



# Conditions and Consequences of Unequal Educational Opportunities in the Life Course: Results from the Cross-National Comparative *eduLIFE* Project

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**Abstract** Using longitudinal data, this chapter studies the development of educational inequalities over the life course in 12–17 different industrialized societies. By comparing highly-standardized country case studies in specific phases of the educational career, it provides evidence of major communalities in modern societies. First, the cross-national findings show that educational inequalities are created and perpetuated in family settings, early in a child's life, long before children start school. Children from less privileged families are the ones who are least likely to attend high-quality institutions, and if they do, their gains are only moderate and generally too small to effectively counteract the family influence. When children are in school, the comparative analyses demonstrate that socioeconomically-advantaged families

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manage to secure the “pole positions” in education for their children, regardless of the organizational specificities of the school system across different countries. They always succeed in strategically exploiting various opportunities provided by different school systems. Finally, the cross-national comparisons of adult learning over the life course show a strong cumulative advantage: Adult learning tends to reproduce and reinforce the outcomes of initial formal education in the later adult life course.

**Keywords** Educational inequality · Matthew effect · Variations in institutional configurations · Comparative life course research · Standardized country case studies · Early childhood education · Tracking · Comprehensive schools · Adult education

### **Bedingungen und Konsequenzen ungleicher Bildungschancen im Lebenslauf: Ergebnisse aus dem international vergleichenden eduLIFE-Projekt**

**Zusammenfassung** Dieses Papier vergleicht für eine größere Anzahl moderner Gesellschaften deskriptive Befunde zur Entstehung und zu den Konsequenzen ungleicher Bildungschancen im Lebenslauf. Die international vergleichende Analyse basiert auf einer Reihe hochstandardisierter (und damit vergleichbarer) länderspezifischer Fallstudien, in denen jeweils spezifische Bildungsphasen (Kleinkindalter, Schulalter, Erwachsenenalter) mit Längsschnittdaten untersucht wurden. Ziel des Beitrags ist es, gemeinsame Mechanismen des Bildungsverlaufs in modernen Dienstleistungsgesellschaften herauszuarbeiten. Die Ergebnisse des internationalen Vergleichs zeigen zunächst, dass die Bildungsungleichheiten (insbesondere die Kompetenzunterschiede) bereits im frühen Kleinkindalter in den Familien entstehen, also lange bevor die Kinder überhaupt beginnen, zur Schule zu gehen. Die Grundlagen der Bildungsungleichheiten werden in modernen Gesellschaften damit weiterhin im Kleinkindalter von einer Generation auf die nächste übertragen. Kinder aus sozial privilegierten Familien gehen in den meisten modernen Gesellschaften danach auch häufiger in Kinderbetreuungseinrichtungen mit höherer Qualität. Generell sind die Kompetenzzuwächse für benachteiligte Kinder in den bestehenden Kinderbetreuungseinrichtungen aber zu moderat und zu klein, um die Kompetenzdifferenzen zwischen Kindern aus verschiedenen Herkunftsfamilien effektiv ausgleichen können. In der Schule zeigen die komparativen Analysen, dass sozio-ökonomisch privilegierte Familien dafür sorgen, dass ihre Kinder immer wieder die aussichtsreicheren „Pole-Positionen“ erhalten. Mit anderen Worten: unabhängig davon, wie das Bildungssystem in einem Land organisiert ist (als Gesamtschule, in Form interner Schul- oder Fächerdifferenzierung oder als dreigliedriges Schulsystem), gelingt es privilegierten Familien in allen Schulsystemen immer wieder, die jeweiligen Chancen und Vorteile, die diese unterschiedlichen Systeme bieten, für ihre Kinder zu nutzen. Damit sind institutionellen Reformen des Schulsystems zur Erreichung von mehr Bildungsgleichheit enge Grenzen gesetzt. Schließlich zeigt der internationale Vergleich, dass das formale und non-formale Lernen von Erwachsenen im späteren Lebenslauf in modernen Gesellschaften einen starken kumulativen Charakter auf-

weist. Das Bildungsverhalten von Erwachsenen tendiert damit generell dazu, die Bildungsunterschiede der Erstausbildung im Lebenslauf noch weiter zu verstärken, anstatt auszugleichen.

**Schlüsselwörter** Bildungsungleichheit · Matthäus-Effekt · Institutionelle Konfigurationen von moderneren Bildungssystemen · International vergleichende Lebensverlaufsanalyse · Standardisierte Fallstudien · Frühe Kindheit · Bildungsstratifikation in der Schule · Gesamtschule · Erwachsenenbildung

## 1 Introduction

The study of life courses has become one of the most active research fields in the social sciences in the last four decades. Retrospective life course and prospective panel studies have become available during this period in most modern societies, especially in North America and in Western Europe. Most of these datasets are representative longitudinal studies that explicitly recognize the dynamic nature of social roles and circumstances as men and women move through their life paths, the interdependence of lives and life choices, the situational imperatives confronting actors in various countries, and the cumulation of advantages and disadvantages experienced by the individual within national settings (Elder et al. 2004).

Today, most of the life course analyses have been studies of, and in, single societies. Based on such limited work, some life course researchers have interpreted their findings by contrasting what they have learned about the country that they actually studied and what is known or believed to be true about some other country or countries. Melvin Kohn (1987) classified such interpretations and comparisons as *implicitly* cross-national. The increasing availability of life history and panel studies for many countries provides a promising opportunity for more *explicit* cross-national life course analysis. They allow (1) to *establish the generality of findings* about the life course found in one particular society, and (2) to *study the specific impact of variations in institutional configurations and social structures*, historically developed and country-specific, on specific phases of the life course or the life course as a whole (see also Kroneberg 2019).

Cross-national comparative life course studies can therefore greatly extend the scope of sociological knowledge when they answer the question of *whether a specific life course mechanism* established in one country also *applies outside of this particular national context*. Research based on longitudinal data from diverse countries therefore provides a particularly promising way to generate, test, and further develop sociological theory. Longitudinal data offer a much better handle to execute “*internal analysis*”—the analysis of variations within each country in a cross-national comparative study (Janoski and Hicks 1994; see also Schmidt-Catran et al. 2019). Life course studies also tend to *deepen our understanding of cross-national differences* when we are able to give a convincing explanation of the impact of institutional and social structural conditions on the life courses in various nations. In other words, cross-national life course research helps us to escape cultural one-

sidedness or ethnocentrism, because we, as social researchers, often wear cultural blinders of some sort that are connected to the society in which we are socialized.

This chapter presents selected results from the *Education as a Lifelong Process* (*eduLIFE*) project, supported by an Advanced Grant from the European Research Council (2012–2016). The aim of this cross-national project was to study how individuals' educational careers unfold over the life course in different societies. The project concentrated on conditions and on (short- and long-term) consequences of unequal educational opportunities over longer spans of the life course. In this chapter, we limit ourselves to three educational life phases: (1) the age of “early childhood education and care” (ECEC) before starting school, (2) the phase when pupils in secondary school are confronted with different models of school differentiation, and (3) lifelong learning in adulthood. Our leading research question is: How does social inequality influence educational careers and their outcomes in these three life phases?<sup>1</sup>

There is a widespread consensus today that panel and life history data improve the opportunities to describe trajectories of growth and development over the life course and to study the patterns of causal relationships over longer time spans in different societies. The choice of the countries for our cross-national comparisons was determined by the availability of representative longitudinal data (secondary analysis), and by asking whether including a particular country sheds additional light on the theoretical issue being studied. We have included 12–17 countries in our cross-national comparisons in each of the three educational phases. Our design is based on identical or highly similar meanings of survey questions in each country. The measurements are functionally equivalent, which means that they may assume different institutional forms in various countries (e.g. different institutions of pre-school education, various forms of school differentiation, and distinctive organizational models of adult learning), but refer to the same conceptual framework.

The country case studies were carried out by national experts who are familiar with the data sets available within each country and are able to analyze them to the fullest advantage. The joint comparative perspective and method were developed in several international workshops. These workshops included specifying theory and hypotheses, the comparability of concepts across countries, the question of how countries can be compared over longer historical periods, the application of statistical controls, and the equivalent measurement of dependent and independent variables.

On the pages below, we first develop the guiding theoretical perspective of our life course research, and then summarize the empirical key findings of the three educational life phases studied in the *eduLIFE* project.

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<sup>1</sup> Limited space has prevented us from considering the particular phase of school-to-work transitions and their country variations. We refer the reader to the comparative volumes of Shavit and Müller (1998) and Shavit et al. (2007) with regard to the links between vocational training and higher education institutions in different national contexts.

## 2 Education as a lifelong process

The particular theoretical orientation of our cross-national comparisons is the life course. This perspective aligns attention toward the *process dimension* of education, and *links the (changing) social structure to the unfolding of individual lives*. The life course provides a framework for studying education at the nexus of developmental trajectories and social pathways, as well as institutional and social change. Elder et al. (2004) have summarized the following five general principles of life course research.

### 2.1 The principle of lifespan development

The first principle requires a focus on long-term individual trajectories over the lifespan. The resulting emphasis in sociology is therefore placed on systematic pathways of development and educational career profiles over time. Major aspects of educational careers are nationally-varying contexts that foster or hinder learning, competence development, and educational progress. Elementary and secondary educational institutions are often strictly age graded in modern industrialized societies. Thus, education as a lifelong process is to a large extent age structured, because age and time often exert a formal influence on progression through educational institutions during early childhood, school age, youth, and early adulthood. In other words, the movements of individuals through the educational systems was a central object of the *eduLIFE* project, both as a phenomenon to be explained and as a determinant of subsequent economic and noneconomic outcomes throughout the life course.

Educational institutions have not only the task of social integration, but they often serve as *gate keepers* in the lifelong process of reproducing social inequality. Thus, educational systems in modern societies intentionally *sort students into differing positions*, whether *within* schools, *between* schools, or both. The *eduLIFE* project therefore focused not only on between-school tracking, but also on ability grouping, age grouping, and interest grouping as the most common within-school stratification mechanisms in modern societies. These mechanisms structure educational career lines by opening up some doors whilst closing others. The research carried out by the *eduLIFE* project that is reported here traced the trajectories of individuals from early childhood, to lower and upper secondary school, and across adult learning.

Life-course research shows that the events and states of earlier educational stages often have lasting consequences for subsequent educational processes and outcomes. Dannefer (1987) introduced the “*Matthew effect*” into the literature on the life course. The Matthew effect means that small initial educational inequalities become magnified over the lifespan. Thus, there seems to be a kind of logic in educational careers in the sense that those who have already received an education receive even more education, and those who have received a poor education become relatively poorer over the life course. The Matthew effect is sometimes also referred to as the *cumulative disadvantage/advantage hypothesis* (O’Rand and Henretta 1999). It offers a cumulative explanation of how intracohort inequality is engendered from early education, via attendance at school, to adult learning. The Matthew effect seems to be particularly interesting today with regard to (1) the *long-term consequences of*

*different institutions of early educational investments at pre-school age, and (2) the opportunities offered by various adult learning systems to compensate for disadvantages engendered in the school system.* Cross-national educational research, which is often based on cross-sectional data, has paid relatively little attention in the past to the challenges of describing and explaining long-term educational trajectories. The research carried out by the *eduLIFE* project contributes to the longitudinal analysis of long-term processes.

## 2.2 The principle of linked lives

The second principle of life-course research concerns the interdependence of lives over time, especially in the family, where *individuals are linked across generations* by bonds of kinship and processes of intergenerational transmission. The *eduLIFE* project examined long-term relationships between parents and their children, and studied how these relationships influence the educational careers of children, adolescents, and adults over the life course. The kin-based perspective on the life course focuses on families, and helps to understand how different societies reproduce inequalities across generations. The life-course perspective of “linked lives” also refers to important *relationships outside the family*. Kindergartens and schools are the first educational organizations that children experience, and they constitute important social networks for most children. It is these educational settings in which knowledge and competencies are constantly *tested, evaluated, and compared with other students*, and in which children develop a sense of their intellectual efficacy.

## 2.3 The principle of agency

The third principle guiding the *eduLIFE* analyses concerns agency in human development and the idea that planfulness and intention can affect life-course processes and outcomes. In sociology, the idea of agency has been developed in the theories of *methodological individualism* and *rational action theory*—that is, theories that the macrolevel aggregates of educational inequality have to be reconstructed via the educational and occupational choices that families and individuals make under certain constraints in the life course. Drawing on rational action theory, the *eduLIFE* project employs *models of educational decision-making at critical branching points* over the educational career. These micro-macro models provide important conceptual tools for understanding how individuals from different social origins might incorporate the risk of educational failure along with beliefs about what kind of choices are possible into a rational calculation of costs and benefits.

## 2.4 The principle of timing of events and transitions

The fourth principle, that of the life-course perspective, emphasizes that the consequences of life transitions and events vary according to their timing in a person’s career. It recognizes that the impact of life events is contingent on when they occur in an individual’s life. For example, there are “*vulnerable*” *phases in an educational career* in most societies such as (a) the timing of entry into the school system, (b) the

period of transition to secondary school, (c) the period of transition from secondary school to vocational training, university education, or the employment system, and (d) the appropriate timing for starting adult education.

## 2.5 The principle of time and place

The fifth principle, namely that of time and place, states that *individuals' educational careers are embedded and shaped by the highly-specific historical times and country-specific institutions*. During the last decades, cross-national life-course research has demonstrated the necessity of nesting individual lives in social and historical contexts. The life-course researchers of the *eduLIFE* project have therefore considered a set of mechanisms related to period and cohort effects in terms of institutional and social change. The *multilevel design* of the *eduLIFE* project also allowed researchers to specify the *complexities of time and environments* in different societies more accurately for educational processes.

## 3 Social inequality and early childhood education and care (ECEC)

Early childhood is a decisive developmental phase that sets the stage for a broad range of later life course outcomes: Children's early educational experiences create developmental foundations often translating into long-term path dependencies in educational and occupational careers (DiPrete and Eirich 2006). Research in the United States in particular has demonstrated the efficacy of preschool investment in improving socio-economic outcomes for children facing adverse environmental conditions in very disadvantaged parental homes (Heckman 2006). The most influential empirical study from the United States is the often cited Perry Preschool experiment in Ypsilanti, USA, which started in the 1960s (see Schweinhart 2013). In this study, 120 Afro-American children with relatively low IQs (around 80) from very disadvantaged families (headed mostly by lone, uneducated, and often unemployed mothers) were randomly assigned to two groups at the age of 3–4: (i) a treatment group of about 60 children were sent to a high-quality preschool, and their families received additional support from professionals at home, and (ii) a control group (of about 60 children), where children and their families did not receive any additional support. The individuals of both groups were then interviewed and tested several times over their life course (Becker and Zangger 2015). The interesting finding was that the treatment group behaved differently from the control group even up to age 50. The members of the treatment group were more likely to be employed and achieve higher earnings, and were less dependent on social welfare (Heckman 2006). The Perry Preschool experiment established a remarkable long-term effect for a very specific study population (children from extremely poor families in the USA). Of course, it is desirable to understand and generalize the results of such a study as broadly as possible (see Schubert and Becker 2010). It is however doubtful whether the observed effect can be simply generalized to other social origin groups and countries.

Thus, a first aim of the cross-national *eduLIFE* study (Blossfeld et al. 2017) was to *focus on different social origin groups* and to analyze the *relevance of institutional contexts in modern societies*. In order to understand how social inequality in early educational opportunities is produced, it was at first crucial for the *eduLIFE* project to consider the *role of national institutions in early childhood*. Indeed, not only do the *availability and quality of childcare provision* vary across countries, but there are also major cross-national differences in the *variety of childcare options and services* (Gambaro et al. 2014). For instance, while early childhood education varies widely in quality in the United States (e.g. Vandell and Corasaniti 1990) and is strongly market based (Kamerman and Waldfogel 2005), early childhood programs in Europe are usually much more standardized by state regulations, more homogeneous in service, and more universally provided (Spiess et al. 2003). These differences also explain the quest for early educational interventions and programs in the United States that are targeted towards children from highly disadvantaged backgrounds. Nonetheless, organizational features of childcare systems differ vastly within Europe as well because of the plethora of country-specific social and educational policies. Hence, by taking a broader *cross-national perspective on early childhood education and care (ECEC)*, the *eduLIFE* project tried to enlarge the scope of the somewhat Anglophone-centric empirical literature, and includes other regions such as Northern, Southern, and Central European countries, and even Russia.

The aim of the *eduLIFE* project has been to understand *how (educational) inequalities emerge in early childhood*, and *what can be done to combat them*. *Parental care* is the first option available to families, and is *typically predominant* as exclusive care in the early months of children's lives. The first research question therefore focused on *the role of parental involvement and care* when it comes to causing social disparities in cognitive and non-cognitive outcomes in infancy and earliest childhood. Parental involvement refers to physical care, the stimulation of intellectual capacity and social behavior or, more broadly, time and material investment in children. Cognitive outcomes are considered in developmental and ability tests, while non-cognitive skills cover child attention and activity, as well as different soft skills.

A second research question specifically addressed the *relation between care arrangements* in infancy and early childhood up to preschool age *and children's social background*. In addition to parental care, the *eduLIFE* project considered two further main kinds of childcare: *informal childcare and formal childcare*. Informal care includes a variety of actors taking care of the child, such as grandparents, other relatives, friends, neighbors, and baby-sitters. The third form is formal childcare, which refers to institution-based forms of care, such as public or private nurseries. We were particularly interested in understanding whether and to what degree the decisions about *the various forms and timings of childcare arrangements in different countries* are influenced by a mother's education, household wealth and income, as well as parental social class.

A third research question concerned *different types of childcare arrangements* and how these mitigate or exacerbate social inequalities in early and later educational achievement. It is worth noting that, when studying this issue, the *eduLIFE* project considered not only exposure to formal childcare in the early years of life pure and simple, but also the important characteristics of the type of childcare attended



**Table 1** Overview of (country-specific) studies on early childhood education and care (ECEC). Authors' own work

Authors	Data	Country
Weinert, Attig, and Roßbach	German National Educational Panel Study (NEPS), Starting Cohort 1	Germany
Barnett and Frede	Abbott Pre-K program evaluation	United States
Brilli, Kulic, and Triventi	ISTAT—Italian Survey on Births (2002, 2005 and 2012)	Italy
Dämmrich and Esping-Andersen	PIRLS/PISA	Cross-national analysis
Karhula, Erola, and Kilpi-Jakonen	Register data from Statistics Finland	Finland
Kosyakova and Yastrebov	Russian Longitudinal Monitoring Survey (RLMS)	Russia
Leseman, Mulder, Verhagen, Broekhuizen, van Schaik, and Slot	The national pre-COOL2–5 cohort study	The Netherlands
McGinnity, McMullin, Murray, and Russell	The Growing Up in Ireland longitudinal study (GUI)	Ireland
Del Boca, Piazzalunga, and Pronzato	Millennium Cohort Study	United Kingdom
Skopek	German National Educational Panel Study (NEPS), Starting Cohort 2	Eastern and Western Germany
Viklund and Duvander	Administrative register data from the Swedish Social Insurance Agency	Sweden
Wahler, Buchholz, and Breinholt	The Danish Longitudinal Survey of Children (DALSC)	Denmark
Zachrisson, Dearing, Blömeke, and Moser	Behavior Outlook Norwegian Developmental Study (BONDS)	Norway

such as its *quality, duration, and frequency*. An overview of the individual country-specific contributions within each topic is found in Table 1.

The cross-national research strategy therefore involved 12 in-depth country-specific studies in Europe and the US using longitudinal datasets and a standardized comparative study of 14 OECD countries. These studies were conducted by expert scholars in the field of early childhood who are familiar with the respective country contexts under study. Studies are grouped according to the three topics of the project: Some focus on the role of home environments and parental involvement in social inequalities in childhood; some deal with the stratification patterns in various childcare systems; while the majority investigates the link between social background, institutions of early childcare and education, and short- and long-term educational outcomes. The studies were not standardized in terms of methodology, yet each handled the questions with the most suitable methods. Applied methods range from traditional multivariate analyses (linear regression, binomial or multinomial logistic regression), which were employed in the majority of the studies, to experimental and simulation-based designs (e. g. US and UK study).

This research design is complex but provides one of the first cross-national investigations of the factors that drive *achievement gaps in cognitive and non-cognitive development in early childhood*, the goal being to understand the potential to combat these early inequalities through educational policies. Although the project embraces

insights from various disciplines, it largely emphasizes a sociological perspective. Attention is devoted to the role played by *country-specific early education institutions* in reducing educational inequality among children from different social backgrounds. Three research questions guide the presentation of our research results: (1) What is the role of early parental involvement and care in educational success? (2) How do families of different origins choose modes of childcare? (3) What are the consequences of early childcare and education for inequality of educational opportunity?

The first question was studied by looking at the *earliest mother/child interaction and parental involvement* in the course of early childhood. Using unique data from the National Educational Panel Study (NEPS), for example, the German study shows that a child's interactive behavior such as 'attention to objects' and 'activity level' is positively influenced by a higher social background and mediated by the mother's interactive behavior. At the early age of six to eight months, there is however only weak measurable evidence with regard to children's social disparities in developmental status, learning resources, or motor skills. Much early development seems to take place in the brain, and is hard to observe with conventional methods. When the children become older, for example the Irish study is able to demonstrate a direct relation between a better home-learning environment and more advanced vocabulary skills at different preschool ages. Based on our cross-national comparison, we can state that *educational inequalities are created and perpetuated in the family very early in a child's life*—long before school age. Resources, activities, and mother/child interaction in the family, shape children's early conditions and opportunities for learning at home differently by social background. Although initially rather minor and hard to measure, these early differences seem to be important harbingers of future social inequalities in educational achievement. Even if they are hard to detect shortly after birth, disparities among children of different social backgrounds tend to grow substantially through the early childhood years. This means that skill formation is a path-dependent and cumulative process (Phillips and Shonkoff 2000; Cunha and Heckman 2007): *learning begets learning*—tiny differences in infancy tend to grow, probably most strongly in toddlerhood; and if certain skills and competencies are not mastered at crucial ages, it will be hard for children to catch up when they are older (see also German National Academy of Sciences Leopoldina 2014).

Therefore, *parents' choices regarding early environments of education and care are critical*, given that these may enable or hinder opportunities for learning and acquiring relevant competencies. Almost all of the case studies in the *eduLIFE* project present evidence of the *social selectivity of childcare arrangements* where children from higher social backgrounds are more likely to attend institutional childcare and education and tend to take advantage of intensive participation in high-quality care. In contrast, informal care arrangements seem to be dominant for children from less privileged social backgrounds, especially in countries with rationing and low affordability of formal childcare services. The general findings show that *families with a lower social position rely more strongly on parental care*, while those with a higher social position more often resort to formal or informal childcare. This holds true for different measures of social background, be it the mother's education

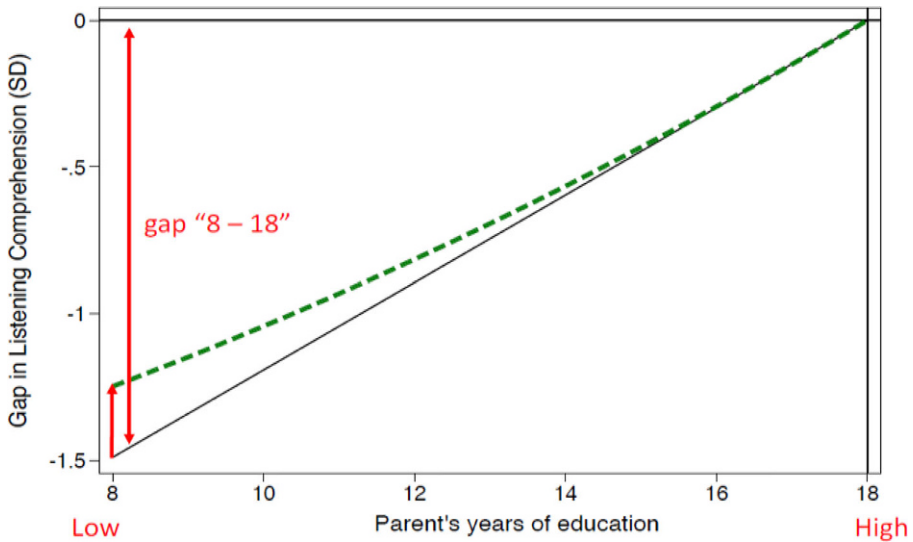
or the father's occupation. Yet, the *eduLIFE* study specifically compared measures of social background, and concluded that *a mother's education has a primary role in explaining the early decisions made about childcare.*

In the Swedish system of universal access to childcare and very high participation rates, the mechanism of *differentiation in childcare take-up* is visible in the *age of entry into day care*—however, with only a small difference. Further cross-national analyses were also able to show that the decisions taken by *highly-educated parents* are particularly susceptible to policy changes and depend on the perceived quality of the childcare services: *They enroll their children earlier when the quality of service is high, and opt to wait when the quality is low.*

Several country-specific case studies were able to assess *shorter and longer-term consequences of children's experiences of early formal care.* Heckman (2006) argued that early education and care have the power to enhance children's cognitive and non-cognitive abilities and compensate for the initial disadvantage faced by less privileged children. When it comes to the first part of this hypothesis, confirmation was found in several studies of the *eduLIFE* project. For example, the German study on preschool children born in 2005/06 provided evidence that *earlier enrolment in center- or group-based care* (day care centers, crèches, or play groups) *is related to higher linguistic competencies* at age five for all children. Similarly, the British study showed that children who attended formal childcare (center- and group-based, non-parental care settings) when they were one and a half years old perform significantly better on average when it comes to school readiness at the age of three.

The Finnish study found that having attended day care below the age of three, as compared to being cared for at home, is associated with positive long-term outcomes such as attendance at upper secondary qualification, as well as entry into higher education. The Abbott Pre-K program in the United States that was designed to support disadvantaged children in 31 low-wealth school districts identified a positive impact of the preschool program on various achievements (such as math, language, and literacy), and this impact persisted through the first six grades of school. However, *the long-term positive effects of preschool are not found in the Danish case study.* Thus, with the exception of the Danish study, the *eduLIFE* project was able to *demonstrate that center-based care has a higher positive impact on the achievements of children from a lower social background, although the effects are limited in scope.*

In addition, several country-specific studies tested for the *role of preschool center quality or the quality of particular programs in compensating for the early disadvantages of children from a lower social background.* We learned from their results about the important role of centers with a structured curriculum in compensating for early disadvantage in achievements. The previously-mentioned case study on the United States gave additional insights into how to design and maintain high-quality early education programs to combat inequality among children. In addition, it could be shown that the government programs in the Netherlands target children of a low social background as early as the age of two by placing them into childcare centers of the highest quality. This study found a *strong correlation between the quality of ECEC and the growth of cognitive and non-cognitive skills* among disadvantaged children, even though the catch-up effects are found to be relatively minor. The



**Fig. 1** Achievement gaps in listening comprehension by parental education at age 5 with and without attendance at institutions of early childhood education and care (ECEC) (*Dotted line*: with attendance at ECEC, *solid line*: without attendance at ECEC). (Source: Skopek 2016)

majority of Nordic countries with universal childcare systems in this project report relatively minor socio-economic disparities in access to early education.

In summary, based on our cross-national analysis, we have learned that the *highest returns on early childhood education and care programs*, particularly below the age of three, *could be harvested by children coming from the most disadvantaged backgrounds*. However, one has to bear in mind that (1) these children are also the ones who are least likely to attend, and (2) that their gains are only moderate and generally too small to achieve effective compensation. Several of the country case studies demonstrate that *the gains that children from disadvantaged families can achieve through participation in early childcare institutions are rather minor in relation to the extant achievement gaps for children coming from privileged families*. Using NEPS data, Skopek (2016) for example demonstrates this in Fig. 1. It shows that, at age five in Germany, the achievement gaps in listening comprehension of children from parents with only eight years of education compared to children whose parents received 18 years of education are only reduced to a small degree through attendance at early childcare and education institutions.

Thus, the most important theoretical conclusions of the cross-national comparative *eduLIFE* study are (1) that *all children can profit from early childcare (general elevator effect)*, (2) that *disadvantaged children certainly profit more than children from advantaged parental homes (interaction effect)*, and (3) that *the social inequalities in achievement between children from unequal social backgrounds can only be marginally reduced by their attending early education and childcare institutions*. In other words, the effect of the Perry Preschool experiment that was demonstrated for disadvantaged children cannot be simply generalized to other social groups and other countries, and that *the interpretation of the Perry Preschool Program seems to be far*

*too optimistic with regard to the possible reduction of social inequalities.* From the cross-national evidence accumulated in the *eduLIFE* project, one can say that *greater exposure to early education and care programs of children from disadvantaged backgrounds in Europe and beyond would probably only partially narrow down the early achievement gaps between children from unequal social groups.* However, it is worth underlining that one should not only offer access to formal childcare at an earlier age, but also make sure that the *service is of a high quality.* Otherwise, attending formal childcare for children from low social backgrounds might not lead to any compensation of their early disadvantage in cognitive abilities, or might even widen these achievement gaps. Finally, the cross-national analyses of the *eduLIFE* project also provided evidence that the gains brought about by early *educational investments are only sustainable if they are supported during school age.* Several case studies in the *eduLIFE* project clearly demonstrated that *early educational intervention effects might fade away over the years unless they are supported in school with a set of policy efforts that secure the early gains.*

#### **4 Social inequality and different models of educational differentiation in secondary education**

Our country-specific studies on early childhood education and care (ECEC) made it clear that students' academic performance when starting school is closely related to their family background. Among the various goals of educational systems, two are prominent in contemporary societies: (1) to provide all students with a common foundation of competencies for full participation in civic and socioeconomic life (*social integration*) and (2) to *sort and select students* according to their abilities and diverse life-course goals (Van de Werfhorst and Mijs 2010). Consequently, sooner or later in the school career, students will enroll in different tracks, school types, ability groups, curricula, or subject courses (Dupriez et al. 2008). *Tracking between schools versus comprehensive schooling* stand out in the literature as the two ideal-typical approaches of sorting in secondary school. However, *these two basic school types have been converging in organizational terms* in many countries in recent years, so that the long-standing differences between them have become increasingly blurred.

On the one side, countries with a traditionally rigid system of early tracking have been introducing reforms aiming to make their education systems more flexible. Besides raising the compulsory school age, countries such as Germany or Switzerland have *increased the permeability of tracks, facilitated mobility between types of school, or have promoted inclusive school types* in addition to track schools (Benavot and Resnik 2006). In addition, *performance hurdles for the prestigious academic track have been reduced.* For example, several of the *Länder* in Germany have *abolished the obligatory achievement-based teacher's recommendation for upper secondary schools.* At the same time, *admission to higher education has been opened up more and more for students in non-traditional academic routes,* which is creating new opportunities, particularly for students starting off on vocational routes. All these reforms have been intended to make the early track allocation

less rigid and consequential in the tracking system, especially for children from less advantaged social origins. In addition, several reforms were introduced in the tracking systems in order to increase students' participation in higher education. For example, by creating specialized secondary schools (so-called "*Fachoberschulen*" and "*Berufsoberschulen*"), and introducing the less demanding professional colleges ("*Fachhochschulen*") next to the traditional Universities (Blossfeld et al. 2015).

On the other side, nations with *comprehensive school systems* have been fanning out curricula programs by introducing new educational options (e.g. types of school, curricula, and subjects) which *lead to an unprecedented differentiation of the educational landscape in these schools*. Many of these transformations have been sponsored by a neoliberal stance on "school choice" which became increasingly dominant (Ascher et al. 1996). These neoliberal arguments not only underscore the centrality of parents' freedom when it comes to choosing the education that they would like their children to have, but also emphasize the autonomy of schools acting as agents in a quasi-market of educational supply and demand. While such market models of schooling based on principles of freedom of choice may contribute to the overall effectiveness and efficiency of a school system, they might harm equality of opportunity for children from lower social backgrounds (Ascher et al. 1996). Thus, *social inequality in access to the more prestigious and advantageous educational pathways might have become increasingly exacerbated in comprehensive systems*.

These transformations in secondary education systems call for a more fine-tuned approach towards analyzing social inequalities in education. Here we summarize some of the key findings from the cross-national *eduLIFE* project (Blossfeld et al. 2016b). It was aimed at overcoming the simple dichotomy between formally-tracked and untracked systems that are typically used in cross-national studies of educational inequalities, by also studying other more hidden ways of tracking and by adopting a longitudinal design to unravel the ways in which students have travelled through the education system in recent birth cohorts of students.

Two strands of cross-national research are particularly relevant for this work. First, the social stratification literature has examined the role of social background for individuals' educational transitions and educational attainment, and their changes across birth cohorts in various modern societies (e.g. Shavit and Blossfeld 1993; Shavit et al. 2007; Breen et al. 2009; Jackson 2013; Blossfeld et al. 2016a). These works provided important empirical evidence on cross-national differences in the strength and trends of inequalities of educational attainment, but *rely on relatively old cohorts of individuals* (usually born not later than the 1960–70s). Furthermore, they were not able to incorporate in the analyses detailed information on the specific type of secondary education attended, thereby failing to study a potentially important source of stratification of educational opportunities.

Second, there is also a *broad literature on educational inequalities using international school-based surveys and large-scale assessments* such as the "Programme for International Student Assessment" (PISA), or the "Trends in International Mathematics and Science Study" (TIMSS) (e.g. Duru-Bellat and Suchaut 2005; Marks 2005; Horn 2009; Becker and Schulze 2013). Without a doubt, several of the studies drawing on such data have significantly improved our understanding of educational differentiation in secondary school and its consequences for inequalities in student

achievement. However, most of this cross-national research has been carried out based on a very narrow definition of formal tracking (e. g. Hanushek and Wössmann 2006), while neglecting less visible forms of educational differentiation working in the background—such as placement in high-ability groups or specific course-taking patterns—which can be highly relevant in the social stratification of the student body—not only between but also within schools (Lucas 1999). Furthermore, these *studies have relied solely on snapshots of students' and schools' characteristics measured at a specific student age* (about age ten in TIMSS and age 15 in PISA). Thus, lacking a longitudinal design, these cross-national studies have been unable to assess the development of students' performance within different forms of secondary education, let alone the long-term consequences of educational differentiation for subsequent school transitions.

Last but not least, lacking information on students' prior educational experiences before allocation to different forms of secondary education, previous comparative research was very limited when it came to drawing conclusions on the consequences of differentiation for inequalities of educational opportunities. *A failure to incorporate prior achievement measures into statistical models of educational inequality makes it impossible to disentangle the "added value" of different types of differentiation* from mere selection effects arising from sorting students into tracks or ability groups according to ability (Morgan 2001).

The cross-national *eduLIFE* project aimed to overcome these kinds of drawbacks of the previous research. We conducted in-depth country-specific case studies in 17 countries characterized by various models of secondary education (see Table 2). The studies were unified by a common analytical scheme, addressed the same research questions within the context of a particular country's education system, and were conducted by reputable scholars in the field who are experts on the respective school systems and country contexts.

Figure 2 illustrates the overall longitudinal framework of our comparative study. Children's development of various skills in general, and students' academic performance in primary school in particular, prove to be strongly related to their family background in terms of cultural and socioeconomic resources. This creates differential opportunities for them to thrive. When students and their families face educational transitions—that is, when decisions have to be made on which types of education to pursue in lower and upper secondary school—both *social background and early school performance operate jointly in producing allocation outcomes*. These outcomes may, in turn, have consequences for students' subsequent achievement, given that the various forms of education provide different curricula-specific learning input and heterogeneous learning opportunities. Various path dependencies may lead such “school factors” to have profound effects on the subsequent educational trajectories, as well as on final educational attainment.

In our international workshops we identified *two major dimensions for classifying various aspects of differentiation in secondary education*. The first dimension distinguishes between *external* and *internal*. External differentiation refers to differences between schools, whereas internal differentiation refers to heterogeneity within schools such as differences across school classes or courses. The second dimension distinguishes between *formal* and *informal*. Formal differentiation refers

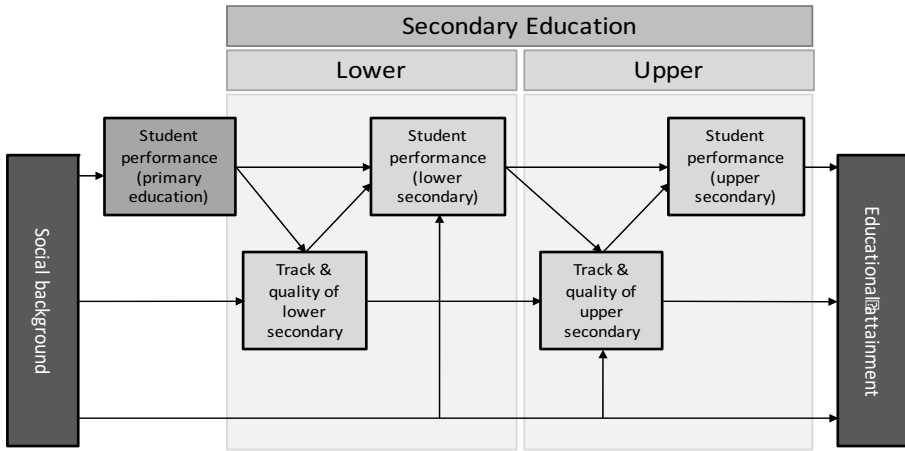
**Table 2** Overview of the country-specific case studies included in the cross-national comparison of secondary school differentiation. Authors' own work

Authors	Data	Country
<i>Early tracking model</i>		
Buchholz, Skopek, Zielonka, Ditton, Wohlkinger, and Schier	NEPS Starting Cohorts 3/4/6, BIKS	Germany I
Lauterbach and Fend	Life study	Germany II
Buchmann, Kriesi, Koomen, Imdorf, and Basler	COCON, TREE	Switzerland
Horn, Keller, and Róbert	NABC, HLCS	Hungary
Dronkers and Korthals	COOL, VOCL89	Netherlands
<i>Nordic inclusive model</i>		
Rudolphi and Erikson	CILS4EU, Register data	Sweden
Kilpi-Jakonen, Erola, and Karhula	Register data	Finland
Wähler, Buchholz, and Møllegaard	Register data	Denmark
<i>Individual choice model</i>		
McMullin and Kulic	LSYPE	England
Klein, Iannelli, and Smyth	Scottish and Irish School Leaver Surveys	Scotland and Ireland
Schührer, Carbonaro, and Grodsky	NELS	United States
Chesters and Haynes	LSAY	Australia
<i>Mixed tracking model</i>		
Farges, Tenret, Brinbaum, Guég-nard, and Murdoch	Panel 1995 of French Ministry of Education	France
Contini and Triventi	INVALSI-SNV, IARD, ISTAT	Italy
Kosyakova, Yastrebov, Yanbarisova, and Kurakin	TrEC	Russia
Täht, Saar, and Kazjulja	ESS and FFS on Estonia	Estonia
Blank, Shavit, and Yaish	Register data	Israel

to regulated forms of diversity that are recognized by law and manifested in school certificates and qualifications. Informal differentiation refers to differences between types of education that are not recognized formally but can impact on the quality of instruction and levels of students' learning. Table 3 provides a classification of the main forms of differentiation based on their location along these two theoretical dimensions.

Although the education systems in the 17 countries studied in the cross-national project incorporate very different models of secondary education, we found that *allocation to different types of secondary education can be regarded as a general mechanism for the intergenerational reproduction of social inequalities* in contemporary societies. In all countries under study, *social background is associated positively with attendance at more prestigious types of secondary education* that provide students with higher-quality scholastic preparation, improve their performance, and increase their chances of entering more promising educational programs later on in their educational careers. Differential allocation by social background emerges largely from





**Fig. 2** The eduLIFE framework for analyzing individual trajectories through lower and upper secondary education. Source: Blossfeld et al. 2016b

differences in students’ previous performance. Ability differences between social strata, though, do not fully explain these patterns.

Institutional forms of secondary education clearly vary across contemporary societies. Inequality of educational opportunity can also emerge from less obvious forms of differentiation such as school sector (e.g. public vs. private, religious vs. nonreligious), region, placement in ability groups, or choice of subjects within systems possessing flexible curricula (see also Blossfeld et al. 2016b). These “hidden” forms of differentiation can occur together with more established and “visible” forms of tracking, but they might also be manifest before children are formally allocated to different types of secondary education. In France, for instance, students with a higher social background are more likely to choose German as a first foreign language or Latin or Ancient Greek as an option. These choices, in turn, are related to greater chances of succeeding in an academic track. Also in Russia, the socially stratified pre-tracking allocation into top-tier (Lyceum and Gymnasium) and ordinary schools is likely to affect subsequent placement in upper secondary education and chances of success in higher education. Even in ‘comprehensive systems’ such as those found in Sweden, teaching based on *subject-specific ability grouping* occurs

**Table 3** Classification of various forms of differentiation in secondary education. Source: Blossfeld et al. 2016b

	External (between schools)	Internal (within schools)
Formal	Formal school tracks School maintainer (public vs. private) School specialization (e.g. generalist vs. denominational school)	Specializations Subjects on advanced level
Informal	School reputation (e.g. ranking) School resources Student composition at the school level	Ability grouping Classroom composition Teachers’ characteristics in different school classes

before students are streamed into upper secondary, tracks which contribute toward diverging the subsequent educational trajectories of students from different social backgrounds. Thus, our findings clearly demonstrate that in order to gain an appropriate understanding of the reproduction of educational inequalities in contemporary education systems, we need to take into account “hidden” forms of differentiation within secondary education (see Blossfeld et al. 2016b).

We also observed that individuals’ secondary schooling careers are less fixed than the state of research suggests. The first allocation to different types of secondary education nowadays predicts subsequent educational pathways to a much lesser degree. Moreover, *mobility between types of secondary education is not as rare as previously thought in many countries*. Nonetheless, the flip side of the coin is that mobility patterns are strongly stratified by social background—beyond the importance of students’ academic performance in directing their mobility between tracks. The few upward movements occur disproportionately frequently among students with highly-educated parents, whereas downward mobility is much more common among students with a low social background. As a corollary, one could argue that increasing flexibility in movements between tracks effectively leads to increasing rather than decreasing social inequalities in education.

Furthermore, the type of secondary education has lasting effects on students’ subsequent educational careers, and on educational outcomes (such as competencies and skills) in later life. Notably, this result seems to be of a universal character, given that it holds true for all 17 countries studied in the *eduLIFE* project irrespective of the kind of educational differentiation in secondary school. This underscores the importance of integrating cross-national analyses of test score inequality with an extended perspective on further educational transitions and final educational attainment.

Comparative findings obtained from in-depth analyses in the *eduLIFE* project show us that *socioeconomically-advantaged families manage to secure the “pole positions” in education for their children regardless of the specificities of a school system*. They succeed in *strategically exploiting various opportunities provided by school systems in order to harvest the most favorable outcomes for their children*. As an unintended consequence, therefore, strategic behavior of socioeconomically-advantaged families appears as a strong social force offsetting the desired impacts of many educational reforms that aim to reduce social inequalities of educational opportunities. Thus, *the strategic behavior of families clearly limits the impact of educational reforms aiming to reduce inequalities of educational opportunities in school systems*.

## 5 Adult learning and social inequalities

Today, when individuals have entered the labor market, adult learning is increasingly shaping their social and economic opportunities. Especially in globalized and aging societies, it seems that the *generational replacement of older workers with obsolete skills by younger workers who have up-to-date qualifications has become a less efficient mechanism* to adapt the workforce to the rapidly-changing demands made by jobs and labor markets (Janossy 1966; Blossfeld and Stockmann 1999).

The focus is shifting towards keeping workers' skills continuously up-to-date during their working lives. *It is no longer appropriate that education takes place solely at the beginning of the life course.* In most modern societies, the primary policy focus with regard to adult learning has therefore been to increase participation rates. For example, the target of Europe's 2020 Agenda is to raise average participation rates to 15% for adults aged 25–64. Adult learning has also received considerable attention as a strategy to enable older workers to stay employed longer, thereby also reducing the pension burden of welfare states (D'Addio et al. 2010; Organisation for Economic Co-operation and Development [OECD] 2004). There are good reasons for being equally interested in the social inequalities of participation in adult learning and for focusing on the (educational) selectivity of participants.

The aim of the *eduLIFE* project was to examine adult learning by *exploring cross-national patterns of participation in different adult learning activities and their consequences on individuals' labor market trajectories* using a life-course approach. We assessed the extent to which cross-national commonalities and differences exist in the mechanisms of social inequality in two different types of adult learning, namely formal and non-formal job-related adult learning. The research design included 13 country-specific case studies and two cross-national comparative studies (Blossfeld et al. 2014). The countries analyzed and the data used in these analyses are summarized in Table 4. The best available data were used in each country, and the analyses were guided by the same theoretical ideas, and the same statistical models were often used. As far as is possible, these studies used longitudinal data and statistical modeling that enables the analysis of theoretically important mechanisms over the life course. The data were modeled with multivariate statistical models, often using either event history analysis or methods of panel data analysis (such as random and fixed effects models). In the majority of analyses, the results that are included refer to models where the impact of other individual-level characteristics (such as age and labor force status) was taken into account. Moreover, the analyses were frequently run separately for women and men in order to take gender-specific life courses into account. Although previous research on these issues exists, these often only focus on either participation or on outcomes, and usually examine only one type of adult learning or include all types together. As far as we are aware, the *eduLIFE* project was the first one to combine the *study of both inequalities in participation and outcomes*, and to *examine whether the processes of social inequality are similar across the two different types of adult learning.*

Adult learning can be divided into formal, non-formal and informal learning. In our longitudinal analysis, we examined only the first two, and we further focused on learning related to the labor market due to the centrality of employment in modern societies. We view *formal adult education* as learning that leads to recognized certificates that can also be obtained along the typical educational career; it often takes place in formal educational institutions. In contrast, *non-formal adult learning* consists of (often) shorter training courses, and is frequently at least partly sponsored by employers. Nevertheless, non-formal adult learning may also be certified, but these certificates are not widely recognized qualifications in the same way as those obtained from formal education are. Finally, *informal adult learning* differs from these two by being less institutionalized; it is often self-directed. It should also be noted

**Table 4** Overview of the (country-specific) case studies of adult learning. Authors' own work

Authors	Data	Country
Dämmrich, Vono de Vilhena, and Reichart	Adult Education Survey (AES)	Cross-national comparison or participation in adult learning
Triventi and Barone	International Adult Literacy Survey (IALS)	Cross-national comparison of returns to adult learning
Buchler, Chesters, Higginson and Haynes	Household Income and Labour Dynamics in Australia (HILDA)	Australia
Hamplová and Simonová	AES 2008, Labour Force Survey 2011 (LFS), Social Cohesion Survey 2005/2006 (SCS)	Czech Republic
Wahler, Buchholz, Myrup Jensen and Unfried	Integrated Database for Labor Market Research (IDA)	Denmark
Saar, Unt and Roosmaa	AES 2007, Family and Fertility Survey 2004/2005 (FFS)	Estonia
Kilpi-Jakonen, Sirniö and Martikainen	Register data from Statistics Finland	Finland
Buchholz, Unfried and Blossfeld	National Educational Panel Study (NEPS)	Germany
Csanádi, Csizmady and Róbert	AES 2007, Hungarian Household Panel Study (HHP)	Hungary
Barbieri, Cutuli, Lugo and Scherer	Indagine Longitudinale sulle Famiglie Italiane (ILFI)	Italy
Kosyakova	Russia Longitudinal Monitoring Survey (RLMS-HSE)	Russia
Vono de Vilhena and Miret Gamundi	Panel Survey on Inequalities in Catalonia (PAD)	Spain
Kilpi-Jakonen and Stenberg	Register data from Statistics Sweden (LISA)	Sweden
Elman and Weiss	National Longitudinal Study of Youth (NLSY79)	USA
McMullin and Kilpi-Jakonen	British Household Panel Study (BHPS)	UK

that countries differ in the way that adult learning is organized, which means that there is some variation in how each country in the *eduLIFE* project operationalized the two types of learning (functional equivalence of concepts).

*Participation in adult learning often displays a pattern of cumulative advantage* whereby those who are already better endowed also receive more (*Matthew effect*; see Merton 1968; Dannefer 1987). With regard to non-formal learning, this pattern has been explained by employers' incentives since it is employers who play a major role in sponsoring learning after labor market entry. It has been argued that the *higher educated are more trainable*, which means that each unit of training produces a greater enhancement in the productivity of highly-educated workers compared to those with lower educational attainment (Boeren et al. 2010; Dieckhoff 2007; Oosterbeek 1998). In addition, the *occupations in which the highly educated tend to work are likely to require more training* due to being knowledge intensive and requiring knowledge and skills to be kept constantly up to date, whereas low-skilled

jobs may remain more stable in their required tasks but have a greater risk of becoming obsolete in the long run due to technological innovations (OECD 2013).

On the other hand, individuals' incentives and barriers are likely to be more relevant for explaining educational selectivity for participation in formal education. In particular, *low prior educational attainment can be a barrier to entry despite the expansion of tertiary education* and new possibilities for individuals who do not satisfy traditional entry requirements. Moreover, psychological reasons such as prior schooling experiences may also act as an indirect barrier (Field 2000; Illeris 2003; Rubenson and Desjardins 2009). In addition, there are likely to be few incentives for individuals who are already highly educated to enter time-consuming formal education. Finally, there may also be ceiling effects so that at some point individuals are no longer able to climb the (formal) educational ladder. All in all, it is likely that *the benefits of participation in formal education are highest and the barriers impeding it are lowest for individuals with medium levels of education.*

It can generally be expected that adult learning is linked to positive labor market returns due to increased productivity as a consequence of the accumulation of human capital. In our research, we focused on what we term '*career progress*': Depending on the country in question, this can be defined as *upward mobility in terms of occupational prestige, social class or earnings*, or as (changes in) the level of these measures. However, *formal adult education* does not always take place as an upgrade from the previously held level of education, but *can also constitute an educational step sideways*, particularly when individuals want to change careers. In these cases, occupational status or earnings may not be any higher than they were before participation. On the other hand, participation in formal adult education (because it is time consuming) is also likely to act as a signal of higher motivation to employers, which should also increase employment outcomes. Furthermore, entry into many higher-status occupations tends to be restricted to individuals with the requisite qualifications, thus opening up access to individuals who acquire those (often tertiary-level) qualifications.

*Non-formal learning* is more likely to lead to productivity increases, particularly *when sponsored by the employer*, though these increases are likely to be smaller in size due to the shorter duration of training courses. On the other hand, the productivity-enhancing effects of training may be overstated if participants are already selected on the basis of higher productivity (or productivity potential). However, a review of studies that have been able to measure both wage and productivity growth concludes that individuals are able to capture only between one-fifth and a half of the financial returns to training, and the rest of the benefit goes to employers (Hansson 2008). Due to our focus on the benefits to the individual, our results are likely to reflect only a part of the overall benefits of training participation. Finally, it has also been suggested that not all types of non-formal learning lead to productivity increases, either because they are not designed to do so (e.g. because they are related to statutory requirements, such as health and safety courses, Field 2000), or because the compulsion to attend specific courses leads to low motivation and poor learning outcomes (e.g. some active labor market programs, Illeris 2003).

On the whole, *we expect the main mechanisms behind educational selectivity and the effect had by adult learning on career progress to be relatively similar across*

*countries*. However, it should also be recognized that the countries included in our analysis differ substantially in their *institutional configurations*, some of which are expected to affect different aspects of adult learning (e.g. Brunello 2001; Dieckhoff 2007; Wolbers 2005; see also Dämmrich et al. 2014; Triventi and Barone 2014). Our purpose here is not to assess the effect of specific institutions on particular aspects of adult learning, but rather to build a broader picture of adult learning across the different aspects and the two types that are analyzed.

If we summarize the results of the *eduLIFE* analysis of adult education in modern societies, the overwhelming conclusion is that, despite a wide variation in participation rates, *the main mechanisms of adult learning tend to be relatively similar across countries. Particularly when it is non-formal, adult learning displays a pattern of cumulative advantage and improves participants' career progress*. Nevertheless, some further observations can be made, in particular relating to the variation that is found in selectivity into formal adult learning.

One macro-level factor that seems to be related to less selectivity in formal adult learning is the education level of a country's adult population. A possible explanation for this may be that, in countries with high proportions of people with tertiary education, there is a greater perceived need among lower-educated adults to acquire additional education. This seems to be most keenly felt in Russia, where the social safety net of the state is also relatively sparse and therefore success in the labor market is paramount. In Estonia, higher participation rates of women compared to men and women's greater returns to new formal qualifications have also been explained by the expansion of higher education, accompanied by rising qualification requirements for certain (female-dominated) occupations, which in turn create pressures on women to gain new qualifications in order to be competitive, whereas men may rely more on their accumulated labor market experience. On the other hand, country differences in educational and occupational systems can also shape the form that these educational 'needs' take: In Germany, workers without occupational certificates have a strong incentive to obtain them due to their importance in the labor market.

Although a number of countries were not found to support the expectation that the medium-educated would be most likely to participate in formal adult learning, additional results from most of these countries suggest that the participation pattern is not one of cumulative advantage purely and simply. *It is often the case that disadvantages in the labor market also increase propensities towards participation*. This is the case in Australia, for example, where the conclusion is drawn that it is individuals in an intermediate position in the labor market who are most likely to re-enter formal education as adults. In Sweden, the long-term income trajectories of adult learners show that they have steadily fallen behind those among their peers who had similar levels of education. *Labor market disadvantages can also increase participation in non-formal learning*, although normally this is only the case for *non-formal learning that is not sponsored by employers* (but which is nevertheless related to the labor market). For example in Spain, workers in stable jobs are less likely to have participated in this type of learning than are those in precarious jobs or the unemployed—but this type of learning does not tend to improve one's labor market position.

With regard to how selectivity and career progress following adult learning combine to form broader patterns of social inequality, it is relatively clear that *no country is truly able at present to reduce social inequalities through adult learning*. Even in countries where some of the more disadvantaged individuals are able to obtain more adult learning, it is often those who obtain higher levels of (formal) adult learning who benefit more (such as in the Russian Federation and in Finland). The situation is worst in countries such as Hungary, where the disadvantages of low-status groups are exacerbated because they face considerable barriers when it comes to gaining access to any type of adult learning, and even when they do, they can only get into lower levels of adult education, which are less beneficial in the labor market. The same situation tends to hold for employer-sponsored non-formal learning, particularly in countries with strongly-segmented insider-outsider labor markets, such as in Italy, where marginal workers (not to mention individuals outside employment) are de facto excluded from beneficial training opportunities.

In this sense, *many countries seem to display a trade-off between equality and labor market rewards for adult learning*, which has been found for initial education (Bol and van de Werfhorst 2013). This is particularly the case for non-formal learning, but also to some extent for formal learning. *The comparative study also found that (short-term) wage returns of formal adult education correlate with wage returns on years of (initial) schooling*, suggesting that the institutional mechanisms driving the two are similar. On the other hand, there are suggestions in the results that positive combinations are possible: Lower selectivity and relatively widespread beneficial effects are seen in some countries, though only for formal learning, which tends to be much less widespread than non-formal learning. Nevertheless, positive cycles with greater investment in adult learning, the greater participation of less privileged individuals and gains in the labor market are possible, though not inevitable.

*The most uniform pattern found in our analysis is one of cumulative advantage: Those members of society who are better off are better able to access adult education, and tend to see greater benefits ensuing from such learning. More generally, adult learning tends to reproduce and reinforce the outcomes of initial education.* However, *there are substantial differences between the two types of adult learning that we have analyzed: Whereas the processes of cumulative advantage and the trade-off between equality and labor market rewards is clear for non-formal learning, this is less often the case for formal learning.* One of the reasons behind this difference may be that non-formal adult learning is more often sponsored by employers than is formal learning, particularly when the non-formal learning is job-related, which is what the *eduLIFE* project has analyzed. This means that *adult learning policies in modern societies need to explicitly target older, less-skilled workers as well as immigrants and the unemployed* because these groups tend to be overlooked in market-based systems (see also OECD 2013). *Age-based learning policies* are one step in this direction (Schuller and Watson 2009), but a broader conception of different life-cycle-based needs is also necessary (Billet 2010). Moreover, attention needs to be paid to the *content of the courses* in order to ensure that the participants also benefit from their participation in the labor market.

Taken as a whole, since much of the policy discourse related to adult learning emphasizes helping individuals keep their skills up-to-date and constantly develop, our message is that *countries need to shoulder greater responsibility when it comes to distributing opportunities for learning equitably and promoting the learning of individuals who are not intrinsically motivated.*

## 6 Summary and conclusions

Our cross-national research on the development of educational inequalities over the life course demonstrates that cross-national similarities greatly extend the scope of our knowledge about theoretical mechanisms in modern societies (Kohn 1987). Based on comparisons of diverse societies that vary widely in important institutional characteristics, our interpretations have gained considerable generality. By using an explicit cross-national comparison, it has been shown that there is empirical evidence of more universal sociological regularities.

Based on the cross-national analyses of the eduLIFE project, we have learned that *educational inequalities are created and perpetuated in the family early in a child's life, long before children enter school. Resources, activities, and mother-child interaction in the family, shape children's early conditions and opportunities for learning at home differently by social background.* Heckman (2006) claims that institutions of early childhood education and care are able to increase children's cognitive and non-cognitive abilities, and might compensate for the initial disadvantage faced by less privileged children. Our cross-national analysis confirms the first part of this hypothesis. *All children can profit from early childhood education and care (elevator effect), and children coming from the most disadvantaged backgrounds gain the greatest returns from these programs.* However, one has to bear in mind that these children are also the ones who are least likely to attend high-quality institutions, and if they do, their gains are only moderate and generally too small to effectively counteract the family influence.

When children are in school, the findings that we obtained from the comparative analyses demonstrate that *socioeconomically-advantaged families always manage to secure the "pole positions" in education for their children, regardless of the organizational specificities of the school system (this is the third time the authors have said this!).* They always succeed in strategically exploiting various opportunities provided by different school systems, and thus obtain the most favorable outcomes for their children. *This strategic behavior of families clearly limits the success of educational reforms aiming to reduce inequalities of educational opportunities within school systems.*

Finally, we found a *uniform cumulative advantage in adult education:* The better off members of society are better able to access adult learning, and tend to see greater benefits from learning. More generally, adult learning tends to reproduce and reinforce the outcomes of initial education in the life course.

*All these regularities are of course far from being sociological laws.* They can only be generalized to the countries actually studied. Nevertheless, our theoretical explanations can focus on more general life course mechanisms common to them



(Kohn 1987, p. 719). Indeed, apparent similarities can always mask profound societal differences, but this danger is reduced significantly when the studies in one particular country are replicated by competent social scientists from other countries using comparable measurements and concepts, as well as systematic techniques of longitudinal analyses with extensive time-related statistical controls.

However, we should also mention that our examples of cross-national comparative life course studies also produced many *interesting cross-national differences*. When observed relationships differ from country to country, these inconsistencies have to be interpreted in terms of how the country-specific case studies or the countries differ. If we can rule out methodological differences between case studies as an explanation, we must take into account what is idiosyncratic about the particular countries for our interpretation (see Goerres et al. 2019). From an analytical point of view, it would be great if cross-national life course differences could be interpreted as instances of lawful regularities. This however requires a more explicit theoretical consideration of cultural and institutional conditions and further replications of the analyses in further countries.

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