



German Council for Social  
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# RatSWD

## *Working Paper Series*

Working Paper

No. 60

### Improvements and Future Challenges for the Research Infrastructure in the Field of “Preschool Education”

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March 2009

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## Working Paper Series of the Council for Social and Economic Data (RatSWD)

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# Improvements and Future Challenges for the Research Infrastructure in the Field of “Preschool Education”

**C. Katharina Spiess**

## **Abstract**

Given the importance of the early stage of a child`s life and taking into account that there various initiatives underway to improve preschool programs in German, it is remarkable that there are only a few microdatasets covering the field of preschool education in Germany - even less if the focus is on nationally representative datasets. The majority of these at least provide information on attendance of preschool programs. In principle there are two main groups of data: data that comprise part of the official statistics and survey data. However, there are hardly any data which allow a linkage between preschool program information and child outcome data. Furthermore, better data for children up to three years are needed, as well as data for children from migrant families. In particular, there is a need for good panel data allowing to match individual data and institutional information. Given the developments in the German data infrastructure, the potentials for preschool education research will certainly improve. Nevertheless there remain a number of gaps. Among the mentioned recommendations the paper recommend improvements in fields, such as better data on the quality of preschool programs, better data on the family context and the costs of preschool education and finally the paper addresses the need for detailed intervention studies (on a representative (generalizable) level, which help to learn more about the most effective and efficient parameters of preschool programs.

Keywords: preschool education, day care, child outcomes

## 1. Research Questions

Preschool education is the provision of education to children before the commencement of statutory education, often between the age of two and the compulsory school age. Usually the term preschool education refers to preschool programs in formal educational settings. The main form of preschool programs in Germany are the “*Kindertageseinrichtungen*,”<sup>1</sup> the generic term that encompasses the traditional *Kindergarten*, the *Kinderkrippe*, and the day care centre, which offers care to children ranging in age from birth to compulsory school age. A broader concept of preschool education might also include family day care (*Tagespflege*), or at least licensed family day care. This is a particularly relevant point in Germany, where family day care is currently being discussed as an alternative to *Kindertageseinrichtungen*, at least for younger preschoolers.

Preschool education is embedded in the broader field of early childhood education, and is particularly important for this field of educational research, which views parents and/or families as an integral part of the early childhood education process apart from formal educational settings. Thus, for this age group in particular, the family as a context and the interaction between family and preschool education is of great importance.

Today more than ever, the importance of early childhood education is being recognized and investigated in a range of disciplines encompassing neuroscience, developmental psychology, educational research, educational economics and sociology. All these diverse strands of research share in common the finding that these early years are the most crucial in the child’s development, and are particularly important for his or her later performance.

Given the importance of this early stage, a great deal of attention should be devoted to preschool programs, particularly if the broader goal is to improve the effectiveness and efficiency of the educational system. Preschool programs produce a wide range of positive effects. As has been shown mainly on the basis of US studies, high-quality programs produce short-term gains in cognitive functioning and longer-term gains in school achievement, including special education placement, high school graduation, and college enrollment. Other positive impacts include better health as adults, reduced criminal activities, and an increase in lifetime earnings. In particular, high-quality preschool programs are important for

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<sup>1</sup> In an even stricter definition the first tier of the German educational system, the so-called Elementarbereich, refers to the German Kindergarten, which starts at age three. However, a focus solely on the Elementarbereich seems too narrow for the analysis of preschool education in Germany today.

disadvantaged children.<sup>2</sup> Although most of these effects have been demonstrated in model programs, high-quality preschool programs can be considered an effective tool to reduce the achievement gap between poor children and children from better-off families. In an even broader sense, high-quality preschool programs can contribute to increasing an economy's human capital.

Today more than ever before, preschool programs are attracting attention among the German public. Starting with the last government administration and increasing with the current one, initiatives have been launched to increase preschool education for children below the age of three. The *Tagesbetreuungsbaugesetz* (TAG) and the *Kinderbetreuungsförderungsgesetz* (Kifög) on the federal level were major steps in this direction. These initiatives have been accompanied by various initiatives on the state and municipal levels. The states and in particular the municipalities are the agencies actually responsible for the funding of preschool programs. Although these initiatives are motivated by more than just educational objectives,<sup>3</sup> they are most important for the improvement of preschool education in Germany. The federal government aims to provide preschool education or day care to 35% of the children under the age of three by the year 2013. Apart from these efforts to increase preschool in Germany quantitatively, there are various initiatives to increase preschool quality. In providing these measures, the German government is trying to catch up with the preschool provision rates of other countries such as the Scandinavian countries, France, and Belgium. For instance, in Denmark, almost 62%, in Norway 44% and in Belgium 34% of all children under the age of three attend some kind of formal day care. In Germany the corresponding number is 9% (OECD 2006; 2007; UNICEF 2008). Thus it is clear that other countries such as Sweden and Denmark are considered to be the childcare and preschool education leaders in Europe offering universal, or close to universal high-quality and publicly-funded childcare to their citizens. However, there are other countries that - like Germany - have begun promoting increased preschool education attendance. The UK, for instance, has sought to learn from the Nordic childcare model and are moving towards a model of universal childcare while focusing on an educational approach for the early-years services.

For older preschoolers, the German discussion is different: In Germany these children have the legal right to a spot in a *Kindertageseinrichtung*, but on the federal level, this legal right only covers four hours per day. The public debate is partly favoring an increase in the

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2 For a summary of the results of the relevant US studies, see for instance Karoly et al. (2006).

3 Another important motivation for these initiatives is the aim to improve the reconciliation of work and family life in Germany.

supply of slots covering more hours as well as provision of school lunch. Again this is what some other European countries already have achieved, in Sweden 63%, in Denmark 83% and in France 45% of all children age three up to age five are enrolled in full-time day care - in Germany the rate is only 29% (OECD 2006; 2007).

Regarding the educational aspects of these facilities, another issue requires attention: children from families with a better socio-economic position are overrepresented particular in the German preschool system, particularly up to age four. There is some empirical evidence, that this is different in other European countries, in particular the Scandinavian countries (OECD 2006). After the age of four, almost all children in Germany attend preschool (87% of all 4-5-year-olds and 91% of all 5-6-year-olds).<sup>4</sup> This is a problem of children with a non-migration background as well if the age groups below 4 years of age are considered - however, preschool attendance is higher among migrant children if older age groups are considered. This is remarkable, as preschool could be an efficient tool for integration.

## 2. The Status Quo: Databases and Access

There are only a few microdatasets covering the field of preschool education in Germany - even less if the focus is on nationally representative datasets. The majority of these at least provide information on attendance of preschool programs. There are two main groups of data: the first covers data that comprise part of the official statistics. The most important database in this field is the so-called *Kinder- und Jugendhilfestatistik* (see Schilling 2002; Kolvenbach and Taubmann 2006). Since 2006, the *Kinder- und Jugendhilfestatistik* compiles information on the number of children attending a *Kindertageseinrichtung* and the number of children who attend a publicly funded family daycare facility (*Kindertagespflege*). Furthermore these statistics include information on the staff of *Kindertageseinrichtungen* and family day care facilities.<sup>5</sup> Furthermore, these statistics cover information on the age and gender of the children, the country of origin of the parents, the language spoken most at home, and information on special needs for support. They also cover number of hours in care as provided for in the care contract<sup>6</sup> and provision of school lunch. Moreover, these data cover the type of provider: whether non-profit provider or for-profit provider. The information on staff covers their gender and contracted working time. The information on age, qualifications,

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4 See for instance, Konsortium Bildungsberichterstattung (2006: chapter C).

5 Before 2006 these statistics included information on the number of slots in *Kindertageseinrichtungen*. This supply-side approach was changed to offer better information on the actual attendance rates. For the relevant law see *Kinder- und Jugendhilfeentwicklungsgesetz (KICK)*, which came into effect in October 2005 (Kolvenbah and Taubmann 2006). Information on family day care facilities was not collected before this date.

6 The daily care hours as contracted do not necessarily correspond to the actual amount of time in day care.

occupational status, and field of activity is collected for the majority of the staff. All data are collected on a yearly basis.<sup>7</sup> Official reporting based on these statistics differs by state and district. It is the task of the *Arbeitsstelle Kinder- und Jugendhilfestatistik* in Dortmund to analyze this data and promote its use (see <http://www.akjstat.uni-dortmund.de/>). The microdata can be used via the research data centers (*Forschungsdatenzentrum der Länder*). Other official statistics no longer cover preschool education: the German microcensus stopped doing so in 2005. Thus, only the scientific use files of the microcensus up to 2004 provide information on whether the children in the household attend a *Kindertageseinrichtung*.

The second set of data is survey data. This group covers the DJI children's panel (*DJI Kinderpanel*),<sup>8</sup> which started in 2002 with two cohorts: one of children in their last year of preschool (age five), and one of children in second grade (age eight). In the first wave, the sample size was over 2,000 children. Two more waves followed in 2004 and 2005. The DJI children's panel covers various topics, among information on the preschool education: if the child attends a *Kindertageseinrichtung*, information is collected on provider, actual daily care hours, costs, and parental satisfaction with this preschool program. Apart from this data, information on the health and the personality of the child is collected as well as data on the family and the household. There is a special sample for the Turkish and Russian minority. Given the panel character of the DJI children's panel, this dataset allows for longitudinal research. However, the panel covers only three waves. In principle, the DJI children's panel is open to the entire research community.

Another dataset covering preschool education is the German Socio-Economic Panel (SOEP).<sup>9</sup> The SOEP is a representative longitudinal study of private households in Germany, which has surveyed the same private households, individuals, and families since 1984. And since this time, information on preschool education has been collected: data on preschool attendance and daily hours in preschool for all children in the household. Every four years, more information on the type of provider, lunch provision, and parental fees is collected. In 2003, the SOEP started collecting age-specific information as well. In the meantime, special survey instruments have been developed for children in their first year of life, for two-to-three-year-olds, and for children in their last year of preschool. For all these three age groups, the SOEP

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7 Before 2006, they were collected on a four-year basis only.

8 For more information see <http://www.dji.de/kinderpanel> and, for instance, Alt (2005).

9 For more information on the SOEP see <http://www.diw.de/english/soep/26636.html> or Wagner et al. (2007).

collects more detailed information on the child, including his or her preschool education and child outcomes (for more information, see Lohmann et al. 2008: chapters 3.1 and 8.1). Further age-specific survey instruments for children in school are planned up to age 16 or 17 (see Schupp et al. 2008). This is the age when the “children” are interviewed as regular SOEP respondents. Given the panel character of the SOEP, such data is especially useful for longitudinal research, in particular for the analysis of preschool effects. With the SOEP, the relationship between preschool education, family indicators, and child outcomes can be analysed. The SOEP data are available to the entire research community.

Another group of surveys consists of those with a research focus other than preschool education. One example for this is the KIGGS Study by the Robert Koch Institute.<sup>10</sup> It was designed as a nation-wide health survey for the age group 0-17 years. Between 2003 and 2006, around 18,000 children were enrolled. The data obtained include a large number of objective and subjective health measures. The parents were asked if the child visits a *Kindertageseinrichtung* and the age of entry. However, preschool education is only seen as one among numerous other environmental determinants of child health. These data thus are useful to analyze the relationship between preschool education and child health. There will be a Public Use File of the KIGGS data starting in 2009.

Apart from these representative datasets with a panel character, there also exist other cross-sections or regionally limited datasets including information on preschool education. Most of these represent regional cross-sections with a special focus on children. A cross-sectional study is the “DJI Kinderbetreuungsstudie”,<sup>11</sup> covering detailed information preschool education. In the study, more than 8,000 parents of children up to the age of six were interviewed. An example of a regionally restricted panel study is the “German Logik Study” started in 1984 with 200 almost four-year-old children in the region of Munich (see Weinert and Schneider 1999). The study, which was designed to analyze the development of various competences of children, covers information on preschool education as an environmental determinant of child development. Another study by Tietze et al. (1998) in three German states was designed to study the effects of preschool program quality. The study started with children in preschool and followed them up to primary school. Given the focus of this study, it is one of the few that collected detailed information on the structural and process quality of preschool education. Common to all these very different datasets is that they are

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10 For more details see <http://www.kiggs.de/> or Kurth et al. (2008).

11 For more information see <http://www.dji.de/cgi-bin/projekte/output.php?projekt=390> or Bien et al. (2006).

produced by a particular research group or institution with a particular research interest. Usually they are not available to the research community. Nevertheless, they can serve as raw models for the development of an adequate preschool data infrastructure.

From an European and international perspective, it is important to note that other countries realized long before Germany the importance of having a solid data infrastructure for research on preschool education, or even more broadly, on early education. The Anglo-American research community was among the first to take up this issue in depth.<sup>12</sup> Thus, major household-panel studies as the US American Panel Study of Income Dynamics (PSID) with its Child Development Supplement (CDS) (see <http://psidonline.isr.umich.edu/CDS/>) and the National Longitudinal Surveys of Youth (NLSY) (see <http://www.bls.gov/nls/>) have special child-related supplements or questions. A number of these include preschool education-related research questions offering information on the household context and family context in particular. Since they cover some measures on the cognitive and non-cognitive development of children, they allow longitudinal studies on the effect of preschool education. Apart from major household panel studies, the NICHD study (<http://secc.rti.org/>), which already started in 1991 is an example of a study offering an extremely rich data base to analyse preschool education. The Cost, Quality and Child Outcomes Study in Child Care Centers (for instance, Helburn et al. 1995) is one of the few examples that combine detailed information on the quality of preschool programs and detailed information on its costs. There are a few studies that focus on particular model preschool programs. They allow a very detailed analysis of their effects, benefits, and costs (among them the Perry Preschool Project, Schweinhardt et al. 2005). Great Britain is another country that acted on the need for a data infrastructure on early education many years ago, producing various cohort studies starting at birth such as the British Cohort Study (see <http://www.cls.ioe.ac.uk/>), the Millennium Cohort Study (see <http://www.millenniumcohort.org/>), and the Avon Longitudinal Study of Pregnancy and Childhood (ALSPAC) (see <http://www.bristol.ac.uk/alspac/>).

For comparable European and international research, it would be of great benefit if comparable survey instruments were used to collect data on preschool education and child outcomes. A survey intending to provide harmonized instruments is the *European Union Statistics on Income and Living Conditions (EU-SILC)*. The EU-SILC data cover some preschool information such as the number of hours in preschool.

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12 For a brief summary of Anglo-American longitudinal studies covering the early years, see BMBF (2008: chapter 2).

### 3. Future Developments

Given the lack of empirically based educational research in general, the Federal Ministry for Education and Research (BMBF) has launched various initiatives to stimulate empirical education research in Germany within the last several years. However, given the importance of preschool education, it is surprising that up to now so few initiatives exist in this educational field. One of the few initiatives focusing on preschool (and school) education is the BIKS Project.<sup>13</sup> BIKS stands for educational processes, competence development, and selection decisions at pre-school and primary school age. It is located at the University of Bamberg and started with the first round of data collection in 2005. The BiKS studies take place in *Kindertageseinrichtungen* (and schools) in Bavaria and Hesse. The so-called longitudinal BiKS-3-8 involves the observation of approximately 600 children; it begins at age 3 and continues up to the second grade of elementary school.<sup>14</sup> This project will help to answer questions on the effects of preschool, taking various socio-demographic and socio-economics variables of family background into account. Moreover the project will deal with the quality of preschool education.

Another project that reflects the efforts of the federal government to stimulate empirical educational research is the “German National Education Panel Study – NEPS”.<sup>15</sup> The panel will start in 2009 with children at the age of four and older. The sample will be drawn from institutions such as *Kindertageseinrichtungen* and schools. Once these data have been collected, they will provide the basis for innovative research, particularly on the effects of preschool programs. The NEPS offers a highly promising infrastructure, with a research team comprising social scientists from different disciplines such as sociology, educational science, psychology, and economics.

### 4. Future Developments: European and International Challenges

Given the European target set by the Barcelona European Council of providing childcare services for 90% of children between three years of age and the mandatory school age by 2010, and for 33% of children under three years of age (European Council 2002), and more recent initiatives from May 2005, which consider the improvement of childcare an important tool to this end, the almost complete lack of internationally comparable data on preschool

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13 See <http://www.uni-bamberg.de/biks/>.

14 The longitudinal BiKS-8-12 follows approx. 2,000 children from the third grade of elementary school through sixth grade.

15 See <http://www.uni-bamberg.de/neps>.

education is a crucial problem.<sup>16</sup> The only exception is the information in EU Silc, but as mentioned above, it contains little preschool information and does not include quality data or child outcome data in a stricter sense, such as variables on skills or socio-emotional behavior - precisely the data needed to study educational effects of preschool programs from a European perspective. Apart from this, it is not clear what the different countries mean by child care and thus whether this information can be used for research on preschool education.

Therefore there *exists a need in most countries for a systematic procedure* to collect and provide consistent and comparable information on preschool education programs. Currently, the ministries responsible for young children use different indicators and diverse methods in collecting data on the preschool education of young children. Thus the definition of the population group considered to be in pre-primary education is often arbitrary. Moreover, programme criteria are sometimes confusing. What is clear is that countries use different proxy measures to determine whether a programme should be classified as educational or not. Variation in these proxy measures undermines comparability. Moreover, the weekly and annual durations of preschool education sessions are rarely taken into account. Thus it is obvious that a first great future challenge will be to provide comparable data on preschool education with respect to basic structural characteristics. Once these data exist, a further challenge will be to provide data on program quality, the costs and potential outcomes of preschool education programs in the European countries or even at a broader level, in various OECD countries (on the need for comparable data, see OECD 2006: chapter 8 as well).

## **5. Conclusions and Recommendations**

Given the importance of improved preschool programs in Germany and taking into account the various initiatives underway on different levels, we can summarize the following demands for a data infrastructure in this area: (1) Current and detailed data on the development of preschool programs is needed (detailed with respect to age groups, hours of care provided, provider type, etc.). This is also needed to ensure that the current political initiatives are effective. This data should be available on a small regional level since there are great regional disparities that needed to be analyzed. (2) Data on attendance of these preschool programs are needed, covering the socio-demographic and socio-economic backgrounds of the children and

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<sup>16</sup> Also on a broader international level it is an aim to expand early childcare and education: One of UNESCO's medium-term objectives (2002-2007) is to expand and improve comprehensive early childcare and education, especially for the most vulnerable and disadvantaged children (UNESCO 2003).

their families. This will make it possible to address such important questions as whether disadvantaged children attend preschool. (3) Given the importance of preschool programs, data on the quality of these programs should be made available. These data should not focus on structural quality indicators only (such as group size and child-staff ratios). As has been shown in the research, other quality dimensions such as process quality (the interaction between child and teacher) are even more important for child development (see, for instance, Roßbach 2005). (4) These data should ideally be linked to cost information. General information on the expenses of such programs is important, but not necessarily sufficient. What is ideally needed is data on the detailed costs of particular programs in relation to the level of educational quality. (5) Especially from a longitudinal point of view, it is important to have child outcome data<sup>17</sup> that can be linked to preschool information. This child outcome data should include cognitive measures as well as socio-emotional outcome measures. Only this linkage allows the effects of preschool programs to be analyzed in the short, medium, and long term. Given the fact that most of the empirical research on the effects of preschool programs has been conducted in Anglo-American settings, this type of analysis is widely missing on Germany, where this kind of microdata is virtually nonexistent. Up to now, there are only a few empirical studies on preschool effects in Germany, partly on regionally restricted samples. Moreover, only a few of the existing studies were able to control for the quality of the preschool programs and even less for their costs (for a short summary of these studies based on representative microdata see, for instance, Spiess 2008a).

Given the developments in the German data infrastructure, the potentials for preschool education research will certainly improve. Nevertheless there remain a number of gaps:

- 1) First of all, the below-three or below-four age group has not yet received adequate attention. On the one hand, this reflects the longstanding idea that preschool education starts with entrance to the traditional German *Kindergarten* at age three. On the other hand, developmental psychologists and brain researchers have shown that education starts much earlier. Apart from this, a major political goal is to increase preschool attendance of children below the age of three. Thus it is recommended that particularly the data infrastructure on this early stage be improved.<sup>18</sup>
- 2) Given the importance of preschool for disadvantaged children, such as those from households with low socio-economic status, datasets should be developed with an

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17 For a summary of relevant child outcome indicators with respect to various competencies in early childhood, see, for instance, BMBF (2008).

18 The SOEP data are almost the only publicly available dataset covering this early age. Furthermore, there should be more data on family day care, which will probably play a more important role in the future. Thus, efforts to improve the data infrastructure for the younger age group should be linked with efforts to improve the data situation on family day care.

adequate sample size covering this group. An oversampling of this group in existing surveys might be one option; special surveys of these groups of children might be another. Nevertheless, later study designs should cover the set-up of a control group as well.

- 3) Third, there are no representative data on the quality of preschool education programs if researchers do not want to rely on structural quality indicators (such as group size, staff-to-child ratio, or education of the staff) only. This is remarkable considering that other quality dimensions, such as process quality, have been shown to be of higher importance than structural indicators in explaining the variance in child outcomes. However, the lack of representative data on this aspect might be related to the difficulties inherent in measuring process quality. There do exist a few instruments for quantifying process quality (for a summary, see Mc Cabe and Ackermann 2007), but they are cost and time intensive to apply. Thus, on the one hand, greater efforts should be undertaken to develop more efficient instruments to measure process quality with respect to cost and time. On the other hand, more efforts should be made to apply the existing instruments to a broader set of preschool programs.
- 4) Fourth, given the importance of preschool quality for child development, such quality measures should be available in datasets including child outcome measures as well. Given the short-run lack of efficient measures of process quality, structural quality indicators can be used in a first step. Official data such as the *Kinder- und Jugendhilfestatistik* cover some indicators on the structural quality of preschool programs, while surveys such as the SOEP, for instance, cover child outcome measures. But so far, it is not possible to link this information. Thus serious investigation needs to be undertaken as to how survey data can be linked with official data, and it is obvious that the preschool institution a child attends is the key indicator. The efforts of labor market researchers to link official data with survey data in their field of research may provide such a model. Another option would be to enrich datasets as the SOEP with preschool quality data by collecting additional preschool quality data for the explicit purpose of linkage. This is possible once the respondent has agreed that the institution which his or her child attends can be identified.<sup>19</sup> It is obvious that data security will play a major role in such an enterprise. But such efforts are of particular interest in the long run as they enable researchers for long term analysis.
- 5) Fifth, the crucial interaction between the family or home environment and preschool

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<sup>19</sup> The SOEP has conducted a first pretest asking respondents for information on the preschool or day care center that their child attends (see Schupp et al. 2008, 72).

education can be analyzed with current and future data, but only to a very limited extent. This is particularly true with respect to the quality of these two educational settings, although it is known from international research that these quality aspects are of special importance. Thus it is recommended that greater efforts be undertaken to provide data on the quality of the family/home environment<sup>20</sup> and the quality of preschool education simultaneously. Such data would be of particular interest for multilevel analysis.

- 6) Apart from preschool quality and child outcome aspects, there is a dearth of information on the real costs of preschool programs. There are almost no options for combining detailed cost information with preschool quality and child outcome information. This is remarkable since the pure information on costs is not very useful for educational research, and it is still an open question what preschool quality and what child outcomes are produced given a particular input (that is, particular costs). Better data on costs, preschool quality, and child outcomes would also be necessary for solid cost-benefits analyses of the German preschool system. A cost-benefit analysis based on such data would complete the set of first cost-benefit calculations for Germany (for a brief overview, see Spiess 2008b).
- 7) Nevertheless, it is clear that compiling nationally representative datasets that cover detailed cost information, quality information, and detailed information on various aspects of the cognitive and non-cognitive development of children is an extremely cost and time intensive enterprise. Thus one strategy could be to add the missing information to an already existing dataset on a less detailed level. Another strategy could be to focus on particular preschool programs or on a particular group of children. In this case, the recommendation is for more intervention studies in the strict sense. These studies could have different foci, but should all share the aim of collecting more detailed information on preschool quality, child outcomes, and costs. They would also allow us to learn more about the effects of special preschool programs with a special educational program.
- 8) From an international, in particular European perspective, there is a clear need for more, and more comparable data on preschool education in the various countries. As pointed out in Chapter 4, the first aim is to collect and provide more detailed information on preschool, with information on structural indicators. Such *datasets need to cover newborns to six-year-olds*, and include all forms of provision, regardless of administrative responsibility, funding source, or setting. What is needed is a collection of data over time. From a longer-term perspective, comparable data are needed, which offer more

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20 As an example for a scale to measure the quality of a child's home environment, see the HOME scale as used in the NLSY, for instance (Bradely et al. 2001).

information on the quality, costs, and outcomes of such preschool education programs. Apart from this, there is a special need to collect and identify preschool information for children from disadvantaged families.

- 9) All these recommendations show obvious links to those for the data infrastructure in the field of families in general (see the expertise of Huinink in this volume) and in the fields of abilities and competencies (see the reports by Stern, Trautwein and Schoon in this volume). Thus it might be of added value to develop the preschool data infrastructure jointly with the data infrastructure in the other fields mentioned. Although the foci might differ, the overlaps between the various fields should be kept in mind and efforts should be made to foster an exchange between the different interests, agencies, and organizations involved.

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