

Parental influence on students' educational choices in the U.S.A. and Germany:

Different ramifications – same effect?

(in press: Journal of Vocational behavior)

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Running Head: PARENTAL INFLUENCE ON SCHOOLING USA/GERMANY

6/07/2001

Authors' Note: This article is based on an integrative re-analysis project headed by the first two authors. The data collection in the United States was funded by grants from NIMH, NSF, and NICHD to Jacquelynne Eccles and by grants from NSF, the Spencer Foundation, and the W. T. Grant Foundation to Jacquelynne Eccles and Bonnie Barber. The Max Planck Institute for Human Development, Berlin, and the Institute for Science Education (IPN) in Kiel funded the data collection in Germany. We want to thank Susanne Heyn and Judith Tangermann for their coding support. Inquiries can be addressed to the first author at the University of Michigan, Department of Psychology, 525 E. University, Ann Arbor, MI, 48109-1109 or by email at schnabel@umich.edu.

Abstract

Despite the historical trend in all Western societies to increase educational participation irrespective of students social origin, the correlation between parents' education and socio-economic status and the educational outcomes of their offspring remains a rather universal phenomenon. Although comparative studies have consistently found this association in various nation which differ in many way in their educational systems, little is known about the mechanism behind this effect. Drawing on the assumption that career decision points are the major gateway for social background influences, we assume that similarities as well as differences in the structure of the correlation between parents' socio-economic background and students' school success can be explained.

Using two longitudinal data set from the United States ($N = 1425$) and Germany ($N= 1755$) covering the school careers from grade 7 to grade 10, the analyses supported the hypothesis that a) achievement information is the best predictor of career relevant decisions in both nations, b) parents background variables are independent additional predictors of career decision but not for actual learning progress, c) the assumed accumulation process of social background influences is more pronounced in the German than in the U.S. school system.

Parental influences on educational and vocational careers

Most comparative studies on education deal with the role that educational institutions play in the intergenerational reproduction of the class structure in a given society. Usually, the correlation between parents' socioeconomic status (SES) on the one hand, and children's highest educational degree or status/prestige of their occupation on the other hand, is used as indicator for the strength of this effect (cf. Blau & Duncan, 1967; Erikson & Goldthorpe, 1993; Erikson & Jonsson, 1996a; Featherman & Hauser, 1978; Ganzeboom, Treiman, & Ultee, 1991; Kerckhoff, 1995; Mare, 1981; Müller & Karle, 1993; Shavit & Blossfeld, 1993). Despite the various political efforts in most Western countries after World War II to open up educational opportunities, research has consistently failed to provide empirical evidence of substantial change in this intergenerational association in the second half of the last century (for the U.S., see e.g., Hout & Dohan, 1996). As Johnson, Mills & Müller (1996) have shown using survey data from Sweden, Britain and Germany, the relation between class origin and educational destination did attenuate consistently across nations already in the first half of the last century. This effect is most likely due to general social changes that come with modernization (Erikson & Jonsson, 1996c; see also Grubb, 1985). Specific educational reform projects – most of them brought into effect decades later – did surprisingly little. Nowadays, the association between socio-economic background of parents and educational attainment of their offspring in different countries has seemed to converge in size, although national differences persist (cf. Shavit & Blossfeld, 1993). In summarizing a comparison of intergenerational class structure reproduction in nine countries, Müller (1996 p. 178) concludes that “indeed, for all nations the data show a large commonality in the pattern of class effects”.

The similarity and historical convergence of strength in the correlation of parents' and children's social status does not necessarily imply that the mechanisms at work are the same across nations. It suggests, however, that along the educational and professional career functionally equivalent processes occur in different societies. Using two longitudinal studies in Germany and the United States, the purpose of the present study is to compare the genesis and development of the impact of parental SES on students' school careers during the high school.

Bidwell and Friedkin (1988) identify three major avenues that lead to a correlation between parents' social background and educational attainment: 1) The education in middle and upper class families might promote the development of attitudes and traits that match the demand of the school-type learning environment. 2) Upper class families simply provide better learning resources. 3) Upper class students enjoy direct favoritism in the formal or informal setup of the school system. Coleman (Coleman, 1987; Coleman, 1988) has similarly discussed these three aspects as human, financial and social capital, alluding to Bourdieu's more universal concept of cultural capital (Bourdieu, 1984).

Erikson and Johnson (1996b) have suggested a comprehensive model (EJ-model) basically reframing Coleman's model as a rational-choice model of decision making. The core model assumes a simple utility function for all perceived alternatives at a certain decision point for the child's further education. The function takes both the perceived likelihood of success and the perceived costs of the alternatives into account. It is important to note that the EJ model conceptualizes the relevant variables as psychological constructs. For example, not the real costs influence the decision making process of students and parents, but the perceived costs; not the objective chance to succeed in a particular educational program drive the

decision but the perceived likelihood. As (Heckhausen, 1999) has pointed out, the school system creates age-normative sociostructural constraints and the required decisions trigger developmental regulation processes which for children are controlled by the parents. The decisions have to be made with considerable uncertainty. If the educational system requires (more or less irreversible) decisions with lasting effects, the parents' perceived chances for their child's success are likely to be influenced by their own educational biography, independent of the presumably strong influence of the child's actual performance. It is obvious that this effect should be the more pronounced the earlier relevant decisions are enforced by the school system in the child's life. For school and career decisions in adolescence a longer school history can be taken into account and the decision is likely to be less determined by the parents than the student him- or herself.

This is an obvious structural drawback of school systems where the type of secondary school has to be chosen for most of the children when they are about 10 years old, as it is the case in Germany. For later career decisions, the roles of the parents might be better characterized as consultants who influence the decision making process of their daughter or son. And again, parents who successfully finished full-time college are likely to see a lower risk of failure for their children and encourage them to go to college than parents who cannot underpin their judgment with first-hand experience. In general, more highly-educated parents tend to maximize their children's exposure to a more demanding curriculum which, in turn, yields substantial competence advantages down the road, as Useem (1992) has shown for American within- school tracking in mathematics.

In the following we want to provide empirical evidence that in both school systems, the effect of SES in fact is related to and accumulated over educational decisions. This, in turn,

means that it is assumed that in time periods where no decision is required, SES does not effect the educational progress of the child. This should hold to be true in both societies even if the structure of the school system differs.

Differences between the German an U.S- high school system

The major difference between the two school systems that is relevant to the question at hand is the way the students are tracked and how demanding a curriculum the student is exposed to.

figure 1 about here

While the comprehensive American high school is characterized by mechanisms of within school tracking, usually starting in grade 8 or 9, the German school system is characterized by the predominance of three-tier between school tracking starting as early as age 10. Given students' achievement and social behavior in school, parents decide on the basis of the elementary school's recommendation at the end of elementary school, usually at the end of grade 4 (in some state at the end of grade 6), what type of high school their child will attend in 5th grade. The three school types (Gymnasium, Realschule, Hauptschule) differ remarkably with regard to the depth and breadth of the curriculum and predetermine the educational and professional trajectory of the student (Ditton, 1992). About 30% of a given student cohort move on to the Gymnasium. After graduation from the Gymnasium track with a University-

entrance-certificate (Abitur), approximately 80% of them move on to full-time college education (Schnabel & Gruehn, 2000). The majority of youth in Germany, however, enroll in the Realschule or Hauptschule from which they graduate – varying by state – after grade 9 or 10 (i.e. at the age of about 16). These non university-bound graduates typically start a full-time vocational apprenticeship, which usually comprises a three-year integrated training program in a private company or small firm in combination with general instruction given in a public vocational school one day a week (“Dual System” Raggatt, 1988; Schenkel, 1988)).

Although changing school types is rare, enrollment in a lower tier school type does not necessarily determine the certificate at the end of secondary education. In most German states, graduates from the Realschule after grade 10 who have reached a certain GPA level qualify to enroll in the “Gymnasiale Oberstufe”, the last three years of the Gymnasium education (college prep school), without further requirements. About 15% of all graduates from the Realschule (approximately a third of those eligible) choose this option each year. Similarly, there are various ways to upgrade the certificate from the Hauptschule, often in combination with successful passing of the vocational training exam. Despite the *formal* flexibility, it is *empirically* evident that the decision on the type of secondary school more or less predetermines much of a student’s pathway into either an academic or a vocational career (Hamilton, 1990; Heinz, 1999).

In contrast, there is no required age in the United States at which young people must make a decision about their educational pathways and post-secondary training, although tracking within high schools exists and college-bound students can easily be identified among the high school graduates (Oakes, 1985; Rosenbaum, 1976).

Research questions

A direct application of decision making approaches like the EJ-model would imply the exploration of perceived costs, benefits and risks of all perceived options at each decision point, further complicated by the fact that this information would have to be collected for all persons actively involved in the decision making process. Indirect evidence of the underlying decision making processes, however, can be given. In all modern educational systems, the most crucial determinant for many educational decisions in elementary and high school is the actual performance of the student. Empirical studies which do not include actual achievement yield ambiguous results at best. The major contribution of the present study that this information is available in both data sets longitudinally. Whether the SES of the parents has an influence over and above the actual competence level of the students at a given decision point defines the core question and empirical paradigm for the analyses to be presented.

In addition, the present study also includes psychological variables on the student level that prior educational research has shown to influence school outcome or later career decisions. As Marsh (1988; 1990) has shown, students' perception of their own competence influences later school success, even after controlling for achievement. Using longitudinal data for German upper high school students, Köller, Daniels, Schnabel & Baumert (2000) demonstrated the specific relevance of the academic self-concept for advanced placement courses. Two metaanalyses integrating a decade of empirical research on this topic have given strong evidence that test anxiety (disposition to get distracted by worry cognition in evaluative situations) is detrimental for academic performance (Hembree, 1988; Seipp, 1991). Since testing is an integral part of any sorting or allocation procedure for students, it is possible that test anxiety indirectly influences the decision making about a student's future career. Another possible factor relevant in the deliberations about a student's educational future is "school

weariness". Even if a students' grades look promising, he or she might simply be "fed up" with school. The reasons for this lack of motivation may vary, ranging from problems with the peers to mismatch between personal learning style and the abstract form of instruction found in regular school settings.

In the present study, we investigate the role of the socioeconomic background of parents compared to the variables described above at five major decision points: school type choice (Germany), track placement (USA), decision to move on to college prep high school (Germany), advanced placement course selection (USA), plan to enroll in a full-time college (USA/Germany).

The following hypotheses are tested:

1. Socio-economic background is an independent factor in all school career related decisions in both countries.
2. The student's socioeconomic background does not affect the learning success of students in phases where no educational decision has to be made.
3. Achievement information is the most important predictor of school-career decision.
4. Achievement is the most important indirect gateway for SES to affect school careers.
5. In Germany, SES-effects on academic achievement become more pronounced over the course of schooling.

Hypothesis 1 is directly derived from the decision making paradigm, assuming a considerable amount of uncertainty about the child's actual future development in every school system, based on the assumption that parents are likely to base their decision or recommendation on their own educational history. Although Hypothesis 1 does not logically exclude other mechanisms that might cause a correlation between SES and educational success, the decision

making approach gains strength if Hypothesis 2 holds in addition. Hypothesis 3 alludes to the rationale of all modern educational systems to make educational decisions contingent on student performance. Given Hypothesis 3, Hypothesis 4 is the best explanation why SES effects do not “wash out” in the course of time but rather transform into achievement differences. High SES parents tend to expose their children to a more demanding curriculum, causing substantial competence differences in the long run. Since differences in the learning environment are maximized by between school tracking, Hypothesis 5 can be derived for the U.S. – German comparison because the tracking practice is the major structural difference between the two systems.

Methods

Samples

MSALT The Michigan Study of Adolescent Life Transitions (MSALT) began as a junior high transition study in 1983 when the participants ($N > 2000$) were in 6th grade (age 12). The sample consists of lower-middle and middle-class Euro-American students recruited from 12 school districts in a major midwestern metropolitan area in the U.S. Participants were administered surveys or interviewed every few years until they were 25. In addition, available information from the students’ school record was collected (achievement test scores, course enrollment). (see Table 1 for MSALT sample demographics). For the present study, longitudinal data from grade 7, 10 and 12 are used ($N = 1425$)

The empirical basis for our investigation in Germany are two subsample (grade 7 and grade 10 at the first measurement point) of the cohort-sequential longitudinal study Learning Processes, Educational Careers and Psychosocial Development in Adolescence (BIJU). This two-cohort investigation was conducted by a research alliance between the Max Planck

Institute for Human Development in Berlin and the Institute for Science Education at the University of Kiel. Stratified random school samples were drawn in four of the 15 German states. For the present investigation, only data from the two West German states were used because the school system in East Germany underwent a radical transition during the period of observation. As we have shown elsewhere, this transformation had various effects on the socio-emotional development of the students, which are not focus of the present study (Marsh, Köller, & Baumert, in press; Schnabel, Baumert, & Roeder, 1996).

The longitudinal subsample used consist of $N = 1755$ students who participated in the study in 1992 when they were enrolled in 7th grade and who participated in the follow-up in 1995. Sample attrition was due to nonparticipation on the school and classroom level – mainly for organizational reasons (merger of classrooms, restructuring of the school etc) and is considered mostly at random. However, attrition was found to be related to achievement indicators at grade 7. Although the effect size is small (between 0.1 to .16 of a SD, cf. Cohen, 1988), this finding reflects the German retention practice. Approximately 4% of students each year fail to meet the achievement requirements for promotion and repeat a grade. In comparison to the original population, the longitudinal sample therefore is slightly biased towards a more favorable school career. The analyses to be presented in this paper, however, basically draw on measures of association (covariances). Comparison of within wave correlations of the full grade 7 sample and the longitudinal net-sample did not reveal any systematic reduction in correlation coefficients, which would have indicated a systematic variance/covariance suppression.

For the data collection in grade 12, the BIJU study expanded the sample. All students enrolled in grade 12 and 13 of schools in the sample carrying a Gymnasiale Oberstufe, were asked to participate. In order to increase the power of the analysis about college plans, we used all data sets available for this particular analysis (augmented sample $N = 3103$)

Table 1: Sample Characteristics

	<i>MSALT (USA)</i>	<i>BIJU (Germany)</i>
Years of data collection (present study only)	1986-1996	1992-1995
<i>N</i> at Grade 10	1425	1755
Attrition rate 7-10	24.4%	31.1%
% Females	53%	53%
% Ethnic minority	9%	6%
Median Birth Year	1972	1976

Dependent variables

Career decisions and plans. The dependent variable in all analysis is either an actual educational decision or the intention to take a certain step. For the BIJU sample, the first relevant decision is the type of secondary school chosen after elementary school (*school type*). Since data collection started in grade 7, this decision was made just before the first data collection (Berlin) or two years before (North Rhine-Westphalia)¹. In grade 7 as well as in grade 10 the students were asked what highest educational degree they believe they will earn in the future, ranging from 0 = no high school diploma to 5 = University degree (*aspiration*). The second relevant career step in Germany is the decision to either start a vocational training after finishing 10th grade or to move on to the “Gymnasiale Oberstufe”, the college prep school. The intentions to move on to the Gymnasiale Oberstufe at the end of 10th grade was used (*intention10*). In order to make a comparison to the American sample, this data will be used in

¹ Analyses using state membership as a dummy variable failed to show a specific contribution in all regression models ran below and was not considered in the models presented throughout the paper. The two states also differ with regard to their population compositions. It would therefore not be possible to attribute an effect of this variable unambiguously to the difference in the length of elementary school. We the

a dichotomized way, dividing academic versus vocational tracks using the categorization applied by Buechtemann, Schupp & Soloff (1993).

For the MSALT sample the course enrollment for grade 10 from the school record was used to determine students' track in mathematics and English (*Math-track, English-track*). Three level were defined: College track (e.g., math: algebra 2, trigonometry; English: literature, journalism, theater/drama), general track (e.g., math: Algebra 1, Applied algebra, applied geometry; English: advanced composition, practical writing) or vocational track (e.g., math: general/basic/remedial or no math class; English: remedial or no English class). The identification of the track was sometimes difficult in English because the course denomination was less standardized across school compared to mathematics where the ambiguity was negligible. In grade 7, 10 and 12, the students were asked about their future career plans and expectations after high school (four separate questions: "starting full time work", "going into the military", "getting a technical or vocational training", "[four year full-time] college"). This information was integrated into one variable each wave to match the variable for the Gemran sample ranging from 1= full time work to 5 = full-time college (*degree7, degree10, degree12*).

Independent variables

Achievement tests (variable labels: *Math achievement, English achievement*). For the U.S. sample, standardized test scores in mathematics and English for grade 7 and 10 were taken from the school records based on the Michigan Educational Assessment Program (MEAP). The tests are proven to have a high content validity with respect to the subject specific curriculum for the particular grade level in the State of Michigan. The participation at MEAP testing sessions is mandatory for all public school students. MEAP scores are

documented to be highly reliable, Cronbach's $\alpha \geq .85$ (Office of Michigan Merit Award Program, 2000). In the German sample, curriculum validated tests in mathematics were developed for the purpose of the BIJU-study and administered in grade 7 and 10. A two-parameter IRT-model was applied to determine achievement scores for both grade levels. Similarly, an IRT-score for English was constructed based on a grammar and vocabulary test. Reliability estimates for the IRT scores range from .86 to .91. Note, that the language achievement score is based on native language competence in the U.S. sample, while it is a foreign language test for the German students. Although they are not comparable across countries, they nevertheless indicate achievement in another domain than mathematics in both countries. In all German states, foreign language education is mandatory in all three high school types.

Grades (GPA). In both samples, final grades in major subjects grade were averaged for 7th and 10th and grade as a proxy for overall school achievement feedback to students and parents. In MSALT, these information was taken from the school records (Math, English and Science). In BIJU, students self reports were used (Math, German, Foreign language). The German marks in grade 7 and 10 were inversed so that a higher score reflects a better grade in all analyses.

Socio-economic background (SES). In both samples the highest educational certificate for both parents was translated into a five level variable (1 = no high school degree 5 = full-time college degree). Information about the actual occupation of father and mother was collected with an open question in both studies. The data sets were jointly coded in accordance to the Standard International Socio-Economic Index of Occupational Status (ISEI) developed by Ganzeboom, De Graaf, Treiman & De Leeuw (1992). For both samples, the validity of the

ISEI has been shown to be comparable to SES indicators which were calibrated to the specific national occupational system (see also\ (Wolf, 1995).

Although it would have been possible to use separate SES indicators for mothers and fathers, the common practice was followed to use the maximum of either (Müller & Shavit, 1998). This reflect the conceptual assumption in SES theory that the social status of a family is high irrespective whether the father or the mother is a physician. The status is assumed to be equally high if both parents are physicians. Combining this information is also necessary because more than 40% of the mothers in both sample were either not employed or the employment information from the student was unspecific (“works part-time”) causing a large proportion of missing. The substitutive relation is illustrated by the fact, that the ISEI scores for the parents (where this information was available) correlate significantly lower ($r = .27$) than the parents educational level ($r = .56$).

Parents education (father's education, mother's education). In both studies, highest educational degree of both father and mother was coded on a scale ranging from 0 = no degree to 5 = college degree (BA/BS/Diplom/Magiser).

Psychological variables. Subject specific self concept of ability in mathematics and English (*Math self concept, English self concept*) was measured in both studies using 4 item scales addressing the students' reflection of their own competences either in absolute terms or in comparison to classmates (e.g. BIJU: “Nobody's perfect, but I am just not good in math.”, “Although I try hard, math is harder for me than for my classmates” MSALT: “How good are you at math?” “If you were to rank all the students in your math class from the worst to the best in math, where would you put yourself?”). Students responded to each item on a 4-point

(BIJU) or a 7-point scale (MSALT) response format. Previous research has shown for both studies independently that the scales are reliable and have convergent and discriminant validity in relation to performance variables in different school subjects and course choices (Eccles, Adler, & Meece, 1984; Köller et al., 2000). Scales were shown to be very reliable (all coefficient alphas $> .8$). In the BIJU study, only mathematic self concept data were available in grade 10.

Subject specific anxiety for mathematics and native language (*test anxiety math*, *test anxiety English*) was measured in both studies with scales derived from the Test-anxiety scale introduced by Spielberger (1978), capturing worry and emotionality cognition in evaluative test situations (MSALT: “Does your hand you write with shake when you are taking a [math/English] test?”, “How much do you worry about how well you are doing in [math/English]?”), BIJU: “When I was writing, my hand was shaking”, “When taking the exam in [math/German] last time, I started to doubt my [math/German] competences”). Reliabilities are above alpha .85 throughout. For grade 10, test anxiety scores are only available for the BIJU study in math. School weariness (*weariness*) was measured in MSALT using a two item index (“I come to school because I have to”, “How much do you like school this year?”-inverse-, 7-point rating scale). In BIJU, the same construct was measured using a three-item scale (“It would be nice if I didn’t have to go to school anymore”, “I like going to school”, “There are only a few thing you really enjoy in school”). The items were adapted from a German school attitude and affect questionnaire (Wieczerkowski, Nickel, Janowski, Fittau, & Rauer, 1975).

Results

SES and schooling in Grade 7

In both samples, the SES indicators as well as the parents' education correlate significantly with achievement indicators (tests and grades) in grade 7 (table 2). They also correlate in both societies with future academic plans (attending college). The association with the students' academic self-concept is – if at all significant – weaker. No substantial correlation was found with test anxiety and school weariness in the U.S. sample. If significant, the coefficients are small in the German sample also.

Table 2: Correlation between indicators of socio-economic status and achievement, test anxiety and school weariness in the U.S. and Germany in grade 7.

	SES		Father's education		Mother's education	
	Germany	USA	Germany	USA	Germany	USA
<i>Math achievement</i>	.28**	.15**	.25**	.19**	.26**	.16**
<i>English achievement</i>	.30**	.16**	.27**	.20**	.26**	.17**
<i>GPA</i>	.16**	.12**	.17**	.22**	.19**	.15**
<i>Math self concept</i>	.08**	.10**	.06*	.09**	.06*	.05
<i>English self concept</i>	.08**	.01	.10**	-.03	.10**	.01
<i>Test anxiety math</i>	-.08*	-.05	-.08**	-.06	-.07**	-.05
<i>Test anxiety English</i>	-.12**	-.03	-.12**	-.07*	-.09**	-.04
<i>Weariness</i>	-.04	-.04	-.05**	-.04	-.03	-.03
<i>Aspiration</i>	.35**	.16**	.34**	.23**	.33**	.17**
<i>School type</i>	.37**	-	.31**	-	.30**	-

** p < .001

* p < .01

As a general trend, table 2 reveals that in Germany the correlations between SES-indicators and students' test scores, and aspiration variables tend to be consistently stronger. The highest correlation coefficient in the German sample is found for the association between parents' SES and type of school enrolled in. This confirms prior research which has consistently shown that the high-school choice at the end of elementary school can be

considered a major gateway of indirect social inequality in the German school system.

Although the correlation seems to support this interpretation at the first glance, it does not rule out alternative explanations: Table 2 also shows a high correlation between SES-indicators and achievement. The biserial correlation between both achievement scores and type of school (dummy coded as 1 = Gymnasium, 0 = Hauptschule, Realschule) is $r = .60$ for mathematics. Because the achievement data were collected in grade 7, i.e. two years after the transition in one state, this correlation might also reflect differences in the quality of schooling between school types. This would mean that the stronger correlation between SES and achievement is part due to a net school type effect.

We tested this hypothesis in a logistic regression analysis based on an *a fortiori* argument. If there was a significant effect of SES at the transition to the tiered school system two years before, we get a conservative (lower bound) estimate of this effect using grade 7 data when the type of school is predicted and the achievement information from grade 7 is used as an additional predictor besides the SES indicators. Without the SES indicators, 57% of the (pseudo) variance in the decision for the Gymnasium can be explained by achievement variables (Nagelkerke's R). Entering SES and father's and mother's education raises the percentage about 8.6 %. This findings is in line with Hypothesis 1 for this particular educational transition for which – of course – no equivalent exists for the US.

SES and schooling in Grade 10

Table 3 provides the correlation matrixes between SES indicators and school related variables for both samples three years later at the end of grade 10. The statistical test for change in correlations compared to table 3 reveal a highly significant increase for the German sample for

all correlation coefficients between the three SES indicators and mathematics and language test scores, resulting in a maximum association of $r = .41/.42$ for the SES. For the American sample, no trend could be observed. The highest value was found for the correlation between fathers' education and the GPA scores ($r = .27$).

Table 3: Correlation between indicators of socio-economic status and achievement, test anxiety and school weariness in the U.S. ($N = 1382$) and Germany ($N = 1723$) in grade 10.

	SES		Father's education		Mother's education	
	Germany	USA	Germany	USA	Germany	USA
<i>Math achievement</i>	.41**	.14**	.32**	.21**	.36**	.16**
<i>English achievement</i>	.42**	.19**	.36**	.26**	.34**	.20**
<i>GPA</i>	.17**	.20**	.13**	.27**	.15**	.23**
<i>Math self concept</i>	.08**	.03	.08**	.02	.10**	.01
<i>English self concept</i>	.08**	.14**	.10**	.12**	.10**	.10**
<i>Test anxiety math</i>	-.11**	-.05	-.12**	-.06*	-.13**	-.05
<i>Test anxiety English</i>	-.12**	-.04	-.12**	-.07*	-.09**	-.04
<i>Weariness</i>	-.07*	-.08*	-.05	-.05	-.04	-.02
<i>Aspiration</i>	.42**	.19**	.38**	.26**	.40**	.24**
<i>Math-track</i>	-	.06	-	.09**	-	.05
<i>English-track</i>	-	.17**	-	.29**	-	.18**
<i>School type</i>	.37**	-	.31**	-	.30**	-

** $p < .001$

* $p < .01$

In 10th grade, information about the tracking was available for the American sample which shares some structural aspects with the German school type variable. Although the correlation between SES indicators and tracks is lower than respective correlation with school type in the German sample, it is nevertheless substantial, at least for the track in mathematics. The critical test whether parental SES has an influence on the children math and English track beyond the academic performance it tested in table 4.

Applying a similar rationale as for the analysis of school-type choice in the German sample, the influence of SES on tracking is analyzed using logistic regression including simultaneously achievement and motivational information from grade 7 in the prediction of a dichotomized tracking variable (1 = academic track 0 = general/vocational track). We used grade 7 achievement information in order not to confuse cause and effect. The test scores in grade 10 might already reflect the effect of course choices in grade 8 and 9. For the ease of interpretation, all predictor variables in table 6a) and b) were standardized. The odds ratios (1st columns) then can be interpreted as the change in the chance to be enrolled in the academic track when the predictor variable is raised about one standard deviation (*SD*). For mathematics, the major dependence of the tracking on the subject specific performance is obvious. Students who are one *SD* above average in their math test in grade 7 have a more than 2.5 time higher chance to be found on the academic track than the average student. Holding this subject specific effect constant, the overall achievement reflected in the GPA raises the chance to be on the upper track slightly. In addition, however, we also find an independent effect for the father's education which is almost as strong as the GPA effect (holding test achievement constant). This suggests that the decision on the track in mathematics basically follows the meritocratic principle but is at the same time susceptible for influence of family background.

Table 4a: Prediction of academic track enrollment in mathematics using SES indicators, achievement and motivational information as predictors. (N = 1135)

	<i>B</i>	<i>S.E.</i>	<i>p</i>	<i>Odds ratio</i>
<i>SES</i>	.056	.089	.529	1.058
<i>Father's education</i>	.263	.097	.007	1.301
<i>Mother's education</i>	-.017	.077	.828	.983
<i>Math self concept grade 7</i>	.050	.080	.530	1.051
<i>Math achievement grade 7</i>	.988	.125	.000	2.685

<i>GPA grade 7</i>	.314	.100	.002	1.368
<i>Test anxiety math grade 7</i>	-.076	.080	.343	.927
<i>Weariness grade 7</i>	-.026	.071	.710	.974
<i>(Constant)</i>	-.911	.088	.000	.402

Table 4b: Prediction of academic track enrollment in English using SES indicators, achievement and motivational information as predictors. ($N = 1112$)

	<i>B</i>	<i>S.E.</i>	<i>p</i>	<i>Odds ratio</i>
<i>SES</i>	.164	.082	.045	1.178
<i>Father's education</i>	.004	.090	.964	1.004
<i>Mother's education</i>	-.021	.074	.780	.980
<i>English self concept grade 7</i>	-.050	.075	.501	.951
<i>English achievement grade 7</i>	.299	.095	.002	1.348
<i>GPA grade 7</i>	-.090	.083	.274	.914
<i>Test anxiety English grade 7</i>	-.050	.069	.472	.952
<i>Weariness grade 7</i>	.091	.067	.174	1.095
<i>(Constant)</i>	-.911	.088	.000	.402

Although the pattern for tracking in English is similar, the effects are generally less pronounced. In this case, the SES turns out significant instead of the father's education. The achievement score, however, stays the (relatively) strongest predictor. As mentioned in the method section the difference between the finding for tracking in math and English is likely due to the fact that the tracks were easier to identify in mathematics than in English. The coefficient in the prediction of the track in English therefore are statistically attenuated by measurement error.

SES and learning Gains

Both studies provide school-independent achievement information in two subjects on two grade levels. This enables us to investigate the question whether or not the SES background of the students affect learning gains in phases between required educational

decisions, which is the critical test of hypothesis 2. For both samples, multiple regressions were run separate for both subjects. In step 1, only the prior achievement score was introduced in order to implement a autoregression model which can be understood as a measurement of change model, i.e. after holding prior achievement constant, further significant predictors explain unpredicted high or low achievement gains (cf. Schnabel, 1996). Step 2 introduces SES and parents education as predictors. The third step adds the school type for the German sample and the track variable for the American sample, respectively. Different from prior analyses, were type of school was dichotomized to make the correlation coefficient meaningful we used dummy contrast coding for the German school types in order to account for all variance that is related to this categorical variable. The dummy variables express the achievement gap of other school types against the Gymnasium which explains their negative signs. Table 5a and b show the results for mathematics in both samples. In both samples, the patterns for English are very similar to the patterns for mathematics. Therefore they are not presented (available on request).

Table 5a: Prediction of learning gains over three years in mathematics in Germany (N =1204)

<i>MATH10</i>	<i>Step 1</i>		<i>Step 2</i>		<i>Step 3</i>		<i>Step 4</i>		<i>Step 5</i>	
	<i>Beta</i>	<i>p</i>	<i>Beta</i>	<i>P</i>	<i>Beta</i>	<i>P</i>	<i>Beta</i>	<i>p</i>	<i>Beta</i>	<i>p</i>
<i>Math achievement grade 7</i>	.650	.000	.579	.000	.353	.000	.325	.000	.325	.000
<i>SES</i>			.176	.000	.078	.007	.058	.067		
<i>Father's education</i>			-.007	.837	-.049	.119	-.048	.118		
<i>Mother's education</i>			.048	.161	.011	.730	-.014	.637		
<i>School type D1</i>					-.444	.000	-.478	.000	-.485	.000
<i>School type D2</i>					-.231	.000	-.255	.000	-.261	.000
<i>School type D3</i>					-.227	.000	-.240	.000	-.244	.000
<i>Test anxiety Math grade7</i>							-.013	.615	-.011	.690
<i>Test anxiety English grade7</i>							-.004	.877	-.005	.866
<i>Weariness grade 7</i>							.036	.120	.034	.133
<i>Math self concept grade 7</i>							.054	.024	.054	.023
<i>English self concept grade 7</i>							.007	.785	.004	.860
<i>Sex</i>							.138	.000	.139	.000
<i>R²</i>	42.3%		45.8%		56.9%		59.0%		58.7%	

Table 5b: Prediction of learning gains over three years in mathematics in the U.S. (N=1318)

MATH10	Step 1		Step 2		Step 3		Step 4		Step 5	
	Beta	p	Beta	p	Beta	P	Beta	P	Beta	p
Math achievement grade 7	.609	.000	.590	.000	.449	.000	.438	.000	.441	.000
SES			.002	.935	.001	.973	-.003	.900		
Father's education			.029	.254	.024	.306	.028	.238		
Mother's education			.076	.010	.016	.579	.014	.610		
Track math					.310	.000	.307	.000	.314	.000
Test anxiety Math grade 7							-.034	.180	-.034	.189
Test anxiety English grade 7							-.008	.734	-.009	.709
Weariness grade 7							-.004	.847	-.005	.822
Math self concept grade 7							.032	.137	.034	.109
English self concept grade 7							-.021	.329	-.022	.322
Sex							-.043	.042	-.040	.054
R ²	37.1%		38.0%		44.9%		45.3%		45.2%	

Comparing the gross effect between countries (Step 2 versus Step 1), SES indicators have a more pronounced impact in Germany than in the U.S. sample (3.5% versus 0.9%). For the German sample, however, the regression coefficients for the SES indicators become insignificant as soon as the school type dummy variables are introduced. For both samples, the R^2 -difference from step 4 to step 5 is not significant, a net effect of SES on learning gains cannot be shown. Note, that the type of school causes a remarkable leap in the amount of variance explained in the German sample (additional 11.1%) indicating large differences in the learning rates between school types in this subject. The tracking variable in the U.S. sample explain 6.9% of the learning gains in mathematics. Hypothesis 2 therefore is supported by the analyses in both samples: If between or within-school tracking is held constant, the learning gains cannot be predicted by the students socioeconomic background.

Moving on to the Gymnasiale Oberstufe in Germany

For German students, the end of grade 10 also denotes a point of educational decision making because they are eligible to move on to the last three years of college prep education (Gymnasiale Oberstufe). Students of the Gymnasium who get promoted at the end of grade 10 do not need to fulfill any further requirement. Not surprisingly, more than 75% are certain to move on to the Oberstufe at the end of grade 10. Among students of the Realschule, however, only 11% seriously consider this option. About 80% (64%) of the graduates of the Hauptschule (Realschule) opt to start an apprenticeship either in the “Dual System” or a full-time vocational training school (“Berufsfachschule”).

The two German states from which the samples are drawn require a minimum GPA for graduates from the Realschule if they want to move on to the Gymnasiale Oberstufe. It is therefore sensible to run a confined analysis focusing on graduates of the Realschule who meet this criterion because only for them a real decision making process can be assumed at this point. If Hypothesis 1 is correct, an effect of SES indicators over and above the effect of GPA should be found. A logistic regression is confined to the according subsample ($N = 313$) confirms this prediction (without table). If either parent has earned at least the “Abitur”, the chances for their daughter or son to opt for the Oberstufe increase by a factor (odds ratio) of 1.7 compared to a family where the maximum education level is graduation from Realschule or less.

Hypotheses in the light of the results

Whenever Hypothesis 1 was concerned in our analyses, it was confirmed. Even after controlling for major other factors, socio-economic background turned out to be an independent factor in all career-related decisions observed in the period under investigation in

both countries. As a ballpark figure for the net effect size, the analyses suggest that approximately 3% of the variance can be attributed to parents' education or their social status.

Also in both countries, empirical support was found for hypothesis 2: Learning gains in two subjects were not affected by socio-economic background variables when career-relevant decisions are held constant (type of school or track, respectively).

Confirming hypothesis 3, achievement information turned out to be the most important predictor in all school-career decision under investigation.

Empirical evidence in favor of hypothesis 4 was also provided, particularly for the German system where the strong correlation between SES indicators and learning gains completely vanished after controlling the type of school. This indirect effect can be considered the main cause for the increase in the association between students' career development and SES in Germany – confirming hypothesis 5.

The effects of motivational variables on the concrete decisions looked at were comparably small. Although the observed motivational variables did have varying specific shares of the variance explained after controlling for achievement and social background, it is likely that their influence is underestimated in particular because they tend to correlate moderately with the achievement variables .

Discussion

It is safe to say that the correlation between education and socioeconomic status of parents and the educational and professional success of their offspring is a robust – if not ineradicable – phenomenon of modern societies. Although historical and comparative studies have shown that the relation varies across societies and became less tight over the last fifty years, the effect

nevertheless remains remarkably universal and is likely to stay a major concern in sociology of education and developmental psychology likewise. Sociologists tend to suspect illegitimate means for the reproduction of distributional injustice in societies claiming to be built – at least in the realm of education – on the principle of meritocracy. In a similar vein, educational and developmental researchers question whether children from lower social strata get a comparable chance to live up to their potential.

The purpose of the present investigation was threefold: First, theoretical assumptions about the gateway of socio-economic influences on educational trajectories were tested, drawing on the decision making model of educational choices. The second goal was to compare the German and U.S. high school systems from a longitudinal perspective in order to understand where and when socioeconomic background influence the educational trajectory and how strong this influence is in comparison. In addition, we wanted to prove that psychological variables beyond achievement moderate the students' pathways.

Educational decisions – universal gateways of SES effects?

The analyses strongly support the assumption that educational systems implicitly accept influences of family background on the students pathways when they leave important decision at the discretion of the legal guardian(s). Although the deliberation processes which actually determine the relevant decisions, were not observed in either longitudinal study, decision-making models like the one suggested by (Erikson & Jonsson, 1996b) provide explanations for the observation in the present investigation, as well as in others (Müller, 1996; Shavit & Blossfeld, 1993), that the influence of family background is more pronounced when those decisions have to be made early in the students' school career. The younger the students, the

less information about their academic potential is available, the more uncertainly is involved in the decision. Uncertainty, however, favors ‘conservative’ decisions, which means in this context to stick with the parents own biography as a guiding model by default. This mechanism seems to be rather universal and applies not only to both societies but also across the full developmental period from the end of elementary school up to the point where pros and cons of college education are been weighed.

In light of the longstanding debate about subtle within-school influences favoring higher SES students ranging from middle-class language use (cf. Bernstein, 1971; Bernstein, 1996), over more efficient support systems (‘social capital’ Coleman, 1988), to the understanding of the relevance of cultural symbols of distinction (Bourdieu, 1984), the support of hypothesis 2 in both studies might be surprising at first sight. However, it is important to be aware of the variables which were controlled in all analyses. Besides the prior achievement in grade 7, between- and within-school tracking as decision-dependent predictors were held constant as well. It is obvious, particularly in the German data, that the important decision on the type of secondary school coincides with aspects of social and cultural capital. There is, however, a good message that can be derived from the presented analyses: In both societies, the classroom itself does not seem to be the place where discrimination of low SES children happens. At least for the period between grade 7 and 10, learning gains in mathematics and English do not seem to be associated with parents’ education or their social status. This conclusion has a somewhat paradox consequence for between-school tracking structures like the one in Germany: *Within* a given school type and, therefore, within each individual school, teachers cannot do anything substantial to prevent the exacerbation of the association between achievement and social background. Since they evidently treat high and

low SES kids already the same, any effort in this regard must end in a counter-discrimination within the school type, which undermines the meritocratic principle it was suppose to serve.

SES effects in Germany and the U.S.

The comparison of effects in both countries strongly depends on the equality of measurements. In the light of the correlation structure within each country for the variable in grade 7, there is no evidence that this assumption was violated for the central variables. As expected, socioeconomic status correlated moderately with parent's education, less strongly with students' achievement scores and little with their GPA scores. The presented analyses reveal a consistent picture of the differences between Germany and the U.S. with regard to the gateways for the influence of parents' education and status on their children's school careers. Already in grade 7, the correlations between the SES indicators and students' achievement scores are consistently higher in the German sample, although the differences at this point are rather small (e.g. $r = .28$ compared to $r = .18$ for the correlation between parents' education and mathematics). The higher correlation might be due to the fact that the between school tracking had taken place two years before the first data collection in BIJU for two thirds of the sample. Additional analysis, however, did not confirm this prediction. The correlation is the statistically the same in both German states included in the study although the students transfer into the tiered system at the end of sixth grade in one state (Berlin). Given prior research in Germany it is all but surprising that we were able to replicate evidence that the family background partly predicts the school-type choice (Ditton, 1992).

If we focus on the track selection for mathematics for the US sample, this choice reveals to be mainly driven by achievement indicators and the students' wishes to go to college. It is

interesting that the achievement score in English also plays a significant role in prediction track level in mathematics. This can be understood as a tendency to have the students in matching tracks. Despite the significant effect of parents' education on the course tracking, this did not increase the correlation between parents education and achievement scores in grade 10. Varying little across indicators and subjects the zero-order coefficient stays about $r = .20$. For Germany, the significant increase for the achievement-SES correlation coefficients up to $r = .40$ is exclusively due to pronounced differences in the learning rates between the school types. The between-school tracking system in Germany obviously amplifies SES differences with regard to the actual academic competence level. In grade 10, the substantial competence differences between students from low and high SES background are confounded with differences caused by the enrollment in particular type of school. An independent additional influence of parents' SES in grade 10 was found in Germany for the intention for graduates of the Realschule to move on the Gymnasiale Oberstufe, replicating finding reported using data from the German Third International Mathematics and Science Study (TIMSS, cf. Schnabel & Schwippert, 2000).

Put succinctly, the German secondary school system "bails and boosts" the effect of SES, which, at the transition at the end of elementary school, is probably not "unusually" strong when one takes 3% explained variance as a benchmark for SES effects on educational decisions. Although there is ample empirical evidence to blame the between-school tracking system for the aggravation of the SES-effect on students' careers in Germany, our analyses suggest a closer look at the underlying mechanisms: The major cause is not the tracking per se but the differences in the learning rates between the school tracks. It is most likely that this effect has multiple causes. This may lead to very different strategies for improvement as long

as they address the structure and the process of the decision making which we identified as the major gateway for SES effects.

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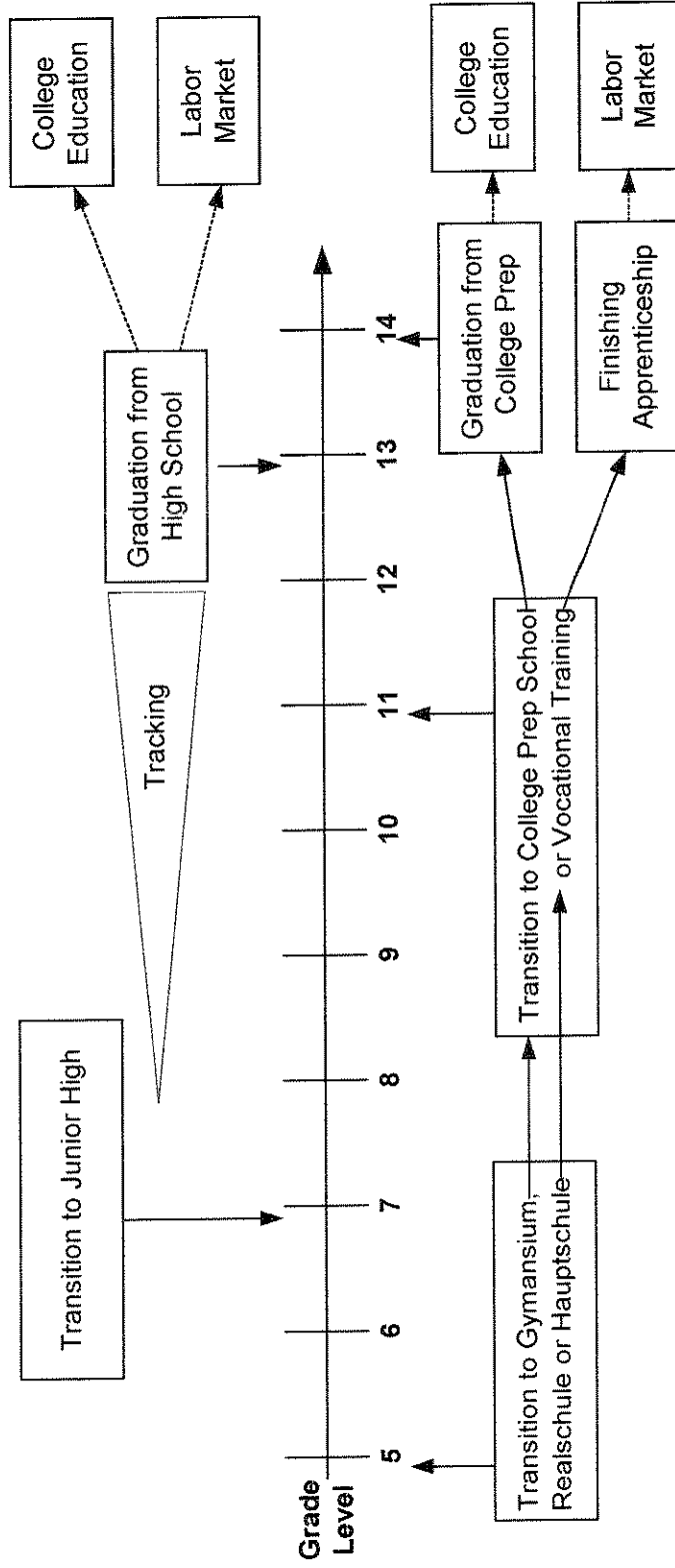
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U.S.A.



Germany

figure 1: Common career trajectories within the German and U.S. high school systems

