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## The influence of parents' social capital on their children's transition to vocational training in Germany

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**Abstract:** This study investigates the up-to-now strongly underexplored role of parents' social capital in the school-to-work transition of adolescents. We base our empirical analyses on unique longitudinal largescale data from the German National Educational Panel Study. Parents' social capital is measured with a position generator. Results show that adolescents with lower secondary education have better chances of finding an apprenticeship in a company if their parents know many persons with lower-status occupations for which vocational training is sufficient. This is especially the case for parents' social contacts that have occupations in which many adolescents with lower secondary education are being trained in a company. The contrary is true for adolescents whose parents know many persons with higher-status occupations. Parents' social networks do not show any effects on the quality of these apprenticeships or on the probability of entering school-based vocational training. Overall, our results indicate that parents' social networks are important for a smooth school-to-work transition of their children. Moreover, our analyses confirm the idea that social capital is goal and labour market segment specific.

**Keywords:** School-to-work transition; Apprenticeship search; Parents' social capital; Social network composition; Labor market segment specificity

### Introduction

Social contacts—along with educational credentials and other individual characteristics—are said to play a central role in ensuring individuals' labor market success (e.g. Bourdieu, 1977; Granovetter, 1995; Lin, 2001). This is because relatives, friends, and acquaintances can, for example, provide individuals with useful information for the job search, help with preparing for a job interview, or put in a good word for them with the employer (Burt, 1992; Kogan, 2011; Roth, 2014b). In order to understand why actors differ with respect to their labor market position, it is therefore crucial to identify more precisely how social networks operate in this context.

Although there is a considerable number of empirical studies that have examined the influence of social networks on labor market success (Field, 2008; Lin, 1999; Lin and Erickson, 2008), research gaps in this area are still glaring. First of all, only few empirical analyses explicitly address the influence of social networks on the transition from the education system to the labor market (Hällsten et al., 2017; Kogan et al., 2013; Roth, 2014b; Verhaeghe et al., 2015). This is an important shortcoming, since it is precisely this transition that has long-lasting effects and essentially determines the later labor market career (Scherer, 2004).

Furthermore, the effects of parents' social networks on the school-to-work transition of adolescents have hardly been investigated. This is a major shortcoming because adolescents themselves as well as their peer group often lack substantive work experience at the time of labor market entry and therefore are not well informed and connected in the labor market. It can hence be safely assumed that adolescents very often have to rely on the support of their family and that the social ties accessed through their parents are of great importance during the school-to-work transition. Parents' social contacts should be particularly helpful for finding a job or an apprenticeship position because, unlike adolescents' peers, they predominantly possess labor market experience. The very few existing studies on this topic point in this direction (Granovetter, 1995; Moerbeek and Flap, 2008; Roth, 2014a,b).

Another weak point of existing research is that only few empirical studies were able to utilize panel data in order to ensure that the network characteristics are measured before the outcome of a job search. This is crucial since cross-sectional correlations between labor market success and network composition can arise not only because an advantageous network composition promotes labor market success, but also because a good labor market position may have a favourable effect on the network composition (Mouw, 2003, 2006). To the best of our knowledge, hitherto only two studies exist that investigate effects of access to social capital on the school-to-work transition with longitudinal panel data (Roth, 2014a,b; Verhaeghe et al., 2015). However, both rely on small, regionally limited samples, which is why results are not generalizable. Moreover,

the small sample sizes limit their possibilities of refined in-depth analyses.

The key objective of our study is therefore to comprehensively investigate the effects of parents' social networks on their children's transition from the education system to the labor market on the basis of largescale, nationwide representative panel data. Due to strategic considerations and the availability of exceptional data, we focus on Germany in our empirical analyses. More precisely, we investigate the entry into (company-based) vocational training after lower secondary education<sup>1</sup>, which is a very crucial step in the school-to-work transition for many adolescents in Germany.<sup>2</sup>

It is a standard argument in social capital literature that ties to persons with a high-status job are especially helpful for labor market success (Bourdieu, 1977; Lin, 2001). However, it has also been pointed out that social capital is goal specific (Flap and Völker, 2001). This means that having ties to persons with similar occupations as oneself can be especially pivotal for the labor market success in a market economy because these contacts are very well connected and informed in the relevant labor market segment (Chen and Volker, 2016). For the labor market success of a person with a low-status job, a contact with a low occupational status can thus be more beneficial than a contact with a high occupational status. Recent findings indicate that this might also be the case for the job or apprenticeship search outcome of adolescents who enter the labor market with a rather low level of education (Roth, 2014b; Verhaeghe et al., 2015). Additionally, Hällsten et al. (2015) highlighted on the basis of a position generator<sup>3</sup> that knowing persons in some specific occupations is crucial, while knowing someone in other occupations is not and that the importance of the occupations varies depending on the population at hand and the outcome process studied. To contribute to this literature is a further aim of this paper. Thus, we will derive two composite measures from a position generator that combine information about the extensity and the social composition of the parents' networks. Furthermore, we will theoretically argue which specific occupations in our position generator should be most pivotal in our particular application for finding an apprenticeship, and we will analyze the effects of each occupation separately. In doing so, we strictly test the assumption that social capital is goal and labor market segment specific.

In our empirical analyses, we use data from the German National Educational Panel Study (NEPS) which are nationwide representative, longitudinal, and have a high number of cases. The data allow us to differentiate between adolescents who have actually applied for an apprenticeship and those who did not. This gives us the rare opportunity to exclude adolescents who did not search for vocational training from our analyses and at the same time include those who did not leave the general school system because they were unsuccessful in their apprenticeship search. The NEPS data contain information from the parents about their social networks, gathered with the help of a position generator (Lin and Dumin, 1986), as well as refined information from the adolescents about the search outcome. Hence, we are able to differentiate between starting a dual vocational training in a company and starting a school-based vocational training. Furthermore, we also obtain information about specific apprenticeship characteristics of those who found a dual vocational training place. These characteristics specify the apprenticeship's quality, such as the occupational status, salary, and subjective satisfaction with the apprenticeship. Additionally, we have information about the current situation of those who did not start vocational training. The structure of the data together with its richness allows us to control for a large number of aspects that might be responsible for a spurious relationship between network characteristics and search outcome. Overall, the NEPS data are exceptionally well suited to address our research questions.

The results are of importance beyond the German case because also in international research effects of parents' social networks on the labor market entry have hardly ever been empirically examined. As far as we know, this is the first study that comprehensively investigates the effects of parents' social networks on adolescents' school-to-work transition on the basis of a nationwide representative, longitudinal data set. Furthermore, we believe that it is also the only study to theory-guided investigate the effects of single position generator occupations on the school-to-work transition. This can give further important insights into the goal and labor market segment specificity of social capital. Apart from that, the German case is also of strategic value because hypotheses about social network effects on the apprenticeship search clearly differ for the company-based dual vocational system and the fully school-based vocational system, which is due to different allocation processes. To the best of our knowledge, this is the first study that separates between the two systems while empirically investigating the role of parents' social networks in the search outcome. This refined inspection can give us deeper insights into the underlying mechanisms of network effects and indicate causality.

### **The German education and vocational training system**

In order to derive specific theory-driven hypotheses, it is important to have some basic knowledge about the German education and vocational training system. Germany is a prime example of a country with a highly stratified education system (Müller, 2005). Students are tracked at an early age into different school types that are clearly distinct with respect to performance requirements, curricula, years until graduation, and common type of school-leaving qualification. In contrast to open and undifferentiated education systems, the type of school attended and the school performance at secondary level therefore strongly determine the later educational attainment as well as the school-to-work transition.

The Gymnasium is the most prestigious secondary school type, leading to a university entrance qualification (Abitur). Almost all students who attend the Gymnasium in lower secondary education continue general schooling in upper secondary education. In contrast, most of the students who attend the other secondary school types enter vocational training after the end of lower secondary education. Yet, some of them continue schooling, while others enter the so-called transition system. It is important to note that attending a transition program is not an option youths strive for but rather a "bridging" strategy for those who are not qualified for upper secondary schooling and did not immediately find a vocational training place. Only a very small fraction enters the labor market without vocational qualification or is inactive (Beicht and Ulrich, 2008).

Overall, more than half of all young adults complete a vocational training program in Germany. Most of these programs last about three years. However, there is no guarantee of finding a vocational training place. Hence, a substantial part of the adolescents who searched for an apprenticeship spends some time in a transition program after lower secondary education or continues further

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<sup>1</sup> In Germany, lower secondary education is called "*Sekundarstufe I*" and comprises the school years from grade 5 until grade 10 (ISCED level 2).

<sup>2</sup> In fact, more than half of all young adults attend vocational training in Germany and about two thirds of those who successfully completed vocational training in a company are offered permanent employment from the respective company (Bundesinstitut für Berufsbildung, 2013a). Entering the labor market without vocational qualification or university degree is the exception in Germany. This indicates that the actual school-to-work transition for many youths without a university entrance qualification in Germany already takes place with the entry to the (dual) vocational training.

<sup>3</sup> The position generator is an often-used, reliable, and valid instrument in which respondents indicate on a list of occupations whether they know someone who works in the respective occupations (Lin and Erickson, 2008; Van der Gaag, 2005).

schooling. The majority of adolescents pursue a dual vocational training program, which combines on-the-job training in a company and schooling in a vocational school, while a smaller part pursues purely school-based vocational training. The two forms of vocational training by and large train for different occupations (Solga et al., 2014). In the dual programs, apprentices receive a small salary from their company, while adolescents in school-based vocational training programs normally do not receive a training salary (Authoring Group Educational Reporting, 2010; Hippach-Schneider et al., 2007).

Starting an apprenticeship can be seen as a two-step procedure. First, adolescents have to opt for an apprenticeship. For this decision educational attainment, expectations, social background and resources play an important role. Second, adolescents have to obtain a vocational training place. In order to do so, in the dual VET system adolescents have to apply directly to companies that offer such positions. This means that adolescents first need to know which companies offer apprenticeship vacancies. After a selection process that normally includes a written application, a personal interview, and sometimes also a qualification test or assessment center, the companies finally decide which applicants they choose. Hence, this can be regarded as a special case of the general matching process between employers and employees, in which adolescents compete with other applicants for vacancies and companies compete with other companies for the best applicants. Overall, it can be said that for those adolescents who decide in favor of VET, the basic search and selection processes are similar for the apprenticeship search in the dual vocational training system and the first job search in the labor market (Glauser and Becker, 2016; Roth, 2014b). In contrast, the search and selection processes for purely school-based vocational training positions differ fundamentally. Here, it is the vocational schools that offer vocational training positions to students with a sufficient educational degree. If more adolescents apply than the school can take, the selection is predominantly based on the applicants' school-leaving certificate. Employers are not involved in this process (Hippach-Schneider et al., 2007). Overall, the basic search and allocation processes for school-based vocational training are similar to other educational transitions.

### Literature review and hypotheses

As has just been argued, for those adolescents who decide in favor of VET the general search and selection processes are assumed to be similar for the (first) job search in the labor market and the apprenticeship search in the strongly company-based dual vocational system. Therefore, we will begin this section with a brief description of the general theoretical explanations of why social networks may affect the labor market entry.

Within the social capital framework, the possible effects of social networks on the structural success of actors have thoroughly been investigated. Although the existing approaches differ from each other, (Adam and Roncevic, 2003; Haug, 1997), they have in common that resources and information to which actors have access through their social network are considered social capital, which actors can use to achieve their goals (e.g. Bourdieu, 1983; Burt, 1992; Coleman, 1988; Lin, 2001; Portes and Landolt, 2000). It is argued that social ties facilitate labor market entry because they can provide information about job opportunities, which increases the likelihood of finding an adequate position. Furthermore, social contacts can give a job seeker additional information regarding a company and its recruitment process and can assist him, e.g., by helping to write an application letter or by coaching him for a job interview. Last but not least, they can put in a good word for the job seeker with the employer in order to enhance his chances of being hired. A recommendation from such a person can be considered a signal of the applicant's productivity or motivation if the employer is in a benevolent relationship with the intermediary person and affiliates positive characteristics with him/her. Moreover, also employers use their own social networks to search for suitable candidates (Burt, 1992; Granovetter, 1995; Kogan, 2011; Roth, 2014b).

These arguments imply several general presumptions. First, a more extensive network of the parents should be beneficial, *ceteris paribus*, as having contact to more people enhances the chances that someone from the network will be able to provide helpful information and support (Bourdieu, 1983). Of course, not every contact is pivotal, but mainly those with suitable information, resources, and connections. Concerning the social composition of the network, it is commonly assumed that persons with a high status and a prestigious job are particularly useful at the labor market, as these persons in general possess great amounts of resources and information as well as a high reputation and power (Bourdieu, 1977; Lin, 2001). However, in cases like ours, where adolescents—due to a rather low education—are restricted to search for an apprenticeship in the lower labor market segment, an exclusive focus on the advantages gained from parents' high-status contacts falls short. This is because it can also be assumed that ties to persons who are well connected in the specific segment of the labor market in which the adolescents are searching for an apprenticeship are especially helpful. "For example, for a plumber who is seeking a new position, vacancy information from a lawyer with a much higher status is very likely to be less useful than that from a gardener with a similar status or from another plumber with the same occupation" (Chen and Volker, 2016). This might be especially true for the apprenticeship search in Germany, since a substantial proportion of apprentices with lower secondary education are trained in small enterprises that do not have employees with high-status jobs. Due to the goal and segment specificity of social capital, it can therefore be assumed that parents' social contacts with lower-status jobs for which vocational training is sufficient are especially valuable when it comes to finding an apprenticeship position at the end of lower secondary education. This is because these contacts might be better informed and better at acting as brokers or advocates in the crucial labor market segment (Roth, 2014b; Verhaeghe et al., 2015).

**Hypothesis 1a.** Adolescents' chances of finding a dual apprenticeship position are higher and the risk of ending up in the transition system is smaller if their parents' network comprises a large number of persons in lower-status jobs for which vocational training is sufficient.

**Hypothesis 1b.** There are only small positive or no effects on adolescents' chances of finding a dual apprenticeship if their parents' social network comprises a large number of persons in higher-status jobs for which a tertiary degree is necessary.

Combining the idea that social capital is goal and labor market segment specific (Chen and Volker, 2016; Flap and Völker, 2001) with the findings from Hällsten et al. (2015) implies that also not all lower-status occupations are pivotal for finding an apprenticeship in the dual system after lower secondary education. It should be rather especially those lower-status occupations in the position generator in which (1.) many adolescents (2.) who left school after lower secondary education (3.) are being trained in the dual system. On average, those ties are supposed to provide the most crucial information and resources in the relevant labor market segment. In contrast, parents' network contacts working in lower-status occupations in which only few adolescents are trained, for which a university entrance qualification is normally requested, for which vocational training takes place in the school-based form, or for which no vocational training is needed at all are supposed

to be less helpful. This might be especially true in countries like Germany with an occupational labor market where occupations are strongly nationally standardized and intrapersonal job changes across occupations are rare (Ehlert, 2016).

**Hypothesis 1c.** It is especially pivotal for adolescents' chances of finding a dual apprenticeship position if their parents know persons in lower-status occupations in which typically many adolescents pursue a dual vocational training program after lower secondary education.

As described in the section on the German education and vocational training system, some adolescents in Germany pursue vocational training not in the dual form but in a full-time vocational school. Since the selection process for these training places is predominantly or exclusively based on the school-leaving certificates and employers are not involved, the above-stated arguments are true only for dual apprenticeships but not for school-based training positions. For the latter, neither information from the parents' networks, connected to the labor market segment the adolescents search in, nor influence and putting in a good word are of great value. Therefore, parents' social capital should in general be of minor importance when it comes to finding a school-based apprenticeship.

**Hypothesis 2a.** There are no effects on adolescents' chances of being in school-based vocational training if their parents' social network comprises a large number of persons in lower-status jobs for which vocational training is sufficient.

**Hypothesis 2b.** There are no effects on adolescents' chances of being in school-based vocational training if their parents' social network comprises a large number of persons in higher-status jobs for which a tertiary degree is necessary.

Up to now, the theoretical arguments have focused on finding an apprenticeship position. In the following, we want to discuss the possible effects of parents' social networks on specific apprenticeship characteristics of adolescents actually trained in the dual vocational system. Here, the hypotheses are less clear than with respect to finding an apprenticeship position. On the one hand, one can argue that adolescents whose parents have ties to many persons with vocational training certificates and lower-status occupations should receive information about a wider set of vacancies and therefore find a good apprenticeship. On the other hand, it can be argued that especially parents' network ties with higher occupational status should secure more attractive apprenticeship positions. This is because these network contacts are rather employed in larger companies that offer higher starting incomes and better career opportunities than smaller companies. Due to their reputation and influence, higher-status ties might therefore be helpful for finding a high-quality apprenticeship in a larger company, although they are not working in the labor market segment in which adolescents are searching for apprenticeship positions at the end of lower secondary education. In order to comprehensively investigate the effects of parents' networks on the apprenticeship quality, we do not rely on one but on four different characteristics, namely the status of the training profession, the monthly salary, the company size and, as a subjective measure of quality, the subjective satisfaction with the apprenticeship in the company.

**Hypothesis 3a.** Adolescents are trained in dual apprenticeships of higher quality if their parents' social network comprises a large number of persons in lower-status jobs for which vocational training is sufficient.

**Hypothesis 3b.** Adolescents are trained in dual apprenticeships of higher quality if their parents' social network comprises a large number of persons in higher-status jobs for which a tertiary degree is necessary.

#### **Data, variables and analysis strategy**

We use information from the first five waves from Starting Cohort 4 of the German National Educational Panel Study (NEPS) for the empirical analyses (Blossfeld et al., 2011).<sup>4</sup> Ninth graders (mostly 15 years old) were representatively selected via stratified cluster sampling. All students of one or two ninth-grade classes of selected schools were sampled (Skopek et al., 2013).<sup>5</sup> Wave 1 was conducted at the beginning of the 2010/11 school year (fall/winter 2010), wave 2 at the end of grade 9 (spring/summer 2011), waves 3 and 4 in spring and summer 2012, and wave 5 in winter 2012/2013. In the second half of the school year 2010/11, the parent who is mainly responsible for educational matters regarding the target children (mostly mothers) was questioned as well. Due to the representativeness, longitudinal design, high number of cases, and refined information about the parents' social networks and other important aspects, the NEPS data are perfectly suited for analyzing our research question.

Since we are interested in social network effects on the outcome of an apprenticeship search, students attending the Gymnasium in wave 1 are excluded from our analyses because nearly all of them continue schooling. In addition, we restrict our sample to adolescents who are actually searching for an apprenticeship. We include those students who answered in wave 3 or in wave 5 that they have applied for an apprenticeship position. Since only a subsample was asked this question in wave 3, we also include students with missing values who indicated at the end of grade 9 that they have searched or plan to search for an apprenticeship position in the current school year. We replicate this procedure with information at the end of grade 10. Because only a very small fraction of students enters vocational training already after grade 9, we focus on the situation of the students in December 2012,<sup>6</sup> which is several months after they have left grade 10. Almost all apprenticeships start between July and October and if students are not in vocational training until the end of a year, they have almost no chances of finding a training position before the next summer.

The starting month does not indicate a higher or lower search success but rather reflects the externally predefined starting time of the apprenticeship, which is why we do not conduct event history models. We differentiate between four conditions: pursuing dual vocational training, pursuing school-based vocational training, pursuing further schooling, and attending transition programs of vocational preparation or doing something else (in this category by far most adolescents are in a transition program, followed by being unemployed or employed without vocational qualification).

For those who do a dual apprenticeship, we additionally analyze the effect of their parents' social networks on different dimensions of their apprenticeship quality. We use information about the socioeconomic status (ISEI-08) of the training profession, the monthly salary, the subjective satisfaction with the apprentice-

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<sup>4</sup> This paper uses data from the National Educational Panel Study (NEPS): Starting Cohort 4 – 9th Grade, doi:<https://doi.org/10.5157/NEPS:SC4:6.0.0>. From 2008 to 2013, NEPS data were collected as part of the Framework Programme for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, the NEPS survey is carried out by the Leibniz Institute for Educational Trajectories (LIfBi) at the University of Bamberg in cooperation with a nationwide network.

<sup>5</sup> We excluded the subsample of students attending special needs schools from our analyses since they were not asked all relevant questions and received different achievement tests.

<sup>6</sup> We derive this information from the biography data set, spell data sets, and the student data set of wave 5.

ship in the company, and the company size. The last characteristic is included because bigger companies offer better future career opportunities.

To investigate the influence of parents' networks, we use information from a position generator (Lin and Dumin, 1986) containing a list of 13 occupations. Parents indicated for each of the occupations whether they know a person in their social network who is currently working in this profession in Germany. In order to test the argument that high-status ties are superior and the argument that social capital is goal and labor market segment specific, we differentiate between higher-status occupations, which require tertiary education as a rule, and lower-status occupations, for which vocational training is sufficient. We calculate the number of named occupations for each of the two groups.<sup>7</sup> This gives us two variables that combine information about the extensity and the composition of the parents' networks. While comparatively few previous studies derive measures from the position generator that make a qualitative distinction between different kinds of occupations, such measures have great research potential and can provide further insights (Verhaeghe and Li, 2015).

In the multivariate analyses, it is possible to control for a large number of relevant variables that can affect the search outcome. Concerning the social background of the students, we consider the number of books in the household, parents' highest educational attainment, and parents' highest occupational status (ISEI-08).<sup>8</sup> Additional variables indicate whether the child lives in a single-parent household, the child's gender, year of birth, and migration status. Students are defined as having a migration background if they themselves, at least one of their parents, or at least two of their grandparents were born abroad. Finally, besides the grades for mathematics and German information from six different performance tests (mathematics, sciences, information and communication technologies (ICT), spelling, reading rate, and reading comprehension) are available. Scores in the achievement tests are standardized and grades are redefined in order for higher values to signify better school grades.

It is essential for our research question to also control for school characteristics and regional variations since context factors, such as the characteristics of the regional apprenticeship market, youth unemployment rates, the school type attended, the school climate, and the school cooperation with training companies can influence the transition after lower secondary education (Glauser and Becker, 2016). In order to do so, we take advantage of the fact that due to the stratified sampling design students are clustered within schools in the NEPS data. Therefore, it is possible to control for all school characteristics by running fixed-effects linear probability regressions using the school identifier as panel variable. With this analysis strategy, we only compare differences between students who attended the same school in grade 9, by which school-constant unobserved heterogeneity no longer biases our results. Since secondary school students predominantly live close to the school attended and the vast majority search for vocational training positions in the vicinity, this analysis strategy also controls for regional variations. Overall, it can be said that an exceptionally high number of potential confounders are controlled in our analyses. Additionally, all independent variables were collected in grade 9 and thus chronologically precede our dependent variables.

Like in many other studies, also in the NEPS data we are confronted with nonresponse that could bias our results.<sup>9</sup> Therefore, we create 20 data sets with multiply imputed missing values by using the official STATA mi system (StataCorp, 2013). We use all variables employed in the analyses and panel entrance weights for imputation. Following the advice from von Hippel (2007), cases with missing information on the dependent variable are used for the multiple imputation but excluded from the analyses (MID method), since efficiency is usually increased with this procedure and the best estimates can be obtained. This procedure reduces the sample size from 6642 to 4753 cases. All results in the empirical section are based on analyses of the multiply imputed data.

## Results

While we do not have direct information about whether the parents' networks have actually been mobilized during the apprenticeship search, it is insightful to note that 75 per cent of the adolescents got information about interesting vacancies for vocational training from their parents, 25 per cent from siblings, 49 per cent from other relatives, 48 per cent from friends, and 27 per cent from other persons. This clearly shows that social ties are an important source of information for the apprenticeship search and that especially parents play a pivotal role.

Table 1 presents the distributions of the dependent variables. We see that nearly half of the adolescents who searched for an apprenticeship were in dual vocational training in December 2012, while about 10 per cent pursued school-based vocational training, about 24 per cent continued schooling, and about 19 per cent was in the transition system or did something else. The apprenticeships of the adolescents attending dual vocational training had a rather low occupational status, company size was on average medium, the apprentices earned a little below 500 Euros, and they were rather satisfied with their apprenticeships.

Descriptive statistics for the key independent and control variables can be found in Table 2. Concerning the parents' social networks, we see that parents named on average three out of the six occupations with higher status and 4.4 out of the seven occupations with lower status. Although parents on average less often

**Table 1**  
Distribution of dependent variables.

Variables	Average or percent
<b>Condition in December 2012</b>	
Dual vocational training	47.40
School-based vocational training	10.41
Further schooling	23.60
Transition system or sth. Else	18.57
<i>Sample Size</i>	<i>4753</i>
<b>Characteristics of dual vocational training</b>	
Socioeconomic status (ISEI-08)	34.30
Monthly salary (Euro)	480.15
Company size*	4.87
Subjective satisfaction with apprenticeship**	8.13
<i>Sample Size</i>	<i>2253</i>

Source: National Educational Panel Study (NEPS): Starting Cohort 4, author's own calculations.

\* The company size was measured on a 11 point scale (1 = 1–4 people and 11=more than 2000 people).

\*\* The subjective satisfaction was measured on an eleven point scale (0=completely unsatisfied and 10=completely satisfied). Missing data are handled using multiple imputation (MID method).

<sup>7</sup> 6 higher-status occupations (university degree required): Engineer, doctor, social worker, legal practitioner, translator, teacher; 7 lower-status occupations (vocational training sufficient): Nurse, warehouse/transport worker, sales clerk, police officer, bank clerk, car mechanic, optician.

<sup>8</sup> In order to measure parents' education and occupation, we use information from the parent questionnaire. If no information from the parents is available, information from the adolescents is used in addition. If there is only information on one parent available, this information is used.

<sup>9</sup> For an overview of the variable distribution before multiple imputation and the number of students with information on the single variables, see Tables A1 and A2 in the Appendix A.

**Table 2**  
Distribution of key independent and control variables.

Variables	Average or percent
<i>Key independent variables</i>	
Number of named occupations lower status (7 occupations)	4.46
Number of named occupations higher status (6 occupations)	3.04
Single occupations position generator	
<i>Occupations lower status (vocational training sufficient)</i>	
Nurse	77.48
Warehouse/transport Worker	56.82
Sales clerk	84.76
Police officer	63.16
Car mechanic	72.78
Bank clerk	61.80
Optician	29.50
<i>Occupations higher status (university degree required)</i>	
Engineer	56.49
Doctor	60.97
Social worker	51.38
Legal practitioner	45.66
Translator	24.79
Teacher	64.70
<i>Control variables</i>	
Highest qualification parents	
Lower secondary degree with apprenticeship or less	28.57
Intermediate secondary degree (with apprenticeship)	47.80
At least <i>Abitur</i>	
Highest occupational status parents (ISEI-08)	42.61
Books in household*	3.32
Migration background	
Two-parent family	81.01
Male	55.81
Year of birth	1995.13
Std. test score mathematics	-0.41
Std. test score ICT	-0.39
Std. test score sciences	-0.37
Std. test score reading rate	-0.29
Std. test score spelling	-0.33
Std. test score reading comprehension	-0.41
Grade German	3.95
Grade mathematics	3.89
<i>Sample Size</i>	4753

Source: National Educational Panel Study (NEPS): Starting Cohort 4, author's own calculations.

Missing data are handled using multiple imputation (MID method).

\* 1 = 0-10, 2 = 11-25, 3 = 26-100, 4 = 101-200, 5 = 201-500, 6 = more than 500 books.

pursuing school-based vocational training or further education. Yet, both increases are not statistically significant and the coefficient for school-based vocational training is small in size. These findings are in line with hypothesis 2b but contradict hypothesis 1b, and we can only speculate about potential reasons. One could be that adolescents whose parents' know many higher-status persons with tertiary education are diverted to the two school outcomes because these ties are not beneficial in the dual system but possess information that is valuable in the general school system and in the vocational school system.

In the following, we go one step further by investigating the hypothesis about the goal and segment specificity of social capital effects even more closely. Since we are predominantly interested in the transition to vocational training and, as we have just seen, parents' social capital mainly affects the transition into the dual system, we henceforth focus on this aspect. Our basic theoretical argument concerning the differences between lower- and higher-status ties is that the former might be better informed and connected in the specific labor market segment in which adolescents search for an apprenticeship after lower secondary education. However, this should not be equally true for all lower-status occupations in our position generator but especially for the occupations in which (1.) typically many adolescents (2.) without university entrance qualification (3.) are being trained in the dual system. This is true for "sales clerk" and "car mechanic", with both being among the top three of all dual training professions in Germany. While "bank clerk" is also a common dual training profession, apprentices in this profession predominantly have a university entrance qualification (Bundesinstitut für Berufsbildung, 2013a,b). In contrast, much less adolescents are trained as police officer or optician, and there is no vocational training necessary to work as a warehouse or a transport worker. Finally, nurses are not trained in the dual vocational system but in the school-based vocational system. Therefore, sales clerk and car mechanic should be the two most important occupations in the position generator for finding a dual training position.

Table 4 shows the results from school fixed-effects linear probability regressions that are based on separate models for each of the single occupations in the position generator.<sup>10</sup> We see that none of the occupations with higher status has a substantive positive effect on the probability of being in dual vocational training. In contrast, apart from optician, all lower-status occupations show positive coefficients. Sales clerk and car mechanic are by far the most pivotal occupations, both having statistically significant positive effects that are about double the size of the other lower-status occupations. This is in line with hypothesis 1c.

In a last step, we investigate in Table 5 whether parents' social network characteristics affect the apprenticeship quality of those who found a dual vocational training position (coefficients for the control variables can be found in Table A5 in the Appendix A). In contrast to hypotheses 3a and 3b, neither the number of

know persons in higher-status occupations than in lower-status occupations, there is also a great variance within the two groups. The least often mentioned occupation is translator; the most often named is sales clerk.

Table 3 reports coefficients from school fixed-effects linear probability regressions of the students' situation in December 2012 on parents' social network characteristics in 2011 using robust standard errors. Since we differentiate between four possible situations, we run models on four different binary outcome variables. Each of the outcome variables contrasts one of the possible situations with all others. All control variables are included in the models (coefficients for the control variables can be found in Table A3 in the Appendix A).

In line with hypothesis 1a, our results clearly show that adolescents' prospects of being in dual vocational training are higher and the risk of attending transition programs is lower if their parents' network comprises a large number of persons in lower-status occupations for which an apprenticeship is sufficient. Both effects are statistically and substantially significant. For example, the probability of being in dual vocational training is 18 percentage points higher for an adolescent whose parents know someone in each of such occupations named in the position generator than for an adolescent whose parents do not know anybody in these occupations. On the contrary, the number of lower-status ties does not significantly affect the probability of being in school-based vocational training or of attending further education. Our results demonstrate that it is instrumental in finding a dual training position if parents have many lower-status ties, but not so in finding a school-based vocational training position. This is congruent with hypothesis 2a according to which we expect no effects for the latter due to the different kind of selection process that does not value connections to the labor market. In addition, the results show that parents' contacts to persons in occupations for which an apprenticeship is sufficient rather act as safety net against ending up in the transition system or in inactivity than divert adolescents who applied for a vocational training position from attending further education.

For the number of named occupations with higher status, we find statistically significant negative effects on being in dual vocational training. This does however not affect the risk of being in the transition system but instead increases the likelihood of

<sup>10</sup> Table A4 in the Appendix A shows coefficients for the position generator occupations and the control variables derived from a school fixed-effects linear probability regression in which all the single occupations of the position generator are included simultaneously.

**Table 3**

Coefficients from school fixed-effects linear probability regressions of students' situation in December 2012 on parents' social network characteristics in 2011.

Students' situation in December 2012:	Dual voc. training vs all others	School-based voc. training vs all others	Further schooling vs all others	Transition system vs all others
No. of named occupations lower status (vocational training sufficient)	0.026** (0.006)	-0.002 (0.004)	-0.009 (0.006)	-0.014* (0.005)
No. of named occupations higher status (university degree required)	-0.019* (0.007)	0.006 (0.004)	0.011 (0.006)	0.001 (0.006)
Number of observations	4753	4753	4753	4753
Number of groups	387	387	387	387

Source: National Educational Panel Study (NEPS): Starting Cohort 4, author's own calculations.

Significance level: \* $p \leq 0.05$ , \*\* $p \leq 0.01$ . Robust standard errors in brackets. Missing data are handled using multiple imputation (MID method). All models contain the full set of control variables.

**Table 4**

Coefficients from school fixed-effects linear probability regressions on the probability of being in dual vocational training in December 2012 on single occupations in parents' social network in 2011.

Students' situation in December 2012:	Dual voc. training vs rest
<i>Occupations lower status (vocational training sufficient)</i>	
Nurse	0.028 (0.023)
Warehouse/transport Worker	0.035* (0.017)
Sales clerk	0.060* (0.024)
Police officer	0.033 (0.017)
Car mechanic	0.068** (0.019)
Bank clerk	0.033 (0.022)
Optician	-0.000 (0.019)
<i>Occupations higher status (university degree required)</i>	
Engineer	0.001 (0.019)
Doctor	-0.030 (0.019)
Social worker	-0.020 (0.016)
Legal practitioner	0.006 (0.020)
Translator	-0.013 (0.022)
Teacher	-0.005 (0.021)
Number of observations	4753
Number of groups	387

Source: National Educational Panel Study (NEPS): Starting Cohort 4, author's own calculations.

Significance level: \* $p \leq 0.05$ , \*\* $p \leq 0.01$ . Robust standard errors in brackets. Missing data are handled using multiple imputation (MID method). Results are based on separate models for each single occupation. All models contain the full set of control variables.

company. The labor market segment specificity is additionally highlighted in analyses which demonstrate that not all ties with lower status are equally

named occupations with lower status nor the number of named occupations with higher status show significant effects on the socioeconomic status, monthly salary, company size, or the subjective satisfaction with the apprenticeship. This means that, while parents' social networks substantially influence their children's probability of finding a dual vocational training position, they have no effect on the quality of these positions.

### Conclusion and discussion

In this study, we comprehensively investigated the effects of parents' social networks on the school-to-work transition of adolescents who applied for vocational training after lower secondary education in Germany. This is an important contribution, since there are only few empirical analyses on the influence of social networks on the school-to-work transition of adolescents and hardly any studies on the influence of their parents' networks—also in international research.

Our empirical analyses show that adolescents have substantially higher chances of finding a dual apprenticeship in a company if their parents know many persons in lower-status occupations, while this is not the case for finding a school-based vocational training position. In contrast, if parents named many higher-status occupations in the position generator, the probability of being in dual vocational training decreases and the chances of being in school-based vocational training or in further education tend to increase.

These results confirm the theoretical argument according to which social ties to persons in the specific labor market segment in which an actor is searching for an apprenticeship are pivotal for the search success in the dual system. Since adolescents at the end of lower secondary education have acquired only lower school-leaving qualifications, they search for apprenticeships in the lower labor market segment. Therefore, parents' social ties to persons in lower-status occupations for which an apprenticeship is sufficient should possess especially useful information and connections for finding an apprenticeship at a

**Table 5**

Coefficients from school fixed-effects linear probability regressions of apprentice-ship characteristics in the dual system in December 2012 on parents' social network in 2011.

	ISEI-08	Monthly salary	Company size	Subjective satisfaction
No. of named occupations lower status (vocational training sufficient)	-0.094 (0.232)	0.727 (2.847)	-0.032 (0.058)	-0.022 (0.035)
No. of named occupations higher status (university degree required)	0.064 (0.212)	0.247 (3.113)	0.053 (0.058)	0.023 (0.037)
Number of observations	2253	2253	2253	2253
Number of groups	370	370	370	370

Source: National Educational Panel Study (NEPS): Starting Cohort 4, author's own calculations.

Significance level: \* $p \leq 0.05$ , \*\* $p \leq 0.01$ . Robust standard errors in brackets. Missing data are handled using multiple imputation (MID method). Only those adolescents included who attend dual vocational training. All models contain the full set of control variables.



important for finding a dual apprenticeship but especially those in occupations in which many adolescents are being trained in a dual program after lower secondary education. Lower-status ties, however, are not instrumental in finding a school-based vocational training position, since labor market information and connections are subordinate for this purpose. Overall, our results clearly speak against a general superiority of high-status ties and provide evidence for the goal specificity of social capital. This is especially the case, since lower-status ties not only increase the chances of starting dual vocational training but, unlike higher-status ties, they also substantially decrease the risk of entering the transition system or inactivity.

In contrast to the substantive effects on the probability of being in dual vocational training, the composition of parents' social networks shows no effects on several quality characteristics of these apprenticeships. While we do not find the expected double advantage for the number of parents' ties to persons in occupations for which vocational training is sufficient, there is also no trade-off between the effects on the probability of finding an apprenticeship and on the apprenticeship quality. This means that the positive effect of parents' lower-status ties on finding an apprenticeship is not bought with less attractive positions that might be easier to get.

On a general level, our results indicate that parents' social networks are important for a smooth school-to-work transition of their children. Additionally, our analyses clearly confirm the idea that social capital is goal specific. First, although it might usually be true that higher-status ties are especially beneficial with regard to the labor market, our results suggest that lower-status ties are pivotal for the school-to-work transition of persons with a lower level of education. Secondly, effects of network characteristics fundamentally differ for the transition to the labor market and the transition to school-based vocational or general education. Additional analyses (available on request) in which we also include students who did not search for an apprenticeship position show that their probability of making a transition to further education is significantly increased if their parents have a large number of higher-status ties. This is in line with previous international and German findings, showing that especially contacts with high status and high educational expectations lead to higher educational expectations and educational transitions of students (Cheng and Starks, 2002; Roth, 2014a, 2017; Schuchart, 2009; Verhaeghe et al., 2015; Wells et al., 2011). This means that, while social ties to higher-status contacts increase educational success, lower-status ties are beneficial for the school-to-work transition of adolescents with a lower level of education.

In sum, our results are in line with the few existing studies that deal with the effects of social networks on the school-to-work transition of lower-educated adolescents. At the same time, the data used together with the research strategy and the specific German context gives us the unique possibility of a refined investigation, which is why our analyses go beyond existing ones and give important new insights. The unique features are that it is the first study—as far as we know—to investigate the effects of parents' social networks on the school-to-work transition of adolescents on the basis of a nationwide representative, longitudinal data set. Apart from that, we are not aware of any study on the school-to-work transition that differentiates between several possible outcomes of the search process and at the same time investigates social network effects on several apprenticeship (first job) characteristics of those who found a dual apprenticeship (first job). Especially the differentiation between dual and school-based vocational training is of great value, since it gave us the possibility to test our theoretical arguments more closely. Last but not least, to the best of our knowledge no previous study formulated theory-guided hypotheses for the effects of single occupations, contained in the list of a position generator, on this transition. Overall, the strong data base together with the refined analyses and rather clear results make us optimistic that the significant coefficients do not reflect spurious relationships but social network effects.

We want to end with some implications of our findings for future research. First of all, future studies should place a stronger focus on parents' social networks when looking at transitions into the labor market, because they seem to play an important role here. Since social network effects can vary in different labor market contexts (Chen and Volker, 2016), effects of parents' networks on school-to-work transitions should be comprehensively investigated also in other countries in order to test the generalizability of our results. In this respect, a comparison not only with state job-assignment systems seems worthwhile but also with market economies that—unlike Germany—are not typical occupational labor market countries but internal labor market countries. Secondly, in line with Hällsten et al. (2015), our results demonstrate that not all occupations in a position generator are equally important for specific goals. Concerning labor market research, our findings indicate that the argument of labor market segment specificity of social network effects can give some guidance for the selection of the occupations for specific samples.

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## Appendix A

**Table A1**

Distribution and number of cases for dependent variables without multiple imputation.

Variables	Average or percent	Number of cases
Condition in December 2012		
Dual vocational training	43.4	1709
School-based vocational training	10.6	416
Further schooling	25.6	1008
Transition system or sth. else	20.4	802
Characteristics of dual vocational training		
Socioeconomic status (ISEI-08)	35.5	1655
Monthly salary (Euro)	492.1	1566
Company size*	5.1	1562
Subjective satisfaction with apprenticeship**	8.2	1526

Source: National Educational Panel Study (NEPS): Starting Cohort 4, author's own calculations.

Only those adolescents included who have searched for a vocational training position.

\* The company size was measured on an eleven-point scale (1 = 1–4 people and 11 = more than 2000 people).

\*\* The subjective satisfaction was measured on an eleven-point scale (0 = completely unsatisfied and 10 = completely satisfied).

**Table A2**

Distribution and number of cases for key independent and control variables without multiple imputation.

Variables	Average or percent	Number of cases
<i>Key independent variables</i>		
Number of named occupations lower status (7 occupations)	4.5	2658
Number of named occupations higher status (6 occupations)	3.1	2662
Single occupations position generator		
<i>Occupations lower status (vocational training sufficient)</i>		
Nurse	78.2	2673
Warehouse/transport Worker	55.7	2671
Sales clerk	85.1	2668
Police officer	65.7	2672
Car mechanic	72.0	2672
Bank clerk	63.8	2673
Optician	30.1	2673
<i>Occupations higher status (university degree required)</i>		
Engineer	59.1	2673
Doctor	62.1	2670
Social worker	51.8	2670
Legal practitioner	47.1	2671
Translator	24.5	2675
Teacher	66.1	2675
<i>Control variables</i>		
Highest qualification parents		
Lower secondary degree with apprenticeship or less	25.9	1133
Intermediate secondary degree (with apprenticeship)	49.2	2148
At least <i>Abitur</i>	24.7	1080
Highest occupational status parents (ISEI-08)		
Books in household*	43.02	4352
Books in household*	3.30	4845
Migration background	29.40	5047
Two-parent family	80.35	4676
Male	54.18	5207
Year of birth	1995.1	5207
Std. test score mathematics	-0.41	4964
Std. test score ICT	-0.37	4950
Std. test score sciences	-0.36	4948
Std. test score reading rate	-0.27	4965
Std. test score spelling	-0.33	4955
Std. test score reading comprehension	-0.38	5035
Grade German	3.95	4746
Grade mathematics	3.87	4702

Source: National Educational Panel Study (NEPS): Starting Cohort 4, author's own calculations.

Only those adolescents included who have searched for a vocational training position.

\* 1 = 0–10, 2 = 11–25, 3 = 26–100, 4 = 101–200, 5 = 201–500, 6 = more than 500 books.

**Table A3**

Coefficients from school fixed-effects linear probability regressions of students' situation in December 2012 on parents' social network characteristics in 2011.

Students' situation in December 2012:	Dual voc. training vs all others	School-based voc. training vs all others	Further schooling vs all others	Transition system vs all others
No. of named occupations lower status	0.026** (0.006)	-0.002 (0.004)	-0.009 (0.006)	-0.014* (0.005)
No. of named occupations higher status	-0.019* (0.007)	0.006 (0.004)	0.011 (0.006)	0.001 (0.006)
Highest qualification parents (Ref: Lower sec. degree with apprenticeship or less)				
Intermediate sec. degree (with apprenticeship)	-0.003 (0.018)	0.001 (0.120)	-0.004 (0.015)	0.005 (0.017)
At least <i>Abitur</i>	-0.035 (0.023)	0.007 (0.015)	0.020 (0.021)	0.007 (0.021)
Highest occupational status parents (ISEI-08)				
Books in household	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Books in household	-0.004 (0.006)	0.005 (0.003)	-0.001 (0.005)	0.000 (0.005)
Migration background	-0.097** (0.017)	-0.018 (0.011)	0.089** (0.015)	0.024 (0.014)
Two-parent family	0.057** (0.017)	0.006 (0.012)	-0.024 (0.016)	-0.037* (0.018)
Male	0.205** (0.016)	-0.101** (0.011)	-0.076** (0.014)	-0.027* (0.013)
Year of birth	-0.035** (0.009)	0.009 (0.006)	0.048** (0.008)	-0.023** (0.008)

Table A3 (Continued)

Students' situation in December 2012:	Dual voc. training vs all others	School-based voc. training vs all others	Further schooling vs all others	Transition system vs all others
Test score mathematics	0.025* (0.012)	-0.015 (0.008)	0.010 (0.011)	-0.020 (0.010)
Test score ICT	-0.026* (0.011)	0.006 (0.007)	0.011 (0.010)	0.008 (0.009)
Test score sciences Test score reading rate	0.012 (0.012)	-0.011 (0.007)	0.002 (0.010)	-0.003 (0.010)
Test score spelling	0.005 (0.010)	-0.004 (0.006)	-0.003 (0.008)	0.002 (0.009)
Test score reading comprehension	-0.047** (0.011)	0.011 (0.007)	0.028** (0.010)	0.007 (0.009)
Grade German	-0.002 (0.011)	0.005 (0.007)	0.026** (0.009)	-0.029** (0.009)
Grade mathematics	0.010 (0.008)	-0.010* (0.005)	0.032** (0.007)	-0.031** (0.007)
Number of observations	4753	4753	4753	4753
Number of groups	387	387	387	387
Unconditional intraclass correlation	0.195	0.123	0.180	0.149

Source: National Educational Panel Study (NEPS): Starting Cohort 4, author's own calculations.

Significance level: \* $p \leq 0.05$ , \*\* $p \leq 0.01$ . Robust standard errors in brackets. Missing data are handled using multiple imputation (MID method). a Percentage of variance which is due to differences across schools in a model without covariates.

Table A4

Coefficients from school fixed-effects linear probability regressions on the probability of being in dual vocational training in December 2012 on single occupations in parents' social network in 2011.

Students' situation in December 2012	Dual voc. training vs all others	
Occupations lower status (vocational training sufficient)		
Nurse	0.020	(0.025)
Warehouse/transport Worker	0.020	(0.017)
Sales clerk	0.042	(0.026)
Police officer	0.023	(0.019)
Car mechanic	0.057**	(0.021)
Bank clerk	0.023	(0.024)
Optician	-0.005	(0.020)
Occupations higher status (university degree required)		
Engineer	-0.005	(0.019)
Doctor	-0.051*	(0.021)
Social worker	-0.028	(0.017)
Legal practitioner	0.009	(0.020)
Translator	-0.017	(0.022)
Teacher	-0.011	(0.022)
Highest qualification parents (Ref: Lower secondary degree with vocational training or less)		
Intermediate sec. degree (with voc. training)	-0.002	(0.018)
At least Abitur	-0.030	(0.023)
Highest occupational status parents (ISEI-08)		
Books in household	-0.004	(0.006)
Migration background	-0.095**	(0.018)
Two-parent family	0.056**	(0.017)
Male	0.204**	(0.017)
Year of birth	-0.034**	(0.009)
Test score mathematics	0.025*	(0.012)
Test score ICT	-0.025*	(0.011)
Test score sciences	0.012	(0.012)
Test score reading rate	-0.008	(0.008)
Test score spelling	0.004	(0.010)
Test score reading comprehension	-0.047**	(0.011)
Grade German	-0.002	(0.011)
Grade mathematics	0.010	(0.008)
Number of observations	4753	
Number of groups	387	
Unconditional intraclass correlation <sup>a</sup>	0.195	

Source: National Educational Panel Study (NEPS): Starting Cohort 4, author's own calculations. Significance level: \* $p \leq 0.05$ , \*\* $p \leq 0.01$ . Robust standard errors in brackets. Missing data are handled using multiple imputation (MID method). a Percentage of variance which is due to differences across schools in a model without covariates.

**Table A5**

Coefficients from school fixed-effects linear probability regressions of apprentice-ship characteristics in the dual system in December 2012 on parents' social network in 2011.

	ISEI-08	Monthly salary	Company size	Subjective satisfaction
No. of named occupations lower status	-0.094 (0.232)	0.727 (2.847)	-0.032 (0.058)	-0.022 (0.035)
No. of named occupations higher status	0.064 (0.212)	0.247 (3.113)	0.053 (0.058)	0.023 (0.037)
Highest qualification parents (Ref: Lower sec. degree with apprenticeship or less)				
Intermediate sec. degree (with apprenticeship)	0.390 (0.636)	8.481 (8.689)	0.062 (0.168)	0.015 (0.116)
At least Abitur	-0.050 (0.777)	-6.098 (11.582)	0.063 (0.229)	-0.169 (0.145)
Highest occupational status parents (ISEI-08)	0.042** (0.016)	-0.050 (0.248)	0.000 (0.004)	-0.000 (0.002)
Books in household	0.085 (0.188)	-1.424 (2.821)	-0.009 (0.055)	-0.003 (0.030)
Migration background	1.573* (0.648)	-6.228 (10.076)	0.133 (0.177)	-0.097 (0.103)
Two-parent family	1.462* (0.685)	4.744 (9.144)	0.168 (0.183)	0.077 (0.112)
Male	-6.365** (0.572)	23.372** (8.258)	0.672** (0.153)	0.113 (0.093)
Year of birth	0.080 (0.332)	-3.433 (4.879)	0.076 (0.094)	0.089 (0.053)
Test score mathematics	0.728 (0.405)	11.617 (5.948)	0.368** (0.112)	-0.037 (0.073)
Test score ICT	1.550** (0.398)	0.479 (6.268)	-0.090 (0.103)	0.074 (0.059)
Test score sciences	-0.803 (0.412)	3.721 (6.584)	0.235* (0.112)	-0.097 (0.064)
Test score reading rate	0.687** (0.290)	4.286 (4.127)	-0.002 (0.078)	-0.037 (0.043)
Test score spelling	-0.083 (0.356)	-6.537 (5.326)	0.011 (0.100)	-0.038 (0.064)
Test score reading comprehension	0.711 (0.368)	6.648 (5.614)	0.040 (0.104)	-0.035 (0.057)
Grade German	0.800* (0.367)	15.581** (5.621)	0.310** (0.104)	-0.100 (0.061)
Grade mathematics	0.496 (0.298)	17.790** (4.516)	0.254** (0.087)	0.126* (0.050)
Number of observations	2253	2253	2253	2253
Number of groups	370	370	370	370
Unconditional intraclass correlation	0.256	0.270	0.266	0.255

Source: National Educational Panel Study (NEPS): Starting Cohort 4, author's own calculations.

Significance level: \* $p \leq 0.05$ , \*\* $p \leq 0.01$ . Robust standard errors in brackets. Missing data are handled using multiple imputation (MID method). Only those adolescents included who attend dual vocational training.

a Percentage of variance which is due to differences across schools in a model without covariates.

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