

Chapter 4

4 Early Literacy Support in Institutional Settings – A Comparison of Quality of Support at the Classroom Level and at the Individual Child Level

Susanne Kuger, Hans-Guenther Rossbach, and Sabine Weinert

Summary

Children's literacy skills and their antecedents start developing very early in life. Next to the family setting, preschools are an important learning context for children prior to school enrollment. Overall, research results point to a strong influence of the quality of stimulation in the classroom on children's literacy development. Yet, a detailed research review reveals that some aspects are more important, whereas others are less important for domain-specific learning support. The research field displays a number of different ways to define educational quality and provides about equally manifold methods to assess it. Most methods that assess educational quality employ observational instruments to measure the

Author Note

Susanne Kuger,
Center for Research on Educational Quality and Evaluation, The German Institute for International Educational Research, Frankfurt, Germany.

Hans-Guenther Rossbach,
Early Childhood Education, University of Bamberg, Germany.

Sabine Weinert,
Developmental Psychology, University of Bamberg, Germany.

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Correspondence concerning this chapter should be addressed to Susanne Kuger, Center for Research on Educational Quality and Evaluation, The German Institute for International Educational Research, Schloßstraße 29, 60486 Frankfurt am Main, Germany. E-mail: kuger@dipf.de

quality of stimulation in the classroom as a whole or the quality of stimulation that is experienced by a single child. The two levels of measurement assess different aspects of educational quality, and they are partially independent of each other, yet both are predictive of children's literacy development. This chapter analyzes single and combined longitudinal relations between quality at the classroom level and at the single child level as well as later reading literacy in a sample of 45 preschool children from the beginning of preschool to the end of the second grade in primary school. Results show that both levels of measurement predict reading literacy in primary school independently of each other but even better when the two measures are combined. Implications for further research and preschool practice are discussed.

Introduction

Literacy competencies in terms of reading and writing abilities are central to children's school success and overall achievement level (Savolainen, Ahonen, Aro, Tolvanen, & Holopainen, 2008). Children's first precursors to later reading skills develop very early in life, which may cause achievement differences in the very first grades of primary school (Duncan et al., 2007). Development in semantics, phonetics, and syntax begins when babies first encounter language and children sometimes recognize letters and "write" symbolic information with their crayons years before they begin formal schooling (Whitehurst & Lonigan, 2001; Stamm, 2003).

For the development of these early literacy skills, early childhood learning conditions are crucial. Learning settings such as the family and non-family care settings offer provisions that can be used to stimulate children's learning prior to formal schooling. Policy makers thereby emphasize the importance of institutional early childhood care, which can foster literacy development for a wide range of students, also reaching out to those children who hail from less stimulating home settings.

Many research studies have demonstrated that the educational quality of institutional early childhood education and care (ECEC) settings is a critical and long-lasting factor in efforts to support children's earlier and later reading achievements and interest (Barnett, Lamy, & Jung, 2005; Camilli, Vargas, Ryan, & Barnett, 2010; Cunningham,

2008; Sammons et al., 2011). Although there is general agreement that high-quality early education and care matters, these current research studies differ with respect to the conceptualization and measurement of educational quality (Halle & Vick, 2007; Pianta & Hamre, 2009). One important difference between studies is the level of assessment of educational quality (Burchinal, 2010). Several ongoing large-scale studies assess educational quality that is offered to a group of children (e.g., Effective Provision of Preschool Education-Study in England, Early Childhood Longitudinal Study-K in the USA), whereas others assess educational quality provided for and experienced by a single child (e.g., NICHD Study of Early Child Care and Youth Development in the USA).

Both assessment methods deliver valuable data on ECEC quality that predict later reading development (e.g., Mashburn et al., 2008; NICHD Early Child Care Research Network, 2006), but the two levels of quality assessment – at the single child level and at the classroom level – do not necessarily capture the same features of educational quality (Layzer, Goodson, & Moss, 1993; Sylva et al., 2007). All children share a certain fraction of common quality experiences, yet at the same time, every child encounters unique situations, activities, and stimulation, which establish a singular experience of educational quality for every single child. So far, there is little information about how the two levels of experience are related to each other and about the degree to which assessments at each level have the power to predict children's later reading achievement (Burchinal, 2010). This chapter focuses on broadening the knowledge and empirical basis of this specific aspect of quality in early childhood education and care. It takes into account the two different levels of quality – the individual child level and the classroom level – and studies their individual and combined explanatory power for later reading achievement in a mid- to long-term view until the end of the second year of primary school.

Literacy in German Early Childhood Institutional Child Care Settings

Child care settings are not a homogeneous group of educational institutions. Their characteristics, educational goals, and realizations depend on national guidelines and policies, cultural understandings of the role of early childcare and educational goals, the overall conditions such as the size and layouts of rooms and furniture, classroom

composition, and materials, as well as on the caregivers' understanding and realization of educational goals in the classroom. Some specifics that should be kept in mind when debating about the promotion of early literacy skills in ECEC settings are illustrated in the following. Because this book gives an overview of the results of the German BiKS study, the following section elaborates on specifics about German ECEC settings as they are included in the study.

The Settings

Most child care institutions in Germany are center-based, state subsidized and community- or welfare-led organizations (Rossbach, 2009). So far, only a few but a rising number of for-profit organizations are involved in the German child care market; most organizations are nonprofit or public. Usually the organization, management, and location of ECEC centers are independent from local primary schools with children from an average of three centers enrolled in one primary school. Some German states provide "Vorklassen," a kind of preparatory course in the last year before school entry, and "Eingangsklassen," a special format that combines Grades 1 and 2 to organize a seemingly smoother transition in the years between ECEC and further primary school. Although rather independent from regular primary schools in most regards, the majority of ECEC settings value and emphasize close cooperation with local primary schools.

There is great variation in the duration of a school day. Most settings have traditionally offered child care from about 8 o'clock in the morning until (early) afternoon, but a rising number of mothers in the workforce and a greater demand for extended care provision have led to an extension in the hours of operation from between about 7 o'clock in the morning to 2 to 5 o'clock in the afternoon at most centers. In larger cities or centers that are provided by employers for children of staff members (e.g., in multicompany enterprises), some child care centers are open from 6 o'clock in the morning until 10 o'clock at night; very few institutions offer overnight services.

Preschool Objectives

The German ECEC system originates from organizations that were first established in the 19th century to provide care and most basic forms of support with regard to

questions of health and nutrition for children of working parents. It is in the tradition of this understanding that ECEC organizations used to exclusively depend on and were liable to the social welfare system in Germany and less to the educational system as is the case in many other countries. In recent years, a stronger focus on educational content in the early years of education moved some federal states to involve their educational administration more and more. Although one of the fathers of early childhood pedagogy, Friedrich Froebel, pointed out the importance of education in addition to care issues in the early years, for many decades, most ECEC settings had their primary interest in children's care and supervision (Rossbach, 2008). Thus, for many years, educational goals were located in more general developmental domains such as self-regulation, social behavioral norms, or personal care. Fostering pre-academics and school preparation (i.e., targeting domain-specific educational goals in later school curriculum domains) have therefore been of fluctuating interest. This interest and degree of implementation strongly depended on societal and organizational debates and regained its overall importance only in the last 1 or 2 decades. Beginning in 2002, all federal states prepared and released more or less mandatory curricular guidelines for ECEC institutions, also including pre-academic topics, thus bringing them (back) into the focus of attention in the field.

The Preschool Child

ECEC attendance in Germany is optional and not free of charge. Parents may choose to enroll their child at whichever setting they choose. Mandatory primary school attendance follows different regulations in the different states. In most German states, children are enrolled in primary school around age 6, but begin in ECEC at around the age of 2 or 3 years. Very often, child care prior to preschool is organized in the same settings as preschool for children from the ages of 2 or 3 to 6 years but in different classrooms. Most German ECEC classrooms are attended by age-heterogeneous groups. When the oldest cohort of children leaves the class in summer to transfer to school, new children are integrated in autumn to fill the gap.

Although attendance is optional, the overwhelming majority of German children attend some institutional ECEC setting for more than 1 year. Federal statistics record very high attendance rates (e.g., in 2011, 96.6% of 5-year-olds attended ECEC;

Autorengruppe Bildungsberichterstattung, 2012). Children from disadvantaged backgrounds and children with immigration backgrounds, in particular, display rising but still slightly lower attendance rates.

Educational Quality

Educational studies have focused on the effects of ECEC on child development for a long time, and numerous characteristics and features of child care have been taken into account. In the last 2 decades, a set of measurable characteristics have gained more and more importance in research; these are subsumed under the heading of *educational quality*. This chapter refers to an understanding of educational quality that concentrates on factors that foster healthy overall child development (Bredekamp & Copple, 2006).

A wide number and variety of studies that have focused on the effects of educational quality on child development have been consistent in demonstrating an overall positive effect, yet not all aspects of educational quality have been found to be equally related to different child outcome measures in magnitude. A closer look reveals differential predictive power for various aspects of educational quality for different domains of child development and also for different approaches in their ability to assess educational quality (Anders et al., 2012; Barbarin et al., 2006; Sylva et al., 2006). In alignment with large strands of research on educational effectiveness, common conceptualizations of educational quality have differentiated at least two major aspects: structural background characteristics of the setting and educational processes. Background characteristics have been referred to as “input” with regard to educational situations as they determine the frame and overall conditions of educational interactions. Educational processes in turn involve the child and a teacher, peers, and the physical surroundings such as learning materials. They are conditional on background characteristics and immediately interact with child development. Among educational processes, one can differentiate between different aspects, whereas research has shown that not all aspects support early literacy development equally well. Klieme Lipowsky, Rakotzy, and Ratzka (2006) and Pianta and his colleagues (La Paro, Pianta, & Stuhlman, 2004; Pianta, 2005; Pianta & Hamre, 2009) have distinguished three groups of educational processes that all contribute to process quality: classroom

management, climate, and cognitive activation. The first group of processes, classroom management, incorporates aspects related to establishing and maintaining classroom rules and discipline as well as structuring and organizing learning content. Processes referred to as climate help to establish warm and accepting relationships among children and teachers and focus on aspects of respect and emotional support. The last group of processes is aimed at providing highly stimulating learning opportunities that support cognitive development and precursors of academic development. Among the aspects of process quality that aim to stimulate cognitive development, one can further differentiate between educational processes that aim to support the cognitive development of a child in general and educational processes that aim to promote one or more specific developmental domain(s) such as early literacy or numeracy.

Next to this conceptual differentiation of aspects of quality, a differentiation can be made with regard to the level of assessment. Most research studies that predict literacy development and later reading skills on the basis of educational quality in ECEC apply methods to assess educational quality in the preschool class as a whole. A typical approach in these studies is to observe preschool classrooms for some time during average preschool mornings and then to infer the overall educational quality across all conditions and interactions into a single rating of quality in a certain aspect of child care (e.g., overall book use). Research has found meaningful relations between high-quality educational processes in ECEC at the classroom level and children's later reading achievement (e.g., Cunningham, 2010; Dickinson & Caswell, 2007; Sammons et al., 2011; Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2004). A good example is the English longitudinal Effective Provision of Preschool Education (EPPE) study, which found significant long-term effects of quality in ECEC settings on students' achievement up to age 15 (Sammons et al., 2011; Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2010). Still, such a measure is limited in its endeavor to capture individual children's activities and interactions in the classroom and assesses only an abstraction of the variety of interactions in the classroom. Another more finely grained approach for assessing the educational quality that a child experiences during ECEC attendance is to observe this single child's activities and interactions in the classroom as quality indicators (e.g., a child's engagement with books). This approach of assessing educational quality at the single child level leads to a more refined picture.

In turn, the results obtained with this approach are valid only for this child and cannot be generalized to other children in the classroom because every child experiences different activities and interactions with various materials, the teacher, and peers. Studies using process quality at the single child level have also demonstrated predictive power of their quality data for children's later reading development (e.g., Downer & Pianta, 2006).

It can be argued that in a classroom with more overall book use, individual children are also more likely to engage in book use; thus, there is a relation between quality indicators at the classroom level and at the individual child level. Yet research has also shown that even within one and the same classroom and thus among children who experience the same quality at the classroom level, children's profiles of activities vary largely (Sylva et al., 2007), and thus the proportion of shared experiences varies.

Although quality indicators at both levels of assessment – the individual child and classroom levels – have been shown to predict child development, and it is known that both capture different aspects of the quality that a child experiences, thus far, there is little research on how the predictive power of indicators at the two levels are related to each other when studied simultaneously (Burchinal, 2010). Such results could deepen our understanding of the nature of quality at the individual child level and at the classroom level.

Quality of Literacy-Related Processes in Preschool

Although studies do not all apply the same assessment instruments to measure literacy quality and outcome, there seems to be agreement with respect to what is assumed to be at the core of high-quality literacy stimulation in the preschool years. One core principle of educational quality is the developmental appropriateness of all learning opportunities (i.e., personal and physical environments and processes; Bredekamp & Copple, 2006). As illustrated above, most children in Germany spend several years in ECEC settings – as do children in many industrialized countries worldwide (OECD, 2010). During these years, children experience developmental changes in different domains, but very much so in cognitive development and thus also in early literacy, the precursors of later reading and writing skills (Bjorklund, 2004). Developmentally

appropriate practice in literacy stimulation implies that educational support is in alignment with this development. Therefore, as children mature and develop cognitively over the course of several years, accompanying high-quality education and care should change in parallel to children's demands and abilities.

High-quality literacy support for a 3-year-old is not necessarily high-quality for a 6-year-old. Whereas familiarizing a child with the habits of book use, the idea of symbolic representation of information in writing, reading to a child, and improving communicative language skills are developmentally appropriate examples of good quality literacy support for a 3-year-old, stimulating the student's awareness of the phonetic structure of language, the rhythm and function of language, letter knowledge, and writing skills might be more appropriate for older children. Such adaptations of domain-specific support that parallel child development can be found across different ECEC curricula (e.g., Neumann, Copple, & Bredekamp, 2000; Neuman & Roskos, 2005).

Research Question

Especially in a domain with large achievement variation at and before school enrollment (e.g., literacy) and in age-heterogeneous classrooms (which even further enlarges achievement variation in comparison to age-homogeneous classrooms), analyzing the difference between process quality at the classroom level and at the individual child level for children's reading literacy development appears to be a highly interesting topic. When caring for an entire class, preschool teachers must address children who are at very different levels of literacy proficiency. Quality at the classroom level therefore needs to take this heterogeneity into account and provide either a large range of possible aspects of support or else provide a level of quality that addresses the abstract commonality of achievement levels, or in other words, the promotion of the "average student." When interacting with an individual child, the teacher can focus much more on this child's current developmental status and adapt possible teaching and interaction strategies to the child. Quality indicators at the classroom level thus should capture the quality that is directed at and provided for an average child or the group of children, whereas quality indicators at the individual child level should differ from that. Thus, quality at the classroom level is assumed to remain rather stable in

age-mixed classrooms across the years, whereas quality at the individual child level should display considerable changes as children grow older.

This chapter therefore aims to look at the relations between educational process quality at the single child level and at the class level and at their unique and combined predictive power to explain children's later reading achievement in school (i.e., whether the quality indicators of the two perspectives can be added together or whether they overlap and to what degree they overlap in predicting children's literacy outcomes).

For this question in particular, German preschools are a preferential object of study for two reasons: First, the predominant classroom composition usually includes children within an average age span of 3 to 4 years (ages 2½ up to 6½). Thus, the average achievement range within one classroom is therefore larger than in most other ECEC systems worldwide, and quality aspects at the classroom level and at the individual level should display the largest differences. Second, children remain in the same classroom for several years and in most cases are also taught by the same teacher(s) throughout these years. There is a good chance that the teacher may get to know every child's developmental progress and needs in detail and will adapt his or her teaching strategies and learning opportunities to this knowledge. Therefore, the difference in the effects of the two levels of assessment should be detectable in German settings, perhaps even more distinctly than in other countries' systems.

Method

Adequate study of this research topic necessitates the use of a longitudinal design that includes data on childhood literacy outcomes and educational process quality at both the single child level and at the classroom level.

Sample

The present study used data from a subsample of the longitudinal BiKS-3-10 study. In about half of the preschool classrooms, two different quality assessments were conducted annually on the same day by two different staff members: t_1 in Year 1 (spring 2006), t_2 in Year 2 (spring 2007), and t_3 in Year 3 of children's preschool

attendance right before school enrollment (spring 2008). Two children could be observed in each of these classrooms. The BiKS database contains data on later reading achievement in the second grade of primary school for $N = 45$ children from this subsample (t_4 in spring 2010; only children enrolled in the same school year 2008 with complete observation data at t_1 were included in the analyses). At t_1 , during the first assessment of quality indicators, these children had an average age of $M = 45.5$ months ($SD = 2.7$). Eight (18%) of the 23 boys and 22 girls had at least one non-German speaking parent and were thus defined as children with an immigration background.

Measures

Early literacy support is related to later reading and writing abilities. The dependent child achievement variable was therefore assessed by a test on reading achievement in primary school. BiKS applied the text comprehension scale of the “Ein Leseverständnistest für Erst- bis Sechstklässler” (ELFE 1–6; Lenhard & Schneider, 2009), a test of reading comprehension for first to sixth graders. This subtest of about 7-min duration applies 20 multiple-choice items testing for students’ ability to pick out relevant information from a short text and to draw inferences from this information. The internal consistency (Cronbach’s alpha) of this scale for the relevant measurement point in Grade 2 is high ($\alpha = .94$). The children’s language development was assessed annually in terms of receptive vocabulary with a German version of the Peabody Picture Vocabulary Test (PPVT-R; Dunn & Dunn, 1981). Language testing took place about three months prior to the quality observations each, that is, the first assessment wave of language proficiency was winter 2005/06, and preschool quality was observed in spring 2006 (parallel for later assessment points; for further reading on the BiKS-design, see Lorenz, Schmitt, Lehl, Mudiappa, & Roßbach, chapter 2, this volume).

The BiKS study includes questionnaires for preschool teachers and parents as well as observational measures (cf. Lorenz et al., chapter 2, this volume). Process quality at the classroom level and at the individual child level was assessed through live rating observations on the same preschool morning. The two assessments were conducted by two different observers (after several days of schooling, observers had to reach an 80% agreement with the training research staff on all observation measures in order to be part of the field staff). Quality at the classroom level was assessed using the German

versions of the ECERS-R (Harms, Clifford, & Cryer, 1998) and ECERS-E (Sylva, Siraj-Blatchford, & Taggart, 2003) rating scales. The two instruments cover a wide range of education and care topics in early childhood settings. Indicators are scored on a 7-point rating scale (1 = *lower quality* to 7 = *better quality*). An indicator of quality of *literacy and language support at the classroom level* (LCL) was created across the two instruments by computing the mean score of the following items: books and pictures, encouraging children to communicate, informal use of language, environmental print: letters and words, book and literacy areas, adult reading with the children, sounds in words, emergent writing/mark making, and talking and listening (internal consistency Cronbach's alpha: $t_1 = .74$; $t_2 = .78$; $t_3 = .72$).

Quality at the individual child level was assessed using a newly developed tool. This target child observation is related to earlier instruments of individual child observations such as the ORCE (National Institute of Child Health and Human Development, 1996) and the OAP (Lera & Palacios, 1995) but advances these earlier instruments by adding a focus on the quality of domain-specific activities related to literacy and numeracy, for example. The instrument allows for three cycles of 20-min observations across an average morning. In every cycle, observers note the quality of education and care for a number of different global and domain-specific aspects of process quality. Because definitions of early literacy vary widely, this chapter includes two versions of quality of literacy stimulation at the *individual child level*: one follows a more *narrow definition of early literacy*, which is mainly focused on support in code-related skills (mean of ratings in use of letters, [pre-]reading and pretending to read, and [pre-]writing and pretending to write), therefore called *literacy support* (NLIL; internal consistency Cronbach's alpha $t_1 = .68$; $t_2 = .53$; $t_3 = .67$); the indicator for a *broader definition of literacy* includes ratings on these three items and in addition on the item "use of questions in interactions". Thus, the second indicator is less specific, also covering topics of a more general cognitive and language support, and is therefore called *literacy and language support* (BLIL; the broadness of the indicator results in low internal consistency: Cronbach's alpha $t_1 = .32$; $t_2 = .45$; $t_3 = .39$). Every item represents the mean of three periods of observation across a typical preschool morning.

Questionnaires for parents were applied to assess the children's family background characteristics such as their immigration background and the families' socio-economic

status (SES), which was measured using the highest value of both parents' international socio-economic index (Ganzeboom, de Graaf, Treiman, & de Leeuw, 1992; HISEI).

Analyses and Procedure

As in most studies with repeated measurements, some missing data were to be found in the data. Missing data analyses suggested that they were missing at random. The literature in this case advises that missing data be taken into account as such rather than reducing the sample size via listwise deletion (Lüdtke, Robitzsch, Trautwein, & Köller, 2007). The sample therefore represents all students who were included in the subsample of parallel quality measurement and for whom there was achievement data for the second-grade reading test (sample as described above). The data were analyzed using the software package MPlus 5 (Muthén & Muthén, 2008), which applies the full maximum likelihood (FIML) approach to account for missing data and also takes into account the clustered sample structure (up to two children per preschool).

In a first step, quality indicators were correlated with each other in order to analyze the degree of relatedness among quality indicators, to determine the degree to which the two levels of assessment were related to each other, and whether the relation changed over the course of three consecutive preschool years. As the children developed, we expected quality measures at the single child level to change, whereas quality at the classroom level was expected to remain rather stable. Next, quality indicators were correlated with children's vocabulary development to study the pattern of relatedness of literacy quality to children's developmental path and whether quality at the individual child level was adapted to the children's progress. Finally, both quality indicators were studied in their individual and combined relation to children's later reading achievement in multiple regression analyses controlling for the most relevant child background variables (age at assessment of reading achievement t_4 in grade 2, SES, immigration background, and vocabulary status in the first year of ECEC at the age of 3 years).

Results

At t_1 , the children's parents' average HISEI was 51.4 ($SD = 16.5$) and children's vocabulary knowledge in this first year of preschool averaged 27.1 words on the PPVT ($SD = 11.8$; Year 2: $M = 48.49$, $SD = 14.1$; Year 3: $M = 74.6$, $SD = 17.1$). Student's reading achievement in the second grade displayed an average test score of 9.6 ($SD = 4.4$) correct answers for this subsample of children who were then 97.5 months old ($SD = 4.4$; ≈ 9 years 2 months). Descriptive results of both indicators of process quality are indicated in Table .

Table 1. Descriptive Results of Quality Measures

	t1 spring 2006 <i>M (SD)</i>	t2 spring 2007 <i>M (SD)</i>	t3 spring 2008 <i>M (SD)</i>
Literacy support at the individual child level (NLIL)	1.1 (0.14)	1.1 (0.19)	1.2 (0.31)
Literacy and language support at the individual child level (BLIL)	1.5 (0.20)	1.6 (0.22)	1.7 (0.33)
Literacy and language support at the classroom level (LCL)	3.9 (0.71)	4.2 (0.81)	3.9 (1.00)

Note. All indicators range from a scale minimum of 1 to a scale maximum of 7.

Descriptive results point to the lack of emphasis that was placed on very early literacy instruction in German preschools. Overall provision of literacy and language support at the classroom level (LCL) reached a level of medium quality. Comparing the two indicators for individual children's experiences, the data indicated that this was largely due to more overall language stimulation and not to literacy support in the narrow sense. Although quality at the individual child level was low for both indicators and all measurement points, the quality of code-related literacy promotion at the individual level (NLIL) was even lower than the broader indicator of literacy and language support (BLIL). Both were lowest in the first year of preschool and increased only marginally while vocabulary changed significantly (Ebert et al., 2012; Weinert, Ebert, Lockl, & Kuger, 2012). Conclusions drawn from further analyses thus need to take into account these floor effects (and the low variability in these measures).

Table 2. Bivariate Correlations of the Quality Measure at the Classroom Level with Measures at the Individual Level

		Literacy and language support at the classroom level (LCL)		
		t1	t2	t3
Literacy support at the individual child level (NLIL)	t1	.01	.12	.06
	t2	.06	.21	.40***
	t3	-.14	.09	.00
Literacy and language support at the individual child level (BLIL)	t1	.17	.34	.17
	t2	.17	.32**	.34**
	t3	-.16	-.05	.51***

+ $p < .1$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Bivariate correlations between indicators at the individual child level and at the classroom level displayed very small relations between levels of assessment in the first year of ECEC (all *ns*). Comparing the upper and the lower halves of Table 2, it became evident that relations between the classroom level (LCL) and the conceptually broader indicator at the individual child level (BLIL) were slightly stronger than those between LCL and the narrower indicator, NLIL (average $r_{BLIL, LCL} = .22$; average $r_{NLIL, LCL} = .09$; one exception from this bias is $r_{NLIL3, LCL2} = .40$). This pattern was found throughout the years of ECEC attendance. The overall level of relations rose in Year 2 and Year 3 in particular for the broader indicator at the individual child level, BLIL ($r_{t1} = .17$; $r_{t2} = .32^{**}$; $r_{t3} = .51^{***}$). Taking into account the items included in the scales as enumerated in Section 6.2 (Measures), it could be expected that literacy at the classroom level follows a broader definition of literacy including a wider variety of aspects as did the broader definition of literacy and language at the individual child level. But literacy and language promotion at the classroom level also seemed to be oriented towards an average standard of literacy process quality that was usually experienced by children in their second and third or last year of ECEC rather than in their first year of ECEC. This finding is in contradiction to the usually implicit assumption that the ECERS scales cover educational quality equally well and imply the same meaning for all children in ECEC. Given these results, ECERS values might have a different meaning for the stimulation of 3-year-olds, 4-, 5-, or 6-year-olds.

Besides this description of patterns of relations among different indicators of educational quality, this chapter seeks to research the relative predictive power of

different indicators for children's achievement. The study included the PPVT as a measure of the children's receptive vocabulary. Table 3 displays correlations between language outcomes (vocabulary in Year 1, Year 2, and Year 3 of ECEC attendance and reading achievement in the second grade of primary school) and indicators of process quality.

Table 3. Bivariate Correlations between Language and Reading Outcomes and Quality Measures during the Years of ECEC attendance

		Vocabulary in preschool year 1 of ECEC	Vocabulary in preschool year 2 of ECEC	Vocabulary in preschool year 3 of ECEC	Reading achievement grade 2 in primary school
Literacy support at the individual child level (NLIL)	t1	-.17	-.01	-.19	.13
	t2	.14	.18	.06	-.15
	t3	-.42 *	-.39 ***	.00	-.41 ***
Literacy and language support at the individual child level (BLIL)	t1	.05	.07	-.09	.27 *
	t2	.05	.16	.15	-.17
	t3	-.08	-.23	-.04	-.21
Literacy and language support at the classroom level (LCL)	t1	.28	.39 **	.26 +	.43 **
	t2	.04	-.01	-.05	-.05
	t3	.25 +	.13	.02	-.09
Vocabulary in year 1 of ECEC	year 1				.48 ***
	year 2				.55 ***
	year 3				.27 *

+ $p < .1$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table displays very low relations between support at the individual child level and children's language proficiency in terms of receptive vocabulary during the years of ECEC attendance. Most correlations were not significant and many were close to zero. The only practically relevant relations between support and language proficiency were observed in Year 3. Literacy support at the individual child level (NLIL) in the last year of ECEC displayed significant negative moderately sized relations with children's vocabulary results in earlier years (vocabulary in Year 1: $r = -.42^*$; vocabulary in Year 2: $r = -.39^{***}$). This result points to a compensatory reaction of ECEC settings in the last year before school enrollment to some children's earlier low language proficiency. Results for the broader indicator of individual support (BLIL) were similar, but far less

strong and not significant. Comparing the pattern of relations, the settings' efforts to provide support in the last year of ECEC seemed to be concentrated mainly on code-related literacy promotion (use of letters, pre-writing, and pre-reading) and not on the broader range of language and literacy support additionally including conversational skills and questions that are cognitively stimulating. Current language abilities in Year 3 seemed irrelevant for the support provided. Support at the classroom level, on the other hand, displayed a tendency to be better for children with better language proficiency during ECEC attendance (cf. Table 3).

Relations of support and receptive vocabulary knowledge throughout the ECEC years with later reading achievement supported two points of interpretation in particular: (a) The significant negative correlation of medium size between NLIL and later reading achievement supported the assumption of a compensatory reaction to earlier low language proficiency in Year 3 (cf. Table 3) and at the same time indicated that these measures of treatment might have only a small impact on children's further development: Children's vocabulary scores in the ECEC years were significantly related to later reading achievement (Year 1 vocabulary with second-grade reading: $r = .48^{***}$; Year 2: $r = .55^{***}$; Year 3: $r = .27^*$). Children with lower vocabulary knowledge in the earlier years received better individual literacy support in Year 3 of ECEC, whereas children with better vocabulary knowledge in Year 1 experienced less support (see above Year 1 vocabulary with Year 3 NLIL: $r = -.42^*$; Year 2 vocabulary with Year 3 NLIL: $r = -.39^{***}$). But such slightly better support in the last year before school enrollment was significantly related to lower reading achievement in the second grade (Year 3 NLIL with second grade reading: $r = -.41^{***}$). Students did not seem to profit very much from these measures of support. (b) At the same time, very early (Year 1) promotion of a broader understanding of literacy and language support was significantly and positively related to later reading achievement (Year 1 BLIL with second-grade reading: $r = .27^*$; Year 1 LCL with second-grade reading $r = .43^{**}$) but not with synchronous vocabulary knowledge. A broader combined stimulation of code-related and communication skills seemed to be more beneficial (in terms of longitudinally positive relations, but perhaps not purely causal effects) for children's later reading ability. This long-term positive relation of support and child outcome

across 4 years of child development (the first 3 years of preschool to second grade in primary school) was not replicated using later measures of child support.

Because educational quality is assumed to impact students' outcome in the long run and because overall the strongest relations of support with later reading achievement were found for data from Year 1 of ECEC attendance, these early measures were used to further analyze their individual and combined relations beyond bivariate correlations in multiple regression analyses. Vocabulary in Year 1 of ECEC was also strongly related to later reading achievement and related to some quality measures in Year 1 (i.e., significantly related to quality measures at the classroom level). Further analyses therefore controlled for early vocabulary knowledge. The multivariate analyses were conducted in parallel for both conceptualizations: the narrow and broad definitions of literacy.

Table 4. Multivariate Linear Regression of Reading Achievement on Educational Quality

	Model 0	Model 1	Model 2a	Model 3a	Model 2b	Model 3b
Migration background (ref. immigration background)	.11	.19*	.11	.18*	.10	.18+
SES	.19	.23*	.17	.22*	.22+	.25*
Vocabulary preschool Year 1	.30+	.18	.36*	.23+	.32*	.24+
Age Grade 2	.22	.29*	.17	.26+	.15	.21+
Literacy and language support at the classroom level (LCL)		.44**		.42***		.40**
Literacy support at the individual level (NLIL)			.18	.14		
Language and literacy support at the individual level (BLIL)					.29*	.20*
R ²	.26+	.43**	.29*	.45**	.33**	.47***
N	45	45	45	45	45	45

+ $p < .1$. * $p < .05$. ** $p < .01$. *** $p < .001$.

As expected regarding the construction of indicators and the bivariate correlations reported above, the two versions of analyses led to a parallel pattern of results. The background model (Model 0) explained 26% of the variance between students, but was not significant. After controlling for family SES, students' immigration background,

and age at assessment of reading achievement, vocabulary in the first year of ECEC displayed the largest relation to students' reading achievement in the second grade.

The amount of explained variance increased substantially when educational quality in literacy support at the classroom level was included in the analyses, and it was the most important predictor in Model 1. It should be noted that after literacy support at the classroom level was included in the model, students' background characteristics became significant. For all models, literacy support at the classroom level remained the most important predictor for later reading achievement.

Examining the two models that included literacy support at the individual child level but not at the classroom level (Models 2a and 2b), the most obvious change from the background model was that only the broader indicator of literacy and language support at the individual child level contributed significantly to the overall model. Compared to the background model, the more narrow understanding of literacy support (NLIL; Model 2a) increased the overall amount of explained variance by only 3% (ΔR^2 : *ns*), whereas the broader indicator of literacy and language support (BLIL; Model 2b) added 7% of explained variance (ΔR^2 : $p < .05$). The indicator of a broader understanding of literacy support in preschool predicted later reading achievement almost as well as earlier vocabulary knowledge did.

Models 3a and 3b both incorporated indicators of literacy support at the classroom level and at the individual child level and as expected, explained the largest amount of variance. In Model 3b, literacy and language support at the individual child level contributed significantly to the overall explanatory power, whereas only the families' SES retained its significance from the background model. This model was also the most predictive, explaining almost half the variance in later reading achievement. Finally, the models holding only literacy support on classroom level should be compared to those that additionally include an indicator at individual child level (models 1 and 3a for NLIL, models 1 and 3b for BLIL). Change in overall R^2 was very small and not significant for the narrow definition of literacy support on individual child level (NLIL; $\Delta R^2 = .02$; *ns*), and slightly bigger and tending to significance for the broader indicator of language and literacy support (BLIL; $\Delta R^2 = .04$; $p < .1$).

Summarizing the results from the regression analyses, the study showed that process quality at the individual child level for literacy and for a broader indicator of literacy and language support both positively contributed to a background model in explaining later reading achievement, but the very narrow understanding of code-related literacy support at the age of 3 did not contribute significantly. Literacy and language support at the classroom level, on the other hand, had a very strong relation to a later text comprehension outcome. Combining quality at the individual child level with quality at the classroom level led to an even better prediction of later achievement. This came along with two patterns of results: The indicator of quality at the classroom level remained the strongest predictor throughout all models, and its impact was reduced only slightly after educational quality at the individual child level was included; simultaneously, the impact of process quality at the individual child level was reduced somewhat more strongly when literacy support at the classroom level was included, and only the broader conceptualization of literacy and language support reached significance after controlling for literacy support at the classroom level. Thus both levels of quality assessment contribute individual shares to the prediction of later reading achievement but this prediction is better for broader concepts of literacy support which not only focus on code-related skills but more overall language support in early ages as well.

Discussion

The study included a small subsample of children from the BiKS-3-10 study for which complete data on reading achievement in second grade of primary school is available and educational process quality in literacy and language support in the first year of preschool was measured at two levels of assessment: individual child level and classroom level.

Results first of all point to the low level of literacy support in German ECEC during the years of study (2006-2008). Not so much in terms of the overall level of support and presence of literacy and language in the classroom, but regarding individual children's experiences and the degree of literacy and language support that aims to promote individual children's development. Educational quality at individual child level is very low. Since the observational instrument used to assess educational quality at individual

child level was newly developed for the purposes of the BiKS study, this result could be caused by different reasons. Floor effects could be a purely methodological effect of an overly ambitious scale, i. e. the instrument could demand too high standards for at least minimum quality ratings. Yet the scale was developed on the basis of international standards of good practice and other instruments available in the field such as the ELLCO (Smith, Brady, & Anastasopoulos, 2008) and should thus be valid. Results more probably reflect real low levels of individualized literacy support in German preschools in the years of assessment. Nevertheless these floor effects should be kept in mind in further interpretation of the results, as they might explain an overall low level of relatedness to other indicators.

Although process quality of literacy and language support displays medium values at most, indicators at both levels of assessment were related to later reading achievement from a long-term perspective across the 4-year time span of the study. Later quality measures were less strongly related to reading achievement in the second grade. Those children who experienced good quality at the very beginning of their years of ECEC attendance displayed better reading achievement later in primary school. This result is in line with other international research. Results from the EPPE study in England (Sammons et al., 2004; Sammons et al., 2011; Sylva et al., 2010) had shown that ECEC quality measured at the age of 3 had a long-lasting effect on different cognitive and socio-emotional domains of child development up to the second grade in primary school and far beyond. The EPPE study missed later assessments of quality throughout the years of ECEC as they were included in BiKS. Whether process quality unfolds its maximum “impact” on child development in the long run or whether early experiences of quality are most critical for later achievement (as the results of the current study indicate) will have to be determined by future analyses that also include data from even later measurement points of the BiKS study.

The differences found between the narrower and broader definitions of literacy support at the individual child level are important to mention here. Whereas very early literacy support in a broader sense was positively related to later reading achievement, support as more narrowly defined was not positively related to later reading achievement. Moreover, children with lower language proficiency in the early years experienced better literacy support as narrowly defined in the later years of ECEC. This

can be interpreted as a compensatory reaction in classrooms to support low achievers prior to school enrollment. If this endeavor was successful, results should display positive relations of later support in ECEC with reading achievement in grade 2. But better late literacy support as narrowly defined (i.e., possibly compensatory endeavors) is related to lower reading achievement in the second grade just as lower early vocabulary skills are. It can be concluded that if settings have the goal of compensating for the low language achievement of some children, late literacy support in a very narrow sense cannot do the job well enough by itself.

A comparison of the quality of literacy support at the classroom level and at the individual child level displayed larger relations between the indicator at the classroom level with a broader understanding of literacy and language support at the individual child level than with a more narrow definition of mainly code-related literacy support. This is most probably due to the fact that the indicator at the classroom level itself made use of a broader definition that included, for example, overall book use and language support. Thus, the difference in relations points to conceptual relatedness and differences but also to a shared concept of quality that is independent of assessment level.

Overall, it seems that broader support (i.e., a combination of promotion in literacy and language domains) is more beneficial for later reading achievement than a more narrowly focused promotion of code-related skills only. Given that reading acquisition and achievement is determined by numerous factors, going far beyond letter knowledge, recoding, and writing skills – which were included in the narrow realization of individual literacy support – the results of this study once again underline the importance of support across a broader range of domains. The broader indicators at the classroom level and at the individual child level in this study included aspects such as asking cognitively stimulating questions, using language to support cognitive development, or engaging in longer conversations with children. Besides stimulating language alone, these also promote children's overall cognitive and meta-cognitive development and thus contribute to a number of different developmental domains, which in turn all have a share in reading acquisition and later achievement.

As a limitation, it should be noted that low relations of the narrow realization of literacy support at the individual child level and reading achievement could also be due

to the small amount of variance in the quality indicator caused by a floor effect. However, a similar floor effect was also observed in the broader indicator of individual support, which did not prevent this measure from displaying a stronger relation to reading achievement.

The results of the multiple regression analyses additionally supported the existence of shared and non-shared components of process quality in the indicators of process quality at the different levels of assessment. Indicators at both levels predicted later reading achievement independently from each other, but also shared a combined understanding of educational quality. For this study, quality at the classroom level was much more important than quality assessed at the individual child level. At least two different explanations for this finding should be discussed. One is that this is due to a methodological issue. After all, regarding internal consistency, variance, and skewness, the measure at the classroom level delivered better data than did the indicators at the individual child level. Another possible interpretation could be that educational process quality that is shared among children in the classroom has more impact than quality experienced by just an individual child. Process quality at the classroom level interacts directly with a child, but may furthermore interact indirectly through the child's peers, who also profit from quality in this classroom and in turn stimulate language and literacy development in the target child. An analysis that includes language proficiency and the development of all students in the classroom could further illuminate this line of argument. Nevertheless, quality at the level of assessment of individual children could additionally contribute to the prediction of later reading achievement and could thus conceptually provide information about educational quality that cannot be covered by indicators at the classroom level of assessment.

Further details about the nature of shared and non-shared components of process quality cannot be analyzed in this study because of several limitations. First, the sample was rather small so that it was not possible to develop models to test the impact of a wider variety of children's background characteristics or to test for differential results through interaction effects. A replication of the study with a larger sample could therefore add valuable information about the differences between the results and the concepts of process quality at the individual child level and at the classroom level. Second, knowing about the low level of quality of literacy (and language) support at the

individual child level, it might be feasible to include lower level quality indicators in the description of the instrument to obtain a better differentiation among preschools in the lower quality range (which is true for most settings). Results might profit from a larger variance. Still, it must be underlined that currently the lowest level of quality described in the instrument constitutes a very low level of stimulation: the item “writing and precursors of writing,” for example, should be given a rating of “1” (scale minimum) if the teacher does not help the child to write anything, the child is not encouraged to write anything, the child is not given support for writing spontaneously (e.g., praise), or if the child does not experience any writing in the classroom. It might be advantageous for research purposes but would be difficult and questionable for practical reasons to find descriptors for even lower levels of quality of early literacy support.

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