



The BiKS-Study on “Educational Processes, Competence Development, and Formation of Educational Decisions in Preschool and School Age”: General Outline of Research Questions and Design of the BiKS-3-18 and the BiKS-8-18 Studies

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Abstract

BiKS is an interdisciplinary longitudinal large-scale study on educational processes, competence development, and the formation of educational decisions. It consists of two panel studies: BiKS-3-18 started in September 2005 with 547 children at age 3 and followed these children till age 18 with 13 panel waves. BiKS-8-18 started in March 2006 with 2,395 students in grade 3 and followed them till age 18 with 11 panel waves. Both samples were drawn in

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selected cities and regions in Bavaria and Hesse (Germany) following a multi-step sampling procedure. Besides individual development of competencies, school-relevant attitudes, and educational decisions, special attention is given to the family, preschool, and school as important learning environments. The instrumentation follows a multi-informant perspective where possible and includes standardized competence tests, questionnaires, and observational methods. Moreover, some subsamples are studied with in-depth qualitative methods. Data are documented and available to the scientific community free of charge. This chapter provides a general introduction to the interdisciplinary research unit BiKS and its main aims. Moreover, it presents an overview of the two longitudinal BiKS studies BiKS-3-18 and BiKS-8-18.

Keywords

Educational trajectories · Longitudinal data · Interdisciplinary research · Preschool · School

1 Introduction: From an Interdisciplinary Research Vision to Widely-Used Datasets

The BiKS project was launched at the University of Bamberg in the early 2000s when an interdisciplinary group of researchers discussed the results of the international large-scale student assessment studies (PISA), which showed that German students' competencies at age 15 were below average and were strongly influenced by disparities of family background. The questions of how children's competencies develop in different learning environments, when differences related to family background emerge, how educational decisions are made, and how families and educational institutions can promote children's competence development and educational trajectories have been addressed by the interdisciplinary group of researchers. Intensive discussions focused on the factors

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influencing child development and educational processes at home, preschool, and school, taking into account a comprehensive range of sociodemographic background parameters as well as the complex interplay of (developmental) characteristics and individual prerequisites of the children in the changing institutional and family contexts over the life course. Large-scale data on children’s educational development were not yet available in the early 2000s in Germany, and these questions remained unanswered. Thus, at the University of Bamberg the decision was made to build a large-scale database on educational processes, competence development, and educational decision-making in order to gain cross-disciplinary insights from it. The idea of a 2-cohort multi-informant multi-methods panel study was born.

Drawing on a bioecological model of child development (e.g., Bronfenbrenner and Morris 2006), the two BiKS studies consider children’s individual prerequisites and trace children’s competence and skill development with a special focus on (a) proximal educational processes in the family and in educational institutions, (b) the formation and impact of educational decisions, and (c) the impact of distal influencing factors such as the socioeconomic status of families (e.g., parental education, occupation, and family income) and state regulations, e.g. regarding entry into primary schools or for choice of school tracks. School tracking starts relatively early in Germany, namely after the 4th grade (when the transition to grade 5 takes place) at around age ten with different regulations among the federal states, e.g., regarding the importance of school grades and parents’ choices (for a chart on the structure of the German education system see Kultusministerkonferenz 2017; see also Blossfeld et al. 2023 for a brief description).

At the same time, the need for more synergies between existing empirical educational research activities in Germany and, in particular, the lack of well-trained young researchers in this field in Germany was discussed at the level of science policy, leading to a call for proposals for research units in empirical educational research by the *German Research Foundation* (DFG; for background information see Deutsche Forschungsgemeinschaft 2002). It included the funding of a professorship to enhance research activities and strengthen productive science locations in empirical educational research.

After submitting a successful application to the DFG, the *research unit BiKS* started its work in 2005. Based on extensive theoretical work and instrument development, data collection in preschools (BiKS-3-18) began in September 2005 and data collection in third grade (BiKS-8-18) started shortly thereafter in March 2006. After an 8-year-funding period within the funding line of DFG research units, a further 3-year-funding was granted by the DFG within the framework of the regular funding scheme to continue the research activities as well as data

collection in both BiKS studies. Finally, a further funding of the BiKS-3-18 project (survey wave in 2020) was granted by the Federal Ministry of Education and Research (BMBF).

Data from both BiKS studies were made available to the scientific community from early on as Scientific Use Files¹ (see Weinert et al. 2013, for BiKS-3-18; Artelt et al. 2013, for BiKS-8-18) and results of the BiKS research team are disseminated through numerous publications and national and international careers of team members.

In addition, BiKS proved to be the starting point for some far-reaching structural changes in the field of educational research at the University of Bamberg. Among other things, a chair and a department for empirical educational research as well as an option for a master's program in this field (interdisciplinary master's program) were introduced. Later, BiKS also had an impact on the foundation of the "Bamberg Graduate School of Social Sciences (BAGSS)" and proved to be a focal point for the conceptualization and implementation of the National Educational Panel Study (NEPS; Blossfeld and Rossbach 2019) as a kind of an "adult brother" of BiKS.

2 Research Questions

Based on empirical findings that show an early emergence of educationally relevant individual differences in child development as well as disparities depending on family background and the relevance of both primary and secondary effects of the family on educational careers, future life chances, and social participation, the two BiKS studies were designed to address relevant issues from an interdisciplinary perspective. In particular, the two BiKS studies were designed to analyze educational processes, competence development, and educational decisions combining theories, instruments, and research methods from educational science, psychology, and sociology (see Fig. 1).

¹Data of the waves 1 to 10 of the BiKS-3-18 study (i.e., from age 3 till age 10: BiKS-3-10) and of the waves 1 to 8 of the BiKS-8-18 study (i.e., from age 8 to age 14: BiKS-8-14) are already available as Scientific Use Files. Data releases on the further waves are in preparation.

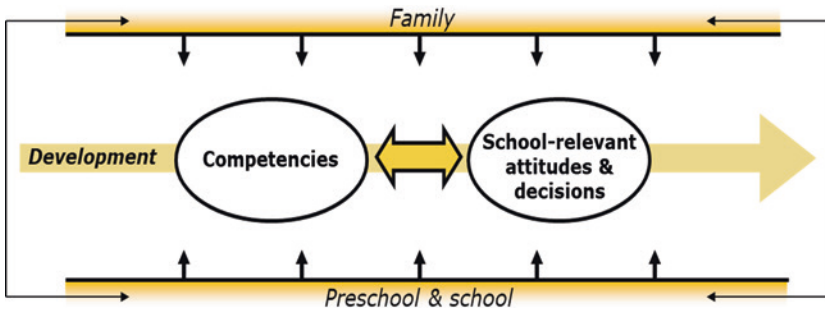


Fig. 1 BiKS as an interdisciplinary endeavour

In addition, BiKS combines a quantitative, large-scale approach with qualitative supplementary projects and with targeted in-depth assessments in smaller subsamples in different projects. With a clear focus on development and the institutional as well as family environment, the underlying mechanisms are thus to be modeled and better understood.

Based on this general approach, the main research projects were carried out addressing a set of research questions structured according to several focal points:

On a first level, BiKS focused on each of the following three main perspectives, i.e., the development of competencies and skills, on factors fostering child development and school performance, as well as on the formation and impact of educational decisions:

- (1.1) When and how do educationally relevant competencies or their precursors develop in childhood? How stable or changeable are educationally relevant competencies from an intra- and inter-individual perspective? Which (sub-group-specific) developmental trajectories and relations between developmental domains can be identified?
- (1.2) What are the structural features, pedagogical orientations, and process features in educational institutions and in families? How stable or changeable are such environmental features?
- (1.3) When and how are educational decisions or decision-related attitudes and orientations related to school enrollment and the transition to secondary education shaped? How stable or changeable are educational decisions and their antecedents?

On a second level, relationships between two of the areas under consideration become relevant, both in a synchronous context and over time:

- (2.1) How do children's competencies influence educational decisions of the different actors (preschool and school teachers, parents) and how are these in turn influenced by the decisions?
- (2.2) How do characteristics of educational contexts (preschool, school, parental home) strengthen or hinder the development of children's competencies and in what way do these in turn influence, for example, the pedagogical orientations of parents or the staff in preschools and schools?
- (2.3) Which characteristics of educational institutions and the family co-vary with educational decisions and how can the relevant mechanisms of action be explained?
- (2.4) What are the relationships between characteristics of different environments (i.e., between preschool and family, school and family, and preschool and school) and how do these relationships change over time?

Finally, all three areas are connected on the third level:

- (3.1) How do children's prerequisites, preschool environment and the staff employed there, school environment and teaching staff, family environment and parents interact in the development of competencies?
- (3.2) What are the relationships between the actors and environments with regard to the design of support processes and how do these affect concrete support efforts or obstacles?
- (3.3) Which interactions of actors in the different contexts affect educational decisions in connection with children's level of competence and competence development and in what way?

(adapted from von Maurice et al. 2007, pp. 3–4)

Although data collection, instrumentation, and research on the various topics mentioned above were assigned to and conducted in separate BiKS projects, from a funding perspective, the success of the BiKS endeavor can clearly be attributed to the interdisciplinary collaboration installed from the outset, which resulted in two jointly planned and conducted large-scale longitudinal studies.

3 Two-Cohort Panel Design

Investigating research questions such as those outlined above clearly requires a life course perspective (Baltes 1990; Baltes et al. 1980; Elder and Giele 2009; Elder et al. 2004). In designing the BiKS studies and the data collection, a focus was placed on transitions between different educational institutions. With the goal

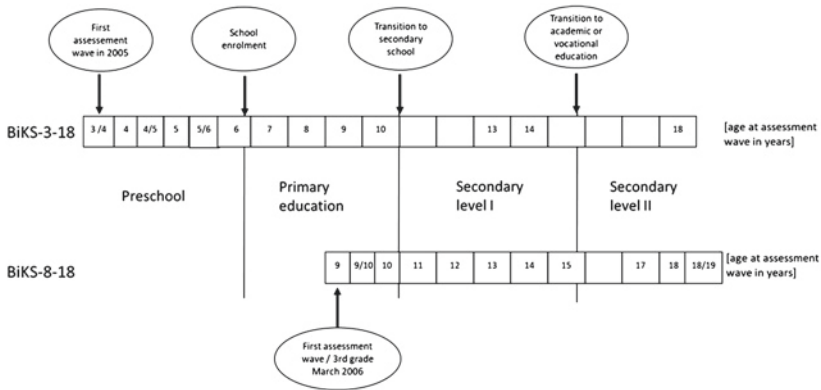


Fig. 2 BiKS as a 2-cohort panel study

of providing results within a reasonable time frame, the decision was made to conduct a *2-cohort panel study* (see Fig. 2).

A first cohort study—*BiKS-3-18*—began at preschool age, three years before regular school enrollment, and followed the children from early preschool through school enrollment, primary, and secondary school and beyond up to age 18. The focus of this cohort study is primarily on children’s development from preschool entry to the transition from preschool to primary school and from primary school to the tracked secondary school system and beyond. The entire survey spans 15 years with 13 panel waves, and the learning environments in the family, preschool, and primary school are captured not only through questionnaires but also through observations (for more detailed information concerning *BiKS-3-18* see Homuth, Lehl et al. [this volume](#)).

A second cohort study—*BiKS-8-18*—began in third grade and followed adolescents into adulthood, the various educational trajectories including upper secondary education, the vocational and educational training (VET) through early tertiary education, and the labor market through age 18. While the early phases focused on the transition to the tracked secondary school system, the later panel phases focused on the trajectories to upper secondary education or out of the general school system. This panel study covers 10 years with 11 waves (for more detailed information concerning *BiKS-3-18* see Homuth, Schmitt and Pfof [this volume](#)).

Panel data have many advantages for understanding educational processes and child development as well as the formation of educational decisions compared to cross-sectional data (Blossfeld 2009). Only these data enable the description and modeling of competence and skill development, educational processes, and decision making, as well as the emergence and roots of social disparities. Taking a *life-course perspective* also implies a focus on the different (normative and non-normative) transitions in the respective observational phase. Studies on school enrollment decisions (taking into account socioeconomic and migrant background), decisions for and effects of early or late school enrollment (as opposed to regular enrollment by age), aspects of school readiness and adaptation (or adaptation problems) to the educational system, secondary school form decisions (within two differently organized school systems of the included federal states Bavaria and Hesse), reasons for and effects of class retention and class skipping, school changes, and transitions to the vocational educational system (VET) or to tertiary education are included in the design. This also enables the analysis of interrelationships between different domains of development, influencing factors, their relations and long-term outcomes. Research on children's and adolescents' development and educational trajectories requires detailed data of the children and adolescents themselves—including their perceptions of the family and preschool/school environments—as well as more objective information on the various learning environments. Because individual perceptions can be highly subjective, we adopted a *multi-informant perspective* in designing the BiKS studies. In the BiKS-3-18 study, additional observational approaches were included where possible (see below).

In addition to children and adolescents, parents were included because they represent a learning environment of paramount importance to children and adolescents. They provide not only detailed information on social and migration background, but also their perception of children's and adolescents' competencies, their interactions with the child, the home learning environment, educational values, and their perceptions of the educational institutions. In addition to the family context the institutional context is also very important. Preschool and school teachers (as well as principals) were included in the design. Their perceptions of the child, information about the composition and quality of the institutional contexts, and also characteristics and (assessment) of competencies of teachers were included. Because both samples were drawn within institutions (see below), we were also able to consider the group level in both preschools as well as in primary schools to answer questions about composition and climate variables, particularly in the school context. As already mentioned, the BiKS-3-18 study also included extensive observations in the children's homes, in the preschools, and in the primary schools.

4 Sampling of Children and Adolescents Within Both BiKS-Studies

The sampling of both cohorts BiKS-3-18 and BiKS-8-18 was conducted in several successive steps, which resulted in two connected regionally representative samples (for a detailed description see Homuth, Lehl et al. [this volume](#); Kurz et al. 2007, for BiKS-3-18; Homuth, Schmitt and Pfof [this volume](#), for BiKS-8-18).

Selection of Federal States

Data collection in BiKS-3-18 and BiKS-8-18 took place in two federal states: Bavaria and Hesse. The two states were selected because they differ in key parameters of the educational system. In particular, in the school system, differences in school enrollment regulations (with differences in the cut-off date for school entry as well as registration deadlines for compulsory schooling), transition to secondary school (with a different role of achieved grades vs. parental preference), and the available types of schools were essential.

Selection of Cities and Regions

In each of the two federal states, one large city, one medium-sized city, and two rural regions were selected. This selection made it possible to cover a high variability of socio-structural contextual factors and opportunity structures in the sample (such as the availability of schools in the respective school types or accessibility). Within Bavaria the large city Nuremberg and the medium-sized city Bamberg as well as the rural districts of Bamberg and Forchheim were selected; Hesse was mapped with Frankfurt am Main as large city, Darmstadt as medium-sized city, and the more rural districts of Odenwald and Bergstraße. These cities and counties differ considerably in terms of area, population, and population density as well as employment structure, unemployment rate, and migrant share, and thus allow for analyses of differences between the two federal states among areas with heterogeneous structural characteristics.

Sampling Procedure for BiKS-3-18

Frame for preschool children: For the sample of preschool children, a sample of institutions was first formed as the primary sampling unit. The sample of preschools for the formation of a panel sample for BiKS-3-18 was based on a sampling frame of 1,018 preschools in eight selected cities and regions mentioned above (379 in Bavaria and 639 in Hesse). Since no other information was available, relevant parameters were collected on these preschools (mainly through a telephone survey from October to February 2005; for most of the Frankfurt

preschools, information was provided by the State Board of Education for the City of Frankfurt). Of the 1,018 preschools, valid information could be collected for 983 institutions, e.g., on funding body, institutional size, structure of preschool center, work in self-contained vs. flexible groups, and migrant proportions. As being relevant for the sampling criteria, information was also collected on the number of primary schools that the children in the preschools will usually attend later. This allows a close description of the preschools within the sampling frame.

Sampling and recruiting preschools: Based on the enriched information of the sampling frame, a sample of preschools was drawn in fall 2005 according to specific selection criteria: (1) the sample benchmark of 60.0% Bavarian and 40.0% Hesse institutions was set; (2) the metropolitan areas of Nuremberg and Frankfurt were to be represented by 33.3% of the institutions; (3) within the metropolitan areas of Nuremberg and Frankfurt, one-third were to have a low percentage of migrants (less than 10.0%), one-third were to have a medium migrant percentage (10.0% to 49.9%), and one-third a high percentage of migrants (50.0% and more); (4) the number of groups in the preschools should be proportionally represented; (5) 90.0% of preschools should be closely associated with a primary school (and given the information in the telephone survey that children in their institution generally all attended the same primary school) and 10.0% should be more loosely associated with a primary school (with children typically spread across three or more primary schools at enrollment). Finally, some types of preschools were dropped from the sampling frame (preschools without fixed groups, forest preschools, preschools specialized in inclusion, which were rare in Germany at the time). Of the total of 1,018 preschools in the sampling frame, 688 remained in the reduced sampling frame (with the reduction explained primarily by the 194 preschools that normally send their children to exactly two primary schools). Taking into account the above criteria, the sample was randomly drawn (with a substitute list used if a preschool refused to cooperate). A total of 178 preschools were asked to cooperate, 15 preschools were non-eligible, and 97 preschools agreed, corresponding to a cooperation rate at the preschool level of 59.5% (65.9% in Bavaria and 51.4% in Hesse).

Sampling and recruiting families: Within the sampled preschools, families in a randomly selected preschool group were asked to participate. Only families with children who were regularly enrolled in school during the 2008/2009 school year (defined by a specific birth span) were eligible to participate. A total of 720 families were asked to participate and the participation rate was quite high with 76.0%—corresponding to a panel sample for BiKS-3-18 of 547 children (participation rates in Bavaria 75.1% and in Hesse 77.6%). The parent survey primarily

involved the parent who was predominantly responsible for the child’s daily life—which was particularly evident among mothers.

Sampling Procedure for BiKS-8-18

Sampling and recruiting schools: Since official information is available, we were able to characterize the 611 schools in the eight selected cities and regions (281 in Bavaria and 330 in Hesse) according to school types as the most important variable for description. However, we did not rely on this sampling frame information only, but additionally aimed to link the sampling to the BiKS-3-18 study by sampling those schools that served as “receiving” primary schools for the preschool institutions of that study. School recruitment began with schools that were named by preschools as “receiving” primary schools. Since not all of these schools were willing to participate, additional schools had to be included in the sampling process. Sampling was conducted according to three main criteria: (1) if possible, the primary school should be one of the “receiving” schools in the BiKS-3-18 preschool sample; (2) the sample benchmark of 60.0% Bavarian and 40.0% Hesse institutions was set; (2) the major cities of Nuremberg and Frankfurt should be represented by 33.3% of the institutions. A total of 189 primary schools were asked to participate, 8 were non-eligible, and 82 schools agreed, corresponding to an overall participation rate of 45.3% (44.0% for Bavaria and 47.7% for Hesse). Linkage to BiKS-3-18 preschools was achieved for 55 out of the 82 participating schools.

Sampling and recruiting families: In the 82 participating primary schools, the class teachers of all third grades were asked to support the study. A total of 155 classes participated (97 in Bavaria and 58 in Hesse); a valid participation rate cannot be given due to limited data. Within the 155 classes, 3,531 families were asked to participate. There are 2,395 adolescents in the final panel sample of the BiKS-8-18 cohort, which corresponds to a participation rate of 67.8% (Bavaria 67.7% and Hesse 68.1%).

Realized Cases at Wave 1 for Both Cohorts: The Base for the Panels

The starting sample of 547 children in BiKS-3-18 and 2,395 adolescents in BiKS-8-18—with roughly equal proportions of boys and girls—provided a solid base for building a long-term panel study. Detailed information on the panel development for BiKS-3-18, with its 13 panel waves, is given by Homuth, Lehl et al. ([this volume](#)) and for BiKS-8-18, with its 11 panel waves, by Homuth, Schmitt and Pfost ([this volume](#)).

5 Multi-Mode Instrumentation and Method Triangulation

Even though BiKS was organized in several projects from a funding perspective, a truly interdisciplinary culture of discussion and instrumentation was achieved: psychological aspects such as functional competencies, specific skills, and general abilities, personality traits, values, and beliefs were combined with macro-, meso-, and micro-sociological indicators as well as qualitative and quantitative measures of family and institutional learning environments. Based on fine-grained social and migration specific background data, it was possible to examine in great detail stabilities and changes in child development, educational decision-making, and educational trajectories. At all times, profound disciplinary expertise was complemented by interdisciplinary discussion—bringing together substantive expertise, methods, theories for the best instrumentation—clearly accepting the often intense discussions about individual concepts, their role in educational research, and their operationalization. This work contributed to the construction of a unique set of instruments.

Competence and Skill Measurement in Individual and Group Test Settings

Standardized tests for the children and adolescents (and later for the adults) are an essential backbone for understanding children's and adolescents' development and educational biographies and were therefore administered regularly and in great detail in both cohorts. Competence and skill measurement was guided by a systematic framework that distinguishes, amongst other things, between verbal and non-verbal and more or less education-dependent abilities, competencies, skills, and achievements (see Weinert and Artelt 2019, for a conceptual discussion), including, e.g., oral language skills and reading and writing skills in the majority language, mathematics, factual content knowledge, working memory, speed of information processing, non-verbal cognitive abilities, and indicators of metacognitive understanding (for an overview on these measurements in BiKS-3-18 see Weinert and Ebert [this volume](#); for BiKS-8-18, see Homuth, Schmitt and Pfof [this volume](#); Karing et al. [this volume](#); Pfof et al. [this volume](#)). Especially in the older age groups, the competence measurements are directly linked to the concept of literacy. In selecting the measurement instruments, care was taken to ensure that they were internationally compatible, could reflect developmental change, and, in some cases, allowed comparisons across different cohort studies (e.g., some instruments developed in BiKS-8-18 were administered in BiKS-3-18 later on and some instruments developed the BiKS-3-18 study were included in

the National Educational Panel Study as well as the other way around). In some waves, parents were also given cognitive tests (e.g., a vocabulary, a knowledge, and a verbal fluency test in the BiKS-3-18 study). The competence and skill tests were administered using paper and pencil instruments and conducted with a high level of standardization. The test setting was implemented as a one-to-one contact between the children and a well-trained semi-professional test administrator (for younger children or when measurements had to be taken in the family home) or in group settings (especially in the school context). For half of the BiKS-3-18 sample, a more detailed and higher frequent measurement of children's competencies was conducted in the early years to explore competence development in more detail (see Weinert and Ebert [this volume](#)).

Questionnaires for Targets, Parents, and Educational Staff

In addition to measuring competencies, questionnaires were administered to the children in the BiKS-3-18 cohort (starting in grade 3) and adolescents in the BiKS-8-18 cohort. The target questionnaires capture a wide range of variables including competence-related aspects (such as self-perception of skills and meta-cognition), motivation and personality, and school-related variables. Because these questionnaires are linked to the competence measurements, they were also administered as paper and pencil instruments. Later, online assessments were also used.

In order to obtain detailed information on family background, educational biographies, parental perception of the child, a range of variables relevant to educational decision-making, and especially qualitative and quantitative aspects of the parental home, parent interviews were also conducted regularly as computer-based face-to-face or telephone interviews. By exploiting filtering options, questions asked could be tailored precisely to the child's particular educational situation (e.g., targeting parents of children enrolled early or late in school or dealing with school changes or grade repetition).

The research questions also included detailed information on preschool and school staff (both at the head level and at the level of the team in charge). The questions cover various aspects of the preschool or school environment (with a strong focus on quality parameters), as well as sociodemographic background variables, values, and perceptions of staff. Preschool and school teachers also provided assessments of the individual children studied, including competencies and socio-emotional and motivational aspects, contributing to research on teacher judgment accuracy. For logistical reasons, mainly paper and pencil instruments were used.

Observational Methods

A distinctive feature of BiKS-3-18, as mentioned earlier, is the use of detailed standardized observation instruments in the family homes as well as in preschools and primary schools (for a selection of interesting results see Rossbach et al. [this volume](#)). All the observational measures were conducted by intensely trained and supervised observers, raters/coders, and interviewers, and some were live or video- or audio-based. Because of the large sample size, observational measures could not be included within BiKS-8-18.

Qualitative Subsamples

Although BiKS is primarily quantitative in its large panel studies, it has been usefully supplemented with qualitative information. Qualitative studies and in-depth assessments on well-selected subsamples of parents, children, and educational staff contributed, for example, to a deeper understanding of school enrollment decisions (i.e., the decision to enroll early, see Pohlmann-Rother et al. [this volume](#)) and of the situation in Turkish families in BiKS-3-18 (for more details, see Blossfeld and Nester [this volume](#)) or to obtaining qualitative data on parents' expectations, aspirations, and perceptions about school careers in BiKS-8-18. In all cases, the broad panel database allowed for a careful selection of cases for the qualitative supplements (or in-depth assessments), but most importantly, this design allowed for triangulation of quantitative and qualitative findings.

6 Extensive Interviewer Training and Panel Care

All fieldwork within BiKS-3-18 and BiKS-8-18 was conducted by well-trained test administrators, observers/raters, and interviewers, with outside fieldwork agencies involved only in parents' interviews and online questionnaire (CASI). In training test administrators and interviewers, particular attention was paid to two types of instruments: (1) for competence and skill tests, a high degree of standardization had to be ensured, including full compliance with instructional texts, feedback rules, and time limits; (2) observational instruments—particularly when assessment had to be conducted online—required theoretical and practical training that lasted up to several days for some of the instruments, with coders trained against predetermined reliability criteria. By investing massively in training test administrators, observers/coders, and interviewers, the BiKS team was able to ensure the best possible data quality.

The implementation of the panel as well as the stability of the panel was supported from the beginning by a well-designed panel support. A stable team of project leaders served as anchors for participant communication. Furthermore, the BiKS team ensured comparably stable contact persons for fieldwork, visits in the institutions convey appreciation for the work done but also to provide direct feedback, carefully selected incentives, and regular flyers and brochures for all participant groups helped to engage and stay in contact with the families and institutions. In addition, well-trained test administrators and interviewers, as well as detailed fieldwork supervision, also contributed to BiKS’ success in recruiting institutions and families and throughout the survey phase.

It is important to emphasize that BiKS invested a particularly large amount of time and energy in fieldwork to observe the children at the transitions—especially at the transitions from preschool to primary school and from primary to secondary school. In doing so, it was important to track more than just the more normative educational careers. All participants who left the original preschool or school context (e.g., by changing schools, enrolling early or late, repeating grades, or skipping) were followed up in the BiKS-3-18 and BiKS-8-18 panel studies and interviewed individually in their home environment.

7 Data Usage

The data from both the BiKS-3-18 and BiKS-8-18 cohort studies underwent detailed data cleaning, data editing and documentation, and anonymization. Given the comparably large sample in the first wave with broad coverage, the satisfactory stability of the panel, and the carefully selected and developed instruments, the data are a powerful source for answering a range of research questions about competence development, educational processes, and educational decisions in preschool and school age. Because both cohorts are not limited to a single relevant environment or educational stage, but explicitly focus on the interplay of the family and the respective institutional environments, the data have been used in a variety of ways to provide a deeper understanding of long-term educational trajectories.

The data are available free of charge as Scientific Use Files through the Research Data Center of the Institute for Educational Quality Improvement (IQB; <https://www.iqb.hu-berlin.de/fdz>). To date, waves 1 to 10 of BiKS-3-18 (Weinert et al. 2013) and waves 1 to 8 of BiKS-8-18 (Artelt et al. 2013) are available,

including a detailed documentation²; in the coming years, this data offering will successively be expanded to include all waves. The data are available for scientific use based on a contract basis and require an institutional affiliation with a university or a publicly funded research institute. For a first overview, the code-books as well as blank data sets in SPSS-format of all shared waves can be downloaded from the mentioned website.

8 About This Volume

This volume provides an overview of the two large-scale studies BiKS-3-18 and BiKS-8-18 and summarizes important findings. In these two BiKS studies, large samples of children, their contextual persons (such as parents, and preschool and school teachers), as well as their learning environments were followed from age three (BiKS-3-18) and eight (BiKS-8-18) through adolescence in a comprehensive longitudinal design. The following chapters provide an overview on the design and assessments of the BiKS studies and compile selected important findings, some of which have been published in German and in disciplinary scientific journals but have international and interdisciplinary significance. In addition to the general overview of the research questions and the overall designs of the two BiKS studies given in this chapter, the following 11 chapters present in depth the methods, including sampling procedures, sample development, and broad-based assessments of the two surveys and selected results. These are reported with reference to the various projects that contributed to BiKS and were funded as part of the research unit.

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²Information concerning BiKS can be found at the IQB research data center under the following links: https://www.iqb.hu-berlin.de/fdz/studies/BiKS_3-10?doi=10.5159/IQB_BIKS_3_10_v6.

https://www.iqb.hu-berlin.de/fdz/studies/BiKS_8-14?doi=10.5159/IQB_BIKS_8_14_v2.

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References

- Artelt, C., Blossfeld, H.-P., Faust, G., Rossbach, H.-G., & Weinert, S. (2013). *Bildungsprozesse, Kompetenzentwicklung und Selektionsentscheidungen im Vorschul- und Schulalter (BiKS-8-14)* (Version 2). IQB—Institut zur Qualitätsentwicklung im Bildungswesen. https://doi.org/10.5159/IQB_BIKS_8_14_v2
- Baltes, P. B. (1990). Entwicklungspsychologie der Lebensspanne. Theoretische Leitsätze. *Psychologische Rundschau*, *41*, 1–24.
- Baltes, P. B., Reese, H. W., & Lipsitt, L. P. (1980). Life-span developmental psychology. *Annual Review of Psychology*, *31*, 65–110. <https://psycnet.apa.org/doi.org/10.1146/annurev.ps.31.020180.000433>
- Blossfeld, H.-P. (2009). Comparative life course research: A cross-national and longitudinal perspective. In G. H. Elder, Jr. & J. Z. Giele (Eds.), *The craft of life course research* (pp. 280–306). The Guilford Press.
- Blossfeld, H.-P., & Nester, M. (2024). Differential school trajectories and educational decisions of migrants in Germany—descriptive results and theoretical explanations. In S. Weinert, H.-G. Rossbach, J. von Maurice, H.-P. Blossfeld & C. Artelt (Eds.), *Educational processes, decisions, and the development of competencies from early preschool age to adolescence: Findings from the BiKS cohort panel studies*. Springer.
- Blossfeld, H.-P., & Rossbach, H.-G. (Eds.) (2019). *Education as a lifelong process. The German National Educational Panel Study (NEPS)* (second, revised edition, Edition ZfE Vol. 3). Springer VS.
- Blossfeld, H.-P., Blossfeld, G. J., & Weinert, S. (2023). Introduction – education, competence development and career trajectories. In S. Weinert, G. J. Blossfeld & H.-G. Blossfeld (Eds.), *Education, competence development and career trajectories. Analysing data of the National Educational Panel Study (NEPS)* (pp. 1–24). Springer.
- Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology. Vol. 1: Theoretical models of human development* (pp. 793–828). Wiley.
- Deutsche Forschungsgemeinschaft (2002). Stellungnahme zur strukturellen Stärkung der empirischen Bildungsforschung. Ausschreibung von Forschungsgruppen in der empirischen Bildungsforschung. *Zeitschrift für Pädagogik*, *48*, 786–798. <https://doi.org/10.25656/01:3861>
- Elder, G. H. Jr., & Giele, J. Z. (2009). Life course studies: An evolving field. In G. H. Elder, Jr. & J. Z. Giele (Eds.), *The craft of life course research* (pp. 1–24). Guilford Press.
- Elder, G. H. Jr., Johnson, M. K., & Crosnoe, R. (2004). The emergence and development of life course theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the life course* (pp. 3–19). Springer.
- Homuth, C., Lehl, S., Volodina, A., Weinert, S., & Rossbach, H.-G. (2024). From preschool to vocational training and tertiary education—study design of the BiKS-3-18 study. In S.

- Weinert, H.-G. Rossbach, J. von Maurice, H.-P. Blossfeld & C. Artelt (Eds.), *Educational processes, decisions, and the development of competencies from early preschool age to adolescence: Findings from the BiKS cohort panel studies*. Springer.
- Homuth, C., Schmitt, M., & Pfost, M. (2024). From primary school to vocational training and tertiary education—study design of BiKS-8-18. In S. Weinert, H.-G. Rossbach, J. von Maurice, H.-P. Blossfeld & C. Artelt (Eds.), *Educational processes, decisions, and the development of competencies from early preschool age to adolescence: Findings from the BiKS cohort panel studies*. Springer.
- Karing, C., Rausch, T., & Artelt, C. (2024). Teacher judgement accuracy—measurements, causes and effects. In S. Weinert, H.-G. Rossbach, J. von Maurice, H.-P. Blossfeld & C. Artelt (Eds.), *Educational processes, decisions, and the development of competencies from early preschool age to adolescence: Findings from the BiKS cohort panel studies*. Springer.
- Kultusministerkonferenz (2017). *Basic structure of the education system in the Federal Republic of Germany. Diagram*. KMK. https://www.kmk.org/fileadmin/Dateien/pdf/Dokumentation/en_2017.pdf
- Kurz, K., Kratzmann, J., & von Maurice, J. (2007). *Die BiKS-Studie. Methodenbericht zur Stichprobenziehung*. Psydok. https://psydok.psycharchives.de/jspui/bitstream/20.500.11780/437/1/Methodenbericht_2007.pdf
- Pfost, M., Becker, S., & Artelt, C. (2024). Competence, motivation, and interest development between primary school and tertiary education—a summary of findings from the BiKS-8–18 study. In S. Weinert, H.-G. Rossbach, J. von Maurice, H.-P. Blossfeld & C. Artelt (Eds.), *Educational processes, decisions, and the development of competencies from early preschool age to adolescence: Findings from the BiKS cohort panel studies*. Springer.
- Pohlmann-Rother, S., Wehner, F., & Kaiser-Kratzmann, J. (2024). Transitions to primary school: School entry decisions, parents' and teachers' ideas about school readiness, and cooperation between preschools, primary schools, and parents. In S. Weinert, H.-G. Rossbach, J. von Maurice, H.-P. Blossfeld & C. Artelt (Eds.), *Educational processes, decisions, and the development of competencies from early preschool age to adolescence: Findings from the BiKS cohort panel studies*. Springer.
- Rossbach, H.-G., Blaurock, S., Große, C., Kluczniok, K., Kuger, S., Lehl, S., & Smidt, W. (2024). Quality of learning environments in early childhood. In S. Weinert, H.-G. Rossbach, J. von Maurice, H.-P. Blossfeld & C. Artelt (Eds.), *Educational processes, decisions, and the development of competencies from early preschool age to adolescence: Findings from the BiKS cohort panel studies*. Springer.
- von Maurice, J., Artelt, C., Blossfeld, H.-P., Faust, G., Rossbach, H.-G., & Weinert, S. (2007). *Bildungsprozesse, Kompetenzentwicklung und Formation von Selektionsentscheidungen im Vor- und Grundschulalter: Überblick über die Erhebungen in den Längsschnitten BiKS-3-8 und BiKS-8-12 in den ersten beiden Projektjahren*. Psydok. https://psydok.psycharchives.de/jspui/bitstream/20.500.11780/440/1/online_version.pdf
- Weinert, S., & Artelt, C. (2019). Measurement of skills and achievement—A critical assessment of theoretical and methodological concepts. In R. Becker (Ed.), *Research handbook on the sociology of education* (pp. 106–132). Edwar Elgar Publishing.

- Weinert, S., & Ebert, S. (2024). Developmental dynamics and social disparities in early education-related child development: Results from the BiKS-3-18 study. In S. Weinert, H.-G. Rossbach, J. von Maurice, H.-P. Blossfeld & C. Artelt (Eds.), *Educational processes, decisions, and the development of competencies from early preschool age to adolescence: Findings from the BiKS cohort panel studies*. Springer.
- Weinert, S., Rossbach, H.-G., Faust, G., Blossfeld, H.-P., & Artelt, C. (2013). *Bildungsprozesse, Kompetenzentwicklung und Selektionsentscheidungen im Vorschul- und Schulalter (BiKS-3-10)* (Version 6). IQB—Institut zur Qualitätsentwicklung im Bildungswesen. https://doi.org/10.5159/IQB_BIKS_3_10_v6

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