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The Development of Early Childhood Teachers' Language Knowledge in Different Educational Tracks

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Abstract

Early childhood teachers should have extensive knowledge about language and language development, because these facets of professional knowledge are considered as important requirements for fostering language development in early childhood education settings. It is assumed that early childhood teachers acquire this knowledge during pre-service teacher-education, which, in Germany, takes place in different educational tracks (universities and professional schools). With the help of an IRT-based test, the longitudinal change of language knowledge during teacher education at universities and professional schools was investigated in Germany (956 participants at the beginning and 371 participants with non-missing data at both time points). As a result, language knowledge increases during teacher education both at universities and at professional schools. Differences concerning the level of knowledge but not concerning the changes during qualification were found between different educational tracks. Different interpretations are discussed and further research questions are derived.

Keywords: early childhood education, professionalization, language knowledge, longitudinal study

1. Introduction

1.1 Relevance

It is well known that the quality of early education has effect on different developmental outcomes of children (Burchinal et al., 2000; ECCE Study Group, 1997; NICHD, 2002; Sylva et al., 2004). The quality of an early childhood setting is subdivided into the quality of orientation, the quality of process and the quality of structure (Tietze et al., 1998; Tietze, Schuster & Rossbach, 1995). Quality of orientation includes all values, attitudes and beliefs, but also the professional knowledge of early childhood teachers (Thoma, Ofner, Seybel & Tracy, 2011). Quality of process refers to all interactions in which a child is involved and may be affected by the quality of orientations (e. g. beliefs and knowledge). The effect of process quality (and thus, indirectly, of quality of orientation) on a child's development is well documented (ECCE Study Group, 1997; NICHD, 2002; Roßbach, Kluczniok & Isenmann, 2008; Sylva et al 2004). Quality of structure finally refers to material, human and social conditions such as equipment, educational level of the staff and group-size (Tietze et al., 1998).

The present study focuses on professional knowledge of early childhood teachers as part of the quality of orientation. In the context of learning at schools teachers' professional knowledge has been proven to be related to cognitive activation, support and designing an optimal learning environment (Berliner, 2001; see also Krauss et al., 2008). Regarding current requirements in the context of early education, early childhood teachers' language knowledge seems to be of particular interest. The aim of this study is to investigate to which extend the language related knowledge of early childhood teachers develops during pre-service teacher education in different educational tracks. Therefore, an assessment tool was developed and the language related knowledge of prospective early childhood teachers was assessed in a longitudinal study during pre-service teacher education at universities and professional schools.

1.2 Professional Knowledge and Quality of Early Childhood Education

Knowledge of educational professionals can be subdivided into content knowledge, pedagogical knowledge and

pedagogical content knowledge (Shulman, 1986, 1987; Borko & Putnam, 1995). Content knowledge is understood as a deepened and advanced knowledge in specific domains, e.g. in mathematics or science (Borko & Putnam, 1995; Shulman, 1987). It provides an essential basis for pedagogical content knowledge, because reliable and comprehensive content knowledge is indispensable for teaching. Pedagogical knowledge refers to general and domain-unspecific principles of learning and related contextual factors (Shulman, 1987). Pedagogical content knowledge finally means a conflation of pedagogical knowledge and content knowledge (Borko & Putnam, 1995; Shulman, 1987). It contains various content-related aspects of teaching and learning (e.g. helpful derivations or analogies), but also the representation of typical learning-problems, which enables the creation of an expedient learning environment. Many findings indicate that these facets of knowledge have a significant effect on the designing and outcomes of learning environments (Baumert et al., 2010; Shulman, 1986): Professionals who have a deep and connected content knowledge have an advance in selecting appropriate methods or in using alternative explanations and representations. Furthermore it turned out that teachers' pedagogical content knowledge leads to higher cognitive activation of most learners (Krauss et al., 2008). Finally, students of teachers who have high content and pedagogical content knowledge tend to have better learning outcomes (Rowan, Chiang & Miller, 1997). Compared to school related educational research, this conceptualization of professional knowledge is not very widespread in research about early childhood professionals (but see Faas, 2013).

Professional knowledge can also be seen as an important component of the competence, even if no consistent definition of competence exists (Klieme & Hartig, 2007). In his well-known definition of competence Weinert (2001) mentions knowledge as a central (but not the only) facet of competence, which leads – combined with motivational, volitional and social skills - to responsible and successful problem solving in various situations.

Furthermore, knowledge is defined as a key qualification for early childhood teachers (Lee & Ginsburg, 2007; Robert Bosch Foundation, 2008). Finally, professional knowledge and professional beliefs are likely to have a reciprocal relation: Existing beliefs (for example in terms of schemes; see Kopp & Mandl, 2005) influence the acquisition of further knowledge. At the same time existing knowledge can affect the attitudes and beliefs of early childhood teachers (Dippelhofer-Stiem, 2006; Vartuli & Rohs, 2009).

Summarized, different research approaches converge to the fact that professional knowledge is a central aspect of professionals in early education settings.

1.3 Language Knowledge as a Part of Professional Knowledge

A child's language can be considered as a key competence, which is of great significance for its cognitive, social-cognitive, emotional, educational and professional development (Weinert, Doil & Frevert, 2008). Receptive language skills and skills of language usage are of great importance for cognitive development and school performance and affect memory performance as well as procedural thinking and problem solving. Moreover, a remarkable part of declarative and procedural knowledge is mediated through language. In addition, there exists evidence that language is important in the context of self-monitoring, self-control and for the acquisition of interpersonal understanding (Weinert, 2006, 2000). Hence, early childhood teachers' knowledge about language, language development and about how to foster language development is a central aspect of pedagogical professionalism (Fried, 2004, 2007; Oberhuemer, 2003; Roux, 2005; Tietze et al., 1998).

For this reason, language diagnostics and language support meanwhile are anchored in political education agreements and national kindergarten-curricula in Germany. The use of various diagnostic procedures and language support programs is recommended or even mandatory in many countries (Authorgroup Bildungsberichterstattung 2008; Dietz & Lisker 2008; Hendler, Mischo, Wahl & Strohmer, 2011). This implies a new challenge for the staff in early childhood settings. Early childhood teachers should be able - either by themselves or with the help of other professionals - to assess, to recognize and to document the level of children's language development as well as to plan and to conduct adequate language support activities (Tracy, Ludwig & Ofner, 2010). In order to fulfill these requirements, early childhood teachers should dispose of pedagogical knowledge, but also of content knowledge (e.g. linguistic knowledge) and pedagogical content knowledge (e.g. how to foster a child's language in a concrete situation; Shulman, 1986, 1987; Borko & Putnam, 1995; Hopp, Thoma & Tracy, 2010).

1.4 Development of Competence Related Skills during Qualification

The acquisition of basic knowledge is of great importance, in particular at the beginning of professional development (Shulman, 1987; Goldschmidt & Phelps, 2010). During further steps of qualification, deepening and differentiation of knowledge and proceduralization of knowledge move into the focus (Fröhlich-Gildhoff, Nentwig-Gesemann & Pietsch, 2011). According to expertise research (Bromme, 1992; Gruber, 1999; Paetz, Ceylan, Fiehn, Schworm & Harteis, 2011) skills differentiate and finally consolidate through various steps, stages or levels (Berliner, 1988; Dreyfus & Dreyfus, 1986; Katz, 1972). According to these approaches general (non-specific) and situation-specific knowledge are acquired.

In the course of professionalization this knowledge finally becomes adaptive and flexible (Dreyfus & Dreyfus, 1987; Rauner 2007). There also exists evidence that education and vocational training affects the pedagogical thinking, knowledge and action of early childhood teachers (Vartuli & Rohs, 2009; Dippelhofer-Sitem, 2006; Mischo, Wahl, Strohmer & Wolf, 2014).

Since in some countries different educational tracks for the qualification of early childhood teachers exist (in Germany, for example, a university- and a professional school-track), the question arises whether these different education tracks lead to different professional knowledge (or different levels of professional knowledge). At least in Germany these differences have barely been studied. Studies from other countries lead to the assumption, that educational level has an effect on professional knowledge, attitudes and professional acting of early childhood teachers and hence on the quality of early education offers and various outcomes in children (NICHD, 2003; Whitebook, 2003). However, the findings are not completely consistent (Kelley & Camilli, 2007). Overall, these studies indeed support the assumption that professionals with a higher educational level can design better and more inspiring learning environments, but a comparison of these studies is hindered due to methodological differences (e. g. conceptualizations of educational levels and outcome-variables). Current studies from Germany suggest that different educational tracks (university vs. professional school) are at least partly associated with differences in professional orientations (e.g. attitudes and values; Mischo, Wahl, Hendler & Strohmer, 2012, 2013, Mischo et al., 2014). However, it cannot be excluded that these effects can be ascribed to (self-) selection, and that early childhood teachers of different educational tracks already differ before they start qualification.

Regarding language related knowledge of early childhood teachers in Germany only few studies exist; most previous studies refer to professional self-concept (Dippelhofer-Stiem, 2000; Frey, 2001; Mischo et al., 2013; Rank, 2008). In the “SprachKoPF-study", however language related knowledge and skills of early childhood teachers are assessed by a standardized knowledge-test and by using video-sequences (Tracy et al. (2010). Furthermore, a performance test assessing content knowledge and pedagogical knowledge in the domain of language and language development as well as a vignette-based assessment tool in order to assess knowledge relevant for language diagnostics were constructed by the authors (Hendler et al., 2011), and differences concerning the time of education (beginners vs. graduates) as well as concerning the educational track (universities vs. professional schools) were found (Strohmer & Mischo, in press). However, longitudinal analyses concerning the development of early childhood teachers’ language knowledge during qualification are not available yet.

1.5 Research Questions

Early childhood teachers’ language knowledge can be considered as an important condition for supporting and fostering children’s language acquisition and development (Tracy et al., 2010). Previous findings suggest both an effect of time of qualification (Vartuli & Rohs, 2009; Dippelhofer-Sitem, 2006; Mischo et al., 2014) and of educational track (NICHD, 2003; Whitebook, 2003). Whether the results of international studies can be transferred the German systems is remains unclear. Thus, the following research questions arise:

(1) Does early childhood teachers’ language knowledge develop during qualification (across both educational tracks)?

(2) Does the base level of early childhood teachers’ language knowledge already differ before qualification depending on the educational track chosen?

(3) Does the change of childhood teachers’ language knowledge during qualification differ depending on the educational track passed?

2. Method

2.1 Assessment of Language Knowledge

For the assessment of language related knowledge, a standardized test was constructed (Hendler et al., 2011), which covers different facets of language related knowledge. It was developed in collaboration with experts from the field of linguistics and language support. Theoretical basis for the test were language-related requirements for early childhood teachers (see Hopp et al, 2010; List, 2010; Robert Bosch Foundation, 2008) as well as scientific literature on language, language diagnostics, language development and language support (Fried & Briedigkeit, 2008; Kany & Schöler, 2007; Mannhard & Scheib, 2005; Ritterfeld, 2000; Szagun, 2006; Tracy, 2008). The test comprises three parts (Hendler et al., 2011): The first part refers to language related knowledge and uses mainly multiple-choice answering format. The second part refers to the ability of diagnosing a child’s language competencies and uses a vignette-based assessment. The third part refers to the ability of supporting a child’s language competencies and also uses a vignette-based assessment.

The present study focuses on the first part of the standardized test which refers to linguistic fundamentals, peculiarities of the German language, steps of a child's language development, language retardation, specific speech development

disorders and possibilities for language supporting language acquisition and development (item example: 'What do you call children, who talk less than 50 words and do not produce sentences containing at least two words at the age of two, but catch up with this by the age of three?'; Hendler et al., 2011). The final version of the test consists of 17 items and yielded an EAP / PV reliability (explained variance according to the estimated model divided by total persons variance) of .62, which can be considered as acceptable for heterogeneous constructs (Kline, 1999 cited by Field, 2009). Confirmatory analyses confirmed the unidimensionality (χ^2 = 158.18, p <.001; CFI / TLI = .959 / .952; RMSEA = .02). The distribution of item and person parameters shows a good coverage of all areas of difficulty and only three items showed differential item functioning, albeit to a very small degree.

2.2 Sample and Design

The data analyzed in this study belongs to a larger research project, which investigates the development of early childhood teachers' competence during pre-service teacher education and transition to in-service. All institutions in the sample do not require any previous vocational education and qualify, among other, for work in a kindergarten. The data include two time points (t1 = at the beginning of pre-service teacher education and t2 = at the end of qualification three years later). The sample contains of 956 prospective early childhood teachers at the beginning and 371 prospective early childhood teachers with non-missing data at both time points. Participants belonged to 15 university courses and 15 professional schools in Germany. The high drop-out is mainly due to organizational aspects, as not all courses assessed at t1 existed in complete composition at t2. At t1, participants had a mean age of 21.4 years, whereby university students were significantly older than professional school students (22.49 years respectively 20.55 years). 84.4% of the sample was female with no significant difference between the educational tracks.

2.3 Data Analysis

The data analysis contained two steps. In the first step the development of early childhood teachers' language knowledge was examined by using a latent change model (Steyer, Partchev & Shanahan, 2000). Within a latent change model, the development of early childhood teachers' language knowledge is modeled by a latent change factor. The knowledge at t2 finally is explained perfectly by the t1-level and the change-score. In addition, indicator-specific factors are used in order to link the individual indicators at t1 and t2 (Geiser, 2010).

In a second step, the effect of the educational track is modeled by including it as an additional predictor for the latent change score in a regression analysis (Selig & Preacher, 2009). Since in the current case individual observations are not completely independent (early childhood teachers attending one certain university or professional school are more similar to each other than to prospective early childhood teachers attending other universities or professional schools) and data therefore exhibits a hierarchical structure, corrected estimation of standard errors was applied (Note 1) (Hox, 2002).

3. Results

3.1 Research Question (1): Development of Language Knowledge during Qualification

The latent change model exhibits an acceptable fit. A chi-square difference test of measurement invariance over time showed complete metric invariance and partial scalar invariance of the model (difference test for the complete metric invariance: χ^2 = 22.67, not significant) difference test for the complete scalar invariance: χ^2 = 55.23, p <.05). The global fit statistics of the three models are shown in table 1.

Table 1. Fit-statistics of the different latent change models

Latent change model	χ^2	p	CFI	RMSEA
unrestricted	424.73	< .11	.930	.009
metric invariance	439.08	< .11	.929	.009
scalar invariance	459.82	< .09	.920	.009

The mean of the change factor is significantly different from zero and positive (E = 0.88, SE = .16, p < .001) which indicates a significant increase of language knowledge during qualification. At the same time the significant variances of t1 (E = 0.48, SE = .09), p < .001) and of the change factor (E = 0.55, SE = .16, p < .001) indicate differences in base level and development. A significant negative correlation of base level and growth shows a higher increase of language knowledge when the base level is rather low.

3.2 Research Question (2) and (3): Different Base Level and Different Changes in Different Education Tracks

In a second step, educational track (university vs. professional school) was included as a predictor to the latent change

model. The prediction model also has an acceptable fit (χ^2 = 481.27, df = 436, p <.07; CFI = .917, RMSEA = .010). Educational track significantly correlates with the base level, which means that students attending universities have a higher t1-base level (r = - .36, p <.05) and – as in the previous model – the base level negatively predicts the increase of knowledge (β = -.56, p < .001). At the same time, there was no significant effect of educational track on the change score. This means that the increase in language knowledge cannot be explained by the educational track, and that the variance of the change factor has to be traced back to other variables (e.g. the different base level of knowledge - despite of the education track). The regression model is shown in figure 1:

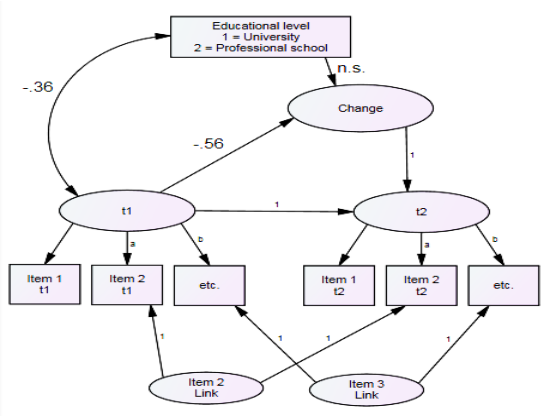

Figure 1. Latent change regression model, n.s.=not significant

4. Discussion

Regarding the development of language related knowledge during pre-service teacher education, a significant increase of knowledge could be documented, which confirms the demand and the assumption that knowledge and competences establish during qualification (see Renkl, 2009; Fröhlich-Gildhoff et al., 2011). This is particularly true for those prospective early childhood teachers with rather low base level. On the one hand, this is a desirable result, but at the same time it is critical because student with high base level do not benefit in the same way.

Regarding the base level of language knowledge it is hardly surprising that university students show higher scores because they typically have a higher graduation and thus more opportunities to acquire language related knowledge. In this context - apart from the selection effect on basis of university entrance qualifications - also a self-selection effect can be assumed, since probably those students chose higher education, who already have higher knowledge.

Regarding the changes in the different educational tracks, the track seems to have no effect on the acquisition of language knowledge itself (when base level knowledge is statistically controlled). This could be explained by the fact that the acquisition of language knowledge rather depends on specific curricula (e.g. the number of courses in developmental psychology, language development or linguistics) than on the educational track per se. Therefore, the question arises, whether university tracks should be generally considered as more valuable than professional school tracks, and how curricula should be compounded in order to support the development of language knowledge during qualification best.

Another focal question refers to a potential effect of language related knowledge on more practical aspects of professional competence (such as diagnostic skills or the concrete support of language acquisition and -development). Hence, early childhood teachers' actions in various workaday-situations in kindergarten should be investigated, e.g. with the help of observational data. Finally, the question arises whether a teacher's language knowledge indeed leads to higher skills and better language-related outcomes in children? Some of those more practical aspects of early childhood teachers' competence were assessed by the second and the third part of the assessment tool and need to be evaluated in the future.

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Appendix A

Items of the knowledge-test

(1) The spoken German words "Katze" and "Tatze" differ only in one sound, but they have different meanings. How are those discriminating sounds called? (a) idioms, (b) lexemes, (c) sememes, (d) phonemes

(2) What skills do children acquire when they learn to recognize the structure of words (e.g. plural formation) and structure of sentences (e.g. verb position)? (a) communicative and pragmatic skills, (b) morphosyntactic skills, (c) phonological skills, (d) prosodic skills

(3) What does bilingual first-language acquisition mean? (a) It means that a child acquires two languages from birth, for example when mother and father speak different languages, (b) It means that a child who already speaks his native language learns a foreign language in a natural language environment (for example while playing with other children in the kindergarten), (c) It means that a child who already speaks his native language learns an additional foreign language in a language course, (d) It means that a child who already speaks a foreign language learns the national language when entering school

(4) Which sound is formed labiodental with the lower lip at the upper teeth? (a) d, (b) f, (c) g, (d) n

(5) The (German) question "Do you go to Berlin today?" can be emphasized and understood in different ways. How many ways are these? (a) 2, (b) 3, (c) 4, (d) 6

(6) What is the conjugated verb in the sentence "Today I go swimming"? (a) go, (b) go swimming, (c) swimming, (d) there is no conjugated verb

(7) What case has the noun marker in the sentence "He gave her the gift."? (a) accusative, (b) neuter, (c) nominative, (d) past tense

(8) How many rules for forming the plural of German nouns are there? (a) there is no rules for plurals, (b) one rule, (c) two rules, (d) seven rules

(9) Where does the conjugated verb typically stand in a simple German sentence? (a) at the beginning, (b) at second position, (c) at third position, (d) at last position

(10) When does a child usually speak the first word? (a) 1 to 4 months, (b) 10 to 14 months, (c) 1.5 to 2 years, (d) 2.5 to 3 years

(11) When do children usually speak about 50 words and understand about 200 words? (a) 6 months to 1 year, (b) 1.5 to 2 years, (c) 2.5 to 3 years, (d) 3.5 to 4 years

(12) Up to what age can the the forward displacement of fricatives be regarded as normal development? (a) up to 1 year, (b) up to 2 years, (c) up to 4 years, (d) up to 6 years

(13) The overgeneralization is a sign of an advanced language acquisition process. What is NOT an example of an overgeneralization? (a) when irregular verbs are conjugated with the rules for regular verbs , (b) when not only dogs but also cats are called bow-wow, (c) when a plural rule is applied to all nouns, (d) when articles and prepositions are omitted, for example, "I go school" instead of "I go to school"

(14) When do you speak of specific language impairment? (a) when a child has difficulties in acquiring a second language, (b) when a child has an incorrect speech due to an anatomical disorder, (c) when a child with hearing impairment has problems in using language, (d) when a child without physical, neurological or mental impairments has an inappropriate phonetic, vocabulary or grammar development

(15) What is NOT a symptom of stuttering? (a) difficulty in word finding, (b) repetition of sounds, syllables or short words, (c) expansion and extension of sounds, (d) blockages before and in words

(16) What reaction is generally recommended when a child makes an erroneous statement? (a) a direct correction, (b) an indirect correction by repeating the statement in the right form, (c) asking the child to repeat the correct statement, (d) acting as if you had not understood the child

(17) Which type of questions is considered as particularly encouraging children to speak while reading picture-books? (a) rhetorical questions, such as "Is there nothing to see in the picture?", (b) yes/no questions, such as "Do you see the boy in the picture?", (c) Search questions, such as "Where is the boy in the picture?", (d) why-questions, such as "Why the boy hiding behind the tree?"

Note 1. TYPE is COMPLEX estimation for complex covariance structures within Mplus-framework (Muthén & Muthén, 1998 - 2012)