Z Erziehungswiss (2011) 14:35–50
DOI 10.1007/s11618-011-0180-9

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3 Data on educational processes: national and international comparisons

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Abstract: Panel data are essential for improving the possibilities of describing trajectories of growth and development over the life course and studying the patterns of causal relationships over a longer period of time. This overview of existing panel studies in the field of education in Germany demonstrates the shortcomings of existing databases. Although there are some excellent theory-driven panel studies, most are based on regional samples and often restricted to one specific stage in the life course or educational career. Major nationwide panel studies are also gathering some education-relevant information, but they do not provide data on competence development in different domains or detailed information on educational contexts outside the household or family. There are long traditions of longitudinal research in other developed countries. Birth cohort studies and school-to-work panels are particularly common. The overview reveals that a multicohort sequence design is the most efficient way to gather relevant information on specific transitions in the educational career as quickly as possible. To capture change and stability over time, new cohorts have to be drawn from time to time (cohort succession). Therefore, the German National Educational Panel Study implements this kind of design.

Keywords: Education · Panel study · Cohort study · International comparison

Daten zur Untersuchung von Bildungsprozessen: Übersicht zur nationalen und internationalen Datenlage

Zusammenfassung: Panelstudien sind unerlässlich für eine verbesserte Datenlage, mithilfe derer Wachstums- und Entwicklungsverläufe im Lebensverlauf beschrieben und kausale Zusammenhänge untersucht werden können. Der Überblick zu den in Deutschland durchgeführten Panelstudien mit bildungsthematischen Bezügen offenbart die Grenzen der bestehenden Datenbestände. Es liegen zwar einige hervorragende, theoriegeleitete Panelstudien vor, diese beschränken sich aber zumeist auf einzelne Regionen oder auf ausgewählte Abschnitte im Bildungs- oder Lebensverlauf. Einige der großen, bundesweiten Panelstudien erheben zwar auch für die Bildungsforschung relevante Informationen, sie enthalten aber keine detaillierten Daten zur Entwicklung

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von domänenspezifischen Kompetenzen in außerhäuslichen Lernumwelten. In anderen industrialisierten Ländern gibt es zum Teil lange Traditionen in der Durchführung von bildungswissenschaftlich ausgerichteten Längsschnittstudien. Besonders häufig sind Panelstudien, die mit Neugeborenen starten, und solche zu den Übergängen von der Schule in den Arbeitsmarkt. Aus der überblicksartigen Darstellung bisheriger Studien lässt sich erkennen, dass ein Multi-Kohorten-Sequenz-Design die effizienteste Strategie ist, um rasch möglichst viele Übergänge im Bildungssystem in den Blick nehmen zu können. Um Veränderung und Stabilitäten im historischen Zeitverlauf erfassen zu können, müssen in regelmäßigen Abständen neue Startkohorten gezogen werden (Kohortensukzession). Aus diesen Überlegungen ergeben sich grundlegende Vorgaben für das Erhebungsdesign des Nationalen Bildungspanels.

Schlüsselwörter: Bildung · Panelstudie · Kohortenstudie · Internationaler Vergleich

3.1 Introduction

Most empirical evidence in German educational research is based on cross-sectional data like the various international student assessment studies such as Progress in International Reading Literacy Study (PIRLS), Programme for International Student Assessment (PISA), or Third International Mathematics and Science Study (TIMSS). Generally, these deliver only a snapshot of the achievement of different students at a particular point in their educational careers. Even though successive snapshots obtained from a series of cross-sectional surveys highlight changes in the structure as a whole, they do not show the changing (and sometimes) unchanging experiences of individual students as their educational careers progress.

There is widespread consensus that panel data and the methodological advantages it provides are essential for a rigorous approach to the types of questions that drive and are central to life-course-oriented educational research (Halaby 2004). In particular, panel data improve the possibilities of describing trajectories of growth and development over the life course and studying the patterns of causal relationships over longer time spans. The strengths of panel data become particularly evident when they are compared with the commonly collected cross-sectional data (see Chap. 2, this volume).

The available multipurpose household panel, the German Socio-Economic Panel Study (SOEP), is not mainly designed for carrying out research on education as an ongoing process. In particular, it does not measure domain-specific competence development over the life course; it lacks information on the educational decision process; it provides only small numbers of observations for specific groups of individuals at various educational branching points; and it provides less coverage of educational environments outside the home.

In Germany, a growing number of panel studies particularly address educational issues. However, most are restricted locally to one city or to one or two federal states. Such data allow only restricted analyzes of the significance of institutional and regional differences (e.g., regional unemployment, local apprenticeship situation) for educational processes, and any generalization of the findings to cover the situation in the whole of Germany is limited. In some respects, the new study TIMSS-*Übergangsstudie* on the transition from

elementary to secondary school is an exception. This study is representative for Germany and has a follow up concept (Maaz et al. 2010).

Existing education studies focus on one or two important phases in the educational career. This might be either an important transition point like school entry or developments in one educational stage. Data covering multiple transitions and educational phases in order to describe and analyze educational processes are a rarity.

In the following, we give an overview of pertinent longitudinal studies in Germany. We address their relevant research topics and some design features. Some nations, especially the United Kingdom and the United States of America, have a long tradition of conducting panel studies on educational issues. Against the backdrop of these reviews, the last section explains why a multicohort sequence design is the most favorable choice for the National Educational Panel Study (NEPS).

3.2 Review of relevant longitudinal studies in Germany

Several longitudinal studies have already been carried out in Germany. These extend knowledge derived from cross-sectional studies by providing more information on the causes of established competence developments and educational decisions. The available longitudinal studies can be assigned to the following four areas: (a) childhood development, (b) transitions and competence developments in elementary and secondary school, (c) transitions from school to vocational training and university, and (d) life-course research with a strong emphasis on educational and employment careers and family-related processes.

Table 1 gives an overview of studies commencing in preschool age. In 1984, the panel study LOGIK started with 4-year-old children in Munich. They were tested up to 2003. The main focus of LOGIK is on the development of cognitive competencies alongside personality development (Weinert and Schneider 1999).

The European Child Care and Education Study (ECCE) was conducted in Germany and three other European Countries in the 1990s. This study surveyed different dimensions of the quality of learning environments, especially of preschool institutions, elementary school as well as families. The main focus of this study was on the importance of the formal and home learning environments on adaptive behavior, social competencies and vocabulary (Tietze et al. 2005). The national DJI child panel study and the regional study BiKS, cohort 1, focus on the transition from Kindergarten to elementary school and the development of competencies in different contexts (Betz et al. 2006; von Maurice et al. 2007).

The majority of longitudinal studies address educational development within schools (Table 2). Among these regionally designed studies, we can differentiate between two types: The first concentrates more on competence development within one level of education (*elementary school*: SCHOLASTIK: Weinert and Helmke 1997; BeLesen: Merkens et al. 2006; Hannoversche Grundschulstudie: Tiedemann and Billmann-Mahecha 2007; KILIA: Kammermeyer and Martschinke 2006; PERLE: Greb et al. 2007; *lower secondary education*: PALMA: Pekrun et al. 2007; *lower and upper secondary school:* LAU: Lehmann et al. 1997); the second also focuses on transitions between two stages in the

Table 1: Overview of German longitudinal studies covering education from preschool age onward

Study title	Age	Topic	Region	Time
LOGIK—*Longitudinalstudie zur Genese individueller Kompetenzen*	4–13, 17, 23 years (12 waves)	• Developmental trends in cognitive competencies (reading, orthography, mathematics, science) and personality disposition	Munich	1984–2003
ECCE—*European Child Care and Education Study*	4, 6, 8 years (5 waves)	• Quality of institutional care settings, elementary school and family • Development of adaptive behavior, social competence, vocabulary	Germany (also in Austria, Portugal, Spain)	1993/1994–1997/1998
DJI—*Kinderpanel (Deutsches Jugend Institut)*	Children in Kindergarten (5–6 years) and school (8–9 years) (3 waves)	• Determinants of psychosocial development of children • Risk factors for competence development	Germany	2002–2005
BiKS—*Bildungsprozesse, Kompetenzentwicklungen und Selektionsentscheidungen im Vor- und Grundschulalter*	Cohort 1: Starting at age 3 (9 waves, 2010)	• Transition from Kindergarten to elementary school • Competence development, educational decisions, and context effects • Domains: German language competencies, mathematical literacy, reasoning, meta-cognition, working memory	Bavaria, Hesse	2005-open

education system (ELEMENT: Lehmann and Nikolova 2005; KESS: Bos, Bonsen et al. 2010; Bos, Gröhlich et al. 2010; MEPS: Stocké 2007; Koala-S: Ditton 2007; BiKS cohort 2: von Maurice et al. 2007). One of the largest studies in terms of case numbers, waves, regional coverage, and topics is the BIJU (Trautwein et al. 2006).

There are three nationally representative studies in the education system with at least one second measurement point: TIMSS 1995, PISA-I-plus 2003, and *TIMSS Übergangsstudie*. The aim of the first two studies was to describe and analyze the progress of competencies from one grade to the next; the focus of the third study is on transitions (e.g., school choice and coping with the transition). TIMSS 1995 tested students in Grade 7 (1994) and one year later (Köller et al. 2001). PISA 2003 was expanded by a second wave (PISA-I-plus). Ninth graders from intermediate and academically oriented tracks were tested one year later in Grade 10 in order to analyze how they had progressed in mathematics and sciences and what the determining factors were (Prenzel et al. 2006). The *TIMSS-Übergangsstudie* consists of six waves—three in 4th grade and then one additional wave every year in Grades 5, 6, and 7. This study has surveyed parents and students repeatedly, gathered information from 4th-grade teachers, and conducted competence tests at one point (at the end of 4th grade). Main issues are social inequalities in the access to a more demanding school type, students' coping with the transition from

Table 2: Overview of German longitudinal studies focusing on development and decisions in general school

Study title	Grade	Topic	Region	Time
SCHOLASTIK—*Schulorganisierte Lernangebote und die Sozialisation von Talenten, Interessen und Kompetenzen*	Grades 1, 2, 3, 4	• Developmental trends in elementary school • Domains: mathematics, German language	Munich	1988–1991
BeLesen—*Berliner Längsschnittstudie zur Lesekompetenzentwicklung von Grundschulkindern*	Grades 1, 2, 3, 4	• Development of competencies (reading and writing, especially of children with migration background)	Berlin	2002–2006
Hannoversche Grundschulstudie	Grades 2, 3, 4	• Development of competencies (mathematics, orthography, reading comprehension) • Personality traits (related to conditions in classroom and family)	Hanover	2000–2003
KILIA—*Kooperationsprojekt Identitäts- und Leistungsentwicklung im Anfangsunterricht*	Grades 1, 2, 3, 4	• Teacher study: importance of teacher when starting school • Student study: class climate and identity development	Nuremberg	2000–2005
PERLE—*Persönlichkeits- und Leistungsentwicklung von Grundschulkindern*	Grades 1, 2, 3, 4	• Development of competencies (mathematics, acquisition of written language and the arts) • Personality traits	Saxony, Berlin, Thuringia, Brandenburg	2006–2010
ELEMENT—*Erhebung zum Lese- und Mathematikverständnis*	Grades 4, 5, 6 in elementary school or Gymnasium	• Staying in elementary school in grades 4–6 or moving to Gymnasium after grade 4 • Domains: reading, writing, mathematics	Berlin	2003–2005

Table 2: (continued)

Study title	Grade	Topic	Region	Time
KESS—*Kompetenzen und Einstellungen von Schülerinnen und Schülern*	Grades 4, 7, 8 (survey of complete cohorts)	• Transition from elementary to lower secondary school • Domains: mathematics, reading, writing, science, English • Children's, teachers', parents' attitudes	Hamburg	2003–2008
MEPS—*Mannheimer Bildungspanel*	Grades 3, 4, 5, 6, 7, 8	• Competence development (verbal and mathematical competencies, reasoning) and educational decisions in elementary and secondary schools	Rhineland-Palatinate	2003-open
Koala-S—*Kompetenzaufbau und Laufbahnen im Schulsystem*	Grades 2, 3, 4	• Competence development (reading literacy, orthography, mathematics, cognitive abilities) and educational decisions in elementary school	Bavaria, Saxony	2005–2007
BiKS—*Bildungsprozesse, Kompetenzentwicklungen und Selektionsentscheidungen im Vor- und Grundschulalter*	Cohort 2: Starting at grade 3 (6 Waves up to 2010)	• Transition from elementary to lower secondary school • Competence development, educational decisions, and context effects • Domains: German language competencies, mathematical literacy, reasoning, metacognition	Bavaria, Hesse	2006-open
TIMSS-*Übergangs-studie*	grades 4, 5, 6, 7 (up to 6 waves)	• Transition from elementary to lower secondary school • Coping with the transition as well as effects on motivation and learning • Domains: mathematics, science, German language, reasoning	Germany, (except Berlin, Brandenburg, North Rhine-Westphalia)	2006–2009
BIJU—*Bildungsverläufe und psychosoziale Entwicklung im Jugend- und jungen Erwachsenenalter*	Cohort 1: Grades 7, 10, 12 (13) voc. training/study/job Cohort 2: Grades 10, 12, voc. training/job/study	• Development of competencies (mathematics, English as a foreign language, science) • Psychosocial changes in youth and early childhood • Transition into the occupational/academic career	Berlin, Mecklenburg-Western Pommerania, North Rhine-Westphalia, Saxony-Anhalt	1991–2001, 1993–1998. follow up 2009/2010
LAU—*Hamburger Lernausgangslagenuntersuchung*	Grades 5, 7, 9, 11, 13 (survey of total population)	• Transition from elementary to lower secondary school (retrospective) • School performance (reading, writing, mathematics) and problem-solving competence	Hamburg	1996/1997–2004/2005

Table 2: (continued)

Study title	Grade	Topic	Region	Time
PALMA—*Projekt zur Analyse der Leistungsentwicklung in Mathematik*	Grades 5, 6, 7, 8, 9, 10	• School performance in mathematics	Bavaria	2002–2007
TIMSS 1995/II—*Third International Mathematics and Science Study*	Grades 7, 8	• Development of competencies (mathematics, science) • Interests (subject-specific) • Teaching	Germany	1994–1995
PISA-I-Plus	Grades 9 and 10 in the intermediate and in the academic-oriented track (different school types)	• School performance in mathematics and science	Germany	2003–2004

elementary to lower secondary school, and the effect of this transition on motivation and learning (Maaz et al. 2010).

The Higher Education Information System (Hochschul-Informations-System, HIS) has conducted numerous national longitudinal studies of tertiary education and the labor market entrance of graduates (Table 3). One type of HIS panel studies includes cohorts of school leavers qualified for higher education. It follows the transition of these young people to university or vocational training and their subsequent educational career for a period of 42 months after leaving school. The second type, the HIS graduates survey, concentrates on the transition from university to the labor market and to the further professional career. The survey uses three waves to cover the first 10 years after graduation (HIS Hochschul-Informations-System GmbH 2010). The DJI transition panel focuses on the transition of "disadvantaged" students who have finished the lower school track, and follows their paths into the vocational training system and their entry to the labor market. To get a closer picture of the diverse pathways in and out of vocational education and training (VET) and the numerous courses offered to young people without a fixed apprenticeship, the first six waves had a panel interval of 6 months before switching to annual surveys (Gaupp et al. 2008). There have been some regional panel studies on the entrance to VET and the early professional career in the 1990s (*Transformation von Lebenslaufdynamiken*, *Berufsverlauf und Delinquenz*). However, none of the listed studies include any performance-based competence measurements. They gather only self-reports on certificates and grades, and sometimes on self-assessed competencies as well. In the 2000s, some transition studies started to assess competencies in the context of general schools (see TOSCA, Trautwein et al. 2010). And there is also the ULME study in Hamburg that is testing competence development from the start to the end of a course in vocational school, independent of whether the vocational school is full- or part-time (Lehmann and Seeber 2007).

Table 3: Overview of German longitudinal studies focusing on transitions from school to vocational training, to university, and to the labor market

Study title	Age/Grade	Topic	Region	Time
HIS—*Studienberechtigtenpanel*	Cohorts of school-leavers entitled to higher education 1976, 1978, 1980, 1983, 1986, 1990, 1992, 1994, 1996, 1999, 2002, 2004, 2005, 2006 (up to 4 waves)	• Transition from upper secondary school to university or vocational training • Course of study or vocational training	Germany	1976-open
HIS—Absolventenbefragung	Cohorts of higher education graduates 1989, 1993, 1997, 2001, 2005 (up to 3 waves, 1, 5, 10 years after first degree)	• Course of study • Transition from university to labor market • Employment, unemployment, further education	Germany	1989-open
Transformation von Lebenslaufdynamiken	Cohorts receiving first training qualification in 1985, 1990, 1995 (3 waves)	• School-to-work transitions, employment and family careers before, during and after unification in eastern Germany	Leipzig, Rostock	1994/1995–2000
Berufsverlauf und Delinquenz	Final year in compulsory school in less demanding tracks (5 waves)	• From school to work • Employment and family careers • Delinquency	Bremen	1989–2001
DJI—Übergangspanel	End of compulsory education in less demanding tracks (10 waves)	• Transition into the vocational training system and into the less-qualified labor market	Germany	2004–2009
TOSCA-2002 and TOSCA-Repeat—*Transformation des Sekundarschulsystems und akademische Karrieren*	Students graduating from vocational and general Gymnasium (3 waves)	• Facets of the ability to study, mathematics, English as a foreign language • Transition into university/vocational training • Transition from upper secondary school to labor market	Baden-Wuerttemberg	2002 and 2006-open
TOSCA 10	Students in Grade 10 (Realschule or Gymnasium)	• Transitions into apprenticeship and upper secondary school • Competence development	Baden-Wuerttemberg	2007-open
ULME—*Untersuchungen der Leistungen, Motivation und Einstellungen zu Beginn der berufl. Ausbildung*	Students at beginning and end of vocational school	• Competence development during vocational school attendance • Domains: reading literacy, English literacy, job-related skills	Hamburg	2002–2005

Table 3: (continued)

Study title	Age/Grade	Topic	Region	Time
Lebensverlaufserhebung ehemaliger Gymnasiasten	Students in Grade 10 in Gymnasium (3 waves)	• Sociostructural determinants of achievement in school • Transition to study and vocational training • Employment and family careers	North Rhine-Westphalia	1969/1970–1997
GLHS—German Life History Study	Retrospective survey of selected birth cohorts (follow ups in selected cohorts)	Changes in education, job entry, and processes of starting a family	Germany	1983–2003

At the end of Table 3, there are also two studies with a strong emphasis on life-course dynamics. One is the study of former Gymnasium students' careers (starting at 10th grade) that examines college and professional education as well as gainful employment in North Rhine-Westphalia over a period of 28 years. This is a study of one single cohort (Meulemann et al. 2001). The German Life History Study (GLHS) collected retrospective data on the previous educational and employment career as well as the family history of several birth cohorts. The GLHS is representative for the selected cohorts and provides detailed information on life courses in western and eastern Germany over time (Mayer 2008).

Finally, we have to mention two large nationwide panel studies delivering education-relevant data: the Socio-Economic Panel Study (SOEP) and the Panel Analysis of Intimate Relationships and Family Dynamics (pairfam) (not listed in a table). The SOEP is a household panel study carried out in Germany every year since 1984. The major SOEP survey instruments are a household questionnaire, an individual questionnaire for all adults in a household, and a supplementary biographical questionnaire that is completed only once in a lifetime. The SOEP combines retrospective data on work- and family-related event histories with prospective panel data on, amongst other areas, job and income mobility, educational participation, family status, and life satisfaction in different domains. One major design feature of the SOEP is the refreshment sampling, which has been drawn several times. One reason for sample refreshment is that long running panel studies often face the problem of changes in the population under study. One consequence of following up a cohort drawn at some point in time is that migrants who arrived later are not represented. A further aspect is German reunification with the resulting change of state. In order to be representative for the whole of Germany, a sample has to have been drawn in eastern Germany before unification (Wagner et al. 2007).

In recent years, the SOEP group has expanded the survey program, and it is now gathering additional education-relevant information at specific ages. There is a short questionnaire on newborns, on 2- to 3-year-olds, and on 5- to 6-year-olds. Parents report on their children's adaptive behavior, social competencies, or personality. The regular household questionnaire surveys children's educational participation (e.g., Kindergarten and school). At age 17, the youngest age for an individual response, the standard questionnaire is replaced by the so-called youth questionnaire. This contains retrospective items

on previous school events and activities, on current school achievement, and on educational and vocational plans. In addition, 17-year-olds are tested for fluid intelligence. Up to now, a sample of adults has also taken part in two very brief tests of perceptual speed and word fluency (Lang 2005; Lohmann et al. 2009; Uhlig et al. 2009). The measures address general cognitive functioning. In contrast, international student assessments such as PISA, but also some regional panel studies, focus on domain-specific competencies like text comprehension, mathematics, and science literacy.

The aim of the new study, pairfam, is to gather data describing and explaining individuals' engagement in intimate relationships, family development, and parenting. This also includes parent-child interaction, child's well-being, and achievement. Random samples were drawn in 2008, and they capture the birth cohorts 1991–1993, 1981–1983, and 1971–1973. Alongside the target person (the anchor), information is also gathered directly from partners, and, from the second wave on, also from parents and from one 8- to 16-year-old child living in the same household as the anchor person. As in most major panel studies, the survey is conducted annually (Huinink et al. 2010).

3.3 Review of relevant longitudinal studies in other countries

There are numerous cross-national studies in the field of education. In most cases, they have been initiated by the International Association for the Evaluation of Educational Achievement (IEA), the Organisation for Economic Co-operation and Development (OECD), and sometimes also by the United Nations Educational, Scientific and Cultural Organization (UNESCO). Alongside assessment studies like PIRLS, TIMSS, and PISA, there are also some studies going beyond the education system like the International Adult Literacy Study (IALS) or the up-coming Programme for the International Assessment of Adult Competencies (PIACC) (see, for overviews, Goy et al. 2008; Schwippert and Goy 2008). These studies are cross-sectional in nature. Therefore, they make it possible to compare the distribution of competencies between nations, and—in the case of a repeated study—to indicate trends over time. However, they cannot describe and explain the individual development of competencies and educational careers.

There is an increasing number of studies on educational careers and school-to-work transitions using populations originally sampled and tested in the PISA framework. Because these follow ups have not been harmonized, they differ in the ways students have been approached. The large follow ups are the Canadian Youth in Transition Survey (YITS), the Swiss Transitions from Education to Employment longitudinal study (TREE), and the Longitudinal Surveys of Australian Youth (LSAY), which had already existed before PISA[1]. The Canadian YITS has been following students from two cohorts every 2 years since 2000. The members of the first subsample were 15 years old and were first interviewed and tested by PISA 2000. The second cohort consists of 18- to 20-year-olds. The later have not taken part in an assessment yet (OECD 2010). A similar strategy has been implemented by the Swiss longitudinal study TREE. This study also began in 2000 and measured competencies within the PISA framework—but only for that year. After this, the students were interviewed by telephone or by mail once a year from 2001 to 2007 and again in 2010 (Bergman et al. 2010; Meyer 2005). The Australian LSAY is a

multicohort study of students in 9th grade or at the age of 15. Cohorts started in the years 1995, 1998, 2003, 2006, and 2009. At the first wave, students are tested and surveyed with a written questionnaire in the school context; afterwards they are interviewed once a year by telephone for up to 10 or 11 waves. Since 2003, the cohort members have been students taking part in the Australian part of PISA[2]. All three studies have high-quality competence measures for the base year. So far, only the YITS has planned a retesting of reading literacy in a subsample of the younger cohort[3]. Generally, no further competencies have been assessed in these cohort studies. They predominantly provide information on educational decisions and participation as well as on entry to the labor market.

Some European and North American countries have a long tradition of conducting educational panel studies that includes the assessment of competencies, skills, and/or intelligence components. An overview of the design and main research issues of existing and upcoming cohort studies on newborns is given in Chap. 12 in this volume. Roßbach and Weinert (2008) provide a summary of the most important longitudinal studies for preprimary education. Kristen et al. (2005) give an extensive overview of studies conducted in Canada, France, the Netherlands, Sweden, the United Kingdom, and the United States of America. In these countries, different approaches have been used to obtain longitudinal information on education. Most, however, are either long-running cohort studies collecting data on an individual's life over a long period of time, or they are short-term studies covering a specific stage of the educational career. In the following, we summarize the main findings for the UK and the USA given by Kristen et al. (2005).

Large birth-cohort studies focusing on education have been carried out in the United Kingdom for more than half a century. The first one, which started in 1958, was the National Child Development Study (NCDS). The British Cohort Study (BSC70) began in 1970, and the Millennium Cohort Study (MCS) started in 2000/2001. Whereas the distances between the panel points in the 1958 NCDS fluctuated between 4 and 10 years, the MCS has much smaller time spans, thereby permitting the collection of more detailed information on developmental processes and education. Data stem from a variety of traditional sources—children, parents, and schools—and various other sources such as medical records. In addition, data are enriched with information from the microcensus.

A prevalent research strategy in England and Wales is to focus on a short relevant sequence of the educational career. The Youth Cohort Study (YCS) is a repeated short panel study that provides insights into the transition from secondary school to further education and the labor market. A new cohort has entered the study nearly every year since 1985. Sample members are normally interviewed at the end of compulsory education at the age of 16 years, and are followed up to the ages of 17 and 18 years. Only individuals are surveyed, and they are asked about their educational careers, grades, labor market experiences, and future plans.

A large number of different longitudinal education studies has been conducted in the United States. According to Kristen et al. (2005), "The most important large-scale longitudinal studies on educational pathways are conducted by the National Center for Education Statistics" (p. 25). The main goals of these different studies are to analyze educational, professional, and personal developments at different points within educational careers and to identify the role played by personal, family, social, institutional, and cultural factors (National Center for Education Statistics 2003a, b).

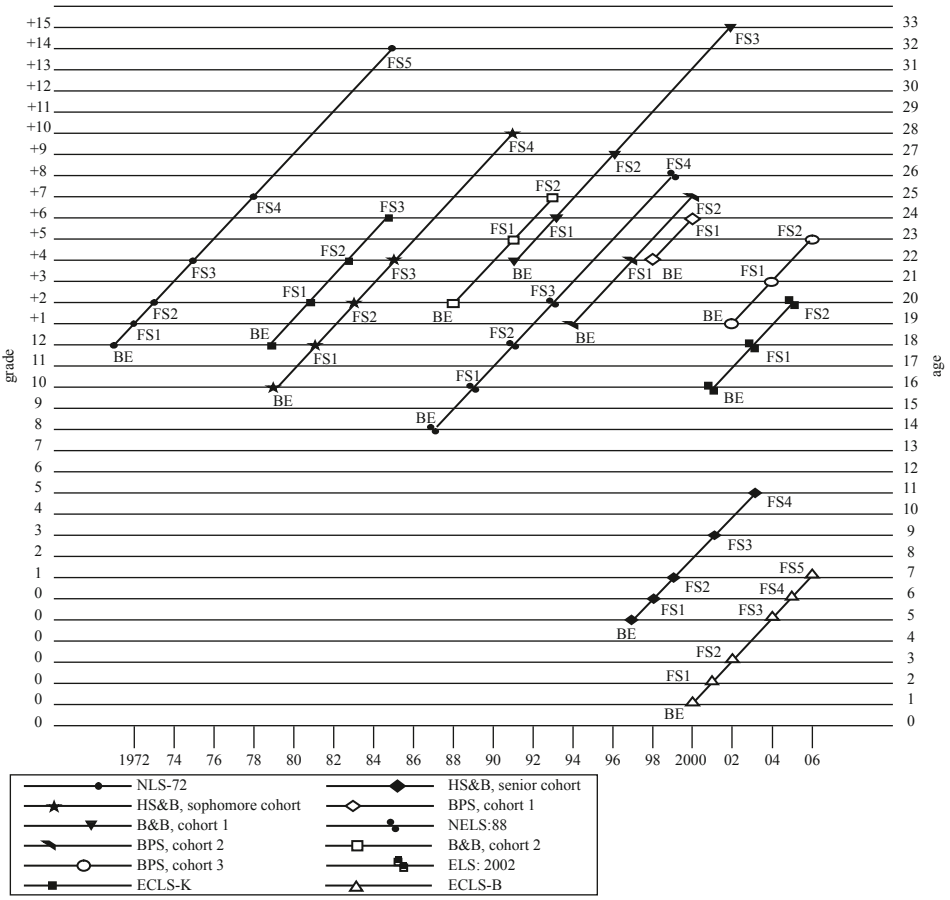

Fig. 1: Overview of studies conducted by the National Center for Education Statistics (NCES) in the United States (Kristen et al. 2005, p. 27)

Most of these cohort studies have four or five observation points and start at Grade 10 or 12. Hence, they are high school studies focusing on transitions to postsecondary education and the labor market (Fig. 1). They include the National Longitudinal Study of the High School Class of 1972 (NLS-72), the National Education Longitudinal Study of 1988 (NELS-88), the Educational Longitudinal Study of 2002 (ELS), and High School and Beyond (HS&B). Some studies concentrate on students in tertiary education and their labor market entry. Two examples are the Beginning Postsecondary Students Longitudinal Study (BPS) and the Baccalaureate & Beyond (B&B). In recent years, two cohort studies focusing on the development at early ages have been implemented. One cohort starts with the newborn, the other with children attending the US Kindergarten. Together, the studies are known as the Early Childhood Longitudinal Study (ECLS-B and ECLS-K).

United States education data can be described as additive, repeated cohort sampling. This means that the data are drawn from different cohorts of children and students at specific stages within the educational career. The complete data pattern of these cohorts

delivers sequences reaching from birth up to the age of 30. However, a gap at the lower secondary level remains.

3.4 Major conclusions for designing a new longitudinal study on education

Our short overview of available longitudinal studies conducted in Germany reveals that there are two genuine nationwide panel studies with education-relevant data: the SOEP and the currently new started pairfam. These studies do not include detailed data on educational contexts outside the family or on the development of domain-specific competencies, even though some measures of cognitive competencies and personality traits have been included in the SOEP in recent years, and pairfam will focus on parenting and child achievement.

There are some longitudinal studies addressing educational issues, including repeated measurements of competencies. But only limited conclusions can be drawn from these. They either confine themselves to a certain region within Germany or concentrate primarily on one stage of education or a specific transition within the educational career. These studies make it impossible to understand how the competencies of individuals develop over the life course, how these competencies interact with educational decisions at various critical transitions in the individuals' careers, and how these competencies are influenced by the family and by the way teaching and learning processes are arranged in Kindergarten, school, vocational education and training, and university. Furthermore, these studies do not cast light on how competencies relate to the achievement of educational qualifications, and which competencies are responsible for being successful on the labor market and in private and social life. Thus, there is a strong demand for high-quality longitudinal educational research in Germany. In particular, there is a great demand for both analytical and methodological progress in order to understand educational pathways throughout the life course and how they lead to different outcomes. In sum, a large National Educational Panel Study covering the whole life course is needed.

The brief overview of longitudinal studies using different designs clearly shows that birth cohort studies take too much time to acquire a "complete" picture of the educational career. To study children's development and transitions until the end of the secondary school level would take nearly 20 years. Another important point is that the generalization of findings based on a single cohort can be limited. A lot of research based on the German Life History Study has shown how educational, professional, and family careers of different birth cohorts can differ according to historical and economic circumstances. Also in the case of school-to-work transition, which is a sensitive phase in educational careers, it can be observed that panels in England and Wales, the United States, and Australia repeatedly draw new starting cohorts.

It is more efficient to concentrate on important sequences in the educational career. Samples must be drawn for every relevant sequence. Such a multicohort sequence design quickly provides relevant information. However, this has to be followed by drawing new starting cohorts and carrying out refreshments (see, for details, Chaps. 1 and 4, this volume). This enables us to observe historical changes and evaluate not only major educational reforms at different transition points like school, university, or the labor market, but

also differences within competence development at comparable education stages. Such a design is comparable to that of the US National Center for Education Statistics. In contrast, however, we shall pay additional attention to lower secondary school and adults, and we shall follow up persons for as long as possible.

Endnotes

1 There are also PISA-L with yearly follow ups of PISA 2003 in the Czech Republic, the PISA Longitudinal with one re-interview of PISA 2000 and PISA 2003 after 4 years in Denmark, and one follow up of a subsample of PISA 2003 in Uruguay (OECD 2010 p. 120).

2 For more information, see http://www.lsay.edu.au/.

3 For more information, see http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=4435&lang=en&db=imdb&adm=8&dis=2.

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