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The development of kindergarten children as evaluated by their kindergarten teachers and mothers

Hannelore Koch[1]*, Ursula Kastner-Koller, Pia Deimann, Christine Kossmeier, Claudia Koitz & Marina Steiner*

Abstract

Kindergarten teachers represent one of the first non-family caregivers for a child; they play a part in educating the child and have significant insight into the developmental status of each individual child. Their assessment of children's development can be an important part of information in the diagnostic process and is also essential for the early detection of developmental problems. Hence, the aim of this study was to measure the accuracy of kindergarten teachers' assessments compared to mothers' accuracy in the evaluation of their children's development. Eighty children between the ages of 4 and 6 were tested with the *Wiener Entwicklungstest* (Viennese Developmental Test, WET, Kastner-Koller & Deimann, 2002). Meanwhile, these children's kindergarten teachers were asked to estimate which items of each of the WET-subtests they personally thought children would be able to solve. The evaluations made by the mothers of 30 children in the sample were also included in the analysis in order to allow for a comparison between the mothers' and teachers' assessments. A multivariate multifactorial variance analysis yielded significant results. Kindergarten teachers under- and overestimated children in several developmental areas, though they were able to accurately estimate children's overall developmental level. The comparison with mothers showed no difference regarding the assessment accuracy between the two groups of caregivers. A behavioral assessment based on a parents' and teachers' questionnaire (Verhaltensbeurteilungsbogen für Eltern und Erzieher, VBV 3-6; Döpfner, Berner, Fleischmann & Schmidt, 1993) also showed similar results. These results highlight the importance of various behavioral and developmental assessments by caregivers.

Key words: Kindergarten teachers, developmental diagnosis, preschool age

[1] *Correspondence concerning this article should be addressed to:* Hannelore Koch, PhD, Department of Developmental Psychology and Psychological Assessment, Faculty of Psychology, University of Vienna, Liebiggasse 5, A-1010 Vienna, Austria, Europe; email: hannelore.koch@univie.ac.at

1. Research goals

Kindergartens, as one of the first educational institutions, are of great importance with regard to detecting and preventing developmental and behavioral problems at an age when interventions are expected to be most beneficial. Moreover, the goal of children's psychological assessment, by means of different methods, is to obtain an idea of the capabilities, accomplishments, and living conditions of the child and its environment, which is as detailed as possible. The aim is that this idea may then serve as a basis for an appropriate diagnosis, as well as for optimal intervention and support measures to be undertaken. The concept of a multimodal diagnosis refers to a diagnostic procedure, in which not only the psychologist's clinical assessment is taken into account, but the evaluations of parents, kindergarten teachers, and school teachers are also considered. However, these claims can only be true if kindergarten teachers' evaluations are in fact valid assessments of children's developmental status.

While the accuracy of mothers' estimations has already been extensively investigated (see Glascoe & Marks this issue; Deimann & Kastner-Koller, this issue), the diagnostic ability of kindergarten teachers is a relatively new topic and remains largely unexplored.

Numerous studies have been conducted on children's behavioral assessment by parents and child educators. The aim of these studies was to investigate the relationship between parental and child caregivers' estimates of behavioral dimensions (i.e. internalized and externalized behavioral problems, emotional problems, social competencies) that are relevant to clinical child psychology. The results show that the estimates of caregivers within the same social context and in the same social role (e.g. mother vs. father) are significantly higher correlated than the information of caregivers from different social contexts (e.g. fathers vs. child carers/teachers); the latter showing a very weak relationship (Achenbach, McConaughy & Howell, 1987; Antrop, Roeyers, Oosterlaan & Van Oost, 2002; Beelmann, Lösel, Stemmler & Jaursch, 2006; Berner, Fleischmann & Döpfner, 1992; Döpfner et al., 1997; Duhig, Renk, Epstein & Phares, 2000; Grietens et al., 2004; Renk & Phares, 2004; Tassé & Lecavalier, 2000). Here it is assumed that behavior is situation-specific, whereby simulation and dissimulation tendencies, differing judgment anchors and varying information about the behavior, lead to greater discrepancies between the raters. Additionally, multiple studies have shown inter-rater consistency to be higher for externalized than for internalized behavioral problems. Furthermore, mothers report more internalized behaviors than fathers, whereby both parents do so more than teachers. Even though externalized behaviors refer to more visible behaviors (Achenbach et al., 1987; Grietens et al., 2004), parental and teacher ratings of children who have been diagnosed with attention deficit and hyperactivity disorder fail to be substantially consistent with each other (Antrop et al., 2002; Tassé & Lecavalier, 2000).

Compared to their behavioral ratings, parents and teachers are better at assessing cognitive characteristics such as development and intelligence (Miller & Davis, 1992; Rennen-Allhoff, 1991; Schrader, 2001). In a study by Helmke and Schrader (1989), the authors found that parents were well informed about their children's cognitive school performance. The correlation between parental ratings and their children's test performance

ranged from r = .20 to .85. In contrast, the mother-child consistency in non-academic, emotional characteristics (i.e. self-confidence, emotional stability, motivation) was considerably low. As expected, teachers were also better able to assess student characteristics that were directly related to learning, school performance and achievement (r = .28). No correlations were found between the following factors: willingness to learn, self-confidence, and performance anxiety (Helmke & Fend, 1982).

When estimating development or intelligence, parents and educators are usually supposed to predict children's performance in test items or to make general estimates of performance. These studies demonstrate that parents and teachers are quite well informed about their children's cognitive development. The correlations found are moderate to high in magnitude. Mean comparisons, however, show that caregivers generally tend to overestimate children's performance capabilities (e.g. Deimann et al., 2005; Helmke & Schrader, 1989; Hunt & Paraskevopoulos, 1980; Miller, 1986; Miller & Davis, 1992; Rennen-Allhoff, 1991; Schrader 2001).

Deimann et al. (2005) investigated the mothers' rating accuracy with the WET, with results showing a significant overestimation, by mothers, of the general development, as well as of the domains concerning gross-, fine-, and graphic-motor skills. Additionally, there was an overestimation of individual subtests measuring cognitive development and memory capacity. An extensive overestimation was identified especially with regard to the social-emotional domain.

In comparing the ratings by mothers and teachers, it became apparent that teachers also tend to overestimate children's cognitive performance (Miller & Davis, 1992; Rennen-Allhoff, 1991). While Miller and Davis (1992) evidenced overestimates by mothers and teachers to be about the same extent, results by Rennen-Allhoff (1991) indicate that mothers estimate their children's performance much higher than teachers, although these also tended towards an overestimation of children's capabilities.

This overestimation does not only apply to the ratings of one's own child. Parents also overestimate what a normally developed child should generally know (Miller & Davis, 1992). Parents, as well as adults without children, have excessively high expectations of what a child of a certain age should be capable of. Peculiarly, infants and young children are under-, while older children are overestimated (Miller, 1986; Miller, White & Delago, 1980). However, teachers are able to estimate students' average cognitive developmental level more accurately than that of one specific child, even though in this case an overestimation still takes place (Miller & Davis, 1992). Mothers and teachers may, however, differ in their implicit ideas about child development. While parents understate the variability of child development (Deimann et al., 2005; Glascoe, 2000; Glascoe & Sandler, 1995), teachers and educators strongly differentiate between children's performances as well as between individual developmental and behavioral dimensions (Helmke, Hosenfeld & Schrader, 2004). Therefore, teachers should be able to assess general intelligence more accurately than specific aptitudes (Glascoe, 2001; Schrader, 2001).

In particular, mothers whose children have developmental problems, show unrealistically high norm expectations in relation to the development of an average child. In such cases, mothers notice a discrepancy between their norm expectation and the actual performance

of their child. However, they are still not able to accurately estimate their performance level (Kastner-Koller, Deimann, Pabst & Tonetti, 2005). Already in 1980, Hunt and Paraskevopoulos pointed out that mothers' estimation accuracy is correlated to the competence of their children; an effect which has become known in the literature as the match hypothesis. The extent to which this match hypothesis also applies to kindergarten teachers remains unclear.

It is known that parents and kindergarten teachers are able to provide reliable ratings of their children's developmental status when they are asked appropriate questions in a systematic way. Several studies show that asking parents and kindergarten teachers about concerns regarding their children is a good indicator of developmental problems in children. In contrast, asking about problems or worries has been found to be a less appropriate approach (Glascoe, 2000; Teisl, Mazzocco & Myers, 2001).

Some types of concerns and global estimates by parents have been identified to be particularly good indicators of existing developmental problems (Crooks, 2005; Ellingson, Briggs-Gowan, Carter & Horwitz, 2004; Glascoe, 1997, 2000; Teisl et al., 2001). Asking parents about concerns regarding general/cognitive development, language development, gross and fine motor skills, as well as school-related areas, is helpful in identifying developmental deficits. On the other hand, these are the concerns of mothers, which have been studied in-depth. Using a screening procedure for kindergarten teachers, an Australian study showed that parents express more concerns compared to teachers. Results also indicated that the caregivers' estimates of all developmental domains were highly correlated, with the exception of the social-emotional domain (Coghlan, King & Wake, 2003).

Tröster, Flender and Reineke (2005) developed a method of developmental screenings in kindergartens (DESK 3-6; Dortmunder Entwicklungsscreening für den Kindergarten, *Dortmunder Development Screening for Kindergarten*) which was shown to reliably identify children with developmental disorders. It is partly composed of monitoring tasks which are completed by the teacher based on her daily observations of the child, as well as performance tasks, which are applied by the teacher. In a small sample of 21 children with developmental problems, there was a high correlation between the assessments of teachers and therapists from an early intervention center. Less consistent, but still significant were the results concerning self and social competence as well as body perception. However, children with special needs in auditory/visual perception could not be reliably identified (Flender & Demant, 2007).

Kindergarten teachers often represent the children's first non-family caregivers, thus playing a very important role in the children's development. In contrast to parents, teachers generally have a much broader knowledge of preschool development, which increases with their professional experience. Vocational training of kindergarten teachers places great emphasis on acquiring a thorough and comprehensive knowledge of the developmental psychology of children. Therefore, it can be assumed that kindergarten teachers are well aware of children's development in general, and individually. The aim of the present study is to investigate whether kindergarten teachers are able to evaluate children's development accurately and whether their accuracy differs from mothers' evaluations.

The following research questions were tested:

1. To what extent are kindergarten teachers able to estimate a child's development?
2. Do kindergarten teachers' estimates differ from mothers' estimates of children's development?
3. Do kindergarten teachers' estimates of children's behavior differ from mothers' estimates?

2. Methods

2.1 Sample

To investigate the research questions, two studies were conducted. In study 1, the data of 80 children and their kindergarten teachers were analyzed. In study 2, a sample of 30 children out of the total sample of study 1 was additionally assessed by their mothers. The data was collected in 15 kindergartens in Vienna and Graz, Austria. The 80 children were between four and six years old. The sex distribution was balanced with 42 boys and 38 girls (χ^2 = .200; df = 1; p = .655). The sample was composed of 42 four-year-olds (M = 53.7 months, SD = 3.61 months; range = 4.0 to 4.11 years) and 38 five-year-olds (M = 64.8 months, SD = 3.84 months; range = 5.0 to 5.11 years). Within these two age groups, boys and girls were equally distributed (χ^2 = .800; df = 1; p = .371). The mothers' ages were normally distributed (M = 35.99; SD = 4.91 years; range = 26 to 48 years). Most of the mothers were either housewives or had high to middle-skilled occupations. The teacher sample consisted of 30 participants. On average, the kindergarten teachers were 34.44 years old (SD = 10.91 years; range = 20 to 59 years) with a normally distributed age range.

2.2 Measures

Developmental assessment

Children were tested with the *Wiener Entwicklungstest* (WET; Kastner-Koller & Deimann, 2002). The WET is a developmental test for three- to six-year olds, which measures children's development in relevant areas of functioning. This procedure allows for a comprehensive developmental assessment of the entire range of important areas of functioning for each age group. It produces an overall developmental score as well as scores for each subscale. (For closer descriptions see Deimann & Kastner-Koller, this issue)

WET testing of the children was accomplished according to the test manual. Mothers and kindergarten teachers were given all of the WET items and were asked whether they believed that their child (mothers) or a child in their group (kindergarten teachers) would be able to perform the task correctly or not. Scoring was carried out according to the test manual. For each scale it was recorded how many tasks the caregiver estimated the child would be able to complete. The resulting raw score was then converted into C-scores, with the use of the manual's standardization tables, to allow comparisons between the children's test performances and the caregivers' estimations. Both the assessment of the

children and those of the adults took place in a quiet room at the kindergarten. The children's testing lasted between 60 and 143 minutes, depending on their attention span and performance. According to individual needs, breaks were taken between subtests. The adults' procedure took 30 to 35 minutes.

Behavioral assessment

Behavioral estimates were given for all children (n = 80) by their mothers and their kindergarten teachers who completed the VBV 3-6 (*Verhaltensbeurteilungsbogen für Vorschulkinder, VBV 3-6*; Döpfner, Berner, Fleischmann & Schmidt, 1993). The VBV 3-6 is a parent and teacher questionnaire assessing behavioral competencies and behavioral problems. It consists of four dimensions: Oppositional-aggressive behavior, attention deficit and hyperactivity vs. playing endurance, emotional problems and social-emotional competence. The frequency of problems within a four-week period is measured on a five-point scale. The questionnaire is available in a teachers' and a parents' form. The results are presented in stanine values.

The scales are described as follows:

The Social-Emotional Competencies Scale (*Skala Sozial-emotionale Kompetenzen, KOMP*) consists of 10 items (parent form) and 21 items (teacher form) respectively. A high score in this scale indicates an age-appropriate play behavior, respect for set boundaries, and adequate ability to resolve conflicts. The 20 and 31 items, respectively, of the Oppositional-Aggressive Behavior Scale (*Skala Oppositionell-aggressives Verhalten, AGGR*) describe behavioral problems such as mood swings, impulsive and oppositional behavior, verbal or physical violence. Attention-Deficit and Hyperactivity vs. Playing Endurance (HYP) comprises 12 and 19 items respectively. Children with high scores tend to change activities often, and quickly lose interest in playing; they also display motor restlessness and give up quickly when faced with difficulties. The Emotional Problems Scale (*Skala Emotionale Auffälligkeiten, EMOT*) consists of 11 and 21 items respectively. Children with high scores on this scale are described by caregivers as being socially anxious and emotionally insecure.

3. Results

Statistical analyses were carried out to explore how accurately kindergarten teachers are able to estimate the overall development and behavior of their kindergarten children. Furthermore, in a subsample of 30 children the teachers' estimates were compared to those of the mothers.

3.1 Accuracy of kindergarten teachers' estimates of development

For every child of the whole sample (n = 80), WET-subscale C-scores and a total-C-score were determined. In addition, the assessment of the kindergarten teachers yielded estimation C-scores for each subscale and a total score.

Table 1: Children's WET-test results and kindergarten teachers' estimates: Mean C-Scores, mean differences, standard errors and results of univariate and multivariate analyses of variance (n = 80).

Multivariate Analysis[1]		Mean C-Score	Difference: Mean Difference	Difference: Standard-error	df	F	p
	Repeated measures Teachers' estimates – Children's test results	5.475 5.113	.362	.219	12	11.638	**≤.001**
Univariate analyses:							
WET-subscale							
Gross motor skills	**Repeated measures** Teachers' estimates – Children's test results	4.456 4.646	-.190	.250	1	.578	.449
Hand skills	**Repeated measures** Teachers' estimates – Children's test results	4.962 5.101	-.139	.198	1	.495	.484
Drawing	**Repeated measures** Teachers' estimates – Children's test results	5.076 4.823	.253	.291	1	.755	.387
Visuospatial perception	**Repeated measures** Teachers' estimates – Children's test results	3.924 5.747	-1.823	.275	1	43.980	**≤.001**
Object memory	**Repeated measures** Teachers' estimates – Children's test results	4.177 4.759	-.582	.315	1	3.418	.068
Digit span	**Repeated measures** Teachers' estimates – Children's test results	5.329 4.228	1.101	.285	1	14.911	**≤.001**
Block design[2]	**Repeated measures** Teachers' estimates – Children's test results	5.545 5.591	-.045	305	1	.022	.882
Coloured matrices	**Repeated measures** Teachers' estimates – Children's test results	6.519 5.759	.759	.344	1	4.866	**.030**
Analogies	**Repeated measures** Teachers' estimates – Children's test results	5.430 5.684	-.253	.272	1	.868	.354
Quiz	**Repeated measures** Teachers' estimates – Children's test results	5.975 4.544	1.430	.255	1	31.411	**≤.001**
Vocabulary	**Repeated measures** Teachers' estimates – Children's test results	7.089 6.038	1.051	.277	1	14.417	**≤.001**
Grammar comprehension	**Repeated measures** Teachers' estimates – Children's test results	4.013 4.924	-.911	.284	1	10.270	**.002**
Emotions	**Repeated measures** Teachers' estimates – Children's test results	6.481 5.025	1.456	.313	1	21.633	**≤.001**

[1] Including the WET-subscales Gross motor skills, Hand skills, Drawing, Visuospatial perception, Object memory, Digit span, Analogies, Quiz, Vocabulary, Grammar comprehension, Emotions

[2] As the subscale Block design is administered only to 4-year-olds, univariate analyses were computed

The results of univariate and multivariate analyses of variance are provided in Table 1. The test scores of the children and the estimation scores of the teachers were treated as repeated measures. The multivariate analysis showed a significant result ($p \leq .001$) indicating differences between the estimates and the test results. The subsequent univariate analyses yielded significant effects in the following subscales: *Visuospatial perception*, *Digit span*, *Coloured matrices, Quiz*, *Vocabulary*, *Grammar comprehension* and *Emotions.* Figure 1 shows the means of kindergarten teachers estimates and of children's test results in the WET. Both over- and underestimations were found. In the case of spatial perception (*Visuospatial perception*) and receptive language (*Grammar comprehension*), clear underestimations took place. Teachers overestimated the children's verbal short-term memory (*Digit span*), inductive reasoning (*Coloured matrices*), information and knowledge (Quiz), vocabulary (*Vocabulary*), and empathy (*Emotions*).

Teachers' estimates of children's overall development amounted to a C-score of 5.48, being higher than children's actual test results (C-score = 5.11). However, this difference was not significant ($F = 2.746$, $df = 1$, $p = .101$).

Pearson's correlation coefficients were calculated to determine the relationship between teachers' estimates and children's actual performance (see Table 2). Significantly positive, yet low to moderate correlations were found for all subscales as well as for the total scores except *Coloured matrices* measuring inductive reasoning and *Emotions* assessing empathy. These results prove the teachers' ability to give an adequate ranking of the children's test performance in relation to their peers.

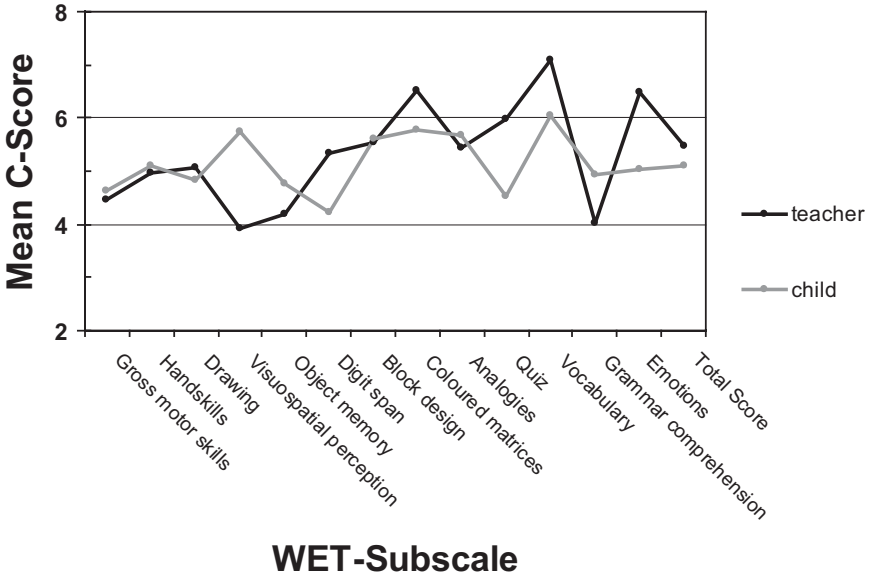

Figure 1:
Children's WET-test results and teachers' estimates ($n = 80$)

Table 2:
Kindergarten teachers' and mothers' estimates: intercorrelation coefficients (n = 80).

WET-subscale	Teachers' estimates/ Mothers' estimates	**WET-subscale**	Teachers' estimates/ Mothers' estimates
Gross motor skills	**.248***	Coloured matrices	.202
Hand skills	**.481***	Analogies	**.504***
Drawing	**.414***	Quiz	**.411***
Visuospatial perception	**.303***	Vocabulary	**.255***
Object memory	**.275***	Grammar comprehension	**.304***
Digit span	**.352***	Emotions	-.087
Block design	**.555***	Total score	**.626***

*: $p < .05$

3.2 Accuracy of kindergarten teachers' estimates of development compared to those of mothers

The study aimed at testing for differences between kindergarten teachers' and mothers' estimates of children's performance. Therefore, the performance of 30 children of the total sample was also estimated by mothers. The WET-total scores were equally distributed in both the sub-sample and the total sample; the group means did not differ significantly (C = 5.11 in the total sample and C = 6.07 in the sub-sample; $\chi^2 = 4.236$; $df = 6$; $p = .641$).

As in study 1, we also tested the caregivers' accuracy of estimations by means of a variance analysis with repeated measures, treating the test scores of the children and the estimation scores of the teachers and mothers as repeated measures. The univariate and multivariate variance analysis results were significant ($p = .023$). However, there were no significant mean differences between the estimates by kindergarten teachers and mothers. Both groups over- and underestimated the children to very similar extents (see Table 3).

As shown in figure 2, the kindergarten teachers' and mothers' estimates were very similar. There were no significant differences between these two groups in any of the subtests. Mothers overestimated their children's drawing abilities (*Drawing*), inductive reasoning (*Coloured matrices*), as well as empathy (*Emotions*). In comparison to the mothers, teachers overestimated the children's inductive reasoning (*Coloured matrices*) and empathy (*Emotions*). They also overestimated children's information and knowledge (*Quiz)*, but underestimated their spatial perception (*Visuospatial perception)* and verbal reasoning by analogy (*Analogies)*.

Correlation coefficients also provide information about the relationship between the estimates made by the two groups of caregivers (Table 4). A significant correlation resulted for the subscale *Hand skills* measuring children's fine motor skills. None of the other estimates were significantly correlated. When comparing mothers' estimates and

children's test scores, significant relationships were found concerning spatial perception (*Visuospatial perception)*, visual short-term memory (*Object memory)*, and vocabulary (*Vocabulary)*. Kindergarten teachers' estimates of fine motor skills (Hand skills), visual memory (*Object memory*), verbal reasoning (Analogies), and information and knowledge (Quiz) and children's test performance in these subscales were significantly correlated to a moderate degree. As in the total sample, kindergarten teachers were able to rank the overall development of their children quite reliably (r = .513).

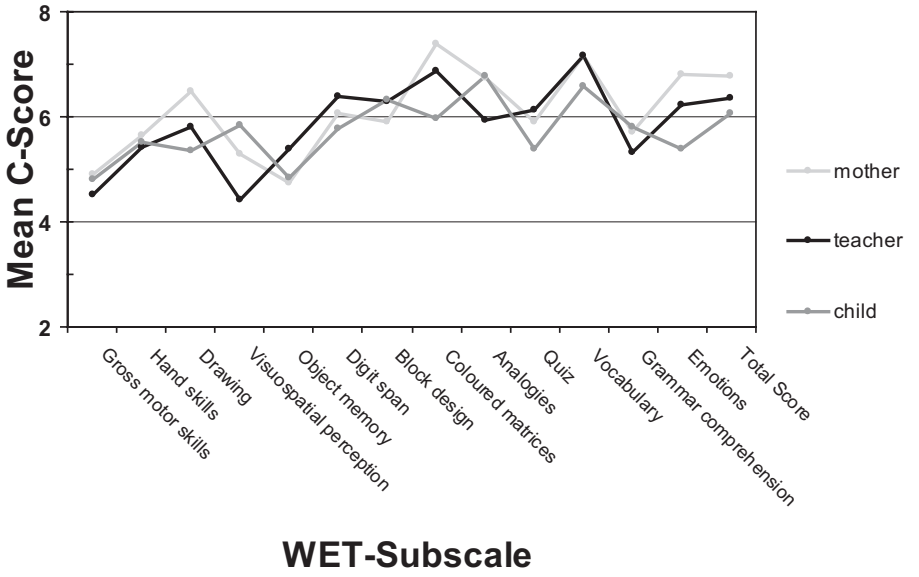

Figure 2:
Children's WET-test results, teachers' and mothers' estimates (n = 30)

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Table 3: Children's WET-test results, kindergarten teachers' and mothers' estimates: Mean C-Scores, mean differences, standard errors and results of univariate and multivariate analyses of variance (n = 30).

[1] Including the WET-subscales Gross motor skills, Hand skills, Drawing, Visuospatial perception, Object memory, Digit span, Analogies, Quiz, Vocabulary, Grammar comprehension, Emotions

[2] As the subscale Block design is administered only to 4-year-olds, univariate analyses were computed

Multivariate Analysis[1]			*Difference* (teacher- child-mother)				
		Mean C-Score	*Mean Difference*	*Standard-error*	*df*	*F*	*p*
	Repeated measures						
	Mothers' estimates –	6.767	.400	.397	6	5.066	**.026**
	Teachers' estimates –	6.367	.300	.292			
	Children's test results	6.067	-.700	.378			
Univariate analyses:							
WET-subscale							
Gross motor skills	**Repeated measures**						
	Mothers' estimates –	4.900	.367	.492	2	.375	.689
	Teachers' estimates –	4.533	-.267	.421			
	Children's test results	4.800	-.100	.393			
Hand skills	**Repeated measures**						
	Mothers' estimates –	5.633	.200	.281	2	.269	.765
	Teachers' estimates –	5.433	-.100	.237			
	Children's test results	5.533	-.100	.297			
Drawing	**Repeated measures**						
	Mothers' estimates –	6.500	.700	.429	2	3.407	**.040**
	Teachers' estimates –	5.800	.433	.386			
	Children's test results	5.367	-1.133	.493			
Visuospatial perception	**Repeated measures**						
	Mothers' estimates –	5.300	.867	.472	2	4.991	**≤.001**
	Teachers' estimates –	4.433	-1.400	.464			
	Children's test results	5.833	.533	.403			
Object memory	**Repeated measures**						
	Mothers' estimates –	4.733	-.667	.399	2	1.701	.192
	Teachers' estimates –	5.400	.567	.380			
	Children's test results	4.833	.100	.391			
Digit span	**Repeated measures**						
	Mothers' estimates –	6.067	-.333	.463	2	1.069	.350
	Teachers' estimates –	6.400	.633	.400			
	Children's test results	5.767	-.300	.435			
Block design[2]	**Repeated measures**						
	Mothers' estimates –	5.905	-.381	.528	2	.456	.637
	Teachers' estimates –	6.286	-.047	.444			
	Children's test results	6.333	.429	.500			
Coloured matrices	**Repeated measures**						
	Mothers' estimates –	7.400	.533	.409	2	5.639	**.006**
	Teachers' estimates –	6.867	.900	.422			
	Children's test results	5.967	-1.433	.457			
Analogies	**Repeated measures**						
	Mothers' estimates –	6.733	.800	.468	2	2.252	.114
	Teachers' estimates –	5.933	-.833	.384			
	Children's test results	6.767	.033	.476			
Quiz	**Repeated measures**	5.900					
	Mothers' estimates –	6.133	-.233	.431	2	1.935	.154
	Teachers' estimates –	5.400	.733	.349			
	Children's test results		-.500	.358			
Vocabulary	**Repeated measures**						
	Mothers' estimates –	7.167	.000	.432	2	1.416	.251
	Teachers' estimates –	7.167	.600	.451			
	Children's test results	6.567	-.600	.344			
Grammar comprehension	**Repeated measures**						
	Mothers' estimates –	5.700	.367	.513	2	.568	.570
	Teachers' estimates –	5.333	-.467	.449			
	Children's test results	5.800	.100	.416			
Emotions	**Repeated measures**						
	Mothers' estimates –	6.800	.567	.464	2	6.038	**.004**
	Teachers' estimates –	6.233	.833	.384			
	Children's test results	5.400	-1.400	.361			

Table 4:
Children's WET-test results, kindergarten teachers' and mothers' estimates: intercorrelation coefficients (n = 30)

WET-Subscale		Mothers' estimates	Children's test results
Gross motor skills	Mothers' estimates		.153
	Teachers' estimates	- .098	- .100
Hand skills	Mothers' estimates		.333
	Teachers' estimates	**.472***	**.582***
Drawing	Mothers' estimates		.005
	Teachers' estimates	.280	.326
Visuospatial perception	Mothers' estimates		**.463***
	Teachers' estimates	.148	.082
Object memory	Mothers' estimates		**.418***
	Teachers' estimates	.332	**.397***
Digit span	Mothers' estimates		.105
	Teachers' estimates	-.269	.226
Block design	Mothers' estimates		.194
	Teachers' estimates	-.177	.170
Coloured matrices	Mothers' estimates		-.170
	Teachers' estimates	-.066	.171
Analogies	Mothers' estimates		.208
	Teachers' estimates	.076	**.582***
Quiz	Mothers' estimates		.351
	Teachers' estimates	.074	**.401***
Vocabulary	Mothers' estimates		**.421***
	Teachers' estimates	-.023	-.126
Grammar comprehension	Mothers' estimates		.165
	Teachers' estimates	.042	.078
Emotions	Mothers' estimates		.328
	Teachers' estimates	.026	-.215
Total score	Mothers' estimates		-.043
	Teachers' estimates	.037	**.513***

*: $p < .05$

3.3 Comparison of kindergarten teachers' and mothers' estimates of behavior

In addition to development, we investigated the correspondence between mothers' and teachers' estimates of children's behaviors. Mothers were given the parents' form of the VBV 3-6, and kindergarten teachers were given the teachers' form. These behavior ratings were compared using the subscale scores of the four dimensions: *Social- and Emotional Competencies, Oppositional-Aggressive Behavior, Attention Deficits vs. Playing*

Endurance, and *Emotional Problems*. Results of a repeated measures multivariate analysis of variance are shown in Table 5 which revealed no significant effects (p = .730).

Pearson correlation coefficients were low for all four dimensions; only the *Aggression* and the *Hyperactivity scales* showed significant relationships between mothers' and teachers' ratings. These results point to rather low agreement on children's behavior when different caregivers are surveyed (see Table 6).

Table 5:

VBV 3-6: Kindergarten teachers' and mothers' estimates of children's behavior: Results of univariate and multivariate analyses of variance (n = 80).

Multivariate Analysis		***Difference***					
		Mean Stanine-Scores	***Mean Difference***	***Standard-error***	***df***	***F***	***p***
	Repeated measures (Mothers' estimates – Teachers' estimates)				4	.508	.730
Univariate analyses							
VBV 3-6 - Scale							
Social- and Emotional Competencies	**Repeated measures** (Mothers' estimates – Teachers' estimates)	5.250 5.275	-.025	.326	1	.006	.939
Oppositional-Aggressive Behavior	**Repeated measures** (Mothers' estimates – Teachers' estimates)	5.300 5.350	-.050	.267	1	.035	.852
Attention Deficits vs. Playing Endurance	**Repeated measures** (Mothers' estimates – Teachers' estimates)	5.150 5.400	-.250	.280	1	.798	.374
Emotional Problems	**Repeated measures** (Mothers' estimates – Teachers' estimates)	5.675 5.925	-.250	.257	1	.947	.333

Table 6:

VBV 3-6: Kindergarten teachers' and mothers' estimates of children's behavior: intercorrelation coefficients (n = 80).

VBV 3-6 - Scale	**Teachers' estimates/ Mothers' estimates**
Social- and Emotional Competencies	.127
Oppositional-Aggressive Behavior	.373*
Attention Deficits vs. Playing Endurance	.221*
Emotional Problems	.203

*: $p < .05$

3. Discussion

The aim of the present study was to examine kindergarten teachers' accuracy when estimating children's development and behavior in comparison to mothers' estimates.

In general, kindergarten teachers seem to provide quite accurate evaluations of children's overall development. In the present study, a correlation coefficient of $r = .626$ was found, which is higher than those found in previous studies on school teachers (Helmke & Schrader, 1989). Similar to school teachers, kindergarten teachers also overestimated children's test performance. This overestimation applied to verbal short-term memory, inductive reasoning, and to cognitive and language development. Social-emotional development was not only distinctly overestimated but also showed low intercorrelation between the children's test performances and the teachers' estimates. With the exception of inductive reasoning, the correlations were higher regarding cognitive abilities than social-emotional development or behavior. Hence, consistent with prior findings, the present study confirms that caregivers are less able to accurately estimate non-cognitive child characteristics than their development or intelligence (Miller & Davis, 1992; Schrader, 2001, Rennen-Allhoff, 1991). Teachers underestimated children's spatial perception skills as well as language comprehension which is in line with the results of Deimann et al. (2005) who found maternal underestimation, but only in the group of children with normal social behavior.

Moreover, the present study revealed that kindergarten teachers and mothers estimated children correspondingly. In the sample of study 2 there were no statistically significant differences between the ratings of the two types of caregivers. Both mothers and teachers estimated children very similarly. In contrast to previous findings (e.g. Deimann et al. 2005), mothers did not overestimate the overall development of their children. Mothers only overestimated their children in certain areas. Yet it has to be taken into account that the children of the present sample were generally well developed. According to the match hypothesis (see Hunt & Paraskevopoulos, 1980), well developed children are more accurately estimated by their parents compared to children with developmental problems. Deimann et al. (2005) found out that mothers of children with behavioral problems overestimate their children's development to a significantly larger extent than mothers of children without behavioral problems. Whether this effect applies to kindergarten teachers as well, remains to be studied. Van der Aalsvoort (1996) discovered that teachers generally offered less help with learning tasks to those children whose learning behavior they had previously described as being poor. These children were given less corrective feedback and they also received less emotional support. Children who teachers thought to be more intelligent also received higher quality instructions.

As far as behavior is concerned, both types of caregivers give ratings on a similar level, yet intercorrelations are low, achieving significance only in the area of hyperactivity and aggression. Consistent with other studies, externalizing behavioral problems were estimated more accurately than internalizing behavioral problems (Achenbach et al., 1987; Berner et al., 1992; Duhig et al., 2000).

In conclusion, kindergarten teachers are able to provide reliable information on children's development, at least as far as normally developed children are concerned. Further studies are required to prove whether this applies to the evaluation of children with developmental deficits as well.

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