\alpha = .78$), “student-parent-interaction (parental point view)” ($\alpha = .71$), “student-teacher-relation” ($\alpha = .74$), “negative reputation in class” ($\alpha = .65$) and “competition in the class” ($\alpha = .66$) are satisfactory. The index “parents-school-relation” ($\alpha = .30$), despite the low number of items shows small internal consistency. However, in the analyses this interaction is still considered, since otherwise the relation of the parents to the teachers and other parents in the secondary school track could not be included. The index “competition in the class” shows a normal distribution, while the indices “student-parent-interaction (student’s point of view)”, “student-parent-interaction (parental view)”, “negative reputation in class”, “student-teacher-relation” and “parent-school-interaction” show response biases indicating an above average positive valuation of the family atmosphere and also the relations in the class context, while the involvement in school activities is reported as not very strongly developed. Also the multistage item “educational aspirations of friends” shows a right-skewed distribution, so that the friends’ educational planning generally is very ambitious. However, it can be determined for these indicators – including the left-skewed distribution of the item “number of siblings in the household” that the deviation from a normal distribution is not problematic based on adequate variance within the respective indicators. There is also adequate variation between the two versions of the items “friends in the same kind of school”. The dichotomous indicator “family structure” on the contrary is unevenly distributed, as only very few children grow up in single parent households.

Table 2: Indicators of social relations

	MIN	MAX	M	SD	α
Single-parent (vs. two parents)			0 = 96 %; 1 = 4 %		
Number of siblings	0	9	1.35	.95	-
Student-parent-interaction (student’s view)	1.17	3.83	3.23	.49	.78
Student-parent-interaction (parental view)	2	4.67	3.66	.33	.71
Student-teacher-interaction	1.33	5	4.34	.65	.74
Negative reputation in class	1	4	1.56	.67	.65
Competition in class	1	4	2.41	.71	.66
Educational aspirations of friends	1	3	2.65	.53	-
Friends in the same kind of school			0 = 26%; 1 = 74%		
Parent-school-interaction	1	2	1.29	.31	.30

Note. Source BiKS-8-14, own calculations; MIN = Minimum; MAX = Maximum; M = Mean; SD = Standard Deviation; α = Internal Consistency (Cronbach’s Alpha).

3.2.2 Dependent variables

Academic success is measured via two dependent variables to get a more valid picture: On the one hand, a test score average on mathematics and reading competences for a more objective measurement of students' abilities is applied. On the other hand, the grade point average in German and mathematics as a measurement of educational achievement, not only including the individual ability, but also a broader view by the teachers' evaluation is being used. Descriptive analyses reveal that using those two concepts is indeed appropriate due to an only moderate correlation between grades and educational competences. For both dependent variables, multi-level linear regressions will be conducted to investigate the effect of social relations in educational success. In each regression, the measurement of academic success which is not regressed, will be controlled in order to draw more reliable conclusions.

3.2.3 Control variables

According to the theoretical considerations by Coleman, the highest level of secondary education in the family is also taken into account in order to operationalize families' human capital (graduation from academic track "Abitur" vs. all others) as well as the families' financial resources operationalized by the highest ISEI score in the household. Additionally, migration background (migrants vs. natives) and sex (girls vs. boys) are controlled. Moreover, the academic school track is taken into consideration. The aim of the paper is to transfer the empirical findings from abroad to Germany. In doing this it is important to account for the fact that the students attend different school tracks which are hierarchically stratified (academic track vs. intermediate vocational track; low vocational track vs. intermediate vocational track). Since the school tracks also have a dissimilar local value in Bavaria and Hesse, the Federal State (Bavaria vs. Hesse) is accounted for, too.

3.3 Method

As students are clustered in classes in the BiKS-8-14 study, a linear multi-level approach with random intercept is applied to account for this possibility. The assumption behind this is that the children's academic success does not only depend on individual characteristics, but also on belonging to school classes which means that the intercept varies randomly between groups.³ In the following, the results concerning the effect of social relation within the family on academic success (Table 3) and between family and school (Table 4) are reported. We always re-

3 Due to an adequate variance on the class level in both regressions, we decided to keep the multi-level approach.

port effects for the grade point average (models are signed with an “a”) and effects for test score average (models are signed with a “b”). All shown models control for families’ resources, migration status, gender and federal residences so that net-effects of social relations are reported. The first models present the net-effect of the social relations, Models 2, furthermore, control for school track, the Models 3 control for each other’s dependent variable, Models 4 give a complete picture, Model 5 integrates the indicators for the other relevant social relations and Model 6 and further Models present interaction effects.⁴

4. Results

4.1 Social relations within the family

Investigating the effect of social relations within the family on educational success, four indicators are integrated into the models (Table 3).⁵ For one of the quantitative aspects of parent-child-relations, the number of siblings, a slightly significant negative effect on grades and test scores can be shown (Models 1a/b). Therefore we can first proof our hypotheses (1) for the negative correlation of academic success and number of siblings. But the effect of the number of siblings loses significance for the grade point average, when accounting for differences in the students’ competences (compare Model 1a–2a with Model 3a). In the models for the competence test scores, the effect disappears when controlling for the different school tracks (compare Model 1b with Model 2b). As former studies showed, there is an effect concerning the number of siblings in earlier educational stages (Schmitt, 2009). Perhaps this finding derived from the data at hand gives a hint that family size is more important for academic success in earlier educational stages, when the development starts and more resources from the parents are needed.

For the other quantitative aspect (family structure) the results show that children living in a single-parent household do not achieve as good grades as those who live together with both parents (Model 1a). For predicting competences, this kind of family structure has no significant influence (Model 1b–4b). In consequence hypothesis (1) is only valid in connection with grades. The significant effect of living together with both parents also remains important in all following models

4 As often the case with socio-scientific studies, an endogeneity problem exists inasmuch as the explanandum and explanans are measured at the same time. The only solution to this problem is the longitudinal analysis. But even though BiKS-8-14 is a longitudinal study, longitudinal modeling using this data does not appear appropriate to the authors: The data ascertainment starting with the fifth grade is performed only once per year. In particular after the transition to the secondary school track it can be assumed that the social relations strongly vary within one year (explanans). Insofar the authors assume that the period of one year is too long for a time model of the effect of social relations on educational success.

5 The step by step inclusion into the models of Table 3 and Table 4 does not change the results.

for the grade point average when the attended school track, the test score or family-school-relations are controlled (Model 1a–5a).

Consequently, living together with both parents is more important for the general measurement of academic success (grades), whereas the number of siblings influences both measurements of academic success.

Table 3 also shows the results for the qualitative aspect of student-parent-interaction – with no significant effects at first for both depending variables (Models 1a/b–Models 2a/b), neither for the student's nor for the parental point of view. Therefore, we cannot prove our hypotheses (2). This does not change regarding the child's evaluation of the student-parent-interaction in all following models (Models 3a/b–Models 5a/b). But the parental point of view of the family climate becomes important for grades under control of the children's test scores – considering the attended school track and family-school-relations (Model 3a–5a). This means, if parents state that there is a good family climate, it does correlate with better grades for children with the same competences at the same kind of school. For the students' competences a significant (negative) effect can analogously be shown when accounting for the grade point average and the attended school track (compare Models 1b to 3b with Models 4b–5b).

In line with the theoretical assumptions of Coleman we hypothesized (3) that we would expect a positive interaction effect of the student-parent-relation and the educational background: Comparing the significant interaction term for the student-parent-interaction and the educational background with the insignificant main effects of these indicators (Model 6b), it can be shown that only children from privileged backgrounds reach higher test scores with rising family climate. This means that these children already reach the same grades at the same type of school with lower competences than those from non-intact homes with higher competences. All in all, this implies that especially children from academic educational backgrounds with low competences benefit from a good family climate.

4.2 Social relations between the family and school

Investigating the effect of social relations outside the family on educational success, six indicators are integrated into the models (Table 4).⁶

4.2.1 Social relations among students and teachers

If the relation between students and teachers is a good, we assumed that this contributes to a higher grade point average. As our results show this is true (hypothesis 4) (Table 4, Model 1a) and holds true for all types of secondary school tracks,

⁶ All effects described below can also be proven without change under the control of the inner-familial social relations (Model 5a/b).

under control of the students' competences and the inner-familial social relations (Model 2a–5a). Complementary, as Model 6a with the interaction effect shows, a good student-teacher-relation is of highest importance for grades of children in the intermediate vocational school track. A comparison of the coefficients indicates that the benefit of a good connection to the teacher is only half as strong for children attending the academic school track than for students of the intermediate vocational track and for children attending the low vocational track it is only one third. Descriptive analyses not shown indicate that only a median correlation exists between grades and educational competences. In consequence, teachers also include other characteristics apart from the abilities of a student in the performance reports. Seizing the described findings it can be assumed that the relation to the teacher is one of these characteristics. This assumption is supported by the analysis of the academic competences in dependence on the relation between students and teachers for the entire group. Regressing test scores based on this social relation, the result of a complaisant effect of the relation is true for the net-effect (Model 1b), but loses significance under control of students' grades (compare Model 1b–2b with Model 3b–5b). Consequently the quality of the relation between a student and the teacher seems to be more important for the grades than for the competences. This is not surprising, assuming that grades are more influenced by the teacher's attitudes.

4.2.2 Social relations among students

Regarding the student-student-interaction, we assumed a positive effect on educational success (4).

First the results show that the grades of children who have a negative reputation within the class are lower than the grades of students with a good reputation (Table 4, Model 1a). This is important for all types of secondary school tracks (Model 2a) as long as the differences in the children's test scores are not accounted for (compare Model 1a–2a with Model 3a). Furthermore, it is revealed that children who are well integrated within the class are the ones with the higher competences – this independently applies to all school tracks (Model 2b). A comparison discloses that seeing yourself as an outsider, is connected to lower performances resulting from low competences caused by this fact. Additionally, when looking at the competence average and the attended educational track simultaneously, the correlation of this aspect of student-student-relation and school grades tends to become significant again (Model 4a). This may indicate that children having the same competences within the same school tracks again achieve better educational results when well-integrated into the class. The absence of an effect on the competency test results after adding the grade point average (compare Model 1b–2b with Model 3b–4b), on the contrary, indicates that when the academic achievements are on the same level, children who do not connect well to their fellow students do not additionally have lower competences.

The perceived competition in school class is another but more achievement-related indicator for the class climate (Table 3). It displays that children reporting a strong competition in school class have lower competences than those who do not feel pressured. This observation was made in all school tracks and independent of grades (Model 4b). The additional analysis to what extent the grade point average, as indicator for academic success, varies with the competition in the class also beyond the background characteristics, can be explained with the educational background of a child by means of the introduction of an interaction term of this indicator after the absence of a significant main effect (Model 1a–Model 4a). For children coming from educated households, a competitive climate is connected with better grades contrary to the theoretical assumptions (compare Model 7a: effect of the interaction term), while the academic performance of children coming from educationally deprived parents is lower (compare Model 7a: Main Effect). This means that under these circumstances the children of well-educated parents can achieve better academic results than children of educated parents in a less competitive environment. Children of parents with educational deficits, however, are comparatively more successful in classes with less competition. Considering the competence status of the children, only the effect on the group of children with a highly educated background is slightly significant (compare Model 8a: Main effect with effect on the interaction term). The described effects can, therefore, partially be explained with different academic competences. On one hand this shows that with the same academic competences students coming from families with a deficit in human capital will not achieve different results when exposed to a strong competition. On the other hand this proves that, in case of a competitive climate, children coming from parents with high human capital and identical competence averages will do better than children having similar conditions in classes with less competition. Contrary to the assumption, the deficit of inner-familial human capital (6) cannot be compensated.

Summing up these results, relations among students altogether seem to have influence on children's grades through the achievement of certain competences. These findings reflect the theoretical assumption that reciprocal support is facilitated over closure among students. Being an outsider and feeling pressured dilutes social relations and reduces the student's chances of achieving higher competence levels.

Additionally, high educational aspirations of the best friends as a qualitative aspect of the children's networks, contributes to better grades first (Table 3, Model 1a). Accounting for differences in the attended school tracks (Model 2a) or the children's competences (Model 3a) this effect disappears. But when controlling for the competence level and the attended school track simultaneously (Model 4a) again a positive effect occurs. This can be explained, when considering the interaction effect between the school tracks and the educational aspirations of the closest friends (Model 9a): There is a positive effect for children with the same competence lev-

el in the low vocational school track. This means that students in the lower school tracks can profit from friends with high educational aspirations, while there is no effect for students in the higher school tracks. This supports Coleman's theses, arguing that social capital can balance missing resources. Analogously, the educational aspirations of the child's closest friends have no significant effect on the children's competences when controlling school track and grades (Model 2b-4b). A possible explanation may be that the aspirations of the students arise with the school track (and therefore with the competences), so that the effect disappears.

Investigating the role of the child's best friends it can be observed that many friends visiting the same kind of school has no effect on the students' grades (Model 1a-5a). Looking at the students' competences as dependent variable, the number of friends visiting the same kind of school leads to higher test scores – even if accounting for grades (Model 1b-3b). But when controlling for the school track this effect disappears (Model 2b-4b). This leads to the assumption, that competences are high because the network of friends gets more homogenous with respect to performance the higher the school track.

4.2.3 Social relations among parents and school

In a last step, the parent-school-interaction is included as a proxy for the parental relations to children's teachers as well as to other students' parents. The indicator shows no significance, neither for grades nor for test scores (Table 3, Models 1a/b-4a/b). This result contradicts one of the unambiguous results of recent research and therefore our hypothesis (5). One explanation could be the crude measurement of the parent-school-interaction, depending on the restrictions of the data at hand. In comparison to other research for younger students in the German educational system (e.g., Schmitt & Kleine, 2010), another more content-related reason may be that older children don't need this specific parental support anymore.

Table 3: Inner-familial social relations and academic success in fifth grade

	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b
Constant	-.02 (.07)	-.09 (.94)	-.10 (.09)	-2.67 (.69)**	.03 (.08)	-2.13 (.82)
Educational background high (vs. low)	.18 (.06)**	1.12 (.41)**	.11 (.06) ⁺	.54 (.39)	.03 (.05)	.66 (.34) ⁺
Socio-economic background	.01 (.01)**	.04 (.01)**	.01 (.00)**	.03 (.01)*	.00 (.00) ⁺	.02 (.01)
Migration background	-.08 (.07)	-.46 (.50)	-.10 (.01)	-.95 (.46)*	-.04 (.06)	-.18 (.42)
Sex girl (vs. boy)	.20 (.04)**	-.34 (.32)	.17 (.04)**	-.56 (.30) ⁺	.20 (.04)**	-1.07 (.27)**
Federal region Bavaria (vs. Hesse)	-.19 (.07)**	-1.14 (.99)**	-.10 (.07)	1.81 (.52)**	-.15 (.07)*	-.33 (.87)
School track low vocational (vs. intermediate vocational)			-.22 (.08)**	-6.20 (.60)**		
School track academic (vs. intermediate vocational)			.17 (.07)*	4.06 (.55)*		
Competence test score average					.07 (.00)**	3.79 (.19)**
Grade point average						
Effects of inner-familial social relations						
Number of siblings	-.05 (.02)*	-.31 (.16) ⁺	-.05 (.02)*	-.21 (.16)	-.02 (.02)	-.21 (.16)
Single-parent (vs. two parents)	-.29 (.11)**	-.74 (.76)	-.28 (.11)**	-.84 (.73)	-.22 (.09)*	-.84 (.73)
Student-parent-interaction (student's view)	.05 (.05)	-.07 (.33)	.05 (.05)	-.07 (.31)	.05 (.04)	-.07 (.31)
Student-parent-interaction (parental view)	.09 (.07)	-.30 (.48)	.09 (.07)	-.44 (.56)	.11 (.06) ⁺	-.44 (.56)
Intercept variance (classes)	.023 (.011)	16.504 (2.631)	.013 (.008)	1.748 (.547)	.040 (.011)	13.091 (2.006)
Residual variance (individuals)	.430 (.021)	19.180 (.966)	.424 (.021)	19.059 (.935)	.303 (.015)	13.456 (.676)

(continued)

Table 3: Inner-familial social relations and academic success in fifth grade (continued)

	Model 4a	Model 4b	Model 5a	Model 5b	Model 6b
Constant	.09 (.09)	-2.36 (.67)**	.15 (.10)	-2.59 (.72)**	-2.37 (.67)**
Educational background high (vs. low)	.06 (.05)	.22 (.33)	.05 (.05)	.21 (.33)	.19 (.33)
Socio-economic background	.00 (.00)*	.01 (.01)	.00 (.00)*	.01 (.01)	.01 (.01)
Migration background	-.03 (.06)	-.51 (.39)	-.04 (.06)	-.45 (.39)	-.51 (.39)
Sex girl (vs. boy)	.22 (.04)**	-1.16 (.26)**	.22 (.04)**	-1.24 (.27)**	-1.16 (.27)**
Federal region Bavaria (vs. Hesse)	-.23 (.07)**	2.18 (.51)**	-.25 (.07)**	2.12 (.52)**	2.21 (.51)**
School track low/vocational (vs. intermediate vocational)	-.25 (.08)**	-5.44 (.59)**	.26 (.08)**	-5.34 (.60)**	-5.47 (.59)**
School track academic (vs. intermediate vocational)	.12 (.07) ⁺	3.37 (.54)**	-.17 (.08)*	3.41 (.57)**	3.39 (.54)**
Competence test score average	.08 (.00)**		.07 (.00)**		
Grade point average		3.53 (.19)**		3.52 (.19)**	3.54 (.19)**
Effects of inner-familial social relations					
Number of siblings	-.03 (.02)	-.08 (.13)	-.03 (.02)	-.08 (.13)	-.07 (.13)
Single-parent (vs. two parents)	-.22 (.09)*	-.21 (.62)	-.22 (.09)*		-.21 (.62)
Student-parent-interaction (students view)	.05 (.04)	-.23 (.27)	.04 (.04)	-.33 (.62)	-.26 (.27)
Student-parent-interaction (parental view)	.12 (.06)*	-.68 (.39) ⁺	.10 (.06) ⁺	-.75 (.39) ⁺	.04 (.55)
Interaction effects of inner-familial social relations					
Student-parent-interaction (parental view)*Educational background high					-1.42 (.76) ⁺
Intercept variance (classes)	.035 (.001)	2.440 (.552)	.035 (.009)	.035 (.009)	2.440 (.552)
Residual variance (individuals)	.299 (.015)	13.393 (.660)	.290 (.014)	.290 (.014)	13.393 (.660)

Note. Source BiKS-8-14, own calculations; subsample $n_1 = 939$; $n_2 = 142$; Hierarchical linear regression (random intercept models, regression-coefficients; standard deviation in brackets; variables centered around group mean; grades recoded); Grade point average = models marked a; Competence test score average = models marked b; models in light gray script = effects under control of family-school relations.

⁺ $p < .10$. ^{*} $p < .05$. ^{**} $p < .01$.

Table 4: Family-school relations and academic success in fifth grade

	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b
Constant	-.05 (.08)	-.95 (.88)	-.08 (.10)	-2.76 (.74)**	.07 (.08)	-.91 (.80)
Educational background high (vs. low)	.11 (.06)*	1.01 (.41)*	.08 (.06)	.47 (.39)	.02 (.05)	.63 (.34) ⁺
Socio-economic background	.01 (.01)**	.04 (.01)**	.01 (.01)**	.03 (.01)*	.01 (.01)*	.01 (.01)
Migration background	-.11 (.07)	-.58 (.49)	-.11 (.07) ⁺	-.91 (.45)*	-.05 (.06)	-.18 (.42)
Sex girl (vs. boy)	.17 (.05)**	-.59 (.33) ⁺	.17 (.04)**	-.68 (.31)*	.22 (.04)**	-.128 (.28)**
Federal region Bavaria (vs. Hesse)	-.17 (.07)*	-.66 (.87)	-.12 (.07) ⁺	1.73 (.52)	-.16 (.07)*	-.06 (.81)
School track low vocational (vs. intermediate vocational)			-.18 (.08)*	-6.00 (.62)**		
School track academic (vs. intermediate vocational)			.13 (.08)	3.91 (.59)**		
Competence test score average					.07 (.00)**	
Grade point average						3.71 (.20)**
Effects of family-school relations						
Student-teacher-interaction	.18 (.03)**	.56 (.24)*	.17 (.03)**	.50 (.23)*	.12 (.03)**	-.05 (.20)
Negative reputation in class	-.10 (.03)**	-.78 (.25)**	-.09 (.03)**	-.59 (.24)*	-.05 (.03)	-.35 (.21)
Competition in class	-.02 (.03)	-.65 (.26)*	-.00 (.03)	-.35 (.24)	.03 (.03)	-.56 (.22)*
Educational aspirations of friends	.14 (.05)**	1.10 (.37)**	.05 (.05)	-.20 (.37)	.00 (.04)	.45 (.32)
Friends in the same kind of school	.08 (.05)	1.10 (.39)**	.03 (.04)	.38 (.38)	-.06 (.05)	.96 (.33)**
Parent-school-interaction	.04 (.07)	.01 (.51)	.06 (.07)	.24 (.49)	.06 (.07)	-.08 (.42)
Intercept variance (classes)	.016 (.009)	11.464 (2.192)	.013 (.008)	1.804 (.551)	.039 (.011)	10.601 (1.817)
Residual variance (individuals)	.417 (.020)	19.174 (.984)	.414 (.020)	18.707 (.919)	.299 (.015)	13.534 (.688)

(continued)

Table 4: Family-school relations and academic success in fifth grade (continued)

	Model 4a	Model 4b	Model 5a	Model 5b
Constant	.13 (.09)	-2.59 (.72)**	.15 (.10)	-2.59 (.72)**
Educational background high (vs. low)	.04 (.05)	.23 (.34)	.05 (.05)	.21 (.33)
Socio-economic background	.00 (.00)*	.01 (.01)	.00 (.00)*	.01 (.01)
Migration background	-.04 (.06)	-.42 (.39)	-.04 (.06)	-.45 (.39)
Sex girl (vs. boy)	.22 (.04)**	-1.23 (.27)**	.22 (.04)**	-1.24 (.27)**
Federal region Bavaria (vs. Hesse)	-.24 (.07)+	2.16 (.52)**	-.25 (.07)**	2.12 (.52)**
School track low vocational (vs. intermediate vocational)	.26 (.08)**	-5.37 (.60)**	.26 (.08)**	-5.34 (.60)**
School track academic (vs. intermediate vocational)	-.16 (.08)*	3.40 (.57)**	-.17 (.08)*	3.41 (.57)**
Competence test score average	.07 (.00)**		.07 (.00)**	
Grade point average		3.49 (.19)**		3.52 (.19)**
Effects of family-school relations				
Student-teacher-interaction	.13 (.03)**	-.08 (.20)	.12 (.03)**	-.04 (.20)
Negative reputation in class	-.05 (.03)+	-.27 (.20)	-.04 (.03)	-.29 (.20)
Competition in class	.02 (.03)	-.35 (.20)+	.03 (.03)	-.43 (.21)*
Educational aspirations of friends	.08 (.05)+	-.43 (.32)	.09 (.05)+	-.43 (.32)
Friends in the same kind of school	-.01 (.05)	-.36 (.32)	-.02 (.05)	-.37 (.32)
Parent-school-interaction	.04 (.06)	.09 (.42)	.01 (.06)	.22 (.42)
Intercept variance (classes)	.035 (.010)	2.522 (.561)	.035 (.009)	2.488 (.554)
Residual variance (individuals)	.294 (.014)	13.290 (.656)	.290 (.014)	13.197 (.651)

(continued)

Table 4: Family-school relations and academic success in fifth grade (continued)

	Model 6a	Model 7a	Model 8a	Model 9a
Constant	.13 (.10)	-.07 (.09)	.14 (.10)	.09 (.10)
Educational background high (vs. low)	.04 (.05)	.08 (.06)	.04 (.05)	.04 (.05)
Socio-economic background	.00 (.00)*	.01 (.00)**	.00 (.00)**	.00 (.00)*
Migration background	-.04 (.06)	-.11 (.06) ⁺	-.05 (.06)	-.05 (.06)
Sex girl (vs. boy)	.23 (.04)**	.16 (.04)**	.22 (.04)**	.22 (.04)**
Federal region Bavaria (vs. Hesse)	-.24 (.07)**	-.13 (.06)*	-.24 (.07)**	-.24 (.07)**
School track low vocational (vs. intermediate vocational)	.25 (.08)**	-.16 (.08)*	.27 (.08)**	.34 (.10)**
School track academic (vs. intermediate vocational)	-.17 (.08)*	-.13 (.07) ⁺	-.16 (.08)*	-.13 (.08)
Competence test score average	.07 (.00)**		.07 (.00)**	.07 (.00)**
Grade point average				
Effects of family-school relations				
Student-teacher-interaction	.27 (.07)**	.17 (.03)**	.13 (.03)**	.13 (.03)**
Negative reputation in class	-.05 (.03) ⁺	-.10 (.03)**	-.05 (.03) ⁺	-.05 (.03) ⁺
Competition in class	.02 (.03)	-.10 (.05)*	-.03 (.03)	.02 (.03)
Educational aspirations of friends	.09 (.05)	.05 (.05)	.08 (.05) ⁺	-.03 (.08)
Friends in the same kind of school	-.01 (.05)	-.03 (.05)	-.01 (.05)	-.02 (.05)
Parent-school-interaction	.03 (.06)	.07 (.07)	.04 (.06)	.04 (.06)
Interaction effects of family-school relations				
Student-teacher-interaction* School track low vocational	-.21 (.09)*			
Student-teacher-interaction* School track academic	-.15 (.08) ⁺			
Competition in class* Educational background high		.19 (.06)**	.10 (.05) ⁺	
Educational aspirations of friends* School track low vocational				.19 (.11) ⁺
Educational aspirations of friends* School track academic				.15 (.12)
Intercept variance (classes)	.036 (.010)	.009 (.008)	.034 (.010)	.036 (.010)
Residual variance (individuals)	.292 (.014)	.412 (.020)	.293 (.014)	.292 (.014)

Note. Source BIKS-8-14, own calculations; subsample n₁ = 939; n₂ = 142; Hierarchical linear regression (random intercept models, regression-coefficients; standard deviation in brackets; variables centered around group mean; grades recoded); Grade point average = models marked a; competence test score average = models marked b. Models in light gray script = effects under control of innerfamiliar social relations.
⁺p < .10. ^{*}p < .05. ^{**}p < .01.

5. Conclusion

Following the state of research, the research question of the paper at hand was whether various relations inside and outside the family have influence on educational success of students in Germany in secondary education.

Summing up, social relations matter: strong and close relations within and outside the family are important for children's academic attainment. But there are also hints that social ties work differently for children in the three tracks of the German school system: A good relationship to the teacher is particularly important for students in the intermediate vocational track, whereas a high academic aspiration of friends becomes significant for children in the low academic track with the same competences. For this reason the division into the different school tracks and the differential learning environments prevailing there appears to be partially responsible for the differential effect of the mentioned indicators.

Moreover, clues can be found that not only social relations vary depending on the respective school track, but also that the division into different types of schools in itself impacts the effectiveness of some relational aspects. Findings of international research as well as findings concerning the primary sector predict a negative effect of the included variables for the inner-familial structure. Indeed, also in the secondary sector the negative effect on the grades for children growing up in single parent households can be found – irrespective of the fact whether a child attends the low vocational track (Hauptschule), intermediate vocational track (Realschule) or the academic school track (Gymnasium), while growing up in a household with many children is obviously important for the division into the different tracks of the secondary sector, but does not take any additional effect there. The findings, therefore, indicate that with growing age the size of the family is no longer an effective variable of academic performance in the German education system. Possibly students in the secondary sector require a lower degree of parental care – compared to the primary sector – so that the parental attention shared with several siblings is still sufficient.

Furthermore it was expected that the contact of the parents to the school is a successful variable of the academic performance, which could not be confirmed, however. In summary, as the relevance of structural indicators within the family decreases, it is substantiated that the academic successes of children in the German education system becomes more and more independent of parental assistance the longer the education process is.

Consequently, it will be important for further research to consider the point of selection into different types of secondary education when aiming to find underlying mechanisms.

Another question of this paper was whether there is an interaction between the importance of social relations and the family background as Coleman presumed. In the eyes of Coleman, this is due to the fact that transmitting human capital is facilitated by close social relations between parents and their children, especially for

those parents who are highly educated. When looking at the interaction effect between student-parent-relations with educational origin, we could show that exclusively children from academic educational backgrounds with low competences benefit from a good family climate. According to Coleman's theoretical assumptions, this means that a convenient parent-child relation matters for transmitting human capital from parents to their children if the parents have a high educational level. For the quantitative aspects of parent-child interaction, no resource-specific mechanism could be shown. This indicates that the possibility to interact with parents is important in the case of all students. Regarding additional relations outside the family among students and between students and teachers – aside from competition within class – effects are shown apart from households' background characteristics, confirming the independent function of social capital outside the family, but not the possibility to compensate for deficits in human capital at home. Future work will have to integrate more process-related aspects of parent-child relations, to reanalyze whether the transmission of human capital over social relations succeeds, especially for children with highly educated parents in secondary education.

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