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**FAMILY BASED ABILITY GAP.
ANTECEDENTS AND CONSEQUENCES**

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Chapter 1

General Introduction

“If you work hard and play by the rules, you should be given a chance to go as far as your good given abilities will take you” (American dream)

This quotation stated that individual outcomes are connected to individual efforts and talents. In other words, setting aside characteristics like ethnicity, race or social class, the individual's efforts may change their future life chances. Nevertheless, there is no question that society is stratified, indeed, high valued resources such as the possession of wealth, having an interesting and well-paid job, or having a good education is not evenly distributed across the society. Moreover, these resources are transferred between parent and children being, for example, the parental education one of the best predictors of the future educational level of children. Of course, this relation is not absolute, instead it should be regarded in relative terms, for example, two-thirds of the population ultimately reproduce their parents' level of education, while one-third take a different path. But still, there is no question that living in a society with considerable gaps of resources produces substantial inequalities in individual outcomes.

In social stratification research much attention has remained on whether the educational level could act as a social equalizer of the different individual outcomes, for example the equal educational resources provided at school should produce the same educational attainment levels, and consequently, the same level of education can be rewarded equally on the labor market. According to the Education based meritocracy (EBM) theory, the socioeconomic position of individuals in society is exclusively determined by their achievement level of education. However, the

question of whether the education is an equalizer it is still an important debate on academic research (Bernardi and Ballarino, 2016). Indeed, most of the empirical research on inequalities in educational opportunities (i.e. the association between social origin and individuals educational attainment) has documented the important effect of ascription, especially socioeconomic origin, to achievement on modern western societies (Ermisch et al., 2012b; Smeeding et al., 2011; Coleman et al., 1966).

The empirical evidence has also documented that influences of social background on educational success and, therefore, life chances are unfolded over time (Lareau, 2012; Minello and Blossfeld, 2017; Manzoni et al., 2014), meaning that class differences in academic performance are already present in preschool age and it widens when students go further on the educational system. This has been more evident in highly stratified systems like those where students are divided in school tracks at a relative early age (Pfeffer, 2008; Blossfeld et al., 2016a; Buchmann et al., 2016; Horn et al., 2016). Therefore, the effects of social background on educational level are better understood from a life-course perspective where the longterm trajectory of educational career of a young person residing in a highly structured system (i.e. timing of entry, duration within the system, and after the exit) can be viewed from two perspectives. From an individual perspective, this trajectory includes the development of cognitive skills and social connections, such as the creation of social networks based on interpersonal relations. From a population perspective, this trajectory relates the way society invests in the education of its people in order to achieve desired economic outcomes, such as a

certain productivity level of individuals in different professions. The investigation linking these two perspectives of educational career is important because it gives information on the way in which cultural, social and economic influences can affect the everyday life of individuals as well as it provides evidence of how social inequalities can be experienced and reinforced over time.

Framing the analysis of educational careers in a life-course perspective requires a conceptualization. Life-course may be conceived as a sequence of life-stages on which the developmental process of a young people is connected to the next adjacent life stages (Buchmann and Steinhoff, 2017). Such perspective is promising in shape our awareness of the pathways of child and young educational career over the stages of childhood, adolescence and adulthood. This perspective also helps to the overall understanding of continuity or discontinuity of the pathways. For example, whether the initial condition settle in childhood have a stable trajectory over adolescence (i.e. continuity of pathways) or how the adolescent process amplify the initial experience of (dis) advantage settle in childhood. Taking together, an important question that emerges is: What are the important factors related to each stage of life that affects the educational success of a young person? The answer to this question is, however, not an easy task. Although the empirical literature has documented differences in cultural capital, social connections and economic resources across social classes affecting the educational performance as well as the educational transition of students, less attention has been paid on specific factors related to the period of childhood and adolescence. In that regard, the particular features and structure of the German educational system make it

well suited for the investigation of the factors associated with academic success from a life course perspective. While it is undeniable that this educational system produces many high quality students, at the same time, it is well known that the influence of social origin strongly shapes the educational career of children and adolescents in this system (PISA, 2006, 2015). The stratification of students into different hierarchical educational schools at a relative young age (10 years old) strengthens the influence of social origin on educational decisions, with upper-class parents having a strong desire to secure the more prestigious track for their children.

Added to that, scholars who investigate the inequalities in educational opportunities in childhood and adolescence for the German system have systematically started on the first transition (from primary to lower secondary) and onwards (Buchholz et al., 2016; Biewen et al., 2016; Neugebauer et al., 2013; Stocké, 2007) leaving aside that the class difference in academic performance are already present in preschool age (Skopek, 2017; Weinert et al., 2017; Blossfeld, 2017).

In the same way, scholars who investigate the inequalities in educational opportunities in adolescence have remained attention on the mobility across school tracks or the different educational pathways to higher education that provides the German system (lauterbach2016educational, buchholz2016secondary, schindler2011differentiation). Often neglecting the role of young persons as an actor endowed with agent capacities to influence their own development.

Considering these aspects this research thesis try to fulfill that gap, therefore, the main aims of this research is to investigate how different opportunity structures

result in different educational outcomes and how it cumulates over the period of childhood and adolescence in the German educational system. In doing that, these studies have been proposed on the period of childhood and adolescence.

In early childhood the education of children begins with informal learning processes at home via family interactions, formal learning process at school with teachers, and through communication with adults in out-of school activities. These formative learning experiences strongly affect childrens intellectual capacities and social abilities, and lay down the groundwork for long-term educational trajectories. These initial experiences can potentially produce advantages in obtaining future educational success or form the foundation for growing disparities between individuals. For instance, at early age children already have different language comprehension abilities, with some children are able to grasp aspects of language like reading or writing, far more easily than others as they proceed through the educational system. These differences can be attributed to different factors, including environmental opportunities, where some families encourage children to learn and develop their capacities and others dont. The empirical literature has found that these differences are often modulated by parents social origin, with families from a high social origin often providing better opportunities for learning compared to families from low social origin. Therefore, one important question that arises at this stage of the educational life course is *what specific parents-children interactions matters more for the well development of cognitive capacities in childhood?* Moving forward on the educational life-course of children, now consider how important are family influences for a successful transition from pri-

mary to secondary school, especially in highly stratified systems. The core idea of sociological models that investigates the differences in school choices is that the effects of social origin accumulate over time at each transition point (Mare, 1980). Thus, the relevant question at this stage is, *why children with the same level of abilities and right to pursue equal education choose systematically different educational options?*

At the point where children arrive at lower secondary school, this period coincides with important changes on students lives. On the one hand, these changes refer to the educational system (i.e. more formalized systems), and on the other hand, this period coincides with adolescence and the socio-emotional adjustments to a new social context. Moreover this critical period connects compulsory education to further academic and vocational pathways. The adolescent development is also embedded on the social context too. In particular, their more proximal life circumstances provide them opportunities, resources and support that may shape their levels of school engagement affecting students academic performance, and, thus, the future educational opportunities. The relevant question in this stage is: *Does the level of school engagement enlarge or reduce the class-differential in academic performance over lower secondary education?.* In this research thesis I am going to address these question on three empirical investigations based on the German educational system.

Chapter 2

State of art on Inequalities on Educational Opportunities (IEO)

2.1 Introduction

Almost fifty years ago the *Coleman's report* (Coleman et al., 1966) discussed the notion of how equal access to education means that the only variation in educational attainment is due to differences in aptitude and effort levels. However, findings from this report pointed to a strong effect of a student's background and their family's socioeconomic position on educational attainment. These inequalities in educational opportunities (IEO) were interpreted as an interaction between resources and aspirations among students, families and institutions (e.g. schools, universities). To gain a greater understanding of this interaction, the established practice in sociological research is to conceptualize IEO as a consequence of two effects: first, as a result of differences in the educational performance of students across different socioeconomic backgrounds (i.e. primary effects of social class); and second, as a result of the educational choices made by actors through the educational system (i.e. secondary effects of social class). This decomposition is advantageous for identifying the determinants of IEO. According to Jackson (2013), subsuming primary and secondary effects into one unified explanation, does not account for the fact that these effects are generated by two different processes. Another advantage of this decomposition is that it provides better possibilities for policy intervention by determining which effect is relevant. Indeed, from a life-course perspective, an educational career could be regarded as a sequence of primary and secondary effects. Thus, the total effect of IEO can result from cumulative measures of primary and secondary effects. Scholars in the field of social

stratification call this a *Cumulative Advantage (CA)*, with this concept referring to the accumulation of advantage or disadvantages resources (e.g. education) over time and among social groups (DiPrete and Eirich, 2006). In a setting where the future level of education depends on the current level of education, the CA process provides a partial explanation for growing educational inequalities over time (Baumert et al., 2012). In this way, the CA process can expand small differences in abilities over time making it more challenging for students that are behind to reach the standard of higher achiever.

Over the past decades, several important advances in IEO research have been made. These contributions center on social stratification and mobility research in the past few decades, and have been summarized into nineteen empirical generalizations and conceptual developments (Hout and DiPrete, 2006). Among them, three empirical generalizations are critical for a proper understanding of the relevant role of family background on the educational attainment of children and students, and serve as a frame of reference for the development of this doctoral research work.

The first conceptualization is the role of education for upward mobility and reproduction of status between generations. The seminal work of Blau and Duncan (1967) in their book "The American Occupational Structure" underlined the major importance of education in occupational achievement, arguing that education fosters both social mobility and generational status reproduction. The authors posit that education has two possible sources of variation: first, the social origin that accounts for social reproduction, and, second, other independent factors from so-

cial origin that contribute to social mobility. This first conceptualization provides a standing point for the investigation of educational inequalities on childhood because it highlights the important role of parental education on determining the educational level and future social status of their children.

The second conceptualization is the model of educational transitions. Here, Mare (1980) proposes that social origin plays a differential role during the transitions encountered over the educational system. Thus, the final correlation between social origin and education is a product of the cumulative effects of social origin at each transition point. This second generalization acknowledges that the effect of social origin (e.g. parental education and occupational level) may change throughout each transitional stage of a child's educational career. Based on this model, it is possible to divide the period of investigation (i.e. childhood and adolescence) into individual transitional stages, and to analyze the effects of social origin on educational level within each transition stage.

The third generalization relates to the hypotheses of *maximal maintained inequality (MMI)* and the complementary hypothesis of *effectively maintained inequality (EMI)* (Panichella and Triventi, 2014). Raftery and Hout (1993) MMI hypothesis proposes that parents have a vested interest in achieving a particular educational level for their children, and thus mobilize all the resources at their disposal that take advantage of the educational system to the benefit of their children without hindering other parents. This hypothesis predicts that once the upper class demand for a particular educational level is satisfied, the barriers come down and the middle class can take advantage of that educational opportunity. The MMI

has been observed in many industrialized nations, however this hypothesis is not borne out in the US and the Netherlands. The EMI hypothesis proposed by Lucas (2001) addresses this deviation, stating that when a given level of education becomes universally accessible for children from all social classes, privileged parents will seek out qualitative differences in order to maintain an advantage for their children. The third generalization of the MMI and EMI hypotheses, provides an important explanation for the effects of socioeconomic background on educational attainment as a product of the stratification and selectivity of educational systems. This chapter starts with a review of the literature on inequalities of educational opportunities (IEO) from a macro and micro level perspectives, discussing cutting edge research in the field. Next, the main contributions and analytical structure are discussed. Finally, a explanation of the dataset is given.

2.2 Macro and Micro level of perspectives on the investigation of IEO

Macro-level of IEO: Trends over time and country comparison

From a macro-level, IEO can be regarded as a longitudinal analysis of the inherited influence of particular factors such as social origin on differences in educational levels and attainments. In western societies, empirical evidence has demonstrated that changes in this association have been mainly driven by the implementation of expansionist educational reforms such as the establishment of universal primary

and secondary education, and the development of a system of mass higher education (Trow, 2007). Given these reforms, one can expect a reduction on IEO as more students from lower socioeconomic origin get access to education, however, debate on the effect of these reforms on the persistence or decline of IEO is still a common theme in the literature. A descriptive analysis of trends over time and between countries is important for acknowledging the existence of particular features that matter for IEO.

The first major international comparative study of IEO was entitled *Persistent Inequality: Changing Educational Attainment in Thirteen countries*. This study was carried out by Shavit and Blossfeld (1993), and found mixed results. Based on Mare's model, the authors reported that only two nations (Sweden and the Netherlands), had succeeded in reducing the effect of social origin on educational attainment over time, with the other nations exhibiting a persistent influence of social origin on education level based on the fathers' education or occupation. Therefore, the outcome of this study is consistent with the hypothesis of *stability of inequality in educational opportunities over time*. The later study of Breen et al. (2009b) investigated the empirical evidence for *Persistent Inequalities*. Using ordered logit models, they investigated IEO trends in eight European countries (Germany, France, Italy, Ireland, Britain, Sweden, Poland, Hungary and the Netherlands), finding an overall decline in IEO for the majority of the countries studied. The authors argued that the three decade at mid-century decline was mainly due to the improved position of children from poor rural and working-class origins, with any significant differences on the timing of decline for men and

women (Breen et al., 2009a).

Meanwhile, the more contemporary research study of Ballarino et al. (2009) investigated the relationship of social origin on educational attainment over five decades in Italy and Spain. On the one hand, the results of this study showed decreased IEO for both countries due to a reduction in a family's risk of engaging in further education. This was further related to a reduction in school selectivity and increasing security of parental employment. On the other hand, analysis of the distribution of educational titles in both countries shows that improvement of economic conditions in Italy allowed farmers children access to higher education, while in Spain school expansion brought more benefits for the offspring of agricultural workers compared to other categories.

In a recent study, Blossfeld et al. (2016c), studied educational expansion between lower secondary and upper secondary school, and from upper secondary to a tertiary education level in 22 industrialized countries. Based on similarities in the patterns of change inequalities, countries were clustered into three groups in the analysis: the first group composed of the US, Germany and Slovakia; the second group composed of Italy, Sweden, UK, and the communist block (Czech, Poland, Estonia); and the third group was composed of the remaining countries (Austria, Belgium, France, Canada, Denmark, Finland, Ireland, Japan, South Korea, Netherlands, Norway, Russia and Spain). The results for the first educational transition (i.e. from lower to upper secondary) produced three main findings. Firstly, a strong decline in educational inequalities since children from privileged families had reached the saturation level. Secondly, children from lower educated

families showed an important reduction in inequalities for most countries except those of the first group, where the expansion from lower to upper secondary education was lower than that of the prior transition. Thirdly, women from families with a lower socioeconomic background succeeded in reducing their prior disadvantage and becoming the winners of the transition. In regard to the second transition (i.e. from upper to higher education), the authors observed that students from tertiary educated parents are more likely to transition on to tertiary education compared to other groups. Moreover, the probability of successfully graduating from tertiary education was worse for students from lower educated families in the countries of the first and second group, while on the probability of obtaining a tertiary education level was improved for lower class students and women from the remaining countries. Blossfeld et al. (2017) complemented these findings in another study which included the different phases of the process of educational expansion, finding that while the lower baseline level of lower secondary school is associated with better educational expansion, this does not always produce less educational inequality.

In industrial nations, educational reforms of the past decades (i.e. reduction of rigid early selection rules, expansion of traditional academic tracks, more inclusive schools and the introduction of multiples alternatives means of reaching higher education) have transformed the educational attainment landscape, with obtainment of a secondary school level becoming universal. This review of important trends in IEO investigations across different countries hopes to shed some light on these findings. The first, and arguably most important conclusion, is that

the association between social origin and educational attainment has weakened in the past few decades. This is contrary to the hypothesis of persistence inequality discussed above. Indeed, expansion of education has increased the rate of school attendance during upper secondary school chiefly for the lower classes, who unlike the upper classes, had not already reached a saturation point. However, the literature does recognize that the increasing opportunities for lower class children from lower class were not only a consequence of educational expansion, but also a combination of important educational reforms, intervention on the labor market, and the timing of the implementation of educational expansion. The next conclusion is that the saturation level was not required to reduce the unequal opportunities of lower class children in some countries. The empirical findings of Blossfeld et al. (2016c) demonstrated that in some of the studied industrialized nations, lower class children succeeded in obtaining advantages from the educational expansion in a context where the upper class has not yet achieved a saturation level. This small but very real transition probability for lower class children is termed the ceiling effect, and warrants further investigation in itself.

2.2.1 Micro-level of IEO: Mechanisms of transmission

On a micro analytical level, the educational attainment of students has three key feature which are: the students' success, their family's socioeconomic position, and the influence of their school and teachers. On the one hand, scholars investigating association of a family's socioeconomic background with a students'

academic success need to go beyond the simple descriptions to understand the mechanisms behind that association, often referring to the Cultural Capital and the Rational Action theory for explanations. On the other hand, scholars investigating the effect of teachers and schools on students' academic success need to gain insight on how institutional features and associated actors affect that association.

To better understanding findings related to this three pronged influences, it is useful to distinguish between familial influences and institutional (i.e. school and teacher related) influences on educational success.

Family influences on educational success

Cultural Capital

The concept of cultural capital was developed by Bordieu (1977) and refers to a system of consciously acquired habits, norms and values that are passively inherited by the socialization process through past experiences, that affect the present and future opportunities. He also stresses that these features can vary systematically between individuals from different social classes since 'the material conditions of the existence characteristics of a class condition (Bordieu, 1977) are part of the environment where they were generated'.

While the ingrained creation of cultural capital is capable of influencing individuals' attitudes towards schooling, academic performance and aspirations, the cultural capital also influences how the school behaves towards students from different social origins. In this way that the knowledge, education and ability ad-

vantages are passed from parents to children through the socialization process enduring the reproduction of this hierarchical class structure across generations (Bourdieu and Passeron, 1990).

The broad literature on the transmission of cultural capital from parents to children and adolescents, can be organized into two axes which are the family socioeconomic structure (i.e. difference in education, social position and economic resources) and family process (i.e. the parental styles). These two bodies of research often overlap, and provide a characterization of parental styles across different socioeconomic circumstances.

An important piece of research on this topic was published by Lareau (2012). Here, Lareu distinguishes between the two parental styles across social classes by characterizing parent-child or parent-adolescent interactions that produce different educational outcomes. Elaborating on the work of Bourdieu, she argued that the parental style adopted by the upper-class parents was in more accordance with the values held by schools and teachers. From that standpoint, a complete understanding of the influence of cultural capital on a student's educational success should distinguish between the important familial and school influences. The process of imparting habitus, norms and values in childhood can be clearly observed in parent-child interaction in the transmission of language, with mothers often playing a big role. The empirical literature found that upper class children perform better in language tests, and have a wider vocabulary because the content of speech they hear is richer (Hoff-Ginsberg, 1991, 1998) than that of lower class children. The literature has also demonstrated that the type of parent-child

interactions varies considerably by social class, and often favor different educational outcomes. For example, Pungello et al. (2009) studied the association of social origin, parenting style (positive interactions and negative intrusiveness) and children's rate of language development. The authors observed that children from higher-SES families developed language skills at a faster rate compared to children from lower-SES families. They also found that increased frequency of positive interactions significantly sped up language development in children, while negative intrusive interactions were not significantly associated with the development of abilities.

Another illustration of family influences can be found in Roksa and Potter (2011). This study investigated the impact of class differences on literacy and mathematical performance related to two measures of the socialization process. These were participation in cultural activities (e.g. visiting museums and musical activities), and measures of concerted cultivation (e.g. children's participation in extracurricular activities, parental involvement, and how often parents talked with children). Results showed important differences between the middle and lower class in parental engagement on concerted cultivation practices and cultural activities, with no significant differences found between the upper and middle class.

In their most recent study, Potter and Morris (2017) investigated the cumulative effect of four family experiences (out of school children's activities, parental involvement, parental educational expectations and the quantity of books at home) on class-differences in academic performance across four ethnic groups (African American, Hispanic, Asian and Whites) from kindergarten to 8 grade. In this

longitudinal analysis, the authors found that white children tended to have initial favorable family experiences that cumulated over time, thus increasing class-differences in academic performance. The only exception was the parental expectation, with parents of Asian children tending to have higher expectations for their children compared to parents of other ethnicities. This study provides important empirical evidence for a cumulative process of family experiences and academic achievement, meaning that initial disadvantageous family experiences unfolded throughout the educational career.

By the time that the young students have arrived at secondary school they have already important cultural differences, with values, attitudes, motivations, aspiration and behaviors towards school differing according to social class. For example, the long-standing literature on aspiration provides evidence for marked differences between the educational aspirations of lower and upper class students (Sewell and Armer, 1966; Alexander et al., 1975; Dronkers, 1978).

The research on educational aspirations has taken a different direction. On the one hand, much attention is paid to the distinction between aspirations (i.e. knowledge of the real world) and the expectations (i.e. desire about the future), with scholars arguing that educational experiences and feedback helps students to self-allocate their position in the educational system, allowing them to adjust their expectations and aspirations accordingly (Khattab, 2015). On the other hand, the empirical research has a sustained interest in uncovering why students' aspiration does not match their achievement or what drives students to make educational choices based on their aspirations. An important explanation is found on the –aligned

ambitious— (Schneider and Stevenson, 2000) which describes the value of having complementary educational and occupational goals. For example, information on the educational pathways of different occupations, oriented students on the time and effort required to fulfill their educational choices (Hu, 2003; Martinez and Cervera, 2012).

Those examples underline some important principles. First, the empirical literature recognizes that cultural capital acquired through the socialization process is associated with the academic success of children and adolescents. Secondly, the transmission of habitus, norm and values are rooted in family interactions in early childhood, and extend to the adolescence period (Cunha and Heckman, 2008), producing enduring intergenerational opportunities and inequalities (Bourdieu and Passeron, 1990). Third, differences in attitude, motivation and aspirations of adolescents not only influence their academic performance, but also their educational choices and attainments. Moreover, investigation of class differences in academic performance due to the inherent transmission of cultural capital necessitates identifying which parent-child activities matter the most, and delineating which attitudes, behaviors, or emotional aspects of adolescent development are more relevant for the academic success. Taken together, the empirical literature supports the idea that the socialization processes and parenting styles of upper-class parents are more advantageous in institutional settings such as schools compared to those of lower-class parents.

The rational action theory (RAT)

In the framework of RAT, the association of social class and educational attain-

ment is regarded as a process of educational decision making-process. For Boudon (1974) that association can be regarded as a sequential process of performances and decisions. This starts with an individuals' enrollment in the educational system where they acquire competencies that help them transition to the next educational level. This transition is thus characterized as the decision process on how to proceed to the next level based on prior academic performance. He labeled these sequential processes primary and secondary effects. While the first accounts for social class differences in the academic performance, the second explains social class differences in educational decisions. The most recent developments based on RAT are educational transition models where the educational decision-making process implies that parents and students carry out a cost/benefit analysis of staying in school (Erikson and Jonsson, 1996; Breen and Goldthorpe, 1997; Breen and Yaish, 2006). The proposed factors affecting this decision can be summarized as follows:

$$EC_i = f(r_i, p_i, c_i, x_i) \quad (2.1)$$

where the individual expected utility associated to each educational option at one transition point (EC_i) is a function of the risk aversion (r_i), probability of success (p_i), the cost associated (c_i) and other individual characteristics (x_i).

The term (r_i) defines the aspiration of families to ensure that their offspring reaches a class position that is at least, equal to the one they have originated from (Breen and Goldthorpe, 1997), i.e., families will try to avoid downward mobility. This models predict higher risk aversion in those who decide to continue in educa-

tion but fail to succeed, compared to those who decide to continue in education and succeed or those who immediately leave the educational system. The term (p_i) refers to the expectation of performance at the next educational level. The model associates prior academic performance with the expectation of success, thus predicting increased success for those who have demonstrated good prior performance. Finally, the term (c_i) measures the costs of each educational option (e.g. tuition fees, cost of living, etc), and associates these costs with the differences in a family's economic resources.

Based on rational choice models, Schindler and Reimer (2011) investigated important factors influencing class-differences in educational decisions on enrollment in German tertiary education. The authors' associated indicators of status maintenance and job security with expected benefits; the duration of studies and monetary cost (e.g. fees of education) with differences in economic resources; and scholastic performance with the probability of success. The results showed that working class students often prefer a semi-tertiary education (i.e. university of applied sciences) or vocationally oriented education for three main reasons: 1) they expect that those options will secure them a job in the labor market; 2) financial constraints make more attracted to short duration courses compared to longer university courses; and 3) their prior academic performance constrains their enrollment in tertiary education.

The empirical literature also underlines how social class differences in educational decision making are highly connected with the institutional features of educational systems such as school-tracks, mobility inter-tracks or the existence of atypical

educational pathways that can affect the final educational attainment of students. Bratti et al. (2012) investigated how the structure of educational system is associated with socioeconomic background from primary school until enrollment at university in a cross-national comparison of Germany and Italy. Institutional differences (i.e. age on track entry, barriers to track entry, type of credentials) in the educational systems provided insights on whether parents were capable of influencing the educational trajectories of students. In both countries, the authors observed a strong association of socioeconomic background and school choice even after the initial choice was made. However, the effect size decreased in Germany after control for academic achievement. Additionally, as expected, the inter-track mobility was lower in Italy than in Germany because Italian parents are more likely to choose a school track in search of social status and are unlikely to have a hand in changing the educational pathways of their offspring later on. In another longitudinal analysis, Lauterbach and Fend (2016) tested the effect of different timing (early, middle and no-tracking), and internal (differentiation of school subjects) or external (three partite system) tracking-schools on educational decisions in the German school system. Their results show that during the 6th to 9th grade the influence of social background and selectivity is reduced in an internal tracking system, meaning that a student's placement often matched their ability level. However, in the long term, the track system did not have any influence on the level of educational degree, meaning that the reduced effect of students' socioeconomic background in non-tracking systems was neutralized later in life. Overall, the most recent empirical literature on social class-difference on educa-

tional choices underline that a common finding on western societies is that social inequalities in accessing educational option are present in all school systems (Triventi et al., 2016). While a highly stratified system such as Germanys, reduces the disadvantages of the first transition by allowing for more permeability in the track-school system , students from a higher social background have less of a risk of experiencing downward mobility and are more likely to upgrade their competencies when are placed in a lower educational track (Buchholz et al., 2016; Buchmann et al., 2016)

Schools' and teachers' influences on academic success

The socialization that takes place in school teaches children and adolescents critical knowledge of the general view points of society. Schooling refers to the organizational form of education (e.g. with a curriculum, structure, and stratification) that takes place in school, and the consequences of this organized form of education for individuals (i.e. opportunities and inequalities).

In contemporary societies, schools are institutions that are responsible for the following three important aspects: 1) the transmission of school knowledge to the young; 2) the attempt to shape their conduct and values; 3) the sorting of students into educational positions according to a hierarchical occupational structure (Brint, 2006).

According to Brint (2006), the analysis of schools can be divided into three parts: First, the *analysis of structures and practices* that frame the action of students, teachers and directors. This makes reference to the general purpose of schools and educational systems as the purveyors of knowledge, values and behaviors of wider

society. This is related to the content and way the curricula is taught, and is an inherent aspect of the teacher-student relationship, for instance in the organization of class time and activities. For example, Ames (1992) investigated how classroom structure is related to students' engagement in learning. In her investigation she identified three important factors related to students' motivation that affected their mastery of goals, which were: tasks and learning activities, evaluations and recognitions, and a teachers' authority over students. She concluded that classroom structures are needed to better identify how these specific factors are related to academic success.

Another study conducted by Kane et al. (2011) investigated the association of classroom practices and student achievement. Using four indicators of teachers' classroom practices (preparing and planning, creating a favorable environment, teaching strategies and professionalism), they showed that the creation of a favorable learning environment for students by teacher, resulted in greater achievement than use of different teaching strategies. This conclusion underlines how the use of students' performance for the identification of important teacher practices required further investigation.

The second part of Brint (2006) analysis pertains to the *analysis of influences in the external environment*. This refers to external influences that affect schools and educational systems in which they are situated. An important aspect of this environmental influence research is the investigation of how students' flow at different school levels is affected by the locality. One example is a school's neighborhood, with students that study and live in a good environment being more likely to

graduate from secondary school and attend university. Burdick-Will et al. (2011) reviewed educational programs implemented in different cities of the US in order to find evidence that supports or contradicts a neighborhood effect on students' educational outcomes. They observed that a neighborhoods racial composition is one of the most important factors in determining educational outcomes, and concluded that future investigations should focus on studying under which conditions these effects are important for students' educational outcomes.

While the definition of external influences is highly dependent on the research topic, like if the researchers' aims is to understand uniformity across the schools, it makes sense to pay attention to the degree of centralized/decentralized control exerted by the state. One illustration of decentralized control is the German educational system where each federal state can be regarded as a small system (Freitag and Schlicht, 2009) Indeed, there is such great variety amongst federal states in terms of transition time from primary to lower secondary (i.e. in the western and eastern part of Germany) or in the distinction of the tripartite school system, with a clear distinction between the *Hauptshule* and *Realschule* in some states but not others.

The third part of Brint (2006) school study refers to the *analysis of the interests and interactions of major actors*. While the relationship among the three major actors inside the educational system (i.e. students, teachers and directors) is often cooperative, slight differences in interactions can shape the immediate experience of schooling. Most empirical research in this area focuses on the creation of learning communities through the student-teacher interactions. For example, the effect

of a teachers expectations of producing high or low level of student achievement is associated with the student educational outcomes (Rubie-Davies, 2010; Rubie-Davies et al., 2006; Trouilloud et al., 2002).

In this part, I review the existing paths by which the schools and teachers affect the students' educational outcomes by framing the analysis on structures and practices, environmental influences, and the interactions among actors. By doing so I recognize the importance of school and teacher effects for explaining variation in students' academic performance.

Finally, the existence of different factors associated with the described path by which schools and teacher may affect the student's educational outcomes can be linked to the reproduction and maintenance of IEO. This is most evident in a school's transmission of knowledge, values, and behaviors. For instance, if the socialization shared by teachers in schools are closer to those held by the upper social class students, or if higher teacher expectations are biased in favor of well performing students, both the school and teachers contributes to the propagation of class difference in educational performance.

2.3 Main contributions

The past decades has been marked by immense cultural and societal changes which have created a raft of new possibilities and constraints for individuals and families as they go through their lives. For example, technological changes and the emergence of mass production in industrial economies has negatively impacted

the demand for unskilled youth driving them out of the paid employment, allowing them to remain in school longer and to acquire new skills. As a result of these trends, there is increasing differentiation of age related groups, and chronological timing for particular roles and activities has changed (e.g. entrance on labor market, marriage, parenthood). These new forms of social organization affect contemporary life opportunities and inequalities across social groups, genders, races, and ethnicities, making for a more accurate and objective analysis from the life-course perspective. In fact, the analysis of educational inequalities from a life-course perspective can greatly help our understanding the mechanisms by which social (dis)advantages are unfolded over time and affect future educational chances. In addition, scholars also stress the importance of distinguishing periods where the social inequalities can be more (or less) effectively addressed. Childhood and adolescence are considered two of most sensitive periods, where political interventions can more efficiently prevent the growth of educational inequalities (Heckman, 2006; Cunha and Heckman, 2008). Empirical evidence has demonstrated that differences in ability level that vary according to social origin in primary school have lasting consequences for later education, meaning that students from a upper class background not only perform better, but also achieve higher educational attainment compared to their peers from a lower social class (Bratti et al., 2012; Ermisch et al., 2012b). This underlines a reward system where the favorable relative position becomes a resource that secures further educational gains (Merton, 1988; DiPrete and Eirich, 2006). The cumulative process of reward seems to be more evident in highly-stratified educational systems where children

are placed in different tracks at an early age (Pfeffer, 2008; Buchmann et al., 2016; Horn et al., 2016). The German educational system is a typical example of such a system. Although its institutional framework and regulations substantially vary among the sixteen federal states, the binding parental school choice based on teachers' recommendations (Freitag and Schlicht, 2009), and the vertically differentiated track-specific schools are regarded as an important source of the enlarged educational inequalities in Germany (Neugebauer and Schindler, 2012). These studies add to the well-established literature on educational inequalities in the German schooling system, identifying its undeniable provision of higher quality students, but also recognized that their educational achievement is strongly associated with their socioeconomic background (PISA, 2015, 2006) finding, for example, that parental educational level has significant effect on the allocation of students in lower secondary school, even after controlling for the ability of students (U. Schnabel et al., 2002; Schneider, 2008; Stocké, 2007). In fact, scholars have repeatedly stressed the major influence of the first educational transition from primary to lower secondary school, because it is regarded as being very consequential for later educational attainment, meaning that parents and students from upper class families seem to recognize the importance of making the right choice during each educational transition point. As a consequence, the secondary effects of social class were particularly strong in Germany (Neugebauer et al., 2013; Lauterbach and Fend, 2016; Buchholz et al., 2016), with students from upper classes being more likely to enroll on the academic track in secondary school, and also for a tertiary educational level, compared to students from a lower so-

cial class (Schindler and Reimer, 2011). That said, the linear association between educational attainment and track choice (i.e. where students were unable to alter their prior choice) has been reviewed again in more recent investigations, since the German system does provide alternative pathways that lead to the academic track after lower secondary school. The main aim of these alternative educational pathways is to provide students with a second chance to access higher secondary and tertiary education. The literature provides important insights on this fact through longitudinal studies, for example, Biewen et al. (2016), constructed a complete model of educational transitions from primary school up to vocational training, observing high social selectivity at each transition point, including those instances where students upgraded their mobility (e.g. shifted from lower to higher tracks) and the new pathways after lower secondary school. This means that students from better social backgrounds are more likely to engage in longer educational pathway, as well as upgrade their mobility, thus profiting from the new pathways that offering them a second opportunity for academic success. In another study, Buchholz et al. (2016) investigated educational inequalities in secondary education from three perspectives: the likelihood of attending the academic track in lower secondary school, the mobility among tracks, and the upgrading of secondary school qualifications. The results showed that socioeconomic background played an important role in the allocation of secondary school, with students from a higher socioeconomic background more likely to experience upward mobility from the middle track, and to upgrade their secondary school qualifications when they have previously graduated from a lower or middle track.

Despite the rich empirical sociological research, in Germany two important aspects have been neglected in the analysis of inequalities in educational opportunities from a life-course perspective. On the one hand, the IEO was studied as a sequential transition point describing different educational pathways starting from the first educational transition (primary to lower secondary) onwards, thus, scholars have paid more attention to the analysis of secondary effects of social class. As a consequence, the importance of early childhood periods such as kindergarten have been neglected. Although the empirical literature shows that children have different ability levels even before entering primary school (Skopek, 2017), few studies have investigated specific factors that affect that period. On the other hand, investigation of adolescent development in the joint framework of IEO has focused on the investigation of intergenerational transmission of inequalities, meaning that more attention has been paid to the analysis of students' allocation to one school-track and their transition to the next educational level, neglecting the fact that the young person is an actor endowed with the capacity to influence their own development.

The main objective of this thesis is to gain of a greater understanding of the two aspects mentioned above. Adoption of a life-stage as opposed to a life-transitions framework in IEO life course perspective analyses enables to conceptually link childhood and adolescent stages and gain a more precise identification of possible factors responsible for the emergence of educational differences, while simultaneously recognizing the importance of these periods for the overall understanding of IEO. This contribution will be made through the presentation of three empirical

studies which each touch a specific age-related factor that drives differences in educational opportunities:

- *The acquisition of competencies on kindergarten and primary school.* An important starting point in the analysis of educational inequalities in the childhood stage is the investigation of the development of early cognitive abilities such as language comprehension because it serves as a basis for the acquisition of other cognitive abilities later in life. In Germany, the majority of children aged 4 to 5 years old attend childcare centers before enrolling in primary school, and empirical evidence has demonstrated the existence of differences in language performance across different socioeconomic background even in kindergarten (Biedinger, 2011). These early socioeconomic differences on children's performance level are caused, among other factors, by the parent-child interactions at home. Indeed, differences in the educational level and the norms and values held by parents shapes the kind of communication and language transmission, making this factor important for the intergenerational transmission of status (Bourdieu and Passeron, 1990).
- *The transition from primary to lower secondary school.* It is well known that the ending of primary school is characterized by an important educational decision which is the enrollment on the lower secondary school. The relevant influence of this transition for future educational attainment makes it an important means of intergenerational transmission of inequalities. In other words, parents will try to strongly secure their childrens' enrollment

in a secondary school type that assures their future education and social status. In understanding these socioeconomic differences in educational transitions, scholars recognized important factors that influence parents and students decisions such as the risk aversion, expectations of success and economic resources (Breen and Goldthorpe, 1997). Among these factors, empirical studies have focused on risk aversion as the main factor driving these socioeconomic differences, with the probability of success not yet fully explored.

- *The school engagement of students on lower secondary education.* As children progress in educational systems they also transition to different stages in their life-course and adolescents. The role of adolescents as actors capable of influencing their own future educational career has not been fully investigated in social research. In the case of Germany, the empirical literature on educational inequalities in secondary school shows that students from a higher socioeconomic background seeking to upgrade their qualifications profited the most from mobility between educational tracks or the engagement in atypical educational pathways. Indeed, emotional and behavioral aspects of students' attitudes towards academic engagement are other factors that can influence educational success. Differences in academic attitudes across students' socioeconomic background may directly affect their academic performance and subsequent educational attainment.

2.4 German educational system

In this section the pertinent period of the German educational system from the kindergarten to end of upper secondary level is briefly described.

A considerable proportion of children enrolled in **kindergarten** or pre-school programs at the ages of four or five years old, while it is not compulsory or institutionally linked to primary schools. These early childhood programs are a typical and often unique option of early childhood programs. The main objectives of these program is to provide childcare and opportunities for interaction with adults and peers besides their family, thus promoting sociability. Nevertheless, in recent years many of this programs have implemented changes to promote the learning of cognitive skills and to prepare children for school with the aim to reducing inequalities at the onset of compulsory education. Finally, in terms of institutional aspects, the quality of kindergartens is regulated at level of the federal government, while some special features like number of slots available or the cost (mostly very cheap or even free) are regulated at the level of Landers based on internal demand. At ages of six to seven, children begin their formal primary education, enrolling in **primary school or Grundchule**. In most of Germany, this covers four years (from grade 1 to 4), however in the bundeslands of Berlin and Brandenburg it takes two years more, totaling six years overall (from grade 1 to 6). Throughout primary school, children are taught by one teacher for all courses. Formal examinations do not exist, however, children receive their report card every year starting from the third grade. At the last year of primary school, children also receive the

teacher recommendation about that type of lower secondary they should continue on, however the final decision is taken by the parents.

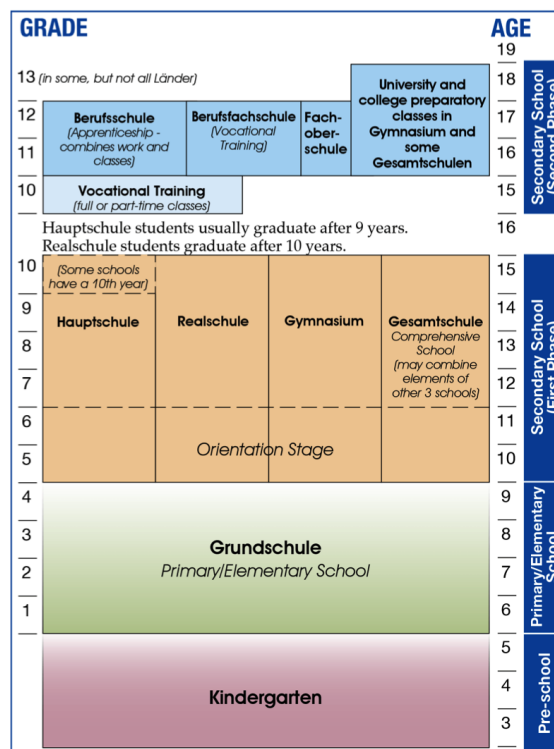
At the end of primary school, children make the transition into one of several types of lower secondary school, with this important decision shaping their whole future educational career. To help make this decision parents are provided with two important pieces of information. First, the report cards which address their childrens prior academic ability. Second the teachers recommendations on which type of lower secondary school their children are most suited for.

There are different types of lower secondary school that children may transfer to at the end of primary school. These three types of school offer different programs in regards to the organization and content of the syllabus, and result in different educational outcomes. The **Hauptschule** type of school consist of five years (from grade 5 to 9), and provides students with a basic general leaving certificate that is vocationally oriented. The **Realschule** consists of 6 years (from grade 5 to 10), with students receiving a more extensive general education and vocational training in a wide range of fields. This type of school also provide students with a *Mittle Reiff* certificate. After the successful completion of Hauptschule or Realschule, students may continue their educational career by enrolling on a full-time vocational education course, with the most common being *Berufsfashschule*, *Fachobershule* and *Fachshule*. This combination of upper education with a vocational focus prepares students for an occupation or enrollment in the *Dual system of vocational training*.

Finally, **Gymnasium** is the only academic type of school that allows student to

continue on to post-secondary and tertiary education, and is considered the most prestigious type of school. It consists of a total of twelve years of education, divided into two parts. The first part comprises of the six years (from grade 5 to 10) of lower secondary school. The second part comprises of two years (grades 11 and 12) belonging to *Gymnasium Oberstufe*. In general, successful completion of both stages Gymnasium and Gymnasium Oberstufe means passing a final examination called the *Abitur*. Students then have the right to directly enroll in traditional or applied science universities, and in a full-time vocational training.

Figure 2.1: German educational system



2.5 Data presentation

This doctoral research thesis used the dataset provided by the *National Educational Panel Studies (NEPS)*. NEPS is a national project that analyzes educational processes in Germany from childhood to adulthood. The objective of this project is to understand how the acquisition of education impacts on individual trajectories by the description and analysis of major educational process across the life span

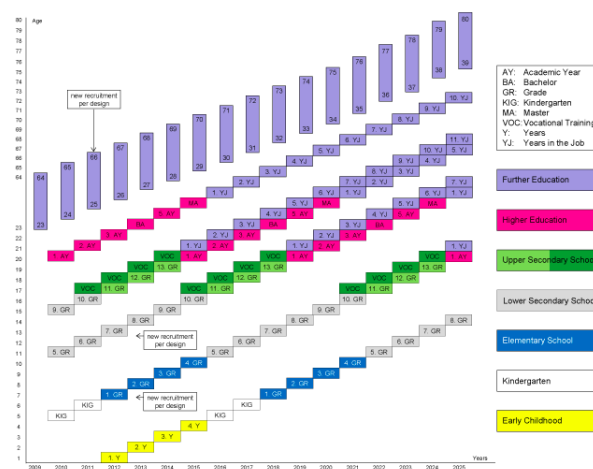
In general, the dataset was structured with two important principles in mind:

- To provide relevant information on educational transitions as soon as possible. This was achieved splitting educational biographies into six key developmental stages in the longitudinal design. These are newborn children, children on kindergarten level, students in the fifth grade of lower secondary school, students in the ninth grade of upper secondary school, students in the first year of university, and the retrospective data for adults. It is noted that some federal states in Germany are currently reforming the curriculum of the upper Gymnasium level, i.e. cutting the duration of school years from 9 to 8. These structural reforms took place in Thuringia and Baden-Wuerttemberg, with the information for these two states being included in a separate stages. This resulted in two stages in addition to the above 6 stages, making a total of 8 educational stages.
- Information was collected in accordance with six theoretical dimensions that described and could be used to analyze long-term developments in ed-

educational pathways. These dimensions were social inequalities and educational decisions, education on different learning environment, competence development, motivational and personality aspects, returns to education and education for persons with migration background.

In respect to the structure and longitudinal design of the NEPS data, the empirical studies in this thesis are formed from information provided for two educational stages (Kindergarten and the 5th grade of lower secondary school), and based on three theoretical dimensions (competency development across the life course, educational processes in specific learning environments, and the effect of social inequalities on educational decisions).

Figure 2.2: Six stages of sampling



The multicohort sequence design of the National Educational Panel Study

2.5.1 Students from kindergarten and primary school (SC2)

The aim is to provide high quality information for a sample of four years old children in kindergarten and onwards. Among other topics the SC2 enables to

investigate different learning environments (e.g. kindergarten, elementary school and family) and the educational transition of kindergarten to primary school. SC2 was composed by five wave of sampling (last update on 2017) from them the empirical study of chapter 2 two waves were used (enrollment in kindergarten wave 1 and enrollment on primary school wave 2), while the empirical study of chapter 3 only one wave was used (3th grade of primary school wave 3)

2.5.2 Students from lower secondary school (SC3)

The SC3 aims to provide high quality information on representative students who attended regular or special schools from lower secondary school onwards. The SC3 connects elementary school to general or vocational upper secondary education levels. Therefore an important area of investigation is the different acquisition pathway that the participants traversed through during lower secondary education. The sampling design, data collection, the measurement of missing responses and competencies are presented on the appendix of this chapter.

Appendices

Appendix A

NEPS data

A.1 Data measurement

A.1.1 Starting Cohort 2: kindergarten and primary school

Sampling design and data collection

In this cohort, a two stage indirect sampling approach was used, since no frame information was available in kindergarten neither for children nor for institutions. Nevertheless, kindergarten and primary school were structurally linked in the sense that primary school has information about their normally suppliers kindergarten. Thus, this link was used to access the target population.

Furthermore, an individual re-tracking and augmentation of the sample was carried out for the third wave (i.e. first year of primary school). In order to establish a re-tracking sample of grade 1 of primary school that was also related to the initial sample of kindergarten, two samples of primary schools were asked to participate at the beginning of the study (i.e. in wave 1): 1) the initial sample that provides information about their kindergarten suppliers, and 2) the second additional sample of primary school. Therefore, the kindergarten cohort was composed of three groups of children:

- Group A, students surveyed only in kindergarten, over two waves.
- Group B, students surveyed only in primary school, over two waves.
- Group C, students surveyed in kindergarten and primary school, over the four waves.

In 2013, children belonging to the initial kindergarten sample transitioned to pri-

mary schools. Children were continuously sampled either if they transitioned to primary schools that participated in the NEPS study, or to other primary schools. By design, almost all the information for those children will be available in wave 6, when many of them were in grade four of primary school. However, a small proportion of this sample was available right after the transition to primary school (i.e. group C). Table 1.1 shows the timing of information collection.

Table A.1: Survey overview of SC2

Wave	Time	Study number
Kindergarten children		
1	2011	A12
2	2012	A13
Primary school children		
3	2013	A14, A14A
4	2013	A14
5	2014	A89

To summarize the sampling design for the SC2, it is important to remark that the socio-demographic information was collected in every year, while the different competencies were collected every two years, this style of sampling competences allows to better acknowledge the changes on ability acquisition.

The empirical study of chapter 2 was based on children that belong to the group A and C during the transition from kindergarten to primary school (waves 1 and 3) for two reasons. Firstly, group A provided detailed information about the home learning environments that are used to explore the formation of competencies during early life stages (4 or 5 years old children). Secondly, analysis of group C

allowed the assessment of competencies while accounting for prior information, profiting from the longitudinal design of this cohort.

The empirical study of chapter 3 was based on children belong to the group B for the third grade of primary school (wave 5). This cross-sectional wave provided rich information about the subjective expectation of success, as well as costs and benefits for parents and children that enables the investigation of the expected transition into a particular type of lower secondary school.

Survey instruments

Regarding to data survey instruments, two kind of interviews were used. The pencil and paper interview (PAPI) were used for the collection of information of children, teachers and school principals, while the computer assisted telephone interview (CATI) was used to collect information for parents.

Treatment of missing values and non-response adjustments

In kindergarten no response was possible for two survey items. These were for kindergarten institutions, and parents and children. The NEPS data was thus adjusted for this possibility. One possibility was that the original kindergartens refuse to participate in the survey. To address this problem, a set of kindergarten replacements was determined. These kindergartens had to deliver a very similar number of children with respect to the original kindergartens. Secondly, parents were asked to provide a consent for them and their children. To address a possible withdraw of consent a probit model that regressed the panel-consent on informa-

tion available for children was estimated (e.g. birth, gender, language spoken at home, and social status). For wave 1, the results suggested that children speaking German at home have a higher propensity to participate, while the opposite was found for children with missing information in regard to the child's environment and other personal characteristics (Blossfeld et al., 2016b).

In the case of primary schools, non-responses may have arisen from problems with the schools and/or parents. On the one hand, sampling of schools was undertaken according to certain characteristics such as the federal state, regional classification, and funding. Therefore, each non-participating school was replaced by another almost identical school. On the other hand, non-responses of children in grade 1 (wave 3) were adjusted by a multinomial probit model that estimated individual participation propensities. Results showed that the propensity of students in grade 1 to participate was significantly influenced by their native language and special needs (Blossfeld et al., 2016b).

A.1.2 Starting cohort 3: Lower secondary school

Sampling designs and data collection

In SC3 a direct sampling procedure was applied using two stages of selection. In the first stage, a set of primary schools were selected as a primary sampling units (PSU), in a second stage, the main sample of students were selected from the classes within the PSU and divided them according to their migration background. Therefore, each wave was composed by two subsamples, which were

the main sample and the migrant sample. The migrant sample mostly is composed of students from the former countries of the Soviet Union or Turkey. These samples excluded students attending schools with a predominant foreign teaching language, and students that are not able to follow the normal testing procedures. In addition, it is important to note the differences in the timing of transitions among the federal states in Germany. In several parts of these states, especially in the west, the transition to lower secondary education is normally at the end of fourth grade when children are 10 years old. However, in a limited number of states, mostly in eastern Germany, primary continues until the sixth grade. Therefore, children make the transition to lower secondary education by the seventh grade when they are 12 years old. To consider this difference, an additional sampling took place in 2013 (wave 3). In this additional sample, the original two-stages sampling design was applied and additional explicit or implicit stratification categories were distinguished. The two explicit strata took into account the previously mentioned differences in the timing of transition, with the first strata consisting of regular schools located on the federal states of Berlin and Brandenburg where the transition was made two years later. The second explicit strata consisted of schools located in the remaining federal states. On the other hand, the implicit stratification took into account schools characteristic such as school type, federal state, regional classification, and so forth. The empirical study of chapter 4 was based on students belonging to the main sample that was surveyed from grade 5 to grade 9. This was because the main objective of the study is to explore the educational pathways through the lower secondary school, i.e. from the initial en-

Table A.2: Survey overview of SC3

Wave	Time	Study number
Original sample		
1	from 11/2010 to 02/2011	A28, A63, A56
2	from 11/2011 to 01/2012	A28, A63, A56
Refreshment sample		
3	from 11/2012 to 01/2013	A28, A63, A56, A30
4	from 11/2013 to 05/2014	A28, A63, A56, A30
5	from 11/2014 to 01/2015	A28, A63, A56, A30
6	from 07/2015 to 02/2016	A28, A63, A56, A30

rollment in grade 5 to grade 9 where the decision to enter vocational or academic education is made. Using waves 1, 3 and 9, enabled the exploration of changes in the acquisition of competencies over the lower secondary school.

Survey instruments

In respect to the data survey instruments of study 4, two kinds of interviews were used. These were the pencil and paper interview (PAPI) for the collection of information of from children, teachers and school principals, and a computer assisted telephone interview (CATI) to collect information from parents.

Missing values and non-response adjustments

In the SC3, non-response observations can appear as a consequence of parents and childrens decision to temporarily drop-out or permanently drop-out of school. Here, three possibilities existed: 1) participation, 2) temporary drop-out (i.e. children are not participating in the current wave but they will continue participating in the next waves) and, 3) permanent drop-out.

The participation decision in each wave was adjusted using a binary random intercept model that accounted for clustering at school level and the prior participation using a probit link function. Given that the size of last category (i.e. final drop-out) was very small, this category was excluded in the adjusted model. Regarding to the initial sample of the grade 5 and the additional sample of the grade 7, separated models were estimated for each of them because the timing of first participation on lower secondary school was differently, therefore their participation decision were not the same. The results shows that in *wave 1* a positive association between the participation in wave and children with special educational needs, however in the posterior waves (wave 5 and 6) the association of children with special needs turned in the other way around, meaning that children from special need were associated to lower participation rates. For *wave 3*, having a language other than German as well as missing values on this variable was associated with lower participation rate, while having a young age was positively associated with participation. In *wave 5* some students left their schools to continue their education in a vocational track, thus they were individually re-tracking. Thus, being part of a individual re-tracking was associated with a lower participation, while having a young age was positively associated with participation. Finally, for the refreshment sample in *wave 5*, being a female was positive associated with participation, and having other language German with a lower participation rate.

A.2 Measurement of competencies on (SC2) and (SC3)

Measurement of academic competencies

Concerning the competence test for each domain in SC2 as well as SC3, there were four possible response formats: a) simple multiple choice, b) complex multiple choice, c) matching and, d) short written responses. Thus for each competence domain a one-dimensional measure was constructed. Additionally, the number of items in each test was chosen to represent the relevance of the domain. Consequently the dataset provides two indicators of competence that can be used on further analysis, those are described as follows:

- The sum score of correct answers, this is the most simple indicator provided in the dataset and it was only available for the wave 1 and 3 of SC2. Besides, this indicator was used for the study of chapter 2.
- The Weighted likelihood estimator (WLE), expresses the most likely competence score for each single person given the item response of that person, this estimator can be used as any other measurement of competencies (Pohl and Clauss, 2012). Considering the nature of possible response formats the Rasch model or related extension was chosen for scaling because it preserves the weighting item during the construction (Pohl and Clauss, 2012). Finally, the WLE was restricted to have a mean of zero and an unrestricted variance, thus negative values are considered below average level and positive values are considered above average level. Therefore, the WLE was

used on the studies of chapter 3 and chapter 4.

Linking measurements for longitudinal analysis

The respective competence tests are constructed in such a way that to ensure the accurate assessment of competencies within each group of ages. So, at each time the test performed to students were built taking into account the acquisition of abilities. For example, an optimally test performed for adolescents on lower secondary could be too difficult for children on primary school. As a consequence the competence measurement for each occasion cannot be directly comparable among waves, specially in the case of longitudinal research designs.

In order to link the competence scores for two or more tests, common items from those tests are extracted and used to link competence scores over time. The two linking methods were used on the NEPS data are linear transformations of those common items. The particularity of these two methods are that the variation on frequencies responses can be attributed only to changes on a person competences over time, since the common items of both test are assumed to have similar difficulty.

The two linking methods are: 1) The anchor-item design which does not take into account memory effects on the performance test over occasions, thus it was ideal to link mathematical competence test. 2) The anchor-group design which takes into account the memory effects on the performance tests over time, thus was used to link reading competences.

Adjustment for missing values

Regarding the treatment of missing responses on competences, four types of missing response were distinguished: 1) items not administered due to testing design, 2) invalid responses due to more than one valid answer, 3) omitted items and, 4) items where not reached by children due to time constraints. Given the nature of these missing responses, category 1 was often ignored (Pohl and Carstensen, 2012b), given that it was missing at random, while the categories 3 and 4 cannot be ignored, since they related to the difficulty of the item, and the ability of children. That said Pohl et al. (2012) who compared different approaches to treating missing values in different competence domains of NEPS, observed that ignoring the missing responses on scaled models resulted in non-biased estimations.

Chapter 3

**The ability gap in kindergarten and
primary school: Do domestic
activities matters?**

3.1 Introduction

An important concern of social stratification research is to investigate how the transmission of inequalities from parents to children affects future life chances. This interest is based on the common knowledge that families of high social origin can afford to provide a broad set of services and goods, and pass on beneficial cultural and social capital to their children in several ways. Conversely, families of lower social origin provide a limited and low quality amount of those resources, exposing their children to certain situations that often leave them in a disadvantaged position.

Amongst others, Bradley and Corwyn (2002) describe in the mechanism of abilities, how parental socioeconomic status (SES) can be linked to children's academic performance. They argue that the analysis of this specific mechanism is very complex, since the components of SES can both directly affect the acquisition of cognitive abilities and indirectly moderate them.

In addition, scholars that investigate the mechanism of abilities make the distinction between primary and secondary effects of social class (Boudon, 1974). Primary effects refers to the direct influences of family on the academic performance, for example, there is empirical evidence that well educated parents often use more elaborated linguistic constructions and a rich vocabulary when talking to their children, impacting the development of language competencies (Hoff-Ginsberg and Tardif, 1995). Thus, the resources that parents own and transmit to children (e.g. cultural capital, social connections and so on), may determine the strength

of the family's direct effect on the acquisition of children competencies.

However, the effects of family extend beyond this direct impact on the educational performance of children. In fact, there is a well-developed body of literature on the persistent influence of family resources after the primary effects are accounted for. In this literature, this residual familial influence on educational choices is known as the secondary effect of social class. A formalization of this concept has been reported by Breen and Goldthorpe (1997) their theoretical model of educational transitions was discussed in chapter 1.

This dissertation will focus on the analysis of primary effects, i.e. the direct effect of a family's influence on the development of early academic abilities. This topic was selected based on the general recognition that childhood is a critical period characterized by cognitive stimulation from external influences, which can greatly diminish the ability gap between children (Heckman, 2006; Anders et al., 2011, 2012). Therefore, it is crucial to understand which familial or school-based factors affect the ability gap in childhood.

Some scholars address this issue by proposing some explanation of how inequalities can pass from parents to children, including genetic factors, healthcare, socio-cultural resources, and parental emotional support. Here, special attention is dedicated to different forms of parental stimulation at home that promote the positive development of early cognitive abilities (Galindo and Sonnenschein, 2015; Skwarchuk et al., 2014). This parental stimulation in the form of various activities performed at home are called *domestic activities*. These activities include telling stories, playing, practicing a musical instrument or reading a book and so forth.

In general, the analysis of socialization process at home based on primary effects is a very interesting topic of investigation for social stratification research. Investigating what type of parental socialization processes results in better stimulation of a child's cognitive development, is critical for understanding factors associated with the emergence of an ability gap at an early age. However, providing empirical evidence on socialization processes is very difficult for at least two reasons. Firstly, the concept of socialization processes is very broad and cannot be determined by a single measure. Secondly, other factors such as parenting styles, educational aspirations, or particular beliefs are also associated with the socialization process, making it difficult to isolate its effects. Therefore, in this study, I will investigate a feature of the overall process of socialization, which is domestic activities and their effects on the development of language comprehension in kindergarten for children aged 4 to 5 years old, and aged 7 to 8 year olds in primary school, making a systematic contribution to the broad literature on this topic.

In the next section I will set out the theoretical basis on two parts which are: the effects of domestic activities on language comprehension, and the possibility of observe heterogeneous effects of domestic activities across social origin that affects language comprehension. After that, I will discuss the data, variables and methodology. Finally, I will present the empirical results, discuss their implications and outline the final conclusions of this study.

3.2 Theoretical background

3.2.1 The characteristics and impact of domestic activities on literacy performance

From a sociological understanding, children are positioned on a socio-cultural milieu where its influences can strongly affect their general development with lasting consequences. The socialization process transforms those cultural effects (e.g. norms, values, beliefs, or even language and ideas), into an inner reality for children. Therefore, the concept of socialization, in a broader sense, can be understood as the process of transmitting norms, values, beliefs and ideologies to children, providing them with abilities and habits that can be used actively in society. Moreover, the core of this socialization process is formed by the institutions (e.g. family, schools, pre-school and others) responsible for transmitting these cultural values. Therefore, to better understand the process of socialization, a distinction should be made between socialization performed within families and socialization outside families, termed *primary and secondary* socialization.

For Frønes (2016), primary socialization refers to internalization of cultural norms and values at early childhood when children have a little understanding of the world. Families, especially mothers, are the basic agents responsible for this initial transmission of cultural beliefs and values. This type of socialization can provide children with an understanding that might be in accord or not with the dominant societal viewpoint. For example, if parents express certain positive or

negative opinions about minority groups, genders or others, children may internalize these ideas as true. Secondary socialization refers to the process of learning critical thinking within a group setting, which often takes place outside the family unit, such as in schools, amongst friends, or within the larger community. For instance, in schools children learn additional cultural values that are in accordance with the general viewpoint of society.

The distinction between these two types of socialization is very important part of the general theoretical framework of this study. In fact, familial socialization may have a variety of forms including domestic activities and experiences, as well as the provision of materials (Fergusson et al., 2008). However, parental stimulation at home may impact on children's cognitive abilities in different ways based on its natural characteristics, for example, activities like reading a book or telling stories may have a positive influences on development of early language acquisition, whilst doing crafts could improve children's creativity and imagination.

Increasing evidence from investigations of familial influences on the early development of linguistic performance, found that the acquisition of abilities was a cumulative process, meaning that the early language knowledge aided the development of other abilities such as mathematics or reading (Duncan et al., 2007). For that reason, a broad set of indicators have been tested in order to describe how familial influences are correlated with the development of good language abilities in childhood, these indicators include the quality of dialog and reading (Whitehurst and Lonigan, 1998; Martini and Sénéchal, 2012) or the use of responsiveness languages (Hart and Risley, 1992). These findings have been supported by stud-

ies which found that parents can successfully provide specific opportunities for improving numeracy and literacy performance in their children (LeFevre et al., 2009; Lefevre et al., 2002; Hood et al., 2008).

It is certainly true that growing up in a stimulating environment with good availability of physical and non-physical material stimulus, is correlated with childrens current and future general cognitive abilities (Cooper et al., 2010).

3.2.2 The influences of social origin on performance of domestic activities

Childhood studies have gradually come to recognize that children's general development is highly influenced by the class, gender and ethnicity they have were born with. Consequently, the socialization processes they receive are highly affected by the social position and cultural patterns of their parents. On the one hand, children absorb as true reality, the language, values, and beliefs from where they are born, which can be seen as intrinsic transmission of parental cultural patterns. On the other hand, the parental social origin associated with educational goals, parenting practices, and attitudes expressed towards their children, directly affects the values, goals and beliefs of children.

The study of Lareau (2012) revealed a clear effect for cultural patterns and the social position of parents. In her investigation she found two different types parenting styles that produced different socialization processes associated with the high or low socioeconomic background of parents, known as *concerted cultiva-*

tion and accomplishment of natural growth.

Concerted cultivation, which is associated with mothers from higher-SES, characterized by constant support on children's activities in and out of school. In contrast, *Accomplishment of natural growth*, is associated with mothers from a lower-SES, and describes less maternal support of children's activities, leaving them free to spend time with friends or family. These two types of socialization processes produce very different educational outcomes which often favor children from a high SES. One of the main differences between these two types of socialization processes are the extracurricular activities of children outside of school time. Parents who follow the concerted cultivation scheme tend to structure children's after school time with complementary activities that provide children with additional opportunities to learn from adults other than their parents or teachers. These extra activities create a strong sense of entitlement that children can use to their advantage in interactions with institutions such as schools. Conversely, parents who encourage accomplishment of natural growth do not offer children those extra opportunities to learn through other activities besides school. Therefore, the combination of strict parental directives and fewer additional opportunities to learn, creates in children a strong sense of obedience, limiting the benefits that can be obtained from institutional interactions.

Even though little consensus exists on the right conceptualization of parenting practices, the empirical literature, such as the research of Lareau, provides insights on how children may obtain real benefits from parental resources such as the provision of extra opportunities to learn.

In childhood, domestic activities between parents and children, is likely to be beneficial for the acquisition of early abilities, especially language cognition. Empirical research on this topic has demonstrated that investigating the direct and indirect interactions between mothers and children, is the best way to understand how the duration and the quality of home interactions differs as a function of SES. For Hoff-Ginsberg (1991, 1998), the quantity and quality of verbal interactions that takes place between mothers and children show a clear difference by SES level. For example, higher-SES children are exposed to a speech that contains a greater variety of words, syntactic complexity in a larger proportion of conversations, while the opposite is true for lower-SES children.

Additionally, variation in quantity and quality of home interactions between parents and children from different social backgrounds, may also reflect parents beliefs about their capacities to help children accomplish certain educational outcomes. For example, Lower-SES parents believe they have less control over the educational outcome of their children than higher-SES parents do (Elder Jr et al., 1995). These differences in parental beliefs, in turn, may result in differences in their efficacy in performing certain activities that favor the general development of children (Brody et al., 1999). In summary, the extensive literature on differences in parental practices suggests that the relation between social origin and socialization process that parents use, is very entangled. Parents in different socioeconomic strata are exposed to different experiences, and interact within different environmental contexts that, in turn, affects their perception about the type, quantity, and quality of domestic activities they perform with their children.

3.2.3 Social origin, domestic activities and literacy performance

During childhood, the research on social origin and socialization processes commonly interrogates aspects of parenting that affects childrens development, such as interactions between mothers and children at home. However, there is only a limited understanding of the effects of these domestic interactions on educational outcomes as a function of social origin. As a consequence, it is difficult to identify with any accuracy which specific social origin differences in those home interactions are important for the educational outcomes of children. For that reason, this study will include a broad set of domestic activities in the analysis that characterize the interactions between mothers and children at home, including those related to the improvement of language.

In order to understand these entangled associations in childhood, it is useful to consider prior theories that refer to the association of these variables. For example, empirical studies have demonstrated that SES related differences are more pronounced for the frequency of mothers dedicate to verbal interactions, than to nonverbal interactions (Hoff-Ginsberg and Tardif, 1995; Hoff-Ginsberg, 1991).

Differences have also been noted in the quality and quantity of speech that mothers use with children. More educated, advantaged parents talk more to their children, employ more diverse vocabulary, and also ask more questions that test their children's knowledge. This is in contrast to lower-SES parents, who tend to ask more yes/no questions that require less extensive responses (Hoff et al., 2002).

Given that specific language related activities are a means by which better edu-

cated mothers can enhance their children’s linguistic development, one would expect that the social origin of mothers is a relevant feature. For example, Magnuson et al. (2009) found that an increase in the mother educational level was positively associated with the current improvement of children’s language development and home environment.

3.3 Research hypotheses and analytical strategy

3.3.1 Hypotheses

Graphical representation of the theoretical hypotheses tested here are shown in Figure 3.1, where the dashed arrows represent each hypothesis. Thus, in this part I will formally present the three hypotheses.

Ability gap in childhood, the effect of domestic activities

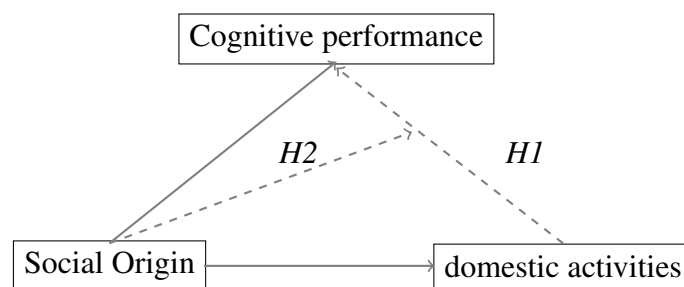


Figure 3.1: theoretical hypotheses to be tested

In terms of primary socialization, there are a wide range of home interactions between parents and children that are considered very stimulating for the development of cognitive abilities. Nevertheless, it is difficult to identify with any certitude which of these are positive or negatively associated with the early

development of literacy performance. Empirical research points to two possible paths for children's acquisition of language abilities, which are termed formal and informal experiences. The former is defined as activities where parents directly tutor their children in specific reading, writing and linguistic skills, while informal experiences are general activities where children might improve their overall academic performance (Sénéchal and LeFevre, 2002). However childhood is a very sensitive period where both kind of experiences, be they formal or informal, can be equally productive in the acquisition of abilities (Heckman, 2006).

In this study, a set of domestic activities that include formal and informal experiences (e.g. telling stories, reading a book, doing crafts, practicing a musical instrument, paying sports, etc), were used, since these have been demonstrated to correlate positively with language learning and mathematical abilities (Galindo and Sonnenschein, 2015; Biedinger, 2011). Accordingly, it is expected that this particular set of domestic activities should be positive associated with literacy performance at the start of kindergarten and primary school (**Hypothesis 1**).

Additionally, the quality and quantity of these specific set of domestic activities is strongly influenced by the social origin and cultural patterns of parents (Hoff-Ginsberg and Tardif, 1995; Lareau, 2012, 2014). For example, mothers of high social origin spend more time with children, with this time being more productive than for lower social origin mothers. The difference in the time spent in engaging with their children at home between mothers from different social classes, may be due to at least two reasons. First, higher-social origin mothers may be aware that early developmental periods like pre or primary school are very im-

portant for the current and future development of children's competencies, thus they decide to increase the time spent engaging with their children at home in the hope of future educational benefits for them. Second, higher-social origin mothers may also have a clear ideas about the desired educational outcomes for their children. Therefore, when noticing some learning difficulties, these mothers will immediately increase their time spent at home helping children to overcome that difficulties. This is called the compensatory effect of social class, defined as the opportunity of a second chance for the acquisition of educational attainment in case of problems (Bernardi, 2012). Given these reasons, I expect to find differences in the time mothers spend on domestic activities with their children to vary by social origin, with increased time investments favored by higher-social origin children. It is also expected that these differences will be more pronounced when higher-social origin children have a particularly low performance (**Hypothesis 2**).

3.4 Data, variable and method

3.4.1 Data

The empirical analysis uses the first and the third wave of Starting Cohort 2 from the German National Education Panel Data (NEPS) (Blossfeld et al., 2011). While the study sample design did not allow for a longitudinal analysis, it does provide rich cross-sectional information for each wave. The raw sample (N=2966) of first wave contained information on children attending kindergarten in the period

2010/2011 who expected to commence primary school in 2012/2013. The raw sample (N=6733) of third wave contained information on children who attended their first year of primary school in the period 2012/2013 and who were expected to follow up throughout the all primary school. Two sample restrictions were applied to these waves: first, the sample was conditioned to take the joint participation of parents and children into account; second, I eliminated missing cases for the parental background, test scores of childrens abilities, and domestic activity. After data preprocessing, the final sample composed of 2114 observations from the first wave (around 90% of the joint participation parent-child sample) and 4947 observations from the third wave (around 88% of the joint participation parent-child sample). In all the analyses, I applied the weights provided by NEPS to adjust for different selection probabilities.

3.4.2 Variables

Language comprehension

Language comprehension was the main outcome variable related to the initial literacy performance ability. Competencies in vocabulary and grammar were tested at kindergarten and primary education levels. Recent studies found that variability in vocabulary and grammar comprehension explain about 80% of listening comprehension scores in kindergarten (Skopek, 2017). Thus, the dependent variable was defined as standardized average score obtained in the vocabulary test and grammar test.

Social origin variables

In measuring the social background of children I take into account the following dimensions: the educational level of the mother, the occupational level of the mother, the assessment of the economic resources of the household, and the immigration background of the parents.

Mothers' educational level was measured using a CASMIN codification that was reconstructed to obtain the following four categories: Lower secondary school or less = no-qualifications, elementary or intermediate school, basic vocational qualifications; Intermediate vocational degree; High school or Vocational degree; University degree = upper and lower tertiary education.

In kindergarten, 34% of mothers had an intermediate vocational degree, 22% had a high school or vocational degree, 21% a university degree, and 21% a lower secondary degree or less. In first year of primary school 33% of mothers possessed an intermediate vocational degree, 27% a university degree, 25% a high school or vocational degree, and 13% had reached lower secondary education or less.

Mothers' occupational level was measured by the EGP codification. Additionally, I took into account the respondents employment status at the time of interview, adding unemployed, maternity leave and housewife categories to the classification. The final reconstruction of mothers occupational level had four categories: upper class = high controllers; middle class= lower controllers; working class = routine non-manual, self-employees, manual supervisors; and lower class = lower sales service, skill and unskilled workers, unemployed, housewives, and mothers on maternity leave.

In kindergarten, the final sample comprised of 14.43% upper class, 29% middle class, 28% working class, and 27% lower class mothers. In the first year of primary school, the final sample composed of 17% of upper class mothers, 33% of mothers in the middle class, 25% of working class mothers and 24% of lower class mothers.

Economic resources of the household, this variable measures the mother's self-assessment of the current household economic situation. It composes of the following four categories: very good, rather good, in the middle, rather poor. In the kindergarten sample around 72% of mothers assessed the economic situation of their household to be rather good or in the middle, 17% as very good, and 9.9% as rather poor. In the sample of primary school, this sample contains high percentage of missing values and it was not included in the analysis.

The migration background concept reflects the migration background of the children and takes the form of a score that represents the migrant generation by considering whether children, parents and grandparents were born abroad. This variable was coded as 1 if the children had a migration score or 0 if not. In kindergarten sample almost one-third of children had a migration background (28%) with the remaining children being natives (71%). The primary school sample, had a similar composition, with 25% having a migration background and 75% native.

Domestic activities

The data provided information on several activities that the children performed at home. In the kindergarten sample nine activities were measured using the question: "*how often the child perform these activities at home?*" It did not matter

whether the children performed alone or with others. The activities were looking at picture books, comparing and collecting objects, counting, solving puzzles, building and construction games (e.g. Lego), doing arts and crafts, games with dolls or playmobil, sports, musical activities, and enjoying nature.

In the primary school sample seven similar activities were measured in response to the question “*how often you or someone else do these activities at home with the children?*” The activities were reading aloud, telling stories, musical activities, painting and doing crafts, sports, playing, and playground play.

In kindergarten and primary school, these activities were measured according to a eight category scale where the parents could answer whether the child performed these activities 1 = Never, 2 = more seldomly, 3= once a month, 4 = several times a month, 5= once a week, 6 = several times a week, 7= once a day, 8 = several times a day.

Tables (B.3, B.4) and the figures (B.1, B.2) of the appendix present some descriptive statistics for domestic activities performed in kindergarten and primary school. In kindergarten, the activity of “reading a book” had the highest mean (7.09) followed by “comparing and collecting” (6.72), meaning that mothers reported that children are more frequently engaged in these activities at home. The frequency figure for each activity (B.1) provides further support, with more than or close to 50% of the mothers reporting that their child performed these activities several time a day. I also observed that children do other recreational activities not directly related to literacy performance such as playing sports, solving puzzles and counting numbers several times a week by children.

In primary school the activity of reading aloud had the highest average. This suggests that mothers were more likely to report that their children performed these activities several times a day or once a day compared with other activities. Figure (B.2) provides important information on the frequency of each activity: for example, the activity of “reading aloud” was often reported to be practiced by the child once a day compared with the other activities which were reported as being practiced several times a week (e.g. sports, painting and doing crafts, musical activities).

In addition to frequency of activities, a reliability analysis was conducted for the domestic activities measured in kindergarten and in primary school. One of the most accurate ways of assessing the reliability of an item is to administer it twice to the same group of people, and then examine the degree of agreement using different methodologies (e.g. canonical correlations, interclass correlations). The cross-sectional sample structure was not suitable for these methods. However, it was possible to test the internal consistency of the items using the chrombach alpha method, which is one of the most frequently employed methods in the literature. Outcomes for the chrombach alpha calculation of the kindergarten and primary school items is given in tables (B.5) and (B.6) of the appendix. In respect to the activities measured in kindergarten, table (B.5) shows an overall chrombach alpha of 0.67. After looking at the calculations for each item, it is clear that this alpha cannot be improved by deleting any item. While an established threshold for the global alpha does not exist, the empirical literature recommends a minimum level of 0.70.

The same analysis was conducted for the domestic activities measured in primary school (table B.6), obtaining an overall value for the chrombach alpha of 0.67, and individual values for each items from 0.62 to 0.66. It is important to mention that the chrombach alpha is a reliability test and not a validity test, therefore, we can conclude that the scales of the items reach the minimum reliable level for descriptive purposes.

To calculate the degree of association between different items, a correlation matrix was computed for all the items and between the items and the dependent variable in both samples kindergarten and primary school. Table (B.7) shows the correlations for the kindergarten items, the activities more frequently engaged in by child at home, had considerable variation in their correlation with the dependent variable. An example is the activity of comparing and collecting measured in kindergarten, which was reported to as being performed several times a day, but had a correlation coefficient with the literacy comprehension of 0.05. Indeed, the domestic activities that have the highest positive correlation with the dependent variable in kindergarten are reading a book (0.14) and enjoying nature (0.10).

Likewise, in primary school table (B.8) presents the matrix of correlation , I observed that most of the measured activities had lower correlation coefficients with the dependent variable except for the activity “reading aloud which has a correlation coefficient of 0.12. This was the highest compared to the others which ranged from -0.007 to 0,034.

After assessing the correlation coefficients among domestic activities items, I found the values could range from a high 0.29 to a low 0.04 in kindergarten. In

primary school, I observed that the items were negative correlated with the 'reading aloud activity, ranging from -0.11 to -0.28; aside of this activity, the remaining items were positively correlated with coefficients from 0.31 to 0.34. These lower correlations make difficult to group the items into more general dimensions.

On the basis of this outcome I concluded several items ought to be removed from the analysis, only retaining the item that had the highest correlation with the dependent variables. In kindergarten, I retained: "reading a book, while in primary school I retained "reading aloud. I then recoded these two domestic activities to obtain two final categories which were: often reading = once a day, or several times a day; and not very often reading = never, more seldom, once a month, several times a month, once a week, several times a week.

Age at the transition to a child care center

Based on the provided information on the age and the timing of childcare episodes, I calculated the earliest age that children entered or experienced some type of care center. In addition, for those children who experienced a care center before the three years old, I distinguished which type was it, thus the variable has three categories: 0 = those children who does not experience a care center; 1= children who experienced a care center up to three years of age and this was a child minder qualified or not, and/or au pair; 2 = children who experienced a care center for up to three years and experienced a care by relatives, group of parents or kindergarten. This variable was only measured for the kindergarten sample, where it could be observed that the earliest time a children experiences a care center was less than one year old, with approximately 11% of the sample experiencing a care center

before three years old, and of these, 7% cared for by relatives, or kindergarten.

Teacher assessment of language

This variable measured the teacher's assessment of childrens German speaking skills using three categories: 1= rather poor, 2= rather good, and 3= very good. In the kindergarten sample around 50% of the children were classified as belonging to the first category, 33% in the second category, and the remaining 14% as rather poor or very poor. In the primary school sample around 52% of children received an assessment of very good, 39% of rather good and 8% as rather poor.

The place of residence

The data set provided a variable called "Eastern and Western Germany where children were classified based on the region of their place of residence in German as reported by their parents. The kindergarten sample composed of 81% of children living in the western and 18% of living on the eastern part of Germany. In the primary school sample, 87% of mothers reported living in the western part and 12% in the eastern part of Germany.

Parental aspirations

This variable was only available for the primary school sample and measured the wishes and expectations of the parents for their children to obtain high school leaving qualifications by asking the following question: what school leaving qualification do you want for them? The answers were classified into the following three categories: 1= leaving certificate for Hauptschule, 2 = leaving qualification from Realschule, and 3= Abitur.

In a first year of primary school, more than half the sampled mothers (77%)

wished or expected that their children obtain the abitur examination, 22% wished or expected a realschule certificate, and 0.29% wished or expected for hauptschule certificate.

Control variables

The analysis also controlled for gender, age at the time of test conduction, birth weight of the child, number of young under 14 years living at home, parental employment, children with a non-German as mother tongue (only in the case of children with 4 to 5 years) and age at entrance to kindergarten (only in the case of children with 6 to 7 years). All the descriptive statistics are presented in tables (B.1 and B.2).

3.4.3 Method

The analysis is based on two cross-sectional samples (first year of kindergarten and primary school). This is due to the sampling methodology applied to the first two waves of the dataset. Here, kindergarten children sampled in the first two waves were assigned to a new sample, with their information on the following waves thus appearing as missing by design and or not being available yet. As a consequence, a new sampling method was conducted for wave 3.

Although this aspect limited the implementation of longitudinal estimations, it was possible to analyze the two cross-sectional samples given the comparable results from the very similar survey questionnaires.

Empirical strategy

The empirical strategy in this work related the estimations to a specific hypothesis mentioned above. All estimations were based on OLS regressions and standardized values of the dependent variable (i.e. language comprehension), in both samples.

H1: The association between literacy performance and direct as well as indirect domestic activities

$$Y_j = \alpha + \beta_1 DA + \epsilon_j \quad (3.1)$$

$$Y_j = \alpha + \beta_1 DA_j + \beta_2 SO_j + \epsilon_j \quad (3.2)$$

$$Y_j = \alpha + \beta_1 DA_j + \beta_2 SO_j + \beta_3 Z_j + \epsilon_j \quad (3.3)$$

Where Y is average language comprehension in vocabulary and grammar, DA are the domestic activities which includes the index of specific and general activities, SO is the social origin of mothers as measured by the level of education and occupation, Z is the set of control variables. The subscript j indicates either kindergarten or primary school. In the first equations (3.1) I estimated the gross effects of domestic activities on literacy performance; in the second equation (3.2) I estimated the effect net on social origin. In the third equation (3.3) all the covariates and controls are added to the regression.

H3: The association between DA, SO, and GPA

$$Y_j = \alpha + \beta_1 DA_j + \beta_2 SO_j + \beta_3 DA_j * SO_j + \beta_4 Z_j + \epsilon_j \quad (3.4)$$

In this part I tested whether the association of literature comprehension and domestic activities varies as a function of social origin. To do this, an interaction term was introduced in the regression estimation (3.4). Hence, I first tested the interaction with the mothers' educational level, and then with the occupational level of the mother.

3.5 Empirical results

3.5.1 Literacy performance and reading activities at home

I start by giving a descriptive overview of the domestic activities, language comprehension and social background of the two groups of children studied (i.e. 4 to 5 years old and 6 to 7 years old).

Table (3.1) shows differences in the reading time at home for language comprehension and social background, in the case of categorical variables frequencies are presented only for the higher and lower educated mothers as well as upper and lower class mother given that the empirical literature often stresses differences among these two groups. however, a more complete description of the variables are presented on the tables (B.1 and B.2) of the appendix.

This table (3.1) reveals systematic differences in the language comprehension between children who often perform reading activities at home and those who do not for the two groups (4 to 5, and 6 to 7 years). Notably children who often practice reading activities at home perform approximately 33 percent of standard deviation

better in language comprehension when they have 4 to 5 years old, and 30 percent of standard deviation better when they have 6 to 7 years. This ability gap is accompanied by some social background differences between high and lower educated or occupied mothers too. Indeed, it seems that children from higher educated or occupied mother often practices reading activities at home compared to children from lower educated or occupied mothers on the two group of children (4 to 5 and 6 to 7 years). Finally, it can also observed the variations in the time children practice domestic activities at home from those who have migration background. In sum, this table (3.1) provides some sights for the first hypothesis.

Table 3.1: Means and proportions of literacy comprehension, social origin and reading activities

<i>Children at the age of 4 to 5 years</i>					
	Language compreh. (z scores)	Mothers' educ.(high vs. low)		Mother' occup. (high vs low)	
Often reading books (N= 1556)	0.10 (0.95)	25%(lower educ)	18%(high educ)	24%(lower occu)	16%(high occu)
Difference reading books	**	**		**	
Not very often reading books (N= 558)	-0.28 (1.0)	31%(lower educ)	9%(high educ)	36%(lower occu)	9%(high occu)
Total (N= 2114)	0.00 (1.1)	21%(lower educ)	21%(high educ)	27%(lower occu)	14%(high occu)
<i>Children at the age of 6 to 7 years</i>					
Often reading aloud (N= 2562)	0.13 (0.9)	10%(lower educ)	31%(high educ)	21%(lower occu)	18%(high occu)
Difference reading aloud	**	**		**	
Not very often reading aloud (N= 1540)	-0.17 (0.9)	18%(lower educ)	21%(high educ)	29%(lower occu)	14%(high occu)
Total (N= 4102)	0.0 (1.0)	13%(lower educ)	28%(high educ)	24%(lower occu)	17%(high occu)

Standard deviation in parenthesis, t test for the mean difference and z test of odds for proportions,* $p < 0.05$, ** $p < 0.01$

Language comprehension at 4 to 5 years:

In the next part I used a multivariate approach to identify whether reading activities at home can partially explain early differences in language comprehension at preschool age and age on entering primary school.

Tables (3.2 and 3.3) show results from ordinary least square (OLS) estimation models which take language comprehension in preschool age (4 to 5 years old) and primary school entrance age (6 to 7 years old) as dependent variables.

Starting with children of preschool age (3.2), the raw difference in language comprehension score in Model 1 had an approximately 33 percent higher standard deviation for children who often practiced reading activities at home compared to those who did not. This difference can also be seen in the table (3.1) of descriptive statistics. Model 2 includes age and gender; indeed the age on the test day contributed to and slightly enlarged (0.012 SD) the difference in language comprehension due to reading activities at home. However this finding is only informative with regard to the total association. Given the contribution of the age ability gap, in Model 3 I introduce the age at the entry in a child care center, however, non significant effects of this variable was observed. Furthermore, Model 4 included socioeconomic background variables that may confound the effect of reading activities at home through the selection of the quantity of time spent practicing this activity at home. The results of Model 4 showed that a large part of the association between language comprehension and the time practice reading activities at home in preschool age is due to social selectivity: the coefficient reduces on more than a half (0.21 percent of standard deviation), as a matter of fact the educational level of mothers matter significantly for the childrens abilities. For example, an increase on maternal education from high school to university degree increases childs performance in language comprehension on 14 percent of standard deviation. Compared to maternal education, occupational level has smaller

influences and in the case of upper class was not statistical significant; besides, the model also showed that migration background of children was linked with lower scores in language comprehension. Summing up, one can argue that more favorable educational resources in a family setting improves language comprehension in preschool age through the influence of cognitive development of the children and time dedicated to practicing reading activities at home. In contrast, a migration background was linked with lower scores in language comprehension.

Finally, model 5 included a set of control variables that slightly increased the effect size of reading activities at home on language comprehension (0.012 SD), while remaining both positive and stable (supporting for Hypothesis 1). The control variables may affect the language comprehension and time dedicated to practicing reading activities, and should be interpreted with caution. For example, the teacher assessment of German speaking in preschool clearly affect the scores for language comprehension, however, the time engaged in reading activities at home may also be affected by teacher assessment, since a child's lower assessment can encourage the parents to dedicate more time to reading activities at home to improve their child's ability. In that case, reading activities at home carries part of the effect of a teacher's assessment, which can be observed in the increased coefficient size of reading activities. Nonetheless, the mechanism explaining this effect is beyond the scope of this study. One can argue that the effect of reading activities at home on language comprehension is slightly lower than in Model 5 but higher than in Model 4. Additionally, children with more than two siblings less than 14 years old scored lower too. One explanation could be that a higher

number of children at home make it more difficult for parents to provide a quality time with each child. Finally, children who did not learn German as their mother tongue during their early age scored lower in language comprehension.

Table 3.2: Linear regression model of language comprehension for children at 4 to 5 years

	Model 1	Model 2	Model 3	Model 4	Model 5
Often reading books	0.339** (0.0679)	0.351** (0.0674)	0.351** (0.0674)	0.121* (0.0575)	0.133* (0.0521)
age at entry to center care			-0.00224 (0.0179)	0.0167 (0.0158)	0.0550+ (0.0282)
Parental education					
Lower Secondary or less (omitted)					
Interm. Voc. degree				0.482** (0.0788)	0.274** (0.0757)
High school or Voc. degree				0.570** (0.0834)	0.346** (0.0735)
University degree				0.713** (0.0929)	0.528** (0.0848)
Parental occupation					
Lower class (omitted)					
Working class				0.141* (0.0620)	0.0648 (0.0552)
Middle class				0.193* (0.0775)	0.0362 (0.0718)
Upper class				0.0834 (0.0990)	-0.0478 (0.0921)
Household economic situation				0.113** (0.0362)	0.0521 (0.0320)
Migration background				-0.627** (0.0597)	-0.323** (0.0650)
Care center attendance up to 3 year					
Care by Child minder/au pair					0.232 (0.146)
Care by relatives/friends					0.204+
Teacher assessment on speaking German					0.404** (0.0350)
Place of residence					
East Germany (include Berlin)					0.0471 (0.0528)
Birthweight (log)					0.158 (0.129)
Child non German language of origin					-0.517** (0.0853)
young less than 14 at home					
Two children at home					-0.0344 (0.0495)
Three or more children at home					-0.149* (0.0750)
Child age at test day		0.327* (0.0688)	0.329* (0.0732)	0.332** (0.0640)	0.238** (0.0660)
Girls		0.00200 (0.0566)	0.00200 (0.0567)	0.0224 (0.0477)	-0.0219 (0.0441)
Constant	-0.208* (0.0599)	-0.962* (0.160)	-0.954* (0.163)	-1.583* (0.156)	-3.801* (1.069)
Observations	2114	2114	2114	2114	2114
Adjusted R^2	0.023	0.044	0.043	0.280	0.414

Standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Language comprehension at 6 to 7 years:

The ordinary least square (OLS) estimations for the language comprehension in primary school entrance are presented in the table (3.3). Model 1 provides the raw difference in language comprehension scores, and has around a 30 percent higher standard deviation for those children who often practiced reading activities at home compared to those who did not. The raw difference in language comprehension for those who often practiced reading activities at home was slightly lower at age 6 to 7 compared to age 4 to 5 (as previously seen in table 3.1). Model 2 includes age and the gender for the sample of 4 to 5 years old children. I observed that the age on the test day slightly enlarged (0.006 SD) the difference in language comprehension due to reading activities at home.

Following with the analysis, Model 3 the socioeconomic variables were included in the estimation. The results of model 3 showed that a considerable part of the association between language comprehension and the time dedicated to reading activities at home is due to social selectivity. The coefficient reduces on 0.10 standard deviation. Hence, the maternal education and occupation are very important for childrens language abilities. For example, an increase in maternal education from intermediate vocational to high school degree increases childs performance in language comprehension on 16 percent of standard deviation. Compared to maternal education, occupational level has a lower effect, for instance, an increase from working to middle class increases childs performance on 6 percent of standard deviation. In sum, we arrived to the same conclusion as for the preschool children which is that a more favorable resources in the family expressed by

parental education improves languages comprehension ability at the entrance of primary school.

Finally, a set of control variables were included to the model 4. While the effect size for the association between the time spent on reading activities at home and language comprehension was reduced after the inclusion of these set of control variables, it did remain positive and stable supporting for Hypothesis 1. Nevertheless, this finding should be interpreted with caution given that this set of controls may affect language comprehension and the time dedicated to practice reading activities at home. For example, full-time employed mothers are associated with lower levels of language comprehension, since full-time employment limited in the amount of time that mothers can dedicate to help children with school. Therefore, it might be associated with a reduction on the time mothers spend with their children on reading activities at home too. In that case the maternal employment, specifically full-time employment, carries part of the reading activities effect on language comprehension. Moreover this variable explain part of the social background indicators in the model 3 that become apparent in lower coefficients. Finally, the model shows a negative link to the number of other young people living in the house, with the presence of two or more people less than 14 years old making difficult for a mother to spend an equal amount of quality time with each.

Table 3.3: Linear regression model of language comprehension for children at 6 to 7 years

	Model 1	Model 2	Model 3	Model 4
Often reading aloud to children	0.273** (0.0380)	0.282** (0.0382)	0.199** (0.0351)	0.114** (0.0331)
Maternal education				
Lower second or less(omitted)				
Interm Voc degree			0.424** (0.0643)	0.262** (0.0566)
High school or Voc degree			0.567** (0.0672)	0.286** (0.0606)
University degree			0.753** (0.0687)	0.394** (0.0659)
Maternal occupation				
Lower class (omitted)				
Working class			0.141** (0.0517)	0.0282 (0.0461)
Middle class			0.240** (0.0492)	0.0745+ (0.0444)
Upper class			0.264** (0.0593)	0.120* (0.0561)
Immigration status			-0.573** (0.0447)	-0.414** (0.0435)
Number of books at home				
From 26 to 100 books				0.257** (0.0678)
From 101 to 200 books				0.545** (0.0694)
From 201 to 500 books				0.571** (0.0728)
More than 500 books				0.625** (0.0785)
Place of residence				
East Germany (include Berlin)				-0.0374 (0.0526)
Maternal employment				
Job side				-0.0485 (0.0711)
Part-time				0.00413 (0.0427)
Full-time				-0.104* (0.0514)
Teachers' assessment of German speak				0.422** (0.0275)
Parental aspiration of high school degree				
Gymnasium				0.0257 (0.0431)
Young less than 14 at home				
Two children at home				-0.133** (0.0386)
Three or more children at home				-0.226** (0.0475)
age at the test day		0.145** (0.0498)	0.174** (0.0401)	0.190** (0.0364)
Girls		-0.0383 (0.0377)	-0.0290 (0.0339)	-0.0449 (0.0312)
Constant	-0.155** (0.0293)	-0.481** (0.126)	-1.018** (0.117)	-2.047** (0.136)
Observations	4102	4102	4102	4102
Adjusted R^2	0.018	0.023	0.192	0.299

Standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

3.5.2 Association between language comprehension, reading activities and social background

Interaction effects for the model of 4 to 5 years old children:

The results for the interaction effects in the sample of 4 to 5 year old children are presented in table (3.4). Model 1 was the last model estimated in table (3.2) and is used as baseline to compare the models with interaction effects.

In Model 2 the result of the inclusion of interaction effects between the maternal education and time dedicated to reading activities at home are given. At first glance, the coefficient size for reading activities increases with respect to the baseline model, in addition to the interaction coefficients for all the categories of maternal education becoming negative. However, after a more careful inspection, I observed that the standard errors for the coefficients for reading activities at home, maternal education and their interaction effects, increases considerably compared to the baseline model. Therefore I argue that interaction effects with mother education do not fit well to the model.

In Model 3 the interaction effects between reading activities at home and maternal occupation are presented. The size of the coefficient for reading activities at home increases with respect to the baseline model, while the size of the coefficient for maternal occupation slightly decreases with the size of the interaction coefficient not being statistically significant.

Using the baseline model, I also tested whether heterogeneous effect may exist for those children who scored lower the average level (not showed). Indeed this was

called compensatory effect of social class, in this study this could be related with the fact that high social background parents might increase the time on domestic activities in view of their children lower performance levels of language comprehension. The different procedures yields no statistically significant different conclusions compared to the results presented above (using the complete sample). In view of these results, I can conclude that the interaction effects do not fit well the model for preschool children. According to the results of the models, I can conclude that increasing time in reading practice at home does not compensate for the effect of parental social background on language comprehension in preschool age.

Table 3.4: Interaction effects on OLS model of language comprehension for children at 4 to 5 years

	Model 1	Model 2	Model 3
Often reading to the child	0.133* (0.0521)	0.286** (0.110)	0.147 ⁺ (0.0878)
Parental education			
Lower secondary or less(omitted)			
Interm. Voc degree	0.274** (0.0757)	0.377** (0.121)	0.272** (0.0752)
High school or voc. degree	0.346** (0.0735)	0.468** (0.120)	0.347** (0.0727)
University degree	0.528** (0.0848)	0.797** (0.140)	0.531** (0.0837)
Parental occupation			
Lower class (omitted)			
Working class	0.0648 (0.0552)	0.0681 (0.0544)	0.0480 (0.0985)
Middle class	0.0362 (0.0718)	0.0405 (0.0713)	0.0596 (0.124)
Upper class	-0.0478 (0.0921)	-0.0442 (0.0918)	0.0361 (0.223)
Interaction effects			
Often reading \times Interm Voc edgree		-0.173 (0.138)	
Often reading \times High school or Voc. degree		-0.194 (0.138)	
Often reading \times University degree		-0.361* (0.153)	
Often reading \times Working class			0.0222 (0.117)
Often reading \times Middle class			-0.0334 (0.138)
Often reading \times Upper class			-0.108 (0.236)
Control variables			
Constant	-3.801* (1.069)	-3.883** (1.056)	-3.838** (1.057)
Observations	2114	2114	2114
Adjusted R^2	0.414	0.415	0.413

Standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Interaction effects for the model of 6 to 7 years old children:

The results of interaction effects for the sample of children aged from 6 to 7 years are presented on table (3.5). In that table, model 1 is the last model estimated in the previous section (Model 4 of table 3.3), this model is used as a baseline to test the interaction effect of reading activities at home and maternal education and occupational level.

Overall I observe that the inclusion of interaction effects reduce the coefficient size of reading activity at home. Indeed, when the interaction involve maternal education, the coefficient of reading activities at home becomes no statistical significant and reduce almost in a half (0.05 SD), besides all the interaction terms are not statistically significant. Conversely, when maternal occupation is involved on the interaction effects, the coefficient size of reading activities at home reduces on 0.014, and neither the interaction effects nor the individual coefficients for maternal occupation are statistically significant.

Likewise in the previous case, I tested the compensatory effects of social class for those children who performed lower of the average level on the total sample. The statistical procedures yield, practically, the same results as for the sample of preschool children.

Thus, we can conclude that the interaction effect either for maternal education nor occupation do not fit to the model language comprehension for children at the age of 6 to 7 years old.

Thus, we can conclude that the interaction effect either for maternal education nor occupation do not fit to the model language comprehension for children at the age

of 6 to 7 years old. In addition, I can also conclude that increasing time in reading practice at home does not compensate for the effect of parental social background on language comprehension at the entrance of primary school too.

Table 3.5: Interaction effects on OLS model of language comprehension for children at 6 to 7 years

	Model 1	Model 2	Model3
Often reading aloud to children	0.114** (0.0331)	0.0538 (0.0947)	0.0558 (0.0679)
Mothers' education			
Lower second.or less(omitted)			
Interm. Voc degree	0.262** (0.0566)	0.201** (0.0737)	0.261** (0.0567)
High school or voc degree	0.286** (0.0606)	0.277** (0.0784)	0.287** (0.0606)
University degree	0.394** (0.0654)	0.363** (0.0882)	0.394** (0.0654)
Mothers' occupation			
Lower class (omitted)			
Working class	0.0282 (0.0461)	0.0264 (0.0461)	-0.0298 (0.0661)
Middle class	0.0745+ (0.0444)	0.0737+ (0.0444)	0.0628 (0.0654)
Upper class	0.120* (0.0561)	0.118* (0.0560)	0.0213 (0.0892)
Interaction effects			
Often reading × Interm. Voc degree		0.110 (0.108)	
Often reading× High school or voc degree		0.0258 (0.113)	
Often reading× University degree		0.0617 (0.113)	
Often reading× Working class			0.0987 (0.0911)
Often reading × Middle class			0.0270 (0.0850)
Often reading× Upper class			0.158 (0.105)
Controls			
Constant	-2.047** (0.136)	-2.018** (0.141)	-2.013** (0.139)
Observations	4102	4102	4102
Adjusted R^2	0.299	0.299	0.299

Standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

3.6 Conclusion and Discussion

Reduction of the ability gap in childhood is a major concern for educational policy given its lasting consequences on the future educational and economic well-being of children. In this study I have examined one specific factor that belongs to the general process of socialization within the family, namely the time spent engaged in reading activities at home during two critical periods in a child's life which are the start of preschool (4 to 5 years) and the start of primary school (6 to 7 years). The findings from this study support the expectation that increased time dedicated to family interactions at home enhances the cognitive abilities of children at an early age. While previous studies have consistently demonstrated the presence of an achievement gap in childhood, and that differences in familial interactions can lead to the maintenance of this cognitive differences (Cunha and Heckman, 2008; Sénéchal and LeFevre, 2002), my study provides an insight into underlying causes that may explain the systematic differences observed. Using recent data from preschool NEPS cohort, I found evidence for the existence of a significant achievement gap at the age 4 to 5 (preschool) that was maintained at age 6 to 7 (entrance to primary school). My results suggest that differences in the time dedicated to reading activities at home may explain a proportion of differences in language comprehension when beginning preschool and primary school. However, it turned out that this association was heavily influenced by the social background of the children. Children from more advantageous social backgrounds had higher abilities in preschool upon entering primary school, with maternal education in

particular having a very important effect on the gap in language comprehension.

While I do not found heterogeneous effects in the time spend on reading activities at home across social background (not interaction effects were found), this may suggest the existence of difference in the quality time of this activity among social background or It might also suggest that parents consider that children are going to compensate their deficiencies of language comprehension throughout their attendance in primary school. Unfortunately, there are not available measures on the quality time of thee family interactions in the dataset.

In good accordance with other studies (Skopek, 2017), the model for children of 4 to 5 years (preschool) suggested that the gap in language comprehension could also be associated to specific preschool experiences, such as childcare provided by relatives or friends.

While analyzing the influence of parenting and how it may affect the achievement gap is no simple task, my study give in depth insights on aspects related to the time spent on reading activities at home. The findings suggest that policies for disadvantaged parents should actively encourage quality parenting strategies that help to promote children abilities. This policy intervention should be accompanied by the provision of good quality care centers. Indeed, some studies indicate that preschools that promote parent-child activities are beneficial for skills development (Sylva et al., 2004), and may give disadvantaged children a head start by increasing their academic abilities when they start school.

Appendices

Appendix B

Tables

Table B.1: Descriptive statistics: children from 4 to 5 years (entry on Preschool)

variables	Mean or %	SD	Range
Sample 2114 obs			
Place of residence			1 - 2
East part (included Berlin)	18.8		
West part		81.2	
language comprehension	40.39	9.49	1-59
Child age at the test day	5.25	0.43	4 - 6
Age at entry to care center	5.2	1.38	0 - 8
Birth weight (kg)	3.3	0.61	0.33 - 4
Mothers' education			1 - 4
Lower secondary or less	21.95		
Interm. Voc.	34.39		
High school or Voc.degree	22.19		
University degree	21.48		
Mothers' occupation			1 - 4
Lower class	27.86		
Working class	29.09		
Middle class	28.62		
Upper class	14.43		
Migration background			0 - 1
Natives children	71.29		
Migrant children	28.71		
Household eco. situation			1 - 4
Rather poor	9.6		
In the middle	30.27		
Rather good	42.53		
Very good	17.60		
care attendance up to three years			
Not attendance	89.26		
Child minder/au pair	3.45		
Relative/friends	7.28		
Teacher assessment German speak			1 - 4
Very poor	2.08		
Rather poor	12.35		
Rather good	33.73		
Very good	51.84		
Child language of origin			0 - 1
No German	13.10		
German	86.90		
young less than 14 at home			1 - 3
None or one	28.52		
Two	52.98		
Three or more	18.50		
Child's gender			0 - 1
Boys	50.05		
Girls	49.95		

Table B.2: Descriptive statistics: children from 6 to 7 years (entry on primary school)

variables	Mean or %	SD	Range
Sample 4102 obs			
Place of residence			1 - 2
East part (included Berlin)	12.26		
West part		87.74	
language comprehension	34.76	6.92	5 - 52
Child age at the test day	7.31	0.49	6 - 12
Mother's education			1 - 4
Lower secondary or less	13.33		
Interm. Voc.	33.30		
High school or Voc.degree	25.60		
University degree	27.70		
Mothers' occupation			1 - 4
Lower class	24.40		
Working class	25.26		
Middle class	33.28		
Upper class	17.06		
Migration background			0 - 1
Natives children	75.45		
Migrant children	24.55		
Maternal employment	28.71		1 - 4
Unemployed	22.06		
Job side	7.51		
Part-time	49.98		
Full-time	20.45		
Teacher assessment German speak			1 - 3
Rather poor	18.43		
Rather good	39.32		
Very good	52.24		
Maternal educational aspirations			1 - 2
Hauptschule or Realschule	21.24		
Gymnasium	77.77		
Number of books at home			1 - 6
0 - 25 books	7.05		
26 - 100 books	26.84		
101 - 200 books	22.45		
201 - 500 books	27.43		
More than 500 books	16.24		
young less than 14 at home			1 - 3
None or one	23.96		
Two	54.02		
Three or more	22.01		
Child's gender			0 - 1
Boys	48.05		
Girls	51.95		

Table B.3: Descriptive statistics of domestic activities doing by children at 4 or 5 years

Activities	Mean	SD	Range
Number of obs. 2114			
Reading books	7.09	1.24	1 - 8
Comparing	6.72	1.42	1 - 8
Counting	6.09	1.47	1 - 8
Puzzles	5.75	1.64	1 - 8
Games	5.87	1.95	1 - 8
Arts and Crafts	6.41	1.56	1 - 8
Sports	6.47	1.30	1 - 8
Musical activities	5.86	1.86	1 - 8
Enjoy nature	5.95	1.66	1 - 8

Table B.4: Descriptive statistics of domestic activities doing by children at 6 or 7 years

Activities	Mean	SD	Range
Number of obs. 4102			
Reading aloud	6.54	1.48	1 - 8
Telling stories	4.29	1.86	1 - 8
Musical activities	3.10	1.75	1 - 8
Painting and Crafts	3.73	1.52	1 - 8
Sports	3.19	1.44	1 - 8
Playing	2.40	1.08	1 - 8
Playground	2.46	1.17	1 - 8

Figure B.1: Frequency of children do domestic activities at home in preschool

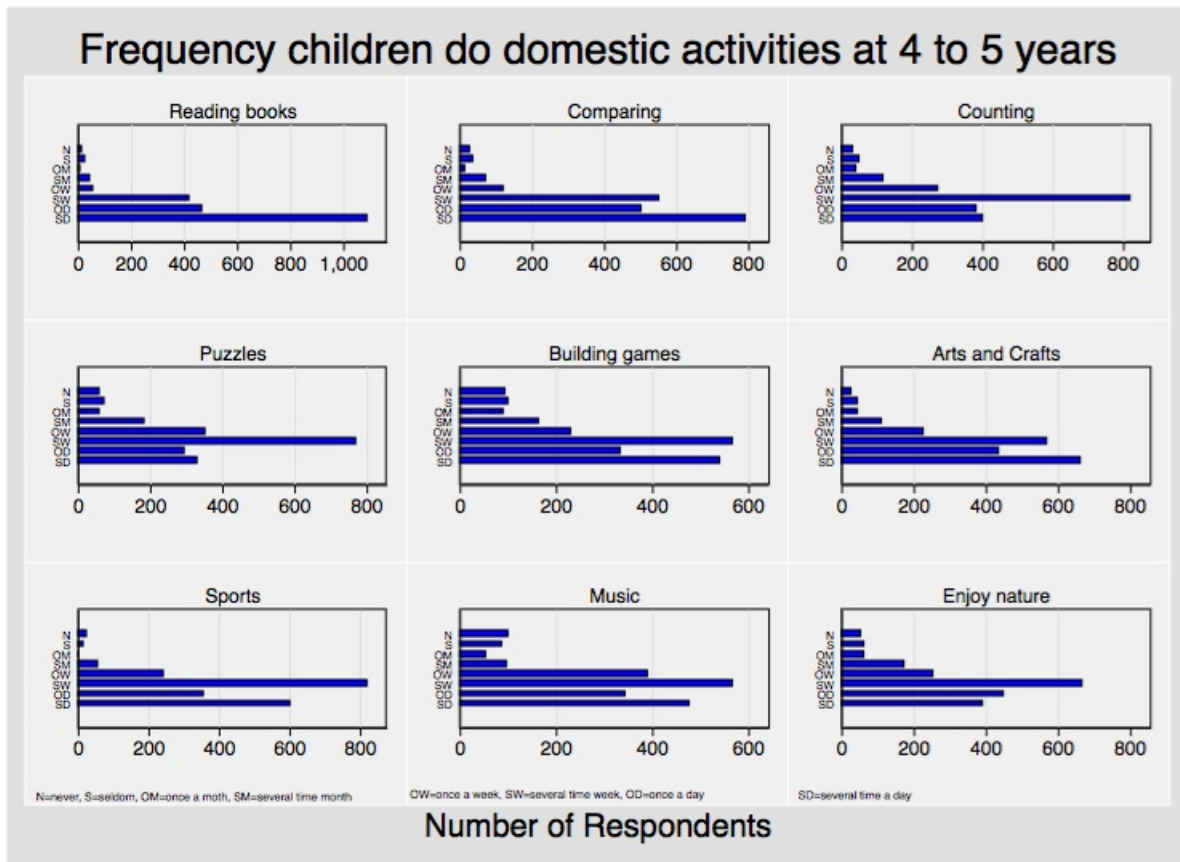


Figure B.2: Frequency of children do domestic activities at home at the entrance of primary school

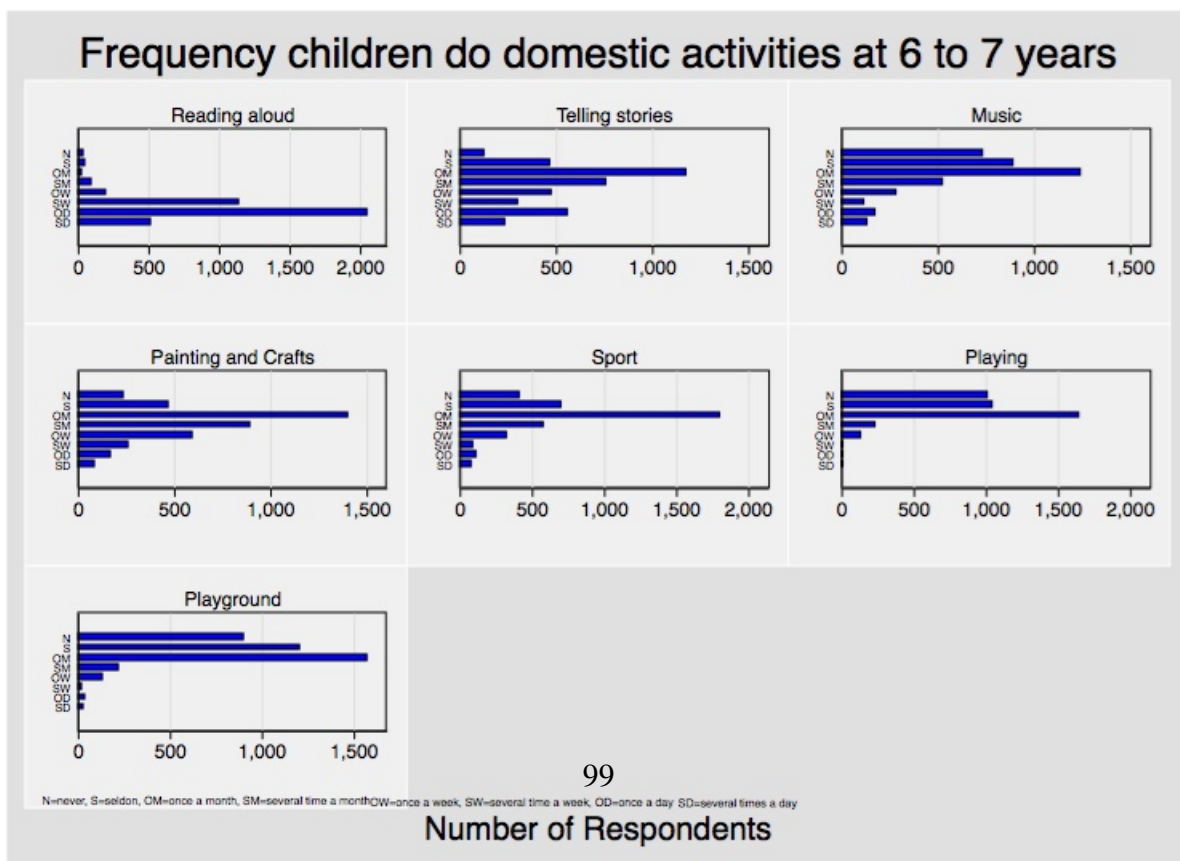


Table B.5: Chrombach alpha test for domestic activities do by children at 4 or 5 years

Activities	Item-test corr.	item-rest corr.	Aver.inter-item corr	Alpha
Number of obs. 2114				
Reading books	0.56	0.39	0.18	0.63
Comparing and collecting	0.56	0.39	0.18	0.63
Counting numbers	0.53	0.35	0.18	0.64
Puzzles	0.46	0.27	0.19	0.66
Games	0.55	0.37	0.18	0.64
Arts and Crafts	0.53	0.36	0.18	0.64
Sports	0.47	0.28	0.19	0.66
musical activities	0.55	0.37	0.18	0.64
enjoy nature	0.50	0.32	0.19	0.65
Test			0.18	0.67

Table B.6: Chrombach alpha test for domestic activities do by children at 6 or 7 years

Activities	Item-test corr.	item-rest corr.	Aver.inter-item corr	Alpha
Number of obs. 4325				
Reading aloud	0.53	0.32	0.24	0.66
Telling stories	0.60	0.41	0.22	0.63
Music Activities	0.55	0.34	0.24	0.65
Paint and Crafts	0.62	0.43	0.22	0.63
Sport	0.60	0.41	0.22	0.63
Playing	0.64	0.45	0.21	0.62
Playground	0.53	0.32	0.24	0.66
Test			0.23	0.68

Table B.7: Matrix of correlations for domestic activities and language comprehension at 4 to 5 years old children

	Lang. comprehen.	Read books	Comparing	Counting	Puzzles	Games	Arts and crafts	Sport	Music Act.	Enjoy Nature
Lang. comprehen	1									
Read books	0.167	1								
Comparing	0.0520	0.282	1							
Counting	0.0556	0.221	0.267	1						
Puzzles	-0.135	0.190	0.224	0.293	1					
Games	-0.0041	0.233	0.213	0.170	0.191	1				
Arts and crafts	0.0767	0.225	0.197	0.128	0.0721	0.266	1			
sport	0.0874	0.167	0.123	0.143	0.0466	0.102	0.186	1		
Music Act.	0.0590	0.206	0.174	0.144	0.0974	0.271	0.286	0.232	1	
Enjoy nature	0.107	0.144	0.198	0.160	0.0819	0.163	0.194	0.239	0.207	1

Table B.8: Matrix of correlations for domestic activities and language comprehension at 6 or 7 years old children

	Lang. Comprehen.	Read aloud	Telling stories	Music	Paint and crafts	Sport	Playing	Playground
Lang. Comprehen.	1							
Read aloud	0.127	1						
Telling stories	0.0135	0.291	1					
Music	0.029	0.190	0.265	1				
Paint and crafts	-0.0255	0.215	0.314	0.279	1			
Sport	0.0088	0.170	0.220	0.199	0.261	1		
Playing	-0.0304	0.216	0.245	0.197	0.307	0.343	1	
Playground	0.0128	0.119	0.157	0.138	0.168	0.291	0.316	1

Chapter 4

The subjective probability of success on the enrollment at Gymnasium

4.1 Introduction

Increasing research on educational inequalities has consistently pointed to a direct association between social origin and educational outcomes for several European countries (Ermisch et al., 2012a; Marks, 2005). However, even when direct effects are controlled for, social origin effects can still have an impact on educational choices. These persistent effects are termed the secondary effects of social class (Boudon, 1974), and are thought to explain why students with equal academic ability but different social origins tend to choose different types of education.

Interest in understanding the secondary effects of social class fostered the development of theoretical models of educational choices based on rational action theory (RAT). These models have evolved over time (Erikson and Jonsson, 1996; Breen and Goldthorpe, 1997; Esser, 1999), and have been validated for different educational systems. For example, Becker (2003) investigated the transition from primary to lower secondary school in the German educational system using the subjective expected utility (SEU) model. He found that the SEU model explained changes in educational participation and persistent inequalities for the three cohorts he studied (60', 70' and 80').

Furthermore, these theoretical models included three important factors associated with the educational choice, which were risk aversion, subjective probability of success, and economic resources. These items are not necessarily equally relevant for children's educational choices. For example, economic resources may not have much influence on educational transition from primary to lower sec-

ondary school, since compulsory education fees have been abolished in almost all industrialized nations, with children from all social strata having access to primary and secondary school education. In regard to risk aversion and the subjective probability of success, the empirical literature related has not defined a clear boundary. From the economic perspective, the subjective probability of success is associated with a perception of the risk of falling. One illustration could be the inference of subject's beliefs from the choices they made (Rabin and Thaler, 2001). From a sociological point of view, an individual's subjective perception of success is attached to structural context, e.g. ability, and selectivity of the school system (Ballarino and Panichella, 2016).

The distinction of these two perspectives is highly relevant for the theoretical basis of this study. Taking into account the sociological perspective, the main objective is to investigate how the probability of success as perceived by parents and children, can partly explain the differences on educational choices during early transitions, such as moving from primary to lower secondary school. Overall this study makes two important contributions to the literature. Firstly, the specific analysis of the subjective probability of success added empirical evidence to the academic discussion related to the effect of social origin on educational choices. Secondly, how a systematic examination of parents' and children's subjective assessment of success contributes to the global understanding of how children create their own expectations. The examination of children's expectations at early transition phases is a very interesting and innovative topic of investigation, especially since it also reflects shifts in underlying decision making processes.

Finally, the distinction between vertical and horizontal inequalities was considered, where the former refers to inter-personal inequalities (e.g. continuing education vs. entering in labor market), and the later refers to intergroup inequalities (e.g. choosing different tracks or fields of study). Given that compulsory education is universal, the analysis of inequalities on educational transitions in childhood is likely to be driven by qualitative rather than quantitative differences (Lucas, 2001). Thus, the effects of social origin on educational decisions are expected to be influenced by horizontal inequalities rather than vertical inequalities. For that reason, in this study the analysis will only explore intergroup or horizontal inequality dimensions.

The study is organized into the following sections. First the theory behind social origin and its link to subjective probability of success, and the probability of enrollment in lower secondary school is discussed. Next, the data, variables and statistical methods are described. Finally, the empirical results, discussion and the final conclusions are given.

4.2 Theoretical background

4.2.1 Subjective probability of success

Contemporary literature on educational choices has been dominated by the development of models based on rational action theory (RAT). These models were designed to understand the decision-making processes of parents, children and

young people over the course of their educational careers. These decision-making process are, thus, thought to reflect a rational evaluation of the costs and benefits of alternative choices available to actors of different social classes (Breen and Goldthorpe, 1997; Erikson and Jonsson, 1996; Esser, 1999). In addition, the articulation of that process is investigated using three important factors which are risk aversion, subjective probability of success and economic resources. Concerning the risk aversion and subjective probability of success, the literature, from a sociological and economic perspective, has not defined a clear border, thus, it is relevant to start the discussion by reviewing the literature from these two perspectives. Some scholars, especially experimental economists, refer the probability of success as function of lower risk aversion i.e., less hesitation of a person in situations with uncertain payoffs. One application can be found on Belzil and Leonardi (2007), who investigated whether risk aversion explains differences in the probability of entering into higher education for the Italian educational system. They concluded that schooling attainment decreased with risk aversion, which was the least important factor for determining educational attainment in higher education (3%) compared to other factors including unobserved persistent differences, parental capital and other sociodemographic characteristics, which accounted for around 95% of the variance. A special feature of this study is its treatment of risk aversion, which was seen as a reflection of lower success. Indeed, higher uncertainty about the future success of education may act as a strong disincentive, thus reducing the rate of enrollment. For example, the disposition to continue in higher education (e.g. post secondary or university) involves a necessary transfer

of present consumption to future consumption where success is not implicit. In this case, the probability of making a poor investment may be a deterrent for continuing education. Some scholars term this idea *loss aversion*, which is defined as the tendency to feel the pain of loss more acutely than the pleasure of an equal-size gain. Rabin and Thaler (2001) discussed how this is an anomaly compared to the normal understanding of risk aversion by economists, one illustration could be related to investigations that search to infer individuals' benefits based on the choices they made. This definition is very close to one employed in the area of social stratification research. Scholars in this field define risk aversion as avoidance of losing one's social status position, i.e. parental aspirations to ensure that offspring acquires a better or at least equal social position in adulthood to themselves. In this situation, individuals are more sensitized to the fear of their current losing status than to the pleasure to acquiring a higher one. As a consequence, they will strongly avoid downward mobility (Breen and Goldthorpe, 1997). The risk aversion has been widely studied in social stratification research with some interesting advances made in the field.

In addition, scholars in social stratification field also distinguish between the subjective probability of success and the subjective probability of risk aversion. For them, subjective probability of success is understood as being related to factors underlying the perceived risk of being unable to finish an educational level. These factors could include a student's ability, tracking of educational systems, and parental education and employment factors (Ballarino and Panichella, 2016), as study opposed to factors related to risk of failure typically used by economists.

An example of a precise investigation on the subjective probability of success from a sociological perspective can be found in Tolsma et al. (2010). These authors investigated whether the subjective probability of success explained the effects of social origin, gender differences, and ethnicity on students choices in the Dutch higher education system. The study drew two important conclusions in respect to the analysis of the subjective probability of success. First, they found that privilege students assess their probability of success higher compared to unprivileged ones. On the other hand, they observe that ability explains in a large extent the differences on assessment of success probability across students. In addition, the study of Tolsma et al. (2010) also explores the decision to enrolled in higher education as well as the choice of specific field of study. They concluded that ability and probability of success explain better the effect of social origin on the field of study rather than in academic level. Regarding this results, the authors argue that in highly disaggregated systems of choices, students tends to judge similar social returns for equal educational levels but different returns for specific fields.

In general, most studies that include the subjective probability of success in their investigation address this factor by including it as a covariate for the probability of enrollment. However these studies have not investigated this variable as an outcome measure. The research discussed above is there an important addition to specific analyses of the subjective probability of success, since it investigates this factor as both predictor and outcome. Consequently, it has been used as a guide for the development of this study.

4.2.2 Subjective probability of success and educational transitions

Empirical research has shown that disparities in educational attainment are strongly associated with social origin (Triventi, 2011; Grodsky and Riegle-Crumb, 2010). Furthermore, these class-specific influences on educational decision making are more evident in highly stratified educational systems like the German one. Unlike other countries, in Germany, important educational decisions are made at early age, this is the tracking selection after primary school. This special feature combined with the marginal permeability among secondary schools, produces a more pronounced effects for social origin on educational decisions. An illustration can be found in Dustmann (2004) who investigated the association of parental background and secondary school choices in the German system. He observed that intergenerational mobility of income and education was highly related to parental influences on early school tracking decisions. He also demonstrated that the choice of secondary school is strongly correlated with the post- secondary education and, thus, with labor market returns.

Additionally, the influence of social origin on educational decisions may also go beyond early transitions. For example, Mayer et al. (2007) investigated inequalities in access to German post-secondary and tertiary education. They observed that children from the higher class, in contrast to other classes, were more likely to choose university studies because it was the best way to ensure that they retained their social class positioning. In another study, an important contribution

was made by Buchholz et al. (2016), they investigated the inflows and outflows from secondary school in the German system by analyzing the first (primary to lower secondary school) and the second (lower to upper secondary school) allocation, the tracking changes and the upgrading education after secondary school. Their results showed that inequalities in the transition to secondary education were mainly driven by parental education, besides students from high social origin were those who more often upgrading their secondary education when they were initially placed in a lower track.

In order to understand why social origin is associated with educational transitions scholars have proposed theoretical models which include some specific factors associated with the educational decision making. One of these is the *subjective probability of success*, which is differentially conceptualized from an economic and sociological perspective, as briefly discussed in the previous section. Thus, in this section, I will review the literature that investigates the effect of the subjective probability of success on educational decisions.

Based on theoretical models like SEU model, the empirical literature has pointed to a positive association between the subjective probability of success and educational decisions. For example, using SEU model, Becker and Hecken (2008) investigated the decision to enroll in German university, finding that after controlling for previous and current academic performance, the empirical evidence supported a higher probability of success was associated with the increased likelihood of making a decision to enroll at university. That substantial association between the subjective probability of success and educational decision making

has also been confirmed by Keller and Neidhöfer (2014) in the case of Germany, and for other educational systems such as France (Bernardi and Boado, 2013), the Netherlands (Tolsma et al., 2010) and the US (U. Schnabel et al., 2002).

Until now, the empirical evidence supports three important facts regarding educational choices. First, educational choices are strongly associated with social origin. Second, the subjective probability of success was often indexed to the academic performance, indeed higher performance was associated with increasing probabilities of success. Third, increasing expectations of success are intimately linked to the decision making process. Additionally, scholars examining school transitions distinguishing between two dimensions such as vertical and horizontal educational inequalities. For example, Reimer and Pollak (2009) investigated the enrollment of post-secondary education over two decades in west Germany, finding stable social origin effect for their systematic exploration of vertical (enrollment in traditional vs. applied universities) and horizontal (the choice of field of study) educational inequalities. Nevertheless, the analysis of horizontal and vertical inequalities may have not equal relevance in transitions where educational levels are compulsory as well as equally accessible to all children, one justification can be found in the hypothesis of *effectively maintenance inequality (EMI)*. The EMI postulates that the upper social class will use their economic, social and educational advantage to secure an specific schooling level for their children, however once that level becomes universal, they will seek qualitative differences on that level to secure the advantages for their offspring (Lucas, 2001). As a result, the socioeconomically advantaged class will secure a similar quantitative

but better qualitative level of education for their children. Thus, in respect to the educational choices at the transition from primary to lower secondary school, it is reasonable to argue that higher social origin parents will ensure that their children enroll in a more prestigious academic track such as the Gymnasium in Germany, given that entrance to lower secondary education has become universal for all. These qualitative differences in educational choice sought be the upper class translate into inter-group or horizontal rather than vertical inequalities.

4.3 Research hypotheses

The path diagram shown below in Figure 4.1 displays in dashed arrows the theoretical hypotheses that are going to be tested in this study.

Mechanisms of educational choices

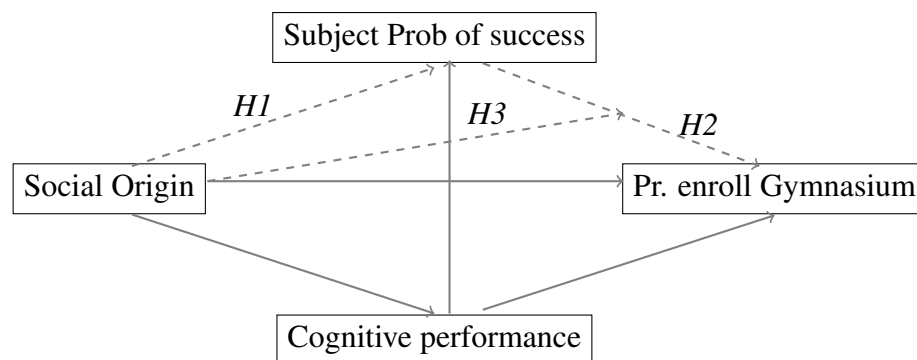


Figure 4.1: Theoretical hypotheses to be tested

From a sociological viewpoint the subjective probability of success is related to underlying factors associated with the success itself. One of these factors is the social origin of the parents (i.e. their educational and occupational level). In fact, assessment of the probability of success by parents and children may change as

function of social origin. For example, parents who have earned a post-secondary educational title may be more likely to positively rate the success of their child in the academic track, since they can provide support when problems arise. Another example is the child's long-term educational prospects. In Germany, the successful completion of the Gymnasium academic track is the only direct path to higher education, thus, long-term parental expectations such as entrance to university could motivate a positive increase in the expectation of success for their children, particularly during early transitions. If social origin is associated with the assessment of children's success in the gymnasium academic track.

Likewise, children's self-assessment of success or failure in the next step of their educational career may also be associated with social origin. In fact, social origin, especially cultural resources, could influence the motivation of children in many ways, and thus, their self-assessment of success (Grusec and Hastings, 2014). For example, well-educated parents often believe that involvement in the educational and intellectual development of their offspring is critical for strengthening of child's motivation and positive views about their perceptions of success for immediate educational courses. In view of these arguments, I expect that social origin to be positively associated with the assessment of success of parents and children in early transitions such as from primary to lower secondary school, and specifically for transition to the academic Gymnasium track (*Hypothesis 1*).

So far, I have presented hypotheses related to the effects of social origin on the subjective probability of success, as assessed by parents and children. Next I am going to develop the complementary hypotheses that refer to how these subjective

expectation are associated with the probability of enrollment on the Gymnasium academic track.

In respect to the particularities of the Germany educational system, the effects of social origin on educational decision making is strongest at early transition points, and decreases as children further their educational careers (Schneider, 2008). A relevant factor positively associated with educational decisions is the subjective probability of success. For example, having a higher expectation of success might indicate that children can handle demanding assignments and tasks, as well as they are highly motivated to develop abilities in challenging environments. In these conditions one may expect that a positive subjective probability of success from parents will be associated with an increasing probability of enrolling on the academic Gymnasium track (*Hypotheses 2*).

The final factor tested in this study is whether the association between subjective probability of success and the likelihood of enrollment in Gymnasium is stratified by social class. For example, parents from high social origin could be motivated by the prospects of future educational outcomes like the connection of Gymnasium track with the entrance in higher education. Thus, it is more likely that parents from high social origin decide in favor of the Gymnasium track despite children having a lower probability of success (*Hypothesis 3*).

4.4 Data, variables and method

4.4.1 Data

The high quality data set rich in description and disaggregated variables for parents and students variables is used in this study allowed me investigate the association of social origin with the probability of success and with the subsequent probability of attending a lower secondary track (Gymnasium). In the first stage, I investigated the association of social origin with the the perceived probability of success from the parents. To do so, I used wave 5 of Starting Cohort 2 (Blossfeld et al., 2011). In 2013, this sample made a survey of first grade primary school students who were expected to attend third grade in 2015 (and who were thereafter sampled on an annual basis since first grade). This study employed the detailed cross-sectional sample of wave 5 to obtain data on the variables of interest. Data was collected for parents and students. In some federal states the differentiation of secondary school was made at the end of the fourth grade, while in others is at the end of the sixth year.

The data provides information on the eastern and western part of Germany, and is not disaggregated into federal states. This meant that I was not able to identify which federal states students belonged to. After filtering for all the relevant information and excluding children with special needs, the remaining sample contained 3333 parent and child observations (raw sample). From this sample, I eliminated observations with missing information on parental background, performance ability, and probability of success assessed by parents. In terms of the parents, this

meant 78 percent of the sample was retained for further analysis. In terms of the children, 52 percent of the sample was retain for the analysis due to high number of missing cases on childrens assessment of probability of success.

In the next step, I investigated the association of the parents subjective assessment of the probability of success and the probability of children being allocated to the Gymnasium track during lower secondary school. This necessitated eliminating participant/respondents who were missing information on the probability of enrollment on the gymnasium track from the remaining sample. The final sample for the second part of the analysis constituted 76 percent of the raw sample.

4.4.2 Variables

Probability of success from parents and children

This first dependent variable measures the expectation of success perceived by parents for the Gymnasium academic track and is the first dependent variable in the analysis. The dataset provides information on this variable for the parents and children who were asked the following question: *How likely do you think it is that (your child) can succeed in obtaining an abitur leaving certificate?*. The answers for both parents and children were encoded in five categories which went from 1 = very unlikely to 5 = very likely. To obtain two final categories, this variable was recoded as follows: 1 = higher probability of success of enrolling in a Gymnasium (categories 4 and 5), and 0 = lower probability of success of enrolling in a Gymnasium (categories 1, 2 and 3). In the first part of the analysis this categorical

variables was employed as a outcome measure, whilst in the second part of the analysis it was used as a covariate.

In respect to the distribution of this variable in Table C.1, the composition of parents ratings for higher/lower success probabilities is unbalanced, with a high proportion favouring a higher (71%) versus lower (28%) chance of success.

Probability of enrolling in Gymnasium

This is the second dependent variable that measures the parents assessment of their childs probability of enrolling on the academic track during lower secondary school. The dataset provides measures of this variable based on the following question: *Which school type will your child attend after the completion of primary school?* Answers were ranked according to seven categories, which corresponded to different types of secondary school in Germany. These were; 1= Hauptschule, 2 = Realschule, 3 = Gymnasium, 4 = Verbundene, and 5=Comprehensive School. Of these, verbundene and comprehensive schools only existed in some states, where they took the place of both a Realschule and Hauptschule. To take this into consideration, the categories were recoded to 1 = the decision to enroll in Gymnasium, and 0 = the decision to enroll in Hauptschule, Realschule, Verbundene and a Comprehensive school.

According to this new codification, the Table 3.1 shows that more than half of the parents wanted to enroll their children in a Gymnasium (62%), compared to those who preferred to enroll them in a vocational school (38%).

Reading performance

This variable measures the academic ability level of children at the third grade of

primary school based on the results of tests examining reading performance.

The database measured the results of this test using a weighted likelihood estimator (WLE). According to Pohl and Carstensen (2012a), WLE has some advantages over a sum score that make it more attractive to use for certain analyses. For instance, the WLE facilitates an adequate treatment of missing responses, comparability of competency scores over different waves, and can be used in the analysis as another common variable. Additionally, here the WLE of reading performance was standardized to include it in the estimations. Consequently, values higher than zero indicates an above average academic ability and values lower than zero indicates a below average academic ability.

Social origin variables

In measuring the social origin of children I take into account the following three dimensions: the educational level of the parents, the occupational level of the parents, and the parents employment status. Many studies also consider the immigration background of children as part of the social origin dimension, but the dataset contains a high percentage of missing values for this variable, so it was not possible to include it on the analysis.

Parental educational level was measured by CASMIN codification and reconstructed to obtain a total of four categories: lower secondary school or less = non-qualifications, elementary or intermediate school, basic vocational qualifications; intermediate vocational degree; high school or vocational degree; and university degree= upper and lower tertiary education.

Mothers occupational level was measured by the EGP codification. I also took

into account the respondents employment status at the time of interview and added to unemployed mothers, mothers on maternity leave, and housewife categories to the classification. The final reconstruction of the mothers occupational level had four categories: upper class = high controllers; middle class= lower controllers; working class = routine non-manual, self-employed, manual supervisors; and lower class = lower sales services, skilled and unskilled workers, unemployed, housewife, and mothers on maternity leave.

Educational aspirations

The educational aspiration of parents and children were measured by the following question. *Considering everything you know now: what qualifications you (your children) will actually leave school with?.*

The answers were coding on three categories: leaving certificate of haupschule, leaving certificate of realchule, and leaving certificate of gymnasium (highest educational entrance qualification).

Variables referring to the knowledge of school transition

The transition from primary school to lower secondary school has many aspects that sometimes are completely known to parents. In the next section I consider some of these aspects. In the dataset these were measured using statements where the parents could answer true, not true, or do not know.

The knowledge of teachers recommendations This variable measured parents knowledge of the teachers binding or non-binding recommendations using the following question *the child has to attend the school type that is recommended at the end of elementary school in every case*, the answers were coded into the following three

categories: dont know, not true and true. In the sample, 78 percent of parents answer that the recommendation is not binding (not true), 14 percent answered that the recommendation is binding (true), and the remaining 8 percent of parents dont know whether the recommendation is binding or not.

The knowledge of school grades This variable measures parents awareness of the minimum academic performance required to make the transition to the academic track, by presenting the following statement *the child needs a grade average of at least 2 in the subjects of math and german*. As with the previous question, the answers were encoded on three categories true, no true, and dont know. In the sample 41 percent of parents answer true, 37 percent answer that it is not true and the remaining 22 percent do not know the requirement minimum level of academic competence for the transition.

The transfer prognosis

This variable measures the childrens outlook on the transfer into one type of lower secondary school. It was measured by asking the child the following question *Do you already know which school you are going to attend after elementary school?*, the answers were encoded into four categories: dont know yet, Hauptschule, Realschule, or gymnasium. The variable was then recoded into three categories: 1= dont know, 2= Hauptschule or Realschule, and 3 = gymnasium. Nineteen percent of children in the sample did not know yet, 16 percent of children thought that they are going to be enrolled on the Hauptschule or Realschule vocational tracks, and the remaining 65 percent of children thought that they are going to transfer to a Gymnasium.

Variables related to how children coped with the school day

Parental opinion on how children were coping with school also likely influences their assessment of probability of success and, therefore, with enrollment in a specific school track. This was measured using a statement where parents assessed to which extent this applied to their children. The answers were encoded on four categories 1= does not applied at all, 2= does not really applied, 3= applies in some extent, 4= applies completely.

Likewise, the opinion of children about how they think were coping with the school day was asked and coded in the same way as parents answers.

Joy of learning at school

This variable measured parental assessment of whether the child enjoyed school. It was measured using the following statement *the child enjoys learning at school*, Given that few children are placed on the first category I recoded this variable in three categories 1= does not applied at all or does not really applies, 2= applies in some extent, and 3= applies completely.

The sample is composed of 44 percent of parents who answered that the statement completely applied to their child, 47 percent who said it applied to some extent, and 8 percent who replied that it did not really applies or does not apply at all.

Effort with difficult assignments

This variable measured parental assessment of how children handled difficult school assignments. It was measured by the following statement *the child makes an effort when the assignment is difficult*. As with the previous case, I recoded the answers into three categories: 1 = does not apply at all or does not really apply; 2

= applies to some extent; and 3 = completely applies.

The sample composed of 29 percent of parents who assessed that the statement completely applies, 54 percent who answered that it applies to some extent, and 17 percent who thought that it did not really apply or does not apply at all.

Control variables

I also control for some other variables such as how often parents thought about the school-leaving qualification of their child, the employment status of mothers, the number of young people under 14 living in the child's home, children's place of residence (east or west) and the gender of the child. More detailed descriptive statistics are presented in tables (C.1, C.2).

4.4.3 Method

Understanding the patterns of early educational transitions requires a detailed analysis of particular factors associated with the educational decisions of parents and children, such as their subjective assessment of the probability of child's success. As a consequence, the empirical strategy was divided into two parts. In the first part, the association of social origin and children's subjective probability of success assessed by parents and children was explored. In the second part, the association between the probability of success and the subsequent likelihood of enrollment on the Gymnasium academic track was analyzed.

The dependent variables subjective probability of successes and likelihood of enrollment on the academic track are dichotomies by nature, and are thus encoded as

0 or 1. Moreover, the adjusted distribution of the dependent variables resembles a logistic distribution, and thus, all the models are based on logistic regression. The empirical strategy in this work related the estimations to a specific hypothesis mentioned above.

Model specification

Models for the first part

H1: Expectation of success and social origin

$$Y_j = \alpha + \beta_1 SO + \epsilon \quad (4.1)$$

$$Y_j = \alpha + \beta_1 SO + \beta_2 X + \epsilon \quad (4.2)$$

$$Y_j = \alpha + \beta_1 SO + \beta_2 X + \beta_3 W + \epsilon \quad (4.3)$$

Where Y is the subjective probability of success and j stays for whether the assessment is from parents or children. SO represents the social origin of children measured by parental education and occupational. X is the academic performance of children demonstrated in 5th grade of primary school measured by reading performance, and Z is the set of control variables. Model (4.1) estimates the raw effect of parental education on the probability of success, in model (4.2) introduces the academic performance, and Model (4.3) estimates the association of social origin and probability of success net of academic performance and other control variables.

Models for the second part

H2: Expectation success probability and likelihood of enroll in Gymnasium

$$P = \alpha + \beta_1 Y + \epsilon \quad (4.4)$$

$$P = \alpha + \beta_1 Y + \beta_2 SO + \beta_3 X + \epsilon \quad (4.5)$$

$$P = \alpha + \beta_1 Y + \beta_2 SO + \beta_3 X + \beta_4 W + \epsilon \quad (4.6)$$

H3: success probability, social origin and likelihood of enroll in Gymnasium

$$P = \alpha + \beta_1 Y + \beta_2 SO + \beta_3 X + \beta_4 Y_j * SO + \beta_5 W + \epsilon \quad (4.7)$$

Where the P represents parental expectation on the likelihood of children to enroll on Gymnasium after finishing primary school and Y is the parental assessment of the probability of success. Model (4.4) estimates the raw effects of subjective probability of success on the likelihood of enrollment. Models (4.5) includes the children's academic performance demonstrated on reading in 5th grade and model (4.6) estimate the effect of subjective probability of success netted by social origin, academic performance and other control variables.

4.5 Empirical findings

Parental probability of success and social background

The results of a multivariate model analysis are presented in table (4.1). Model 1 reports the unconditional effect of parental education; Model 2 includes the parental occupational; Model 3 estimates the effect of childrens social background net to academic performance. Finally, Model 4 estimates the effect of social background net to all control variables. Overall, the odds of parental assessment of probability of success was 4.3 times (model 1) higher for children whose parents held at least a high school degree compared to children with lower educated parents. The average marginal effect between them produces a difference of 0.34.

Moreover, the odds slightly increased when parental occupation was included in the regression (odds of 4.3). Compared to Model 3, the results show that part of these social disparities are captured on the level of childrens academic performance (odds: 3.7 vs. 4.3, average marginal effects: 0.28 vs. 0.34). Model 4 estimated the effect of parental social background on assessment of the subjective probability of success net for all covariates and control variables. The results show that even after control for academic performance and other control variables, the effect of parental education remained highly significant. Overall, the odds of parental assessment of childrens academic success onto the gymnasium academic track was 4.5 times higher for those whose parents held a high school degree compared to children whose parents had a lower education. Model 4 is also informative in terms of its effects on other covariates, for instance, it was observed that part of the class differences in parental assessment of success was captured by parental aspirations of childrens enrollment in the academic track gymnasium as is observed in the size of the odd-ratio estimated. In addition, whether the children enjoyed learning at school or made an effort with difficult task were both positively associated with parental assessment of probability of success.

Table 4.1: Multinomial logistic regression explaining the parental assessment of subjective probability of success of students' transition to lower secondary school

	Model 1 Odds-ratio	Model 2 Odds-ratio	Model 3 Odds-ratio	Model 4 Odds-ratio
Parental education				
Lower second. or less (omitted)				
Interm. Voc degree	2.160**	2.281**	1.920**	1.825*
High school or Voc. degree	4.319**	4.584**	3.738**	2.389**
University degree	9.559**	9.246**	5.829**	2.845**
Parental occupation				
Lower class (omitted)				
Working class		0.705*	0.641*	0.557*
Middle class		0.856	0.789	-0.707
Upper class		1.060	1.089	1.002
Reading performance in language			2.269**	1.695**
Parental aspirations				
Realschule type of school				1.963
Gymnasium type of school				29.731**
Transfer prognosis				
Hauptschule/Realschule				1.029
Gymnasium				1.565**
Knowledge of teacher recommend				
Binding recommendation				1.401
Non-binding recommendation				1.415
Assess. of child enjoy learning				
Applies to some extent				1.823*
Applies completely				3.091**
Assess. child effort on difficult tasks				
Applies to some extent				1.554**
Applies completely				2.725**
Thinking of child school-leaving qualif.				
Sometimes				0.928
Often				1.278
Young less than 14 at home				
Two children				1.079
Three children				1.604*
Girls				1.083
Place of residence East Germany				1.179
Constant	0.588**	0.664*	1.041	0.0195**
Observations	2604	2604	2604	2604
Pseudo R^2	0.083	0.085	0.165	0.438

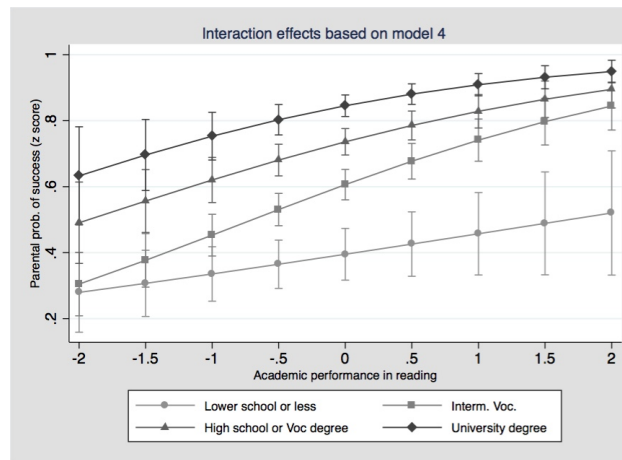
⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

In the literature the probability of success is often indexed to the academic performance assuming a positive association, meaning that if a child demonstrate good performance he/she would have better probabilities of success in the next

stages of education compared to lower able children. However, as we have observed, the probability of success is affected by other factors (e.g. parental education, aspirations) than only children performance.

In order to assess that, I estimate interaction effects between academic performance and parental level of education based on Model 4. The results are presented in the figure (4.2). Although non-significant effects were found, it is possible to observe that social class disparities on the assessment of probability of success are present over the academic performance of children. For example, at higher levels of academic performance parents from high social class assessed high probabilities of success to their children compared to lower class parents. This can be interpreted that: childrens academic level does not compensate for the class differences in the assessment of probability of success, indeed parents may search for other additional factors to assess the probability of success of their children like their educational aspiration. Taking together we can conclude that differences in the assessment of probability of success is driving by social disparities among parents as high-educated parents being more likely to assess the success of their children compared to lower-educated ones (supporting hypothesis 1). Moreover, high levels of academic performance did not compensate the social disparities on the assessment of probability of success as the literature suggest.

Figure 4.2: Parental education and the relation between children's academic performance and parental assessment of success



Children probability of success and social background

The results of a multivariate model are presented on table (4.2). Model 1 presents the unconditional effect of parental level of education; model 2 includes the parental occupational level; model 3 estimates the effect of social background on childrens assessment of success net to academic performance; finally in model 4 all the co-variates and controls are included.

Overall, the odds-ratios of childrens assessment of their probabilities of success on the academic track gymnasium are lower compared to the parental assessment of success presented above. For example, the unconditional model (model 1) estimates that the assessment of success was 2.1 times higher for children whose parents earn at least a higher-school degree compared to children from lower educated parents. While the parental occupation is not significant in model 2, its inclusion in the estimation slightly increases the effect of parental occupation as is observed on the estimation of the odds-ratios.

Compared with model 3, I observed that differences in the assessment of success associated with social background are partly captured by the level of academic performance (odds: 2.0 vs. 2.1).

The results of model 4 showed that after controlling for academic performance and other control variables, the effects of parental education remains highly significant only for upper class children, indeed children whose parents held a university degree assess their success probability on gymnasium 1.9 time higher compared to children from lower educated parents.

Moreover mode 4 is informative about the association of other control variables like childrens aspirations or their assessment of coping with the school day. For instance, children who held aspirations of entrance in the academic track gymnasium are 2.3 times higher to assess their probability of success on it.

Table 4.2: Multinomial logistic regression explaining children's assessment of subjective probability of success on transition to lower secondary

	Model 1 Odds-ratio	Model 2 Odds-ratio	Model 3 Odds-ratio	Model 4 Odds-ratio
Parental education				
Lower second. or less (omitted)				
Interm. Voc degree	1.843**	1.845**	1.744*	1.589
High school or Voc. degree	2.135**	2.177**	2.005**	1.498
University degree	3.262**	3.497**	2.709**	1.969*
Parental occupation				
Lower class (omitted)				
Working class		0.964	0.915	0.866
Middle class		1.052	0.991	0.939
Upper class		0.793	0.755	0.690
Reading performance in language			1.550**	1.505**
Children aspirations				
Realschule type of school				0.442**
Gymnasium type of school				2.397**
Transfer prognosis				
Hauptschule/Realschule				1.319
Gymnasium				1.947**
Assess. of enjoy learning				
Applies to some extent				1.313
Applies completely				1.511*
Mother tongue				
Non-German				1.388
Young less than 14 at home				
Two children				1.069
Three children				1.020
Girls				1.047
East Germany				0.869
Constant	0.610**	0.616**	0.752	0.292**
Observations	1757	1757	1757	1757
Pseudo R^2	0.018	0.199	0.049	0.152

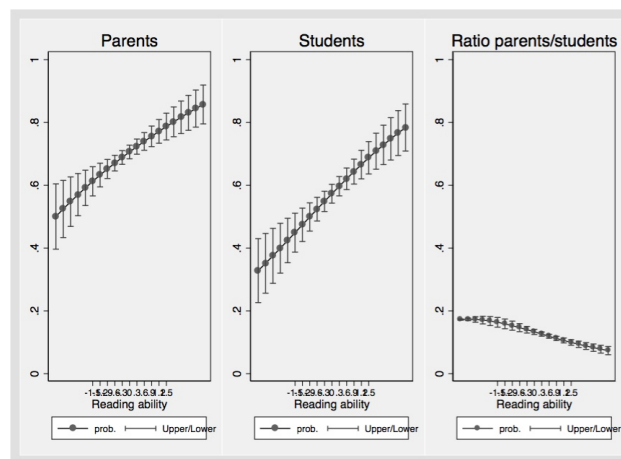
Exponentiated coefficients; z statistics in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Finally, while social origin may be directly associated with the subjective probability of success rated by parents and children, some differences may arise between them. For example, children self-perception about their own success is rather immediate. Conversely, parents tend to have more general perspectives about the immediate and long-term educational prospects for their children when

rating children's probabilities of success. In order to assess whether the differences could arise between the assessment of parent and children I estimate the models of subjective probability of success for parents and children using the same sample size ($n=1757$) and calculate the predicted probabilities for each of them. Hence, the difference was defined as the ration between these two predicted probabilities; the results are showed on the figure (4.3). While I observe a positive slope on the subjective probabilities of success assessed by parents and children over academic performance, the difference differences between the two assessments are minimum and tends to decrease when the performance increases, meaning that it might be the possibility that at lower levels of academic performance parents overestimate the probabilities of success of their children, however this should be confirmed on further analysis.

Figure 4.3: The mismatch on assessment of probabilities of success between parents and children



The likelihood of enrollment in the academic track Gymnasium

In this section, I use a multivariate analysis to explore how the probability of suc-

cess is associated with the likelihood of children enrolling on a Gymnasium academic track after concluding the 4th grade of primary school. Results are shown in table (4.3). Model 1 reports the unconditional effect of subjective probability of success; Model 2 includes the parental socioeconomic background (level of education and occupation); Model 3 presents the effect of subjective probability of success net on social background and academic performance; and Model 4 includes all the control variables.

Overall, the subjective probability of success had a substantial effect on the probability of enrollment on the academic track. The unconditional model (Model 1) estimated that parents who assessed higher the success of children on the academic track were 16 times more likely to allocate their children on this track after primary school compared to those parents who assessed lower chance of success. Compared with Model 3, the results show that part of the effect of the parental assessment of probability of success is captured by social background and academic performance, in line with theoretical prediction. In particular, I observed significant effects for the parental occupational level, indeed, parents from the upper classes were 2 times more likely to enroll their children on a Gymnasium academic track compared to lower class parents.

Finally, Model 4 reports the effect of the probability of success on the likelihood of enrollment on a Gymnasium track net of all control variables. Although a slight increases in the odds and the stability of the effect of subjective probability of success was observed, some caution is warranted when interpreting this result. For instance, while the transfer prognosis is clearly associated with the higher chance

of children becoming enrolled on the academic track at the end of 4th grade, it may also increase the assessment of probability of success as we observed in the previous analysis. In that case, the assessment of probability of success carries part of the effect of the transfer prognosis.

Overall, we can conclude that disparities in the chances of children to being allocated to the academic track are partly driven by the parents perceived probability of success (supporting Hypothesis 2), as well as by the occupational level of parents and childrens academic performance.

Additionally, in estimating the models of probability of enrollment in gymnasium I also test whether childrens assessment of success was actually associated with the probability of being enrolled in the academic track gymnasium, however, after including other covariates the effect becomes non significant. This could be explained by the fact that parents make the final decision of lower secondary school enrollment. In fact, the subjective probability of success of children may have more important effects on later transition like from lower to upper secondary school (Tolsma et al., 2010).

Table 4.3: Multinomial logistic regression explaining the likelihood of enrollment in academic track Gymnasium

	Model 1 Odds-ratio	Model 2 Odds-ratio	Model 3 Odds-ratio	Model 4 Odds-ratio
Parental assessment of success				
Lower success (omitted)				
higher Success	17.60**	15.74**	12.99**	12.43**
Parental education				
Lower secondary or less				
Intern. Voc degree		1.210	1.126	1.109
High school or Voc. degree		1.642*	1.529 ⁺	1.437
University degree		1.899*	1.536	1.335
parental occupation				
Lower class				
Working class		1.617*	1.564*	1.590*
Middle class		1.368	1.336	1.381
Upper class		1.966**	2.026**	1.843*
Reading performance in language			1.499**	1.541**
Knowledge of teachers' recommendation				
Binding recommendation				1.158
Non-binding recommendation				1.044
Knowledge of minim. grades score				
Non average grade equal 2				1.323
Average grade ≥ 2				1.246
Transfer prognosis				
Hauptschule/realschule				0.425**
Gymnasium				3.082**
Parental employment				
Unemployed (omitted)				
Job-side				0.792
Part-time				0.997
Full-time				1.777*
Thinking of child school-leaving qualif.				
Sometimes				1.238
Often				1.157
Young less than 14 at home				
Two children				1.276
Three or more children				1.115
Girls				0.898
Place of residence East Germany				0.871
Constant	0.232**	0.117**	0.155**	0.056**
Observations	2551	2551	2551	2551
Pseudo R^2	0.264	0.278	0.293	0.361

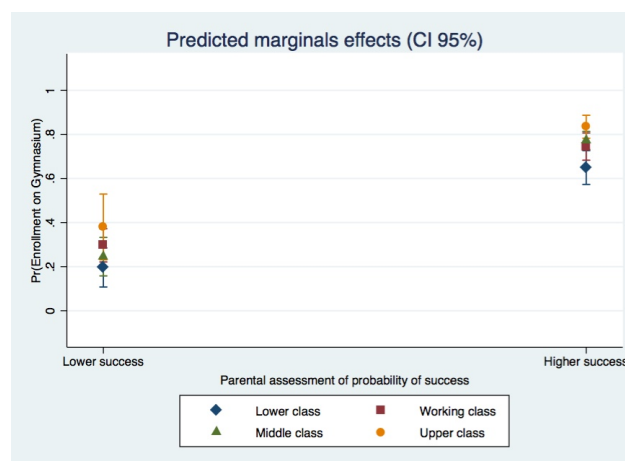
⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Interaction effects of social background and probability of success

Until now the models estimation on the likelihood of enrollment on the academic track assumed the impact of the subjective probability of success to be homoge-

nous across social groups. However, theoretical arguments suggest some heterogeneous effects may be in place for social groups and for different levels of performance. To test this, I used the Model 4 to integrate interaction effects between parental occupational level and probability of success. The results of the interaction effect estimation for the parental assessment of success and the parental level of occupation is presented in figure (4.3) (the estimated model is presented in annex table (C.3), we observe that a high assessment of the subjective probability of success does not compensate for the effect of social disparities on the probability of enrollment on an the gymnasium academic track, meaning that despite lower or higher levels of assessment of success, upper class children always had a high probability of enrolling on academic track compared to lower class children. In addition, some changes were observed for middle and working class parents, at lower levels of assessment of success the model predicted a lower probability of enrollment for middle class children compared to working class, while the opposite was observed for a higher level of parental assessment of success.

Figure 4.4: Parental education and the relation between parental assessment of success and children probability to be enrolled on gymnasium track



4.6 Conclusion and discussion

Most research on inequalities in educational opportunities in Germany concentrates on investigating the primary school to lower secondary school transition by analyzing risk aversion factor, thus, indexing the probability of success by academic performance. This means that highly able children will also have a higher probability of success. However, the high quality NEPS dataset allowed me to dig deeper; enabling investigation of the perceived probability of success independent of academic performance. In this study I investigated two important factors associated with the educational decisions in early transitions. On the one hand, the association of social origin and probability of success is explored. On the other hand, the association between the probability of success and parental expectations of enrolling their children on an academic track at Gymnasium are examined.

In my analysis I observed that important social disparities influence a parents and children assessment of success, meaning that better-educated parents or children from better-educated parents are more likely to give a positive assessment of success on the academic track Gymnasium, These social disparities were not compensated by higher level of academic performance, indeed at higher levels of performance, lower educated parents assessed a lower probabilities of success for their children compared to higher educated parents. This, in turn, affected the probabilities of children being enrolled on the academic track, since higher assessment of success was associated with increasing probability of joining a Gymnasium. Moreover, the difference of assessment of success was observed to be minimum,

meaning that social disparities on the assessment of success are presented even in early age. Further investigation is needed to assess whether these disparities are associated with educational inequalities in school transition. For example, this in part could be associated with the fact that more often upper class children upgrade their education at the end of lower secondary school compared to lower class children (Buchholz et al., 2016).

My results demonstrate how to gain an appropriate understanding of the factors driving inequalities in educational opportunities during important transition points (such as from primary to lower secondary school), researchers much adopt a broader perspective that includes influentially factors like the parents estimation of a childs probability of success. In the context of German educational system, where enrollment on the academic track is the only direct path to higher education, this results supports the argument that parents of a higher social origin want to ensure that their offspring acquire a higher educational level by enrolling them in the most prestigious educational track possible, hence increasing their assessment of the probability of success.

Appendices

Appendix C

tables

Table C.1: Descriptive statistics for parental assessment of success

variables	Mean or %	SD	Range
Sample 2604 obs			
Reading performance	-0.29	1.24	-5.66 - 3.83
Parents Prob. of success			0 - 1
higher success	69.85		
lower success	30.15		
Parents educational level			1 - 4
Lower education	8.76		
Interm. Voc. degree	31.49		
High school or voc. degree	26.96		
University degree	32.80		
Parents' occupational level			1 - 3
Lower class	16.63		
Working class	27.50		
Middle class	35.22		
Upper class	20.66		
Parental aspirations			1 - 3
Hauptschule	1.57		
Realschule	29.88		
Gymnasium	68.55		
Transfer prognosis			1 - 3
Do not know	19.85		
hauptschule/realschule	15.17		
Gymnasium	64.98		
Knowledge of teacher recomm.			1 - 2
Do not know	8.5		
Binding	14.59		
non-binding	76.96		
Assess. child joy of learning			1 - 3
Does not apply	8.18		
Apply to some extent	47.24		
Apply completely	44.59		
Assess. child effort in school			1 - 3
Does not apply	15.90		
Apply to some extent	53.69		
Apply completely	30.41		
Parental thoughts school-leaving qualif.			1 - 3
Seldom	37.63		
Sometimes	39.63		
Often	22.73		
young less than 14 at home			1 - 3
None or one	26.96		
Two	54.26		
Three or more	19.05		
Child's gender			0 - 1
Boys	48.81		
Girls	51.19		
Place of residence			1 - 2
East Germany	11.71		
West Germany	88.29		

Table C.2: Descriptive statistics for children assessment of success

variables	Mean or %	SD	Range
Sample 1757 obs			
Reading performance	-0.30	1.23	-5.66 - 3.83
Children Prob. of success			0 - 1
Higher success	58.70	-	
Lower success	41.11	-	
Parents educational level			1 - 4
Lower education	8.65		
Interm. Voc. degree	33.30		
High school or voc. degree	27.26		
University degree	30.79		
Parents' occupational level			1 - 3
Lower class	16.68		
Working class	27.43		
Middle class	36.25		
Upper class	19.64		
Children's aspirations			1 - 3
Haupschule	1.54		
Realschule	29.43		
Gymnasium	69.04		
Transfer prognosis			1 - 3
Do not know	19.07		
hauptschule/realschule	14.91		
Gymnasium	66.02		
Assess. child joy of learning			1 - 3
Does not apply	26.01		
Apply to some extent	32.10		
Apply completely	41.89		
Mother tongue			1 - 3
German	82.98		
non-German	17.02		
young less than 14 at home			1 - 3
None or one	26.35		
Two	54.58		
Three or more	19.07		
Child's gender			0 - 1
Boys	49.46		
Girls	50.54		
Place of residence			1 - 2
East Germany	10.59		
West Germany	89.41		

Table C.3: Descriptive statistics for the models of parental assessment of probabilities to enroll children in Gymnasium track

variables	Mean or %	SD	Range
Sample 2551 obs			
Reading performance	-0.28	1.24	-5.66 - 3.83
Prob. of enroll in Gymnasium			0 - 1
Enroll in Gymnasium	62.33		
Not Enroll in Gymnasium	37.67		
Parents Prob. of success			0 - 1
higher success	70.49		
lower success	29.51		
Parents educational level			1 - 4
Lower education	8.95		
Interm. Voc. degree	31.56		
High school or voc. degree	27.02		
University degree	32.81		
Parents' occupational level			1 - 3
Lower class	16.58		
Working class	27.64		
Middle class	35.12		
Upper class	20.66		
Transfer prognosis			1 - 3
Do not know	19.64		
hauptschule/realschule	15.09		
Gymnasium	65.27		
Knowledge of teacher recomm.			1 - 2
Do not know	8.35		
Binding	14.74		
non-binding	76.91		
Knowledge of minimum grades			1 - 2
Do not know	21.72		
Not Average grade = 2	34.89		
Average grade ≥ 2	43.39		
Parental employment			1 - 4
Unemployment	14.74		
Job-side	7.25		
Part-time	57.27		
Full-time	20.74		
Parental thoughts school-leaving qualif.			1 - 3
Seldom	37.28		
Sometimes	40.06		
Often	22.66		
young less than 14 at home			1 - 3
None or one	26.81		
Two	54.14		
Three or more	19.05		
Child's gender			0 - 1
Boys	48.45		
Girls	51.55		
Place of residence			1 - 2
East Germany	11.88		
West Germany	88.12		

Table C.4: Interaction effects between probability of success and parental occupation

	Model 1 Odds-ratio	Model 2 Odds-ratio
Parental assessment of success		
Lower success (omitted)		
Higher success	12.43**	15.00**
Parental occupation		
Lower class (omitted)		
Working class	1.590*	2.258
Middle class	1.381	1.459
Upper class	1.843*	1.636
Interaction effects with parental occup.		
higher success \times Working class		0.580
Higher success \times Middle class		0.933
Higher success \times Upper class		1.187
Observations	2551	2551
Pseudo R^2	0.363	0.363

odds-ratio; z statistics in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Chapter 5

Academic interest and educational performance on German lower secondary school

5.1 Introduction

In the past decades, the empirical research of adolescent development in the joint framework of inequalities and opportunities as well as in a life-course transitions have been conducted in a separate way. To the one hand, sociologists have investigated the association of socioeconomic background over the life-course transitions framed by the institutional features, they were particularly interested on the intergenerational reproduction of educational inequalities (Ermisch et al., 2012b; Smeeding et al., 2011; Breen and Goldthorpe, 1997). In addition, the attention was remain on the cumulative aspect of intergenerational transmission of (dis) advantage over the life-course transitions (DiPrete and Eirich, 2006). In effect, familial influences are through to unfold in primary school and extend to lower secondary school and beyond, with the students social origin being one of the most important determinants of academic performance gap (Blossfeld et al., 2016a). Sociological research on the adolescent development has neglected the fact that the young person possesses agent capacities able to influence their development.

On the other hand, psychologists have been interested on the agent-related developmental process on adolescence, they investigate the association of cognitive, emotional and behavioral components linked with a successful development of adolescents (Brown, 2011; Lerner and Steinberg, 2009). A particular attention was remain on the age-related developmental process over the institutionalized life-course, like how adolescents are emotionally adapted to a more formalized educational structure, or how they search for the acceptance in a particular group.

Psychological research has neglected that adolescents are embedded on social structures, values and norms (Ulrich Mayer, 2004) together with the age-related processes driven the adolescent development.

An interdisciplinary framework among life-course transition, social inequalities and agent-related developmental process is needed to better understand how these developmental aspects are interwoven with opportunities, resources and support of their families affecting adolescents educational success and educational attainment.

In adolescence, a major aspect of agent-related developmental process is the school engagement towards school performance. The empirical literature on the topic of school engagement maintains that school success in adolescence presupposes the development of a multifaceted engagement including behavioral, motivational and cognitive components. Understanding such processes in the adolescence is important in order to provide insights about relevant factors related to this period that affects educational performance and, thus, school success.

In this study I investigate how students' academic interest, as part of the motivational component of school engagement, is associated with educational performance, and how this association is framed by students social origin on the period of lower secondary school. In Germany, this period is placed in the middle of two important transition points, at the beginning of lower secondary school students come from the first educational transition which is the primary school; at the end of lower secondary school students transitioned to upper secondary school or to vocational educational qualification. These features of the German educational

system make of this period particularly attractive for a multifaceted approach that includes both the engagement of adolescents themselves and the opportunities provided by families.

In that way, this investigation contributes to the general recognition that educational success of adolescents should be regarded from an interdisciplinary perspective taking into account specific factors of age-related developmental process of adolescents as well as the role played by social background all together affected by an institutionalized life course.

The following section presents the theoretical considerations and hypotheses. Next a description of the data, variables and method is given. Finally, the empirical results and conclusions are presented.

5.2 Theoretical Framework

The theoretical framework of this study integrates two components. The first part presents a review of the conceptualization of school engagement that includes academic motivation and its association with academic performance. The second part exposes the existing literature on intergenerational transmission of educational inequalities and opportunities in the adolescence related with academic engagement.

5.2.1 The motivational component of school engagement

The existing literature on educational and developmental process in adolescence underlines that one important factor that ameliorates school achievement is the

conceptualization of school engagement (Wigfield et al., 2015; Upadaya and Salmela-Aro, 2013; Li et al., 2010; Skinner et al., 2008). Scholars argue that although the school attendance is compulsory, establishing a school commitment is essential to benefit of what school offers as well as to acquire capacities needed to succeed in the labor market.

According to the work of Fredricks et al. (2004) and Jimerson et al. (2003) school engagement has a multidimensional nature that is defined upon three ways. First, *behavioral engagement* is associated with the idea of participation and includes involvement in school as well as in extra curricular activities, thus, it was considered as an important component to prevent school dropouts as well as to achieve positive educational outcomes. Second, *emotional engagement* is associated with positive or negative reaction to teachers, classmates and, in general, to schools. It is considered as a factor that creates on students certain ties with institutions as well as it influences the willingness to do the work. Third, *cognitive engagement* draws on the idea of invest, thus, it is often associated with the exercise a necessary effort to comprehend complex ideas and master the skills.

In this way scholars moved from the unidimensional concept of school engagement to a multifaceted view that encompasses a broader perspective of this macro construct. However, the adoption of this wide perspective have some consequences; in many ways the components of school engagement are overlapped with other constructs already studied in the literature of adolescent development. For example, research on cognitive engagement is related to that on motivational goal and self-regulated learning (Zimmerman and Martínez-Pons, 1992), or the

research on emotional engagement is also related with investigations on students attitudes, interest and values (Wigfield and Eccles, 2000). For this reason, there is not a consensus about what exactly the three agreed forms that composed school engagement entails (Skinner et al., 2008).

In this study I focus on the motivational component of school engagement that reflects students emotional commitment of learning at school. According to Skinner et al. (2008) emotional engagement can be reflected on the students enthusiasm, interest, enjoyment, satisfaction, pride and validity. Therefore, motivational engagement is a multidimensional construct that can take different forms including, in the domain of extrinsic motivation, the academic interest (Gottfried et al., 2007; Steinhoff and Buchmann, 2017). In the literature interest express a desire to acquire knowledge in a specific subject and, therefore, it may be considered as a factor that stimulates the cognitive learning (Hidi, 1990). According to Marsh et al. (2005), academic interest is a domain specific factor such as mathematics, language or science.

The motivational engagement through academic interest has demonstrated to be associated with students grades, school courses selection and school retention (Nagy et al., 2006; Denissen et al., 2007; Connell et al., 1995). However, scholars that investigate the association between academic interest and academic achievement were unable to identify empirically the two theoretical components of interest, which are value (affective) and commitment (importance). The interest driven by commitment is characterized by the experience in a domain specific as well as feelings of autonomy, this is considered as part of motivational engagement on

the framework of school engagement, while the interest driven by value is placed as one component of the task value in an expectancy value framework (Eccles, 1983).

To one hand, some authors argues that academic interest (conceptualize as commitment) can affect the subsequent achievement (Schiefele, 1998) For example, Köller et al. (2001) investigated the association between interest, learning and course selection using a longitudinal data collected from lower to upper secondary school in Germany; their results showed that, after controlling for prior academic performance, interest in mathematics does not predicts performance in lower secondary, but it was an important predictor in upper secondary school, indeed the authors argued that the academic interest is mostly associated with school choices. In another investigation developed by Steinhoff and Buchmann (2017) they explore the co-development effect of academic interest and effortful engagement on academic success on the period of primary to lower secondary school using a cohort of the National Suisse longitudinal survey. Their findings showed that these two components are associated with the allocation of students in the academic track.

On the other hand, scholars have argued that academic interest (conceptualize as value) affect the subsequent academic achievement (Marsh et al., 2005; Krapp, 2000), and suggested that this relation could be mediated by academic self-concept. This stream of research found its support on the original expectancy-value theory where Eccles (1983) proposed that academic self-concept have a causal effect on both academic expectation and task-value (including interest), and, therefore, an

indirect effect on academic achievement. In a subsequent research this model was modified indicating that expectancy value and self-concept cannot be distinguished (Wigfield and Eccles, 2002) thus, theorizing both as one construct.

The empirical research have also investigate the patterns over time between the academic competency and academic interest finding that, to one hand, the association between these two components decrease over time from childhood to lower secondary school and increase again in upper secondary school; on the other hand, academic competency was linked with its previous levels, and few cross links related these two components suggesting that it might be a reciprocal relation (Jacobs et al., 2002), thus, partly consistent with the expectancy-value theory.

In this investigation I am going to follow a developmental perspective, examining the potential of student motivational engagement through academic interest (commitment) in school context on educational achievement over lower secondary school.

5.2.2 Social class differences in academic performance and school engagement in adolescence

The long-standing tradition of sociological research has well established that social origin is one important factor in creating differences in educational performance, and, therefore, academic achievement level. Indeed, students from high social origin perform systematically better in primary school compared to students from lower social class, meaning that they arrive to lower secondary school

with already different levels of abilities. Hence, the educational inequalities due to social origin are unfolded throughout the school system. The investigation of familial influences on academic achievement often is elaborated on the concept of cultural capital (Bourdieu, 1986) stating that the transmission of habits, norms, values from parents to their offspring through the socialization process shapes young own views, beliefs and values that are demonstrated on everyday school interactions. For example, for Lareau (2012) this class differences are also associated with parenting styles practices where parents from high social class create on their children an important sense of entitlement that help them to take advantage on school interaction compared to children from lower social class.

This socialization process within the family may also be observed on the different degrees of student school engagement. For example, Wang and Eccles (2012) investigated the patterns of growth as well as the effect of teachers, peers and parental support on school engagement for secondary school students. They observed that the average growth on school engagement decreases over lower secondary school; they also found a positive association of school engagement and parental support demonstrating that parents remain an important source of influence in adolescence.

In other study Frenzel et al. (2010) investigates the development of math interest over adolescence, gender difference in this trajectories and the effect of family values on the development of students interest for a longitudinal sample of students from 5 to 9 grade on lower secondary school. Their findings support a positive development of academic interest over time, however, with a curvilinear

shape, indeed, ability group is related with interest especially for lower achievement groups; their study also underlines the importance of socializer agents like parents in shaping students' interest in subject matter.

In fact, some studies have linked parenting practices to childrens achievement motivation (including extrinsic motivation). They often argue that parents act as role models for their children in childhood, thus, in adolescence students are more likely to value what their parents value (Eccles et al., 1993). For example if parents show a particular interest in a specific domain, they provide a support system at home to boost children interest in this specific domain Gonzalez-DeHass et al. (2005). While there are numerous studies that link parental expectation as well as parental practices with students school engagement, especially behavioral engagement, there are few studies that link family influences on students interest in a specific subject matter. Indeed, in this study I argue that academic interest of students may also be associated with their social origin given that in childhood children absorbed the class specific values and beliefs that parents transmit them through the socialization process. Therefore, in adolescence students bring this differences in values and beliefs in different school interaction like the interest demonstrate in a particular subject or the importance to understand complex ideas, or the participation in academic extra curricular activities vs. non-academic extra curricular activities.

5.3 Research hypotheses

Graphical representation of the theoretical hypotheses tested here are shown in Figure 5.1, where the dashed arrows represent each hypothesis. Thus, in this part I will formally present the three hypotheses.

Ability gap in adolescence, the effect of Students' interest

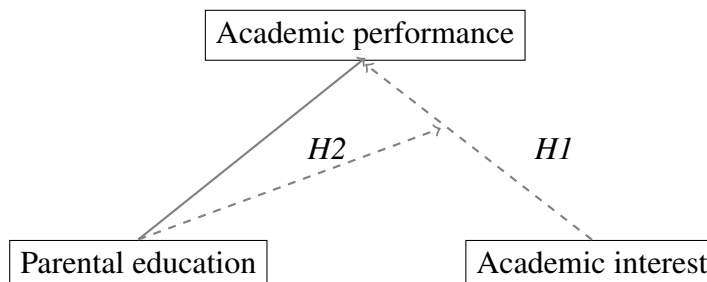


Figure 5.1: theoretical hypotheses to be tested

The empirical literature have recognized that motivational engagement, and in particular academic interest, is associated with different educational outcomes such as the academic achievement, or even it may prevent school retention. Although it is difficult from an empirical perspective differentiate the two components (commitment and value) of academic interest, the literature have support a positive association with academic performance. Hence, according with the theory, I expect that academic interest and academic performance are positive associated over the period of lower secondary school (**Hypothesis 1**).

In addition, the empirical literature that investigates the trends over time between academic interest and academic performance suggest a downward association between them, especially in lower secondary school. However, the evolving of academic interest over time cannot be regarded independent from the educational

system where students participate. In that view, the German educational system provides a particular features that make of it an interesting case of study to investigate how the school tracking deadlines imposed on this stratified educational system as well as the different types of lower secondary school shapes the academic interest. To one hand, a particularity of lower secondary school in Germany is that at the end students transitioned to the academic track or to vocational education. On the other hand, the context and content teaching in the school types are different, being the gymnasium track the most demanding.

To better understand the relation of school tracking at a given age and the development of academic interest, I rely on the Heckhausen theory of developmental deadlines (Heckhausen et al., 2010). This theory stated that individuals adjust their behavior in view of the upcoming deadline transition. They refer to these deadlines of transition as urgent phases of goals engagements where students can regulate their level of engagement. For example, if students regarded this deadlines as impediments to accomplish their academic development (especially in the academic track gymnasium), then they may increase their engagement to overcome this constraint. Therefore, I expect to find a higher size effect of academic interest when students are approaching to the deadline, thus, at the end of lower secondary school, compared to the beginning of lower secondary school especially for those students who belong to the academic track gymnasium (**Hypothesis 2**). Finally, according with the empirical literature parental support was observed to be associated with components to school engagement (Wang and Eccles, 2012) demonstrating that parents remain an important source of influence, therefore,

given that students from higher social origin perform systematically better in academic test compared to students from lower social origin. If social background captures part of the effect of academic interest on reading performance, then I expect that this association should be stratified. Indeed, in view of the approaching deadlines probably lower class students increase their school engagement through academic interest to compensate their lower academic performance compared to higher-class students (**Hypothesis 3**).

5.4 Data, variables, method

5.4.1 Data

The empirical analysis uses the second and the sixth wave of the Starting Cohort 3 of the German National Panel Data (NEPS) (Blossfeld et al., 2011). While the study sampling did not allowed for a longitudinal analysis, it does provide rich cross-sectional information for each wave. The raw sample (N= 3176 obs.) of second wave contains information of students that recently transitioned from primary to lower secondary school in the period of 2010/2011. The raw sample (N=2034 obs.) of third wave contains information of students at the end of lower secondary school education in the period of 2014/2015 that should be transitioned to upper secondary school or vocational training education next year. From these samples I eliminate missing cases for the variables of parental background, academic performance and academic interest. After data processing, in wave two 83 percent

of the sample remains for the analysis, and in wave six 89 percent of the sample remain for the analysis. In all the estimations I applied the weights provided by NEPS to adjust for different selection probabilities.

5.4.2 Variables

Reading performance

The measurements provided for reading competencies were constructed taking into account the changes in acquisition of competencies over the students' life span. The measurement comprises three mainly features, which are: a) type of text (five categories), b) comprehension text (3 categories), and c) text format.

Regarding the type of texts, five categories are described as follows: 1) actual information referring to the basic text of knowledge acquisition; 2) connecting functions with text to controversial questions, for example, texts referring to smoking consequences were provided in order to test students reasoning; 3) literacy function, under this category short extracts of novels, stories or poems are provided; 4) products inserts referring to instructions texts (e.g. engineering instructions); 5) appeals and advertisings referring to texts for job offers or recreational activities.

In respect to the second feature (i.e. comprehension) for the construction of reading competence, it was composed for the following three subcategories: 1) finding precisely information in a particular text; 2) drawing general conclusions based on several sentences; 3) reflecting upon and assessing the text (e.g. recognition of a central idea).

The final feature that composed this construct is the text format referring to text presentation (i.e. the booklets); it was organized into three subcategories: 1) multiple choice format, 2) decision-making tasks (i.e. true/false statements), and 3) correlation tasks (i.e. title chosen for the text).

Based on those features of reading performance, texts were appropriately selected according to each age cohort increasing difficulty over grade levels. The NEPS SC3 dataset provides a weighted likelihood estimation (WLE) for each time that the reading competencies were measured. The WLE estimator provides in each wave was standardized to include it on the regressions.

Academic engagement

The academic engagement measures how strongly students enjoy reading and writing text in German language. In the dataset this was measured using statement where student answer whether it does not applies at all to it applies completely. These statements were: *a) I enjoy reading and writing text, b) it is very important to me to become better acquainted with the German language and literature, c) I really enjoy learning more about myself and the world through reading books, d) I am willing to use part of my free time in order to become better acquainted with the German language and literature.* Based on these statements, the dataset provides a continues scale of academic interest in German language, it goes from 1= to less interested to 4= very interested. This scale is, then, used to measure the students academic interest in german on the 6th and 9th grade of lower secondary school.

Social background variables

In measuring the social background of students I take into account only one dimension: the educational level of parents. The studies normally account for several dimensions included parental occupation and immigration background of parents. Nevertheless, due to the high number of missing cases in these two variables, it was not possible to introduce it on the analysis. Indeed several strategies have taken to understand how the percentage of missing was so higher, but it was not possible to recover these cases.

Parental educational level was measured by CASMIN codification that was reconstructed to obtain a total of four categories: Lower secondary school or less = non-qualifications, elementary or intermediate school, basic vocational qualifications; Intermediate vocational degree; High school or Vocational degree; and University degree= upper and lower tertiary education.

In 6th grade the sample was composed by 36% of parents with intermediate vocational degree, 23% with high school or vocational degree, 23% with university degree, and 12% with lower secondary degree or less.

In grade 9th the composition of the sample was very similar to the 6th grade with 37% of parents with intermediate vocational degree, 26% with university degree, 22% with high-school or vocational education degree, and 12% with lower education or less.

Type of school

This variable measures the type of school that student transitioned to after primary school. Originally this variable was composed by the four categories which are the common tripartite types of lower secondary schools existing in most part

of the federal states (gymnasium, hauptschule, realschule) as well as the called comprehensive schools that exists in few federal states. Comprehensive schools usually unified the hauptschule and realschule under the same umbrella. Finally, this variable was recoded in two categories 1 if the students are currently enrolled in a gymnasium school and 0 if they were enrolled on a vocational education (hauptschule, realschule and comprehensive schools).

In grade 6th 43% of students were currently enrolled in one type of vocational education, while 56% in the academic track gymnasium. In grade 9th the proportion were quite similar 42% in a vocational track and 57% in academic track.

Educational aspiration of student

This variable measures the students high-school leaving qualification with the following question: *Considering everything you know now, what qualification will you actually leave school with?*. The answers were encoded on three categories 1 = leaving certificate of hauptschule, 2 = leaving certificate of realschule, and 3 = abitur, the higher education entrance qualification to university.

This variable was only measure in 6th grade students of them 60% expect to obtain a qualification of gymnasium, 33% of the vocational school realschule and 6% of the vocational school hauptschule.

The subjective probability of completing the “abitur” examination

This variable measures the students expectation of successfully complete the gymnasium academic track, it was measure by the following question: *if you think at this moment, how likely is that you could complete the university entrance qualification (abitur examination)?*.

The answers were encoded on five categories going from 1= very unlikely, 2= rather unlikely, 3 = roughly 50/50, 4 = rather likely, and 5 = very likely. Due to the few number of students that rate their probabilities as very unlikely, I encoded in four categories jointing “very” and “rather unlikely” into one.

This variable was only measured by the sample of 9th grade students, and the final composition is 12% of students rating their probability of success as rather or very unlikely, 20% as roughly 50/50, 40% as rather likely and 26% as very likely.

Student self-assessment of their reading performance

In the empirical literature, especially on the expectancy-value theory, one important factor affecting the academic performance is the students self-perception about their own abilities. Indeed, this factor, together with the task-values components, is an important component that affects the academic performance. The dataset provides measures of students self-evaluation about their reading performance using the following statement *I can understand text very well and quickly*.

The answers were coding in four categories going from 1 = completely disagree, 2= rather disagree, 3 = rather agree and 4 = completely agree.

Likewise in the previous case, the category 1 has few values, thus, I jointed it with the second category. The final composition of this variable only available for the 9th grade students was 22% of students that completely or rather disagree, 50 % of students that rather agree, and 26% of students that completely agree.

Classmates ambitious at school

The empirical literature also stress that in adolescence the peer influences may shape both the academic performance as well as the level of academic interest in

a specific subject. The dataset provide one measure of students perception about their classmates effort with school task. This variable was measured by the following statement *Most of my classmates are very ambitious at school*. The answers were encoded on five categories from 1 = does not apply at all, 2= does not really apply, 3= partially applies, 4 = applies to some extent, and 5 = applies completely. Due to the few number of assessments in the first category, I encoded in four categories jointing does not apply and does not really applies into one. In the same way, the category 5 completely applies have few cases, thus I joint with the category 4 (= “applies to some extent”).

The final composition of this variable only available for 6th grade students was 28% of students assessing that their group of classmates are not really ambitious at school, 53 that are partially ambitious, and 17% that their classmates are ambitious at school in some extent.

Control variables

The analysis also controls for gender, place of student residence (east or west Germany), parental employment number of sibling (only for the sample of 6th grade students), and the number of people under the age of 14 years at home (only for the sample of 9th grade students). All the descriptive statistics are presented in the table (D.1).

5.4.3 Method

The analysis of this study relies on two cross-sectional samples that contain relevant information for this analysis. The first sample collected information at the grade 6th of lower secondary school (one year after the students transition from primary school). The second sample was collected information on 9th grade of lower secondary school (one year before the transition into upper secondary or vocational school).

Although having only two points of measurement limits the implementation of a longitudinal methodology, it is possible to analyze the two cross-sectional samples conducted on the same students and obtain comparable results.

Model specification

The empirical strategy in this work related the estimation equations to a specific hypothesis mentioned above. All estimations were based on OLS regressions and standardized values of the dependent variable (i.e. reading performance), in both samples.

H1: Association of academic interest and academic performance

$$Y_j = \alpha + \beta_1 AI + \epsilon_j \quad (5.1)$$

$$Y_j = \alpha + \beta_1 AI + \beta_2 Educ + \epsilon_j \quad (5.2)$$

$$Y_j = \alpha + \beta_1 AI + \beta_2 Educ + \beta_3 ST + \epsilon_j \quad (5.3)$$

$$Y_j = \alpha + \beta_1 AI + \beta_2 Educ + \beta_3 ST + \beta_4 Z + \epsilon_j \quad (5.4)$$

Where Y_i is student's reading test scores j stays for whether it is measured in 6th

grade or 9th grade, AI symbolize the academic interest in German language, Educ is the parental level of education, ST is the type of school that students belong, Z is set of control variables. Model 1 (5.1) estimated the raw effect of academic interest on reading performance; in model 2 (5.2) I introduce the parental educational level; model 3 (5.3) introduces the type of school that students currently belong; and model 4 (5.4) includes all the covariates and control variables.

H2: Heterogeneous effects of school type

$$Y_j = \alpha + \beta_1 AI + \beta_2 Educ + \beta_3 ST + \beta_4 Z + \beta_5 AI * ST + \epsilon_j \quad (5.5)$$

Based on the estimation of model 4, the model 5 (5.5) introduces an interaction term between the school type and academic interest to test the existence of heterogeneous effect of academic interest over the school types.

H3: Heterogeneous effects of parental education on the academic track gymnasium

$$Y_j = \alpha + \beta_1 AI + \beta_2 Educ + \beta_3 ST + \beta_4 Z + \beta_5 AI * Educ + \epsilon_j \quad (5.6)$$

Using the estimation of model 4, model 6 (5.6) introduces an interaction term between the parental education and academic performance to test if social class stratifies association of academic interest and performance.

5.5 Empirical findings

Academic interest and reading performance

In this part, I address the question of whether the academic interest in German

language is associated with academic performance on two points of measurement (6th and 9th grade) of lower secondary school. Using a multivariate approach, I first assess the differences on reading performance due to academic interest; and second whether this difference is systematically different across parental education and the type of school student are enrolled. In tables (5.1) and (5.2) presents the results from a ordinary least square (OLS) regression models taking the reading performance as dependent variable for the sample of 6th grade students as well as for the sample of 9th grade students of lower secondary school.

Starting with students in the 6th grade of lower secondary school, table (5.1) presents the results of models estimation. Model 1 estimates the raw difference in reading performance as being about 19 percent of standard deviation due to academic interest. Model 2 adds the parental educational level, relying on the large established literature that social origin is an important factor that creates differences on academic performance. Examining the results of model 2, it becomes clear that part of the association of academic interest and performance is due to social background; it is observed a reduction on the coefficient of academic interest (6 percent of standard deviation). As a matter of fact, the educational level of parents matter significantly for the reading performance of students in 6th grade of lower secondary school. For example, an increase on parental education from high-school to university degree increases students reading performance on 39 percent of standard deviation. However, model 2 is only informative with regard to the total association of academic interest and reading performance.

In model 3 students' school type is included on the regression. Examining the

results, the type of school students are enrolling captures part of the association of academic interest and reading performance as is observed on the reduction of the size of coefficient (around 3 percent of standard deviation). This also reflects the difference in reading performance across the types of secondary schools being the gymnasium where the students are more able. As a matter of fact, these differences in academic performance of students might demand different degrees of students motivational engagement, thus, different levels of academic interest.

Finally, model 4 includes all the controls and covariates, although including these predictors reduces the size effect of the coefficient of academic interest it remain stable and significant, indeed the total net differences in reading performance is about 10 percent of standard deviation due to academic interest on the 6th grade of lower secondary school (supporting hypothesis 1). Nevertheless the effect of these control variables should be interpret carefully. For example, students' aspirations are clearly associated with reading performance. On the other hand, the aspirations may also increase the academic interest of students by dedicating more time on subjects that are important for the educational attainment they desire, for example, subjects of math or language are important for the general students' evaluation which gives them opportunities to transitioned on the upper secondary education, hence, aspiration may carry part of the effect of academic interest.

Table 5.1: OLS models explaining the association of academic interest and reading performance on 6th grade of lower secondary school

	Model 1	Model 2	Model 3	Model 4
Academic interest in German language	0.193** (0.0323)	0.163** (0.0311)	0.133** (0.0287)	0.102** (0.0289)
Parental education				
Lower second. or less (omitted)				
Interm. Voc. degree		0.388** (0.0654)	0.303** (0.0624)	0.232** (0.0638)
High-school or Voc. degree		0.488** (0.0710)	0.279** (0.0692)	0.240** (0.0685)
University degree		0.883** (0.0723)	0.597** (0.0718)	0.547** (0.0713)
Students' type of school				
Gymnasium			0.637** (0.0435)	0.484** (0.0531)
Students' educational aspirations				
Certificate from Realschule				0.417** (0.0823)
Certificate from Gymnasium				0.625** (0.0873)
Ambitious classmates				
Partially applies				0.154** (0.0452)
Applies				0.0330 (0.0559)
Parental employment				
Job-side				0.0755 (0.0994)
Part-time				0.0270 (0.0568)
Full-time				-0.0281 (0.0630)
Girls				0.0422 (0.0399)
Number of siblings				
One sibling				-0.179** (0.0485)
Two-sibling				-0.202** (0.0623)
Three or more siblings				-0.282** (0.0840)
East Germany				0.180** (0.0664)
Constant	-0.449** (0.0751)	-0.834** (0.0814)	-0.939** (0.0757)	-1.254** (0.113)
Observations	2645	2645	2645	2645
Adjusted R^2	0.018	0.098	0.188	0.218

Standard errors in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

The models estimated on the 9th grade shows similar results to the models presented for the 6th grade. In table (5.2) presents the estimated results for 9th grade. Model 1 estimates the raw difference in reading performance as being about 34 percent of standard deviation due to the academic interest, almost twice the one obtained on 6th grade. Moreover in model 3 introduces the parental education and students type of school, this reduces the size effect of the academic interest coefficient on 3 percent of standard deviation. An inspection of the model 3 I observe that parental education is still significant for students reading performance in 9th grade, however the difference among levels reduces significantly, for example an increase of parental education from high-school to university degree increases the reading performance of students on 9 percent of standard deviation.

Finally, model 4 estimates the effect of academic interest net to all covariates and controls. Although I observe the net effect of academic interest on reading performance reduces, it remains positive and significant. Indeed, the difference in reading performance is about 22 percent of standard deviation due to academic interest. (Support for hypothesis 1), this effect is about twice the effect observed on 6th grade. I also observe that higher probabilities of passing the examination is associated with good reading performance as well as self-assessment of performance.

Table 5.2: OLS models explaining the association of academic interest and reading performance on 9th grade of lower secondary school

	Model 1	Model 2	Model 3	Model 4
Academic interest	0.347** (0.0375)	0.318** (0.0376)	0.312** (0.0341)	0.221** (0.0375)
Parental education				
Lower secondary or less				
Interm. Voc. degree		0.328** (0.0833)	0.198* (0.0805)	0.107 (0.0773)
High-school degree		0.572** (0.0894)	0.345** (0.0896)	0.173* (0.0857)
University degree		0.794** (0.0897)	0.437** (0.0886)	0.241** (0.0873)
Students' type of school				
Gymnasium			0.675** (0.0527)	0.457** (0.0593)
Probab. of passing the abitur exam				
About 50/50				0.216** (0.0821)
Rather likely				0.510** (0.0871)
Very likely				0.645** (0.101)
Self-assessm. of good reading perform.				
Rather agree				0.293** (0.0581)
Completely agree				0.395** (0.0722)
Parental employment				
job-side				-0.0643 (0.130)
Part-time				-0.150 ⁺ (0.0879)
Full-time				-0.0699 (0.0932)
Girls				0.0136 (0.0517)
Young under 14 at home				
One				0.0178 (0.0548)
Two				-0.0734 (0.0852)
Three or more				-0.0663 (0.161)
East German				0.0651 (0.0710)
Constant	-0.859** (0.0813)	-1.238** (0.103)	-1.374** (0.0990)	-1.496** (0.146)
Observations	1826	1826	1826	1826
Adjusted R^2	0.076	0.144	0.244	0.301

Standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

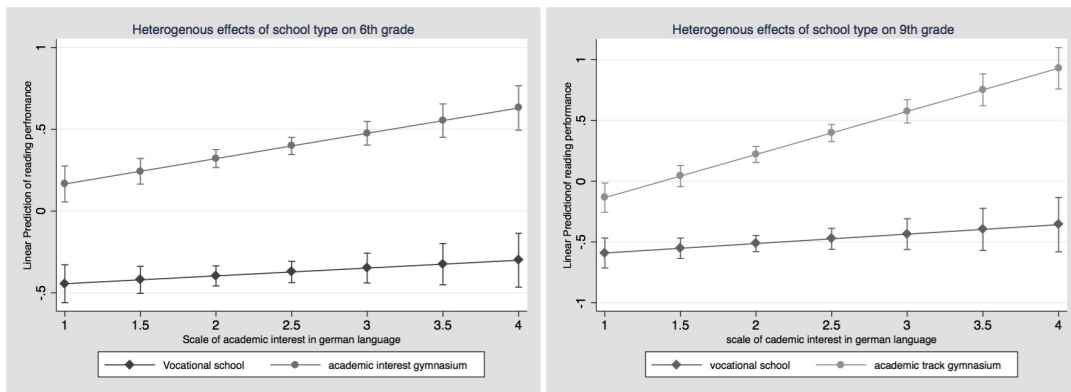
Summing up, over the two points of estimation (6th and 9th grade), I observed that part of the differences on reading performance over lower secondary school are partly partly explained by the different levels of students' academic interest with the size effects increasing when students approaching to the deadline of transition (9th grade).

Heterogeneous effect of academic interest by school type

In this section I present the results for the hypothesis two, figure (5.2) presents the results of the interaction effects estimated between academic interest and the type of school the students are current enrolled, the estimation of corresponding table (D.2) are reported on the appendix of this chapter.

Examining figure (5.2) it is possible to observe important differences on the academic interest for the gymnasium type of school compared to vocational school as well as between the beginning and the end of lower secondary school. It is clearly that academic interest is higher on the gymnasium school type, since the courses and content are more demanding compared to vocational schools. Moreover, this increasing academic interest is to be more pronounced when students approached to the dead lines of transition (support for the hypothesis 2).

Figure 5.2: Students current school enrollment and the relationship between academic interest and reading performance at 6th and 9th grade of lower secondary



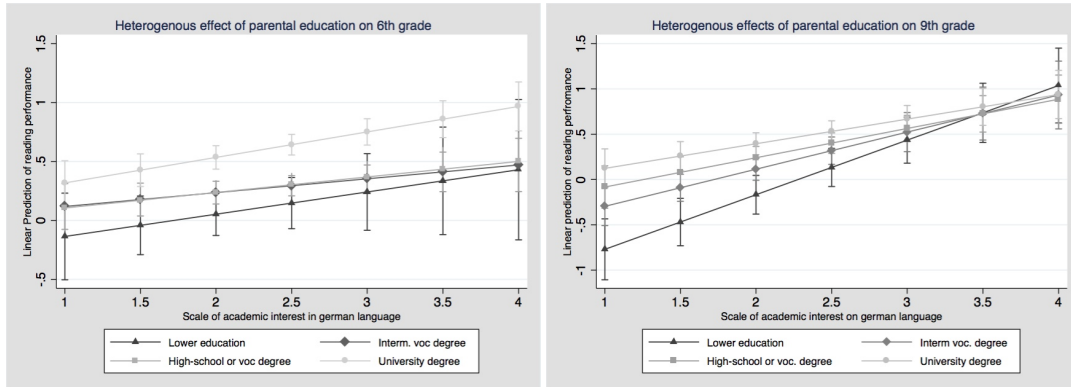
Heterogeneous effect of academic interest by social background

In this last section, I examine the results for hypothesis 3, figure (5.3) presents the results of the interaction effects estimated between the academic interest and the parental educational level for the academic type of school gymnasium, the corresponding estimation models are reported on the appendix (D.3). So far, the model assumed a homogeneous impact of academic interest on both gymnasium and vocational school across group of students. However, theoretical arguments suggested that it might be heterogeneous effects by social origin. The different estimations yield statistical significant associations only for the model of grade 9 of lower secondary school. For example, the effect of academic interest is lower in 9 percent of standard deviation when parental education increases from intermediate vocational level to high-school degree.

This downward trend of academic interest is clearly observed on the figure (5.3). Conversely, it is observed a positive trend for student from lower educated parents, meaning that approaching to a deadline students from lower edu-

cated parent increase their academic interest to compensate their lower academic performance, this is accordance with the hypotheses 3 and 2.

Figure 5.3: Parental education and the relationship between academic interest and reading performance at 6th and 9th grade of gymnasium school track



5.6 Conclusion and discussion

In this chapter I intended to contribute to the general recognition that educational success on adolescence should be take into account factors of age-related developmental process of adolescents are affected by social background as well as institutional features of the educational system. In doing that, I investigate one important factor related to the age-related adolescent development namely school motivational engagement measuring through the students academic interest. First, I analyze the patterns of association between academic interest and reading academic performance at the beginning (grade 6) and at the end (grade 9) of lower secondary school in Germany. Secondly, I consider that the institutional features of the educational system where students are enrolled frame the changes on this important construct. The results showed a positive association between academic

interest and reading performance with an increasing effect at the end of lower secondary school. Additionally, the increasing academic interest observed on the gymnasium type of school was stratified by parental educational level.

While the interaction effects yield an increasing academic interest for students from lower educated parents, a reduction of academic interest is observed for the other categories. One explanation could be that students from well educated parents already secures their transition to upper secondary school, thus they may reduce their academic engagement, the opposite is happened for students from lower educated parents. Indeed, this provides some insights of the possibility that students can regulate their levels of school engagement in view of the institutional deadlines imposed by the educational system.

Appendices

Appendix D

Tables

Table D.1: Descriptive statistics

Variables	Grade 6 2645 Obs.		Grade 9 1826 Obs.	
	Mean or %	SD	Mean or %	SD
Reading performance	0.26	1.22	0.316	1.07
Academic interest	2.32	0.70	2.18	0.81
<i>Parental education</i>				
Lower secondary or less	16.36		12.49	
Interm. voc degree	36.33		37.73	
High school or voc degree	23.89		22.89	
University degree	23.44		26.89	
<i>Students' type of school</i>				
Vocational education	43.97		42.17	
Academic track gymnasium	56.03		57.83	
<i>Parental employment:</i>				
Unemployed	16.52		10.35	
Job-side	7.07		5.86	
Part-time	48.88		50.55	
Full-time	27.52		33.24	
Boys	51.42		47.75	
Girls	48.58		52.25	
<i>Place of residence</i>				
East Germany	9.83		15.88	
West Germany	90.17		84.12	
<i>Students aspirations</i>				
Hauptschule	6.20		-	
Realschule	33.69		-	
Gymnasium	60.11		-	
<i>Ambitious educ classmates</i>				
does not really applies	28.58		-	
Partially applies	53.95		-	
Apply to some extent	17.47		-	
<i>Number of siblings</i>				
None	25.51		-	
One	49.24		-	
Two	18.45		-	
Three or more	6.80		-	
<i>Prob of passing Abitur</i>				
Rather disagree	-		12.66	
About 50/50	-		20.90	
Rather agree	-		40.19	
Completely agree	-		26.26	
<i>Self-assessm. of good perform</i>				
Rather disagree:	-		22.95	
Rather agree:	-		50.77	
Complete agree:	-		26.29	
<i>young less than 14 at home</i>				
None	-		52.61	
One	-		34.67	
Two	-		6.87	
Three or more	-		2.85	

Table D.2: OLS estimation of heterogeneous effects of school type and parental education on 6th grade students

	Model 1	Model 2	Model 3
Academic interest	0.102** (0.0289)	0.0479 (0.0430)	0.189 (0.151)
Parental education			
Lower education (omitted)			
Interm. voc. degree	0.232** (0.0638)	0.235** (0.0640)	0.273 (0.362)
High school or voc. degree	0.240** (0.0685)	0.229** (0.0685)	0.263 (0.364)
University degree	0.547** (0.0713)	0.529** (0.0716)	0.392 (0.363)
Students' type of school			
Gymnasium	0.484** (0.0531)	0.250 ⁺ (0.137)	- -
Interaction effects school type			
Gymnasium \times Academic interest		0.107 ⁺ (0.0569)	
Interaction effects parental educ.			
Interm. voc \times Academic interest			-0.0713 (0.162)
High-school or voc \times Academic interest			-0.0569 (0.163)
University \times Academic interest			0.0275 (0.163)
Constant	-1.254** (0.113)	-1.280** (0.132)	-0.682 ⁺ (0.373)
Observations	2634	2640	1480
Adjusted R^2	0.218	0.215	0.070

Standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table D.3: OLS models estimating heterogeneous effects of school type and parental education on 9th grade students

	Model 1	Model 2	Model 3
Academic Interest	0.221** (0.0375)	0.0776 (0.0539)	0.603** (0.106)
Parental education			
Lower education or less(omitted)			
Interm. voc degree	0.107 (0.0773)	0.107 (0.0763)	0.686* (0.317)
High school or voc degree	0.173* (0.0857)	0.173* (0.0844)	0.936** (0.319)
University degree	0.241** (0.0873)	0.245** (0.0859)	1.197** (0.308)
Students' type of school			
Gymnasium	0.457** (0.0593)	-0.151 (0.149)	- -
Interaction effects school type			
Gymnasium \times Academic interest		0.277** (0.0657)	
Interaction effects parental education			
Interm. voc. \times Academic interest			-0.193 (0.134)
High school \times Academic interest			-0.280* (0.127)
University \times Academic interest			-0.331** (0.124)
Constant	-1.496** (0.146)	-1.199** (0.159)	-1.926** (0.365)
Observations	1806	1806	1055
Adjusted R^2	0.301	0.312	0.201

Standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Chapter 6

Final Conclusions

Clearly the cultural, economic and social resources are not evenly distributed across the society. This unequal distribution of resources was observed to produce different levels of educational attainment on students as well as different labor market outcomes. Indeed scholars on the field of social stratification research called inequalities in educational opportunities to the effect of parental background on the educational achievement of students. In the past, the social stratification research was more concerned with the mechanism of social reproduction in the school system. To the one hand, the differences in academic performance due to parental influences; on the other hand, the differences in educational choice due to parental influences net of academic performance. In sociological theory, these differences are usually called primary and secondary effect of social class (Boudon, 1974; Jackson, 2013; Breen and Goldthorpe, 1997). Regarding the period of childhood and adolescence and given the special features of the German educational system, the empirical evidence has maintained more attention on the secondary effect of social class investigating systematically the different educational transitions along the school career. Firstly, a considerable part of the investigation has been focused on transition (from primary to lower secondary) arguing that the early selection is a way to push up the class-differential on the educational performance. However, it was missing the sociological analysis of educational inequalities before children enter in school. Secondly, the investigation of inequalities in educational opportunities on adolescence has been focused on the way the particularities of the German educational system shape the educational attainment of students from different social backgrounds, for example the likelihood of

moving upwards or downwards after students were assigned in a particular school track, or the likelihood to profit of the different educational pathways that provides the German system to enroll on upper education. Nevertheless, the sociological theory was missing the fact that adolescents are embedded on social structures as well as they have agent capacities able to influence their educational success. This research thesis tried to fill this gap investigating how different opportunity structures result in different educational outcomes and how it cumulates over the period of childhood and adolescence. In doing that, a life-stage perspective was adopted instead of life transitions, thus, three stages were defined over the period of childhood and adolescence: a) the entrance in preschool and primary school, b) the transition from primary to lower secondary school, and c) the period of lower secondary school. In each of these three periods a particular factor affecting the academic performance or educational choices was studied. In the first study I investigate how much the domestic activities, especially the reading activities, are associated with the language performance for children that recently enrolled in preschool and primary school. I observed that increase the time dedicated to reading activities at home enhance the language performance of children in the two points investigated. However, it turned that the gap of abilities was influenced by parental background being the maternal education an important factor enhancing the abilities of the children. While I don't find heterogeneous effect on the mothers dedicate doing reading activities at home across social classes, these results underline that interactions between mother-child, in particular, those dedicated to enhance the cognitive abilities are important for the general development of chil-

dren. This study provide some important insights for the educational policy at early age on which the childcare centers should encourage parents to spend quality time with their children at home. Moreover, future investigations can add to this analysis about the quality of parent-child interaction at home instead of taking only the quantity of time, thus, avoiding the social desirability biases problem. In the second study, I investigate one important factor associated with the first educational transition (from primary to lower secondary) named the probability of success assessed by parents and children. I observed that probability of success was hardly associated with parental educational level as well as with the academic performance of students. Moreover, very small differences were found on the assessment of success of parents and children especially at lower levels of ability. This could be explained by the parental socialization process where students adopt similar view points about the school success equal of their parents enhancing, in that way, the social reproduction. Furthermore, I observed that probability of success was also associated with the likelihood of children to be enrolled on the academic track gymnasium. This turned to be associated more with the parental occupation than parental educational level. Indeed, it seems that the influences of parental education acts through the probability of success and the influence of parental occupation directly on the decision of enrollment. Future investigations based on this study could be address: 1) Whether this small differences on the probability of success between parents and children are one factor explaining the reasons why upper class students are more likely to upgrade their educational level after ending lower secondary school. 2) This study could be an starting point

to investigate how the probability of success are associated with the changes on decision making process between parents and children using systematically two transition points e.g. from primary to lower secondary and from lower secondary to upper secondary school. In the third study, I investigated one age-related factor on the adolescent developmental process named the academic interest at the beginning and end of lower secondary school. Indeed, this last study recognized of two important facts. The adolescent have agent capacities able to affect their future educational attainment taking into account that they are also embedded on social structures that influence their behavior. I observed that the academic interest was positively associated with academic performance on the two points in time analyzed. As a matter of fact, the size of academic interest effect was found to be higher when students approach to the deadline of transition compared to the beginning. This increasing academic interest was mostly observed for those students enrolled on the gymnasium school track. In regard of the effect of social background, I also observed that students from lower social origin are those who increase the most their academic interest. Conversely, students from higher social origin decrease their academic interest when they approaching to deadline of transition. One explanation could be that, students from higher social origin have already secured their transition to upper secondary school compared to students from lower social origin who are searching to successfully transitioned on upper secondary school by increasing their academic interest. This empirical evidence demonstrated that the influence of age-related adolescent capacities are able to affect their educational success. Taking together, this thesis provides empirical

evidence of important factors driven by age-developmental process of children and adolescents that are associated with the academic performance. Moreover, I acknowledge that these factors are linked with the social structures where children are embedded providing them different opportunity structures that ending up on different educational outcomes. Concerning the German educational system we can draw some important conclusions. First, the attendance to kindergarten (preschool) is not compulsory, but almost 90 percent of children attend it before enroll primary school. The differences in academic performance found already in preschool and maintained at the time children enrolled on primary school can be explained by the fact that preschool in Germany is thought to be a place where children acquire sociable abilities more than prepare them for school as it is the case of US, for instance. For these reason, the child-parents interaction has relevant importance for children general development. Secondly, the common recognized characteristic of the German system that is the early stratification process where students are divided in different school tracks at the age of 10 years old was hardly associated with parental background. The second study found empirical evidence of another important pathway through parents affect the transition of student, but most important a via by which parents affect children own assessment of success creating, in that way, bases for the social reproduction. Thirdly, in the German educational system at the end of lower secondary school students approached to a second important educational decision which is the transition to upper secondary school, or the enrollment into a vocational training or to enter on the labor market. This deadlines imposed by the German system together with the adolescent ca-

capacities to regulated their capacities are able to affect their own future educational level of attainment. The third study showed that students regulate their level of academic interest as part of the overall level of school engagement with the purpose to acquire the desired level of academic attainment.

Bibliography

- Alexander, K. L., Eckland, B. K., and Griffin, L. J. (1975). The wisconsin model of socioeconomic achievement: A replication. *American Journal of Sociology*, 81(2):324–342.
- Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of educational psychology*, 84(3):261.
- Anders, Y., Rossbach, H.-G., Weinert, S., Ebert, S., Kuger, S., Lehrl, S., and von Maurice, J. (2012). Home and preschool learning environments and their relations to the development of early numeracy skills. *Early Childhood Research Quarterly*, 27(2):231–244.
- Anders, Y., Sammons, P., Taggart, B., Sylva, K., Melhuish, E., and Siraj-Blatchford, I. (2011). The influence of child, family, home factors and pre-school education on the identification of special educational needs at age 10. *British Educational Research Journal*, 37(3):421–441.
- Ballarino, G., Bernardi, F., Requena, M., and Schadee, H. (2009). Persistent inequalities? expansion of education and class inequality in italy and spain. *European Sociological Review*, 25(1):123–138.
- Ballarino, G. and Panichella, N. (2016). Social stratification, secondary school tracking and university enrolment in italy. *Contemporary Social Science*, 11(2-3):169–182.
- Baumert, J., Nagy, G., and Lehmann, R. (2012). Cumulative advantages and the emergence of social and ethnic inequality: Matthew effects in reading and mathematics development within elementary schools? *Child development*, 83(4):1347–1367.
- Becker, R. (2003). Educational expansion and persistent inequalities of education: Utilizing subjective expected utility theory to explain increasing participation rates in upper secondary school in the federal republic of germany. *European sociological review*, 19(1):1–24.
- Becker, R. and Hecken, A. E. (2008). Why are working-class children diverted from universities?an empirical assessment of the diversion thesis. *European Sociological Review*, 25(2):233–250.

- Belzil, C. and Leonardi, M. (2007). Can risk aversion explain schooling attainments? evidence from Italy. *Labour Economics*, 14(6):957–970.
- Bernardi, F. (2012). Unequal transitions: selection bias and the compensatory effect of social background in educational careers. *Research in Social Stratification and Mobility*, 30(2):159–174.
- Bernardi, F. (2014). Compensatory advantage as a mechanism of educational inequality: A regression discontinuity based on month of birth. *Sociology of Education*, 87(2):74–88.
- Bernardi, F. and Ballarino, G. (2016). *Education occupation and social origin. A comparative analysis of the transmission of social inequalities*. Edward Elgar Publishing Limited.
- Bernardi, F. and Boado, H.-C. (2013). Previous school results and social background: Compensation and imperfect information in educational transitions. *European Sociological Review*, 30(2):207–217.
- Biedinger, N. (2011). The influence of education and home environment on the cognitive outcomes of preschool children in Germany. *Child Development Research*, 2011.
- Biewen, M., Tapalaga, M., et al. (2016). Life-cycle educational choices: Evidence for two German cohorts. Technical report, Institute for the Study of Labor (IZA).
- Blau, P. M. and Duncan, O. D. (1967). The American occupational structure.
- Blossfeld, H.-P. (2017). The role of childcare and early education in creating and compensating educational (dis)advantages: evidence from a multidisciplinary and international project. *Childcare, Early Education and Social Inequality: An International Perspective*, page 287.
- Blossfeld, H.-P., Buchholz, S., Skopek, J., and Triventi, M. (2016a). *Models of secondary education and social inequality: An international comparison*. Edward Elgar Publishing.
- Blossfeld, H.-P., Maurice, J. v., Bayer, M., and Skopek, J. (2016b). Weighting panel cohorts in institutional contexts. *Methodological issues of longitudinal survey*, pages 39–61.
- Blossfeld, H.-P., Roßbach, H.-G., von Maurice, J., Schneider, T., Kiesl, S. K., Schönberger, B., Müller-Kuller, A., Rohwer, G., Rässler, S., Prenzel, M. S., et al. (2011). Education as a lifelong process—the German national educational panel study (NEPS). *Age*, 74(73):72.
- Blossfeld, P. N., Blossfeld, G. J., and Blossfeld, H.-P. (2016c). Changes in educational inequality in cross-national perspective. In *Handbook of the Life Course*, pages 223–247. Springer.

- Blossfeld, P. N., Blossfeld, G. J., and Blossfeld, H.-P. (2017). The speed of educational expansion and changes in inequality of educational opportunity. In *Bildungsgerechtigkeit*, pages 77–90. Springer.
- Bourdieu, P. (1977). *Outline of a theory of practice*. Cambridge University press.
- Boudon, R. (1974). Education, opportunity, and social inequality: Changing prospects in western society. *American journal of sociology*.
- Bourdieu, P. (1986). The forms of capital. in]. g. richardson (ed.) handbook oft/rem]: and research for the sociology of education (pp. 241-258).
- Bourdieu, P. and Passeron, J.-C. (1990). *Reproduction in education, society and culture*, volume 4. Sage.
- Bradley, R. H. and Corwyn, R. F. (2002). Socioeconomic status and child development. *Annual review of psychology*, 53(1):371–399.
- Bratti, M., Cappellari, L., Groh-Samberg, O., and Lohmann, H. (2012). School tracking and intergenerational transmission of education.
- Breen, R. and Goldthorpe, J. H. (1997). Explaining educational differentials: Towards a formal rational action theory. *Rationality and society*, 9(3):275–305.
- Breen, R., Luijkx, R., Müller, W., and Pollak, R. (2009a). Long-term trends in educational inequality in europe: Class inequalities and gender differences. *European Sociological Review*, 26(1):31–48.
- Breen, R., Luijkx, R., Müller, W., and Pollak, R. (2009b). Nonpersistent inequality in educational attainment: Evidence from eight european countries. *American Journal of Sociology*, 114(5):1475–1521.
- Breen, R. and Yaish, M. (2006). Testing the breen-goldthorpe model of educational decision making. *Mobility and inequality*, pages 232–258.
- Brint, S. (2006). *Schools and societies*. Standford University Press.
- Brody, G. H., Flor, D. L., and Gibson, N. M. (1999). Linking maternal efficacy beliefs, developmental goals, parenting practices, and child competence in rural single-parent african american families. *Child development*, 70(5):1197–1208.
- Brown, B. B. (2011). *Encyclopedia of adolescence. 2. Interpersonal and socio-cultural factors*. Elsevier.
- Buchholz, S., Skopek, J., Zielonka, M., Ditton, H., Wohlkinger, F., and Schier, A. (2016). Secondary school differentiation and inequality of educational opportunity in germany. *Models of Secondary Education and Social Inequality—An International Comparison*, pages 79–92.

- Buchmann, M., Kriesi, I., Koomen, M., Imdorf, C., and Basler, A. (2016). Differentiation in secondary education and inequality in educational opportunities: The case of Switzerland. *Models of Secondary Education and Social Inequality—An International Comparison*, edited by H.-P. Blossfeld, S. Buchholz, J. Skopek, and M. Triventi, pages 111–128.
- Buchmann, M. and Steinhoff, A. (2017). Social inequality, life course transitions, and adolescent development: Introduction to the special issue. *Journal of Youth and Adolescence*.
- Burdick-Will, J., Ludwig, J., Raudenbush, S. W., Sampson, R. J., Sanbonmatsu, L., and Sharkey, P. (2011). Converging evidence for neighborhood effects on children's test scores: An experimental, quasi-experimental, and observational comparison. *Whither opportunity*, pages 255–276.
- Coleman, J. S. et al. (1966). Equality of educational opportunity.
- Connell, J. P., Halpern-Felsher, B. L., Clifford, E., Crichlow, W., and Usinger, P. (1995). Hanging in there: Behavioral, psychological, and contextual factors affecting whether African American adolescents stay in high school. *Journal of adolescent research*, 10(1):41–63.
- Cooper, C. E., Crosnoe, R., Suizzo, M.-A., and Pituch, K. A. (2010). Poverty, race, and parental involvement during the transition to elementary school. *Journal of family issues*, 31(7):859–883.
- Cunha, F. and Heckman, J. J. (2008). Formulating, identifying and estimating the technology of cognitive and noncognitive skill formation. *Journal of human resources*, 43(4):738–782.
- Denissen, J. J., Zarrett, N. R., and Eccles, J. S. (2007). I like to do it, I'm able, and I know I am: Longitudinal couplings between domain-specific achievement, self-concept, and interest. *Child development*, 78(2):430–447.
- DiPrete, T. A. and Eirich, G. M. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments. *Annu. Rev. Sociol.*, 32:271–297.
- Dronkers, J. (1978). *Changeable variables of a school career: An application of the Wisconsin model to Dutch primary and secondary education*.
- Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., Pagani, L. S., Feinstein, L., Engel, M., Brooks-Gunn, J., et al. (2007). School readiness and later achievement. *Developmental psychology*, 43(6):1428.
- Dustmann, C. (2004). Parental background, secondary school track choice, and wages. *Oxford Economic Papers*, 56(2):209–230.

- Eccles, J. S. (1983). Expectancies, values, and academic choice: Origins and changes. *Spence Ed.*, pages 75–146.
- Eccles, J. S., Arberton, A., Buchanan, C. M., Janis, J., Flanagan, C., Harold, R., MacIver, D., Midgley, C., Reuman, D., et al. (1993). School and family effects on the ontogeny of childrens interests, self-perceptions, and activity choices. *Developmental perspectives on motivation*, 40:145–208.
- Elder Jr, G. H., Eccles, J. S., Ardel, M., and Lord, S. (1995). Inner-city parents under economic pressure: Perspectives on the strategies of parenting. *Journal of Marriage and the Family*, pages 771–784.
- Erikson, R. and Jonsson, J. O. (1996). *Can education be equalized?: The Swedish case in comparative perspective*. Westview Press.
- Ermisch, J., Jantti, M., and Smeeding, T. M. (2012a). *From parents to children: The intergenerational transmission of advantage*. Russell Sage Foundation.
- Ermisch, J., Jantti, M., and Smeeding, T. M. (2012b). Socioeconomic gradients in childrens outcomes.
- Esser, H. (1999). Soziologie. spezielle grundlagen. band 1: Situationslogik und handeln. *Frankfurt: Campus*.
- Farkas, G. (1996). Human capital or cultural capital? ethnicity and poverty groups in an urban school district. social institutions and social change series. *ERIC*.
- Fergusson, D. M., Horwood, L. J., and Boden, J. M. (2008). The transmission of social inequality: Examination of the linkages between family socioeconomic status in childhood and educational achievement in young adulthood. *Research in Social Stratification and Mobility*, 26(3):277–295.
- Fredricks, J. A., Blumenfeld, P. C., and Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of educational research*, 74(1):59–109.
- Freitag, M. and Schlicht, R. (2009). Educational federalism in germany: Foundations of social inequality in education. *Governance*, 22(1):47–72.
- Frenzel, A. C., Goetz, T., Pekrun, R., and Watt, H. M. (2010). Development of mathematics interest in adolescence: Influences of gender, family, and school context. *Journal of Research on Adolescence*, 20(2):507–537.
- Frønes, I. (2016). *The autonomous child: Theorizing socialization*. Springer.
- Galindo, C. and Sonnenschein, S. (2015). Decreasing the ses math achievement gap: Initial math proficiency and home learning environments. *Contemporary Educational Psychology*, 43:25–38.

- Gonzalez-DeHass, A. R., Willems, P. P., and Holbein, M. F. D. (2005). Examining the relationship between parental involvement and student motivation. *Educational psychology review*, 17(2):99–123.
- Gottfried, A. E., Marcoulides, G. A., Gottfried, A. W., Oliver, P. H., and Guerin, D. W. (2007). Multivariate latent change modeling of developmental decline in academic intrinsic math motivation and achievement: Childhood through adolescence. *International Journal of Behavioral Development*, 31(4):317–327.
- Grodsky, E. and Riegle-Crumb, C. (2010). Those who choose and those who don't: Social background and college orientation. *The ANNALS of the American Academy of Political and Social Science*, 627(1):14–35.
- Grusec, J. E. and Hastings, P. D. (2014). *Handbook of socialization: Theory and research*. Guilford Publications.
- Hart, B. and Risley, T. R. (1992). American parenting of language-learning children: Persisting differences in family-child interactions observed in natural home environments. *Developmental Psychology*, 28(6):1096.
- Heckhausen, J., Wrosch, C., and Schulz, R. (2010). A motivational theory of life-span development. *Psychological review*, 117(1):32.
- Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, 312(5782):1900–1902.
- Hidi, S. (1990). Interest and its contribution as a mental resource for learning. *Review of Educational research*, 60(4):549–571.
- Hoff, E., Laursen, B., Tardif, T., and Bornstein, M. (2002). Socioeconomic status and parenting. *Handbook of parenting Volume 2: Biology and ecology of parenting*, 8(2):231–52.
- Hoff-Ginsberg, E. (1991). Mother-child conversation in different social classes and communicative settings. *Child development*, 62(4):782–796.
- Hoff-Ginsberg, E. (1998). The relation of birth order and socioeconomic status to children's language experience and language development. *Applied Psycholinguistics*, 19(04):603–629.
- Hoff-Ginsberg, E. and Tardif, T. (1995). Socioeconomic status and parenting. *American psychological association*.
- Hood, M., Conlon, E., and Andrews, G. (2008). Preschool home literacy practices and children's literacy development: A longitudinal analysis. *Journal of Educational Psychology*, 100(2):252.
- Horn, D., Keller, T., and Róbert, P. (2016). Early tracking and competition: A recipe for major inequalities in Hungary. *Models of Secondary Education and Social Inequality: An International Comparison*, page 129.

- Hout, M. and DiPrete, T. A. (2006). What we have learned: Rc28's contributions to knowledge about social stratification. *Research in social stratification and mobility*, 24(1):1–20.
- Hu, S. (2003). Educational aspirations and postsecondary access and choice. *education policy analysis archives*, 11:14.
- Jackson, M. (2013). *Determined to succeed?: performance versus choice in educational attainment*. Stanford University Press.
- Jacobs, J. E., Lanza, S., Osgood, D. W., Eccles, J. S., and Wigfield, A. (2002). Changes in childrens self-competence and values: Gender and domain differences across grades one through twelve. *Child development*, 73(2):509–527.
- Jimerson, S. R., Campos, E., and Greif, J. L. (2003). Toward an understanding of definitions and measures of school engagement and related terms. *The California School Psychologist*, 8(1):7–27.
- Kane, T. J., Taylor, E. S., Tyler, J. H., and Wooten, A. L. (2011). Identifying effective classroom practices using student achievement data. *Journal of human Resources*, 46(3):587–613.
- Keller, T. and Neidhöfer, G. (2014). Who dares, wins? a sibling analysis of tertiary education transition in germany. *ECONSTOR*.
- Khattab, N. (2015). Students aspirations, expectations and school achievement: what really matters? *British Educational Research Journal*, 41(5):731–748.
- Köller, O., Baumert, J., and Schnabel, K. (2001). Does interest matter? the relationship between academic interest and achievement in mathematics. *Journal for Research in Mathematics Education*, pages 448–470.
- Krapp, A. (2000). Interest and human development during adolescence: An educational-psychological approach.
- Lareau, A. (2012). *Unequal childhoods: Class, race, and family life*. Univ of California Press.
- Lareau, A. (2014). Schools, housing, and the reproduction of inequality. *Choosing homes, choosing schools*, pages 169–206.
- Lauterbach, W. and Fend, H. (2016). Educational mobility and equal opportunity in different german tracking systemsfindings from the life study. *Models of secondary education and social inequality. An international comparison*, pages 93–109.
- Lefevre, J.-A., Clarke, T., and Stringer, A. P. (2002). Influences of language and parental involvement on the development of counting skills: Comparisons of french-and english-speaking canadian children. *Early Child Development and Care*, 172(3):283–300.

- LeFevre, J.-A., Skwarchuk, S.-L., Smith-Chant, B. L., Fast, L., Kamawar, D., and Bisanz, J. (2009). Home numeracy experiences and childrens math performance in the early school years. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement*, 41(2):55.
- Lerner, R. M. and Steinberg, L. (2009). *Handbook of adolescent psychology, volume 1: Individual bases of adolescent development*, volume 1. John Wiley & Sons.
- Li, Y., Lerner, J. V., and Lerner, R. M. (2010). Personal and ecological assets and academic competence in early adolescence: The mediating role of school engagement. *Journal of youth and adolescence*, 39(7):801–815.
- Lucas, S. R. (2001). Effectively maintained inequality: Education transitions, track mobility, and social background effects. *American journal of sociology*, 106(6):1642–1690.
- Magnuson, K. A., Sexton, H. R., Davis-Kean, P. E., and Huston, A. C. (2009). Increases in maternal education and young children's language skills. *Merrill-Palmer Quarterly*, 55(3):319–350.
- Manzoni, A., Härkönen, J., and Mayer, K. U. (2014). Moving on? a growth-curve analysis of occupational attainment and career progression patterns in west germany. *Social Forces*, 92(4):1285–1312.
- Mare, R. D. (1980). Social background and school continuation decisions. *Journal of the american statistical association*, 75(370):295–305.
- Marks, G. N. (2005). Cross-national differences and accounting for social class inequalities in education. *International Sociology*, 20(4):483–505.
- Marsh, H. W., Trautwein, U., Lüdtke, O., Köller, O., and Baumert, J. (2005). Academic self-concept, interest, grades, and standardized test scores: Reciprocal effects models of causal ordering. *Child development*, 76(2):397–416.
- Martinez, S. and Cervera, Y. L. (2012). Fulfilling educational aspirations: Latino students college information seeking patterns. *Journal of Hispanic Higher Education*, 11(4):388–402.
- Martini, F. and Sénéchal, M. (2012). Learning literacy skills at home: Parent teaching, expectations, and child interest. *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement*, 44(3):210.
- Mayer, K. U., Müller, W., and Pollak, R. (2007). Germany: Institutional change and inequalities of access in higher education. *Stratification in higher education: A comparative study*, pages 241–265.
- Merton, R. K. (1988). The matthew effect in science, ii: Cumulative advantage and the symbolism of intellectual property. *isis*, 79(4):606–623.

- Minello, A. and Blossfeld, H.-P. (2017). 8. can adult education compensate for early disadvantages? the role of adult education in reducing inequalities for german men and women. *Social Inequality Across the Generations: The Role of Compensation and Multiplication in Resource Accumulation*, page 161.
- Nagy, G., Trautwein, U., Baumert, J., Köller, O., and Garrett, J. (2006). Gender and course selection in upper secondary education: Effects of academic self-concept and intrinsic value. *Educational research and Evaluation*, 12(4):323–345.
- Neugebauer, M., Reimer, D., Schindler, S., and Stocké, V. (2013). Inequality in transitions to secondary school and tertiary education in germany. *Determined to succeed*, pages 56–88.
- Neugebauer, M. and Schindler, S. (2012). Early transitions and tertiary enrolment: The cumulative impact of primary and secondary effects on entering university in germany. *Acta Sociologica*, 55(1):19–36.
- Panichella, N. and Triventi, M. (2014). Social inequalities in the choice of secondary school: Long-term trends during educational expansion and reforms in italy. *European Societies*, 16(5):666–693.
- Pfeffer, F. T. (2008). Persistent inequality in educational attainment and its institutional context. *European Sociological Review*, 24(5):543–565.
- PISA (2006). *PISA 2006 Results*. OECD Publishing Paris.
- PISA (2015). *PISA 2015 Results (Volume II)*. OECD Publishing Paris.
- Pohl, S. and Carstensen, C. H. (2012a). Neps technical report. scaling the data of the competence test. *NEPS Working papers*.
- Pohl, S. and Carstensen, C. H. (2012b). Scaling the data of the competence tests, technical report neps. *NEPS technical report*.
- Pohl, S. and Clauss, C. (2012). Neps technical report scaling the data of the competence tests. *NEPS technical report*.
- Pohl, S., Grafe, L., and Rose, N. (2012). Missing responses in competence tests explaining test taking strategies. Technical report, National Education Panel Studies.
- Potter, D. and Morris, D. S. (2017). Family and schooling experiences in racial/ethnic academic achievement gaps: A cumulative perspective. *Sociological Perspectives*, 60(1):132–167.
- Pungello, E. P., Iruka, I. U., Dotterer, A. M., Mills-Koonce, R., and Reznick, J. S. (2009). The effects of socioeconomic status, race, and parenting on language development in early childhood. *Developmental psychology*, 45(2):544.

- Rabin, M. and Thaler, R. H. (2001). Anomalies: risk aversion. *The Journal of Economic Perspectives*, 15(1):219–232.
- Raftery, A. E. and Hout, M. (1993). Maximally maintained inequality: Expansion, reform, and opportunity in Irish education, 1921–75. *Sociology of Education*, pages 41–62.
- Reimer, D. and Pollak, R. (2009). Educational expansion and its consequences for vertical and horizontal inequalities in access to higher education in West Germany. *European Sociological Review*, 26(4):415–430.
- Roksa, J. and Potter, D. (2011). Parenting and academic achievement: Inter-generational transmission of educational advantage. *Sociology of Education*, 84(4):299–321.
- Rubie-Davies, C., Hattie, J., and Hamilton, R. (2006). Expecting the best for students: Teacher expectations and academic outcomes. *British Journal of Educational Psychology*, 76(3):429–444.
- Rubie-Davies, C. M. (2010). Teacher expectations and perceptions of student attributes: Is there a relationship? *British Journal of Educational Psychology*, 80(1):121–135.
- Schiefele, U. (1998). Individual interest and learning, what we know and what we don't know. *Interest and learning*, pages 91–104.
- Schindler, S. and Reimer, D. (2011). Differentiation and social selectivity in German higher education. *Higher Education*, 61(3):261–275.
- Schneider, B. L. and Stevenson, D. (2000). *The ambitious generation: America's teenagers, motivated but directionless*. Yale University Press.
- Schneider, T. (2008). Social inequality in educational participation in the German school system in a longitudinal perspective: Pathways into and out of the most prestigious school track. *European Sociological Review*, 24(4):511–526.
- Sénéchal, M. and LeFevre, J.-A. (2002). Parental involvement in the development of children's reading skill: A five-year longitudinal study. *Child development*, 73(2):445–460.
- Sewell, W. H. and Armer, J. M. (1966). Neighborhood context and college plans. *American Sociological Review*, pages 159–168.
- Shavit, Y. and Blossfeld, H.-P. (1993). *Persistent Inequality: Changing Educational Attainment in Thirteen Countries*. *Social Inequality Series*. ERIC.
- Skinner, E., Furrer, C., Marchand, G., and Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology*, 100(4):765.

- Skopek, J. (2017). 12. entry to formal childcare and abilities of preschoolers: A comparison of east and west germany. *Childcare, Early Education and Social Inequality: An International Perspective*, page 231.
- Skwarchuk, S.-L., Sowinski, C., and LeFevre, J.-A. (2014). Formal and informal home learning activities in relation to childrens early numeracy and literacy skills: The development of a home numeracy model. *Journal of Experimental Child Psychology*, 121:63–84.
- Smeeding, T., Erikson, R., and Jäntti, M. (2011). *Persistence, privilege, and parenting: The comparative study of intergenerational mobility*. Russell Sage Foundation.
- Steinhoff, A. and Buchmann, M. (2017). Co-development of academic interest and effortful engagement and its role for educational attainment in a tracked school system. *Research in Human Development*, 14(2):122–142.
- Stocké, V. (2007). Explaining educational decision and effects of families social class position: An empirical test of the breen–goldthorpe model of educational attainment. *European Sociological Review*, 23(4):505–519.
- Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I., and Taggart, B. (2004). The effective provision of pre-school education (eppe) project: Findings from pre-school to end of key stage 1.
- Tolsma, J., Need, A., and De Jong, U. (2010). Explaining participation differentials in dutch higher education: The impact of subjective success probabilities on level choice and field choice. *European Sociological Review*, 26(2):235–252.
- Triventi, M. (2011). Stratification in higher education and its relationship with social inequality: A comparative study of 11 european countries. *European Sociological Review*, 29(3):489–502.
- Triventi, M., Skopek, J., Kulic, N., Buchholz, S., Blossfeld, H.-P., et al. (2016). Varieties of secondary education models and social inequality—conclusions from a large-scale international comparison. *Models of Secondary Education and Social Inequality: An International Comparison*, page 377.
- Trouilloud, D. O., Sarrazin, P. G., Martinek, T. J., and Guillet, E. (2002). The influence of teacher expectations on student achievement in physical education classes: Pygmalion revisited. *European journal of social psychology*, 32(5):591–607.
- Trow, M. (2007). Reflections on the transition from elite to mass to universal access: Forms and phases of higher education in modern societies since wwii. In *International handbook of higher education*, pages 243–280. Springer.

- U. Schnabel, K., Alfeld, C., Eccles, J., Kaller, O., and Baumert, J. (2002). Parental influence on students' educational choices in the united states and germany: Different ramificationssame effect? *Journal of Vocational Behavior*, 60:178–198.
- Ulrich Mayer, K. (2004). Whose lives? how history, societies, and institutions define and shape life courses. *Research in human development*, 1(3):161–187.
- Upadaya, K. and Salmela-Aro, K. (2013). Development of school engagement in association with academic success and well-being in varying social contexts: A review of empirical research. *European Psychologist*, 18(2):136.
- Wang, M.-T. and Eccles, J. S. (2012). Social support matters: Longitudinal effects of social support on three dimensions of school engagement from middle to high school. *Child development*, 83(3):877–895.
- Weinert, S., Attig, M., and Roßbach, H.-G. (2017). 5. the emergence of social disparities—evidence on early mother–child interaction and infant development from the german national educational panel study (neps). *Childcare, Early Education and Social Inequality: An International Perspective*, page 89.
- Whitehurst, G. J. and Lonigan, C. J. (1998). Child development and emergent literacy. *Child development*, 69(3):848–872.
- Wigfield, A. and Eccles, J. S. (2000). Expectancy–value theory of achievement motivation. *Contemporary educational psychology*, 25(1):68–81.
- Wigfield, A. and Eccles, J. S. (2002). The development of competence beliefs, expectancies for success, and achievement values from childhood through adolescence.
- Wigfield, A., Eccles, J. S., Fredricks, J. A., Simpkins, S., Roeser, R. W., and Schiefele, U. (2015). Development of achievement motivation and engagement. *Handbook of child psychology and developmental science*.
- Zimmerman, B. J. and Martínez-Pons, M. (1992). Perceptions of efficacy and strategy use in the self-regulation of learning. *Student perceptions in the classroom*, pages 185–207.