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Detection of high ability children by teachers and parents: Psychometric quality of new rating checklists for the assessment of intellectual, creative and social ability

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Abstract

In the present study we devised scales for teachers' and parents' estimation of intellectual, creative and social abilities of fourth grade elementary school pupils. Their scores were related to psychometrically determined ability scores. Ninety-three school pupils in the age range between 9.3 and 11.2 years, as well as their parents and teachers took part. The new rating checklists proved as sufficiently reliable (particularly the teachers' version). Analyses of validity showed a high correspondence in parents' and teachers' estimations of cognitive intelligence, but much lower correspondence for creativity and social ability. Correlating teachers' and parents' estimates with the respective psychometric tests shows that teachers and parents were better at identifying intellectual (high)ability than detecting creative and social abilities. With the exception of social (high)ability, where girls were usually regarded as highly socially gifted by their parents, there were no differences in parents' and teachers' estimations of boys and girls.

Key words: high ability, intelligence, creativity, social competence, parents' and teachers' estimation

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In the field of ability assessment, information is gathered by means of psychometric approaches (such as intelligence and creativity tests) as well as by parents' and teachers' assessments of pupils' cognitive or creative abilities. In the applied educational or pedagogical domain, a pre-selection of children through a single person's estimation often precedes the final identification of (high)ability through psychometric assessment, accompanied with the assignment to special talent fostering programs. In this particular context, it has to be considered that even if an individual is able to assess another person's cognitive ability accurately, this can only support the diagnostic process and can never constitute the sole basis for a decision. Thus, the question concerning the quality of subjective assessment judgements still remains a matter of debate (Wild, 1991).

Particularly teachers' decisions are often used in the context of ability assessment, along with psychometric tests for obtaining "first-hand" information about the respective cognitive or creative (high-)ability. For Wieczerkowski and Wagner (1985), the most prominent advantage of teachers' decisions is that this information can be gathered quite economically. Furthermore, Wild (1991) names more advantages of teachers' decisions: Due to their professional experience, teachers have the benefit of being able to compare pupils of the same grade or age (cf. Wild, 1991). Because of this fact, teachers should be sufficiently able to estimate pupils' abilities in comparison to other pupils. Moreover, teachers' decisions are not only influenced by the pupils' actual learning outcome, but also by the individual's successive learning process (Wild, 1991). Furthermore, due to a longer observation period, teachers are able to recognize even temporary or short-term fluctuations in pupils' achievements and efforts.

However, there are also fundamental problems associated with teachers' decisions. One is that teachers cannot „detach themselves" in their assessments from the pupils' achievements at school (Holling & Kanning, 1999).

Along with teachers' estimations, parents' decisions are also often used for the identification of (high)ability. According to Rost (1991), parents' estimations should primarily be considered in pre-school children as almost no adequate psychometric tests for the assessment of ability in this age range exist and frequently no other sources of information are available.

The advantage of parents' estimations over teacher ratings is the fact that the former can observe their children's behavior and accomplishments in various situations and, thus, are better able to judge their children's abilities. A disadvantage of parents' judgements is that they have fewer possibilities of comparison to other children (Schiefer, 2004). Moreover, parents could be positively biased in the estimation of their own children's capabilities. This often results in an over-estimation of pupils' actual cognitive or creative abilities.

As the identification of highly gifted individuals for a fostering training- or research program through the administration of a psychometric test to all pupils is too time-consuming, pre-selections (based on questionnaires, checklists or nominations) are frequently employed. Thus, the aim of the present study was to develop an improved instrument for teachers' and parents' assessment of (high)ability in children. In contrast to most studies concerning high ability which merely refer to intellectual high ability, we additionally aim at assessing abilities from a more comprehensive ability/giftedness concept. Along with intellectual (high)ability we also examined creative and social (high)ability. The newly developed ability checklists should allow for a better discrimination in the upper range of the ability contin-

uum. We also investigated whether there are any sex differences in the ability estimations (i.e. differences when abilities of boys vs. girls are estimated).

The investigation of possible sex differences was motivated by recent evidence in this field of research. According to Perleth and Sierwald (2001) girls are less likely to be regarded as belonging to the most intelligent pupils of a class. Moreover, girls (on average) also obtain worse results in intelligence tests. For creativity, girls receive lower screening estimates than boys, but this sex difference is also observed in psychometric creativity tests. According to Tettenborn (1996) parents assess their sons as being more intelligent and at the same time are expecting them to attain a higher level of education. Elbing and Heller (1996) also point out that parents usually have a higher interest in their sons' advancement than in the promotion of their daughters. Therefore, with respect to intelligence and creativity, girls more likely represent a high-risk group since they are estimated as less gifted.

In addition to this, Perleth and Sierwald (2001) report evidence that girls receive higher estimates concerning social competence than boys. However, no such sex differences can be found in psychometrically determined test results. Endephols-Ulpe (2004) could also show in her analyses that the social behaviour of girls is significantly more positively described than that of boys. Moreover, Lachauer (1993) observed that girls are assessed by parents and kindergarten pedagogues as being socially more competent than boys. These results appear to indicate that boys are underestimated with respect to their social ability.

To summarize, the present study should contribute to the existing literature insofar as it provides an evaluation of the usefulness of parents' and teachers' estimations of ability dimensions in children. The reliable and valid assessment of intellectual, creative and social (high)ability appears to be highly relevant in order to avoid misjudgements and unjustified exclusions from advancement or training programs.

Method

Participants

Ninety-three pupils (47 females, 46 males) of fourth grade elementary class took part in the present study. The age of the participants ranged from 9.3 to 11.2 years ($\bar{x}$ = 9.10, s = 0.41). To participate in the study, written informed consent of the parents was obtained. Furthermore, 93 parents (87 mothers and 6 fathers; $\bar{x}$ = 38.02 years, s = 5.25), as well as 8 teachers ($\bar{x}$ = 41.57 years, s = 7.39) participated in this study. The parents were given three checklists corresponding to the three ability dimensions. Three checklists, again corresponding to the respective dimensions of ability/giftedness, were handed out to the teachers for each child. The teachers and the parents were instructed to assess the pupils according to their respective (high)ability with a given set of criteria. Moreover, teachers and parents had to accomplish a general assessment of the child's (high)ability.

Psychometric tests

Intelligence

Intellectual (high)ability was assessed by means of a well-known German intelligence test („Kognitiver Fähigkeitstest" KFT by Heller & Perleth, 2000). This test allows for the assessment of general cognitive ability and also provides information about verbal, numerical and spatial-figural intelligence.

Creativity

For the measurement of creativity, subscales of the Torrance Tests of Creative Thinking (TTCT, Torrance, 1974) and the "Verbaler Kreativitäts-Test" (VKT, Schoppe, 1975) were administered. Both tests are known to represent good measures of creativity. We employed the classic "Alternative Uses Test" of the VKT in which participants are instructed to generate original and unusual uses of conventional, everyday objects (i.e. tin, brick). In addition to this, we administered the "Picture Completion Test" of the TTCT in which incomplete, abstract figures had to be completed in an original way. In order to obtain a total measure of creativity, a principal component analysis was performed on the verbal and figural creativity scores. The factor scores of the first unrotated factor were used as a general measure of creativity.

Social competence

To measure social ability, we administered an emotional competence performance test for 9 to 12 year-old pupils (Schreiber, 2005). The test captures five components of emotional competence and consists of 19 items: (a) regulation of own emotions (five items), (b) regulation of others' emotions (two items), (c) awareness of one's own emotions (four items), (d) empathy (three items), (e) adequacy of behaviour within emotional social interactions (five items).

Checklists for the assessment of (high)ability

On the basis of the constructed checklists, intellectual, creative and social (high)ability of the pupils can be estimated (or rated, respectively) by teachers and parents and, moreover, a general estimate of the respective ability can be obtained.

The items included in the checklists represent established criteria of high ability. They were constructed on the basis of relevant literature (Bundesministerium für Bildung und Wissenschaft, cited in Grillmayr, 1994; Schreiber, 2005), established checklists (Heller & Perleth, 2007; Reichle & Hermann, 1999) and questionnaires (Hukić, 2005; Neubauer & Freudenthaler, unpublished; Redl, 2005; Schiefer, 2004). Furthermore, we included items that should tap similar aspects as the corresponding ability constructs and the tests used to measure them. The response mode of the items is dichotomous, i.e. parents and teachers

check boxes corresponding to whether they can observe certain aspects in their child or not. By going through the list of giftedness criteria, parents and teachers should get an impression of how to assess the total of the child's respective ability. For this general assessment a 7-level rating scale (1 = below average, 2 = slightly below average, 3 = average, 4 = slightly above average, 5 = above average, 6 = very much above average, 7= highly gifted; adapted from Schiefer, 2004) was used. Each of the three checklists (one for each of the three domains) took about four to seven minutes to complete.

Procedure

Data were collected in schools, taking three days in each one. On the first day the intelligence test was administered. On the second day, participants worked on the TTCT and the VKT. On the third day the performance test for the assessment of emotional competence was employed. All psychometric tests were administered in groups.

The parents of the 93 pupils as well as the teachers had about one month time to fill in the given checklists. After completion of data collection, the teachers were informed about the overall result. The parents were informed about their own child's results.

Results

Performance data

In Table 1 an overview of the descriptive statistics concerning the global estimates and the psychometric test results is shown.

Table 1:
Descriptive statistics of the global estimation and the test results

		n	**Minimum**	**Maximum**	$\bar{x}$	***s***
Psychometric test results	KFT	93	28	68	47.99	8.17
	TTCT+VKT	93	-4.23	1.93	-0.02	1.02
	Social competence	93	42	72	61.37	7.43
Global estimation of the respective ability dimension by parents	Intelligence	93	2	7	3.76	0.99
	Creativity	93	3	7	3.96	1.07
	Social competence	93	1	7	3.83	1.21
Global estimation of the respective ability dimension by teachers	Intelligence	93	1	7	3.77	1.25
	Creativity	93	2	7	3.89	1.14
	Social competence	93	2	7	3.90	1.17

Notes: KFT in T-values; TTCT+VKT as total score value; social competence = raw score of emotional competence test.

Internal consistency

Each checklist for the assessment of (high)ability by teachers and parents consists of nine dichotomous items for estimating the corresponding ability dimension. First, Cronbach alphas were computed in order to check the internal consistency of the items in the teachers' and parents' version.

The checklist for the assessment of intellectual (high)ability contains seven items in the parents' version and eight items in the teachers' version (after item selection). We observed a Cronbach alpha of .72 in the parents' version and a Cronbach alpha of .75 in the teachers' version, suggesting that both versions display satisfactory internal consistency.

The checklist for the assessment of creative (high)ablility contains seven items in the teachers' version and eight items in the parents' one. The Cronbach alpha coefficient in the parents' version was .65, in the teachers' version .70. With respect to the checklist for the assessment of social (high)ability (including eight items in both the parents' and the teachers' version) we observed a Cronbach alpha of .71 in the parents' version and a Cronbach alpha of .80 in the teachers' version. On the whole, it can be concluded that the constructed checklists display satisfactory internal consistencies.

Assessment of validity

To assess the validity of the constructed checklists, the correlations between the global estimation scores (both in the teachers' and the parents' version) and the psychometric test results in the respective ability domains were calculated. The probability of a Type I error was maintained at .05. In Table 2 the correlations between the parents' and teachers' judgements and the test result are presented (for the whole sample and separately for boys and girls).

Table 2 provides evidence that the checklists for the assessment of intellectual (high)ability (in both versions; parents: $r = .50$; teachers: $r = .56$) and for the assessment of creative (high)ability in the teachers' version ($r = .34$) display satisfactory validity, herewith suggesting that the constructed checklists are psychometrically sound methods for the assessment of these (high)abilities. Though considerably smaller, the checklist for the assessment of creative (high)ability in the parents' version (parents: $r = .24$) also displays sufficient validity. With respect to social (high)ability, however, there were no significant correlations between the psychometric test result and the global estimation score in both versions ($r = .11$).

Moreover, inspection of Table 2 reveals that the determination coefficient of intellectual and creative (high)ability is higher for teachers than for parents. This could suggest that intellectual and creative ability of pupils are more validly identified by teachers than by parents.

Table 2 also reveals that the correlations between global estimation and psychometric test results were higher in girls than in boys. Particularly the correlation between the global assessment of creative (high)ability by the parents with the creativity test score is very small (and not significant) in boys. We also investigated the significance of the observed differences in correlations between girls and boys. There was a significant difference in teachers'

Table 2:
Correlations between parents' judgement, teachers' judgement and psychometric test results in the assessment of intellectual, creative and social (high)ability; whole sample and separately for boys and girls

Parents' judgement	**Test result**	***rs***	***det***	***rs*♀**	***rs*♂**
Intelligence	KFT	.50*	25	.54*	.48*
Creativity	TTCT+VKT	.24*	5.76	.41*	.05
Social competence	Social competence	.11	1.21	.09	.00
Teachers' judgement	**Test result**	**rs**	***det***	***rs*♀**	***rs*♂**
Intelligence	KFT	.56*	31.36	.70*[1]	.39*
Creativity	TTCT+VKT	.34*	11.56	.36*	.29[1]
Social competence	Social competence	.11	1.21	.13	.10

*Notes: r*s = coefficient of correlation by Spearman; det: determination coefficient (in percent), KFT in T-values; TTCT+VKT as total score value; social competence = raw score of emotional competence tests ♀ = girls, ♂ = boys; [1]= coefficient of correlation by Pearson; *$p < .05$

judgement of intellectual (high)ability between girls and boys ($r = .70$ vs. $r = .39$) Thus, the appropriateness of teacher's estimation of girls' intellectual ability is significantly better than those of boys.

Correlations between items, psychometric test results and global estimates

Both in the teachers' and in the parents' version it should be investigated to which extent single items of different ability dimensions are more valid than others with respect to the psychometrically determined test value and the global estimation score. To this end, correlations between checklist items, psychometric test value and global estimation of the respective ability dimension were computed.

The items' correlations with the test results reveal which characteristics of individual (high)ability represent good predictors for the total result. Via the items' correlation with the total estimation it can be seen which characteristics of individual (high)ability represent good predictors for the total estimation.

Intellectual (high)ability

Table 3 shows the correlations between items for the estimation of intellectual ability by teachers and parents and (1) the total score of the KFT, and (2) the global estimation of intellectual (high)ability. It can be seen that all of the eight items (both in the teachers' and in the parents' version) correlate significantly with the total score of the KFT (a_1 and a_2) and with the global estimation score (b_1 and b_2). As can be seen, all correlations are significant but nevertheless vary considerably: correlations of estimation items with the psychometric test score between .25 and .61; correlations of single items with global estimates between .34

Table 3:
Intellectual (high)ability: Correlation between items and psychometric test result/global estimation

Items (Nr.)	***r*** **(a_1)**	***r*** **(a_2)**	***rs*** **(b_1)**	***rs*** **(b_2)**
The/my child shows an exceptionally sophisticated vocabulary – unusual for his/her age (1)	.43*	.25*	.65*	.37*
The/my child talks very fluently, intelligibly and expressively (2)	.25*	.30*	.51*	.46*
The/my child knows far more than its peers (3)	.61*	.41*	.57*	.48*
The/my child can solve arithmetic problems that clearly exceed his/her age range (4)	.26*	.33*	.40*	.34*
The/my child has a high specialist knowledge that lies beyond the age-correspondent knowledge (e.g. astronomy, plants, animals, dinosaurs, volcanoes, computer) (5)	.32*	.29*	.34*	.39*
The/my child learns very easily and quickly. It needs hardly any repetition of instructions and explanations (6)	.38*	.40*	.73*	.48*
The/my child reads very much on its own free will and prefers books that clearly exceed its age range (7)	.54*	.35*	.51*	.35*
The child shows great interest in numbers and symbols (8)	.22*		.36*	

Notes: r = coefficient of correlation by Pearson, (a) correlation between items and the test result; (a_1) teachers' version; (a_2) parents' version; *r*s = coefficient of correlation by Spearman, (b) correlation between items and total estimation, (b_1) teachers' version, (b_2) parents' version; *$p < .05$

and .73. Generally, the results show that there is a positive association between items and test score as well as between items and global estimation. Therefore, all items of intellectual (high)ability represent fair to good predictors for overall intelligence and the global estimation of intellectual (high)ability.

Creative (high)ability

Table 4 shows the correlations between items and the test score of creativity, and also the correlations between the items and the global estimation of creative (high)ability. Inspection of this table reveals that only item 5 in the teachers' version and item 8 in the parents' version correlate significantly with the test score of creativity. Moreover, in both versions all of the eight items correlate with the global estimation of creative (high)ability, i.e. all eight items represent good predictors for the global estimation of creative (high)ability. High positive correlations were observed in the teachers' version for item 1, 2, 5 and 7 and in the parents' version for item 2, 7 and 8. Thus, all items of both versions can be considered good predictors of the global estimation of creative (high)ability.

Table 4:
Creative (high)ability: Correlations between items and total score/global estimation

Items (Nr.)	***rs*** **(a_1)**	***rs*** **(a_2)**	***rs*** **(b_1)**	***rs*** **(b_2)**
The/my child has very many ideas (1)	.14	.10	.60*	.40*
The/my child draws very interesting pictures (2)	.06	.09	.44*	.49*
The/my child gives uncommon and unusual answers (3)	-.05	.08	.35*	.41*
My child loves to invent new games (4)		-.05		.23*
The child is very inquisitive and inquiring (5)	.29*		.45*	
The/my child usually forms its opinions independently from others (6)	.04	.01	.36*	.26*
The child has an extraordinary flexibility in thinking (= the ability to consider a problem from different points of view) (7)	.13	.02	.48*	.50*
The child is able to find extremely inventive titles going with tasks (drawings, essay) (8)	-.08	.32*	.31*	.54*
My child invents uncommon kinds of usage for everyday objects (e.g. using a comb as ruler) (9)		.04		.30*

Notes: rs = coefficient of correlation by Spearman, (a) correlation between items and the total score; (a_1) teachers' version; (a_2) parents' version; (b) correlation between items and total estimation, (b_1) teachers' version, (b_2) parents' version, $*p < .05$

Social (high)ability

In Table 5 both the correlations between individual items and the test score of the emotional competence test and the correlations of the items with the global estimation of social competence are presented.

In both versions only one of eight items correlates significantly with the scores on the emotional competence test: Item 2 in the teachers' version and item 6 in the parents' version. In the teachers' version, item 5 displays a tendency towards a significant correlation. For the total estimate, all items show significant and partially very substantial correlations. Particularly high correlations can be seen in the teachers' version for items 1, 2, 5 and 8 and in the parents' version for items 2 and 9.

Correlations between parents' and teachers' estimations

We also investigated the relationship between parents' and teachers' estimates in the respective mental ability dimension. Parents' and teachers' estimations of ability were significantly positively correlated in all three dimensions. The highest correlation was observed with respect to the estimation of intellectual (high)ability ($r = .61$). The correlations between parents' and teachers' estimations of creative and social (high)ability were significant as well (creativity: $r = .25$, social competence: $r = .38$).

Table 5:
Social (high)ability: Correlations between the items and the total score/the total estimation

Items (Nr.)	***r*** **(a_1)**	***r*** **(a_2)**	***rs*** **(b_1)**	***rs*** **(b_2)**
The/my child realizes very promptly if others are treated unjustly (1)	-.03	.00	.54*	.34*
The/my child can empathise very well (2)	.26*	.04	.66*	.50*
The child can express its own emotions towards others very clearly and understandably (3)	-.02		.40*	
The/my child can almost always influence the feelings of others positively (e.g. can comfort others very well when they are sad) (4)	-.03	.03	.44*	.42*
The/my child is downright considerate towards others (5)	.20	.05	.52*	.42*
The/my child can conciliate very well in conflicts between friends (6)	.00	.21*	.40*	.31*
My child controls its own emotions very well (7)		-.09		.30*
The/my child can perceive the feelings of others very accurately and differentiatedly (8)	.12	-.01	.60*	.47*
The/my child has very many ideas for solving social problems (9)	.10	.14	.36*	.48*

Notes: r = coefficient of correlation by Pearson, (a) correlation between items and the test result; (a_1) teachers' version; (a_2) parents' version; *r*s = coefficient of correlation by Spearman, (b) correlation between items and total estimation, (b_1) teachers' version, (b_2) parents' version, $*p < .05$

Additionally, by inter-correlating the judgments of the three domains within teachers and parents, respectively, we tested for halo-like judgment biases. We observed substantial inter-correlations between all three domain estimates in both teachers and parents (see Table 6). However, to interpret them as a halo-effect, these inter-correlations should not be due to inter-correlations between the (psychometric assessments of the) domains themselves. Therefore, correlations between the test results were calculated. As Table 6 shows, there only is a significant correlation ($r = .21$) between psychometric intelligence and psychometric creativity. This means, that both, teachers (*r*s from .48 to .70) and parents (*r*s from .41 to .56) show a general tendency of halo-like judgement biases. This bias was stronger in teachers. Moreover, we observed a somewhat stronger halo-effect when girls' abilities were estimated (*r*s from .47 to .76) versus boys (*r*s from .32 to .63); the only exception being the correlation between teachers' estimates of intellectual and social (high)ability.

Differences in teachers' and parents' estimation of ability dimensions between girls and boys

Another aim of the present study was to investigate potential differences in the estimation of intellectual, social and creative (high)ability between girls and boys. For this reason, we tested the following hypotheses (by means of ANOVAs; the probability of a Type I error was maintained at .05):

Table 6:
Intercorrelations of domain judgements within teachers and within parents; intercorrelations of test scores

	Global estimation						correlation
	Girls		Boys		Total sample		of test score
	r_s	z-value	r_s	z-value	r_s	z-value	r
*Intelligence / *creativity*							
Teacher	.76*	1	.63*	.74	.70*	.86	.21*
Parents	.59*	.67	.52*	.58	.56*	.63	
*Intelligence / *social competence*							
Teacher	.46*	.50	.59*	.67	.48*	.53	.10
Parents	.47*	.50	.32*	.33	.41*	.44	
*social competence / * creativity*							
Teacher	.53*	.59	.48*	.52	.50*	.55	-.05
Parents	.66*	.79	.43*	.46	.54*	.61	

Notes: r = coefficient of correlation; rs = coefficient of correlation by Spearman.

1) Boys are estimated to be more intellectually gifted than girls by teachers and parents.
2) Girls are estimated to be more socially gifted than boys by teachers and parents.
3) Boys are estimated to be more creatively gifted than girls by teachers.

Table 7 shows the descriptive statistics ($\bar{x}$, s) of parents' and teachers' global estimates of the three ability dimensions in girls and boys. Regarding estimates of intellectual (high)ability neither teachers ($F_{1;91} = 1.51$) nor parents ($F_{1;91} = 0.74$) showed a significant difference in the global estimate of intellectual (high)ability between girls and boys. Thus, the hypothesis that boys are estimated as more intellectually gifted than girls by teachers and parents could not be confirmed.

Regarding the global estimate of creative (high)ability neither teachers ($F_{1;91} = 0.00$) nor parents ($F_{1;91} = 0.34$) revealed any significant sex differences in their judgements. Hence, the hypothesis that boys are estimated as more creatively gifted than girls by teachers, could not be corroborated.

Regarding social (high)ability, the teachers ($F_{1;91} = 0.20$) did not show significant differences in the global estimate between girls and boys. However, girls were tendentially estimated more socially gifted by parents ($F_{1;91} = 3.04$; $p < .10$) than boys. In contrast to our expectations girls are not estimated more socially gifted than boys by teachers, but only by their parents. Thus, the second hypothesis has only partly been confirmed.

Differences in psychometric test results between girls and boys

In order to analyze possible differences in psychometric test results between girls and boys, an ANOVA was performed on the results of the intelligence and creativity tests. Due to heterogeneous variances for the emotional competence test, the non-parametric Kruskal-Wallis-Test was used.

Table 7:
Total estimates of the cognitive, creative and social abilities of girls and boys by teachers and parents

	Global estimation of intellectual (high)ability			
	Estimation teachers		*Estimation parents*	
♀	$\bar{x}$ = 3.62 *s* = 1.44	*p* = .22	$\bar{x}$ = 3.85 *s* = 1.02	*p* = .39
♂	$\bar{x}$ = 3.93 *s* = 1.02		$\bar{x}$ = 3.67 *s* = .97	
	Global estimation of creative (high)ability			
	Estimation teachers		*Estimation parents*	
♀	$\bar{x}$ = 3.89 *s* = 1.17	*p* = .99	$\bar{x}$ = 4.02 *s* = 1.09	*p* = .56
♂	$\bar{x}$ = 3.89 *s* = 1.12		$\bar{x}$ = 3.89 *s* = 1.06	
	Global estimation of social (high)ability			
	Estimation teachers		*Estimation parents*	
♀	$\bar{x}$ = 3.96 *s* = 1.12	*p* = .65	$\bar{x}$ = 4.04 *s* = 1.08	*p* = .08
♂	$\bar{x}$ = 3.85 *s* = 1.23		$\bar{x}$ = 3.61 *s* = 1.31	

Notes: ♀ = girls, ♂ = boys, $\bar{x}$ = mean, *s* = standard deviation, *p* = significance

Table 8 shows the descriptive statistics ($\bar{x}$, *s*) of the psychometric test results of the three ability domains.

There are no significant differences between girls' and boys' achievements in the intelligence test and the creativity test (intelligence: $F_{1;91} = 0.38$; creativity: $F_{1;91} = 0.05$). Moreover, inspection of Table 8 reveals that girls (*Mean Rank* = 52.85; *s* = 6.09) have significantly better results in the test of emotional competence than boys (*Mean Rank* = 41.02; *s* = 8.21) (χ^2 (1, *n* = 93) = 4.48). The effect size of the observed difference between boys and girls (according to units of *s*) is $\varepsilon = 0.52$.

Table 8:
Mean psychometric test scores of girls' and boys' intellectual, creative and social (high)ability

	ANOVA				**Kruskal-Wallis-Test**	
	intelligence test		*creativity test*		*emotional competence test*	
♀	$\bar{x}$ = 47.47 *s* = 7.85	*p* = .54	$\bar{x}$ = -.0458 *s* = 1.13	*p* = .83	*MR* = 52.85 *s* = 6.09	*p* = .03
♂	$\bar{x}$ = 48.52 *s* = 8.54		$\bar{x}$ = .0003 *s* = .92		*MR* = 41.02 *s* = 8.21	

Notes: ♀ = girls, ♂ = boys, $\bar{x}$ = mean age, *MR* = mean rank *s* = standard deviation, *p* = significance

Related to the hypothesis that girls are estimated more socially gifted by teachers and parents and in view of the non-significant sex difference in teachers' estimates we could infer a danger of teachers overlooking girls' above-average social ability.

Discussion

It is certainly one of the most important goals in the applied pedagogical or educational domain that the individual intellectual and creative potential of our children is realized to the best possible extent. Everybody has strengths and talents, but also weaknesses in certain cognitive ability dimensions. Thus, every child should be fostered individually according to his or her abilities. An important prerequisite for this is that ability can be reliably and validly assessed. In the field of ability assessment, judgements are often used to estimate children's abilities in a particular cognitive domain. However, as evident from relevant research literature many average-gifted children are over-estimated by commonly applied techniques (Heller, Reimann & Senfter, 2005; Pegnato & Birch, 1959; Schiefer, 2004; Wild 1991). Thus, it was the aim of this study to develop an improved instrument for the assessment of high ability in children through teachers' and parents' ratings. Based on a more comprehensive ability concept, we did not only focus on intelligence, but also on creative and social abilities. The newly developed rating checklists were designed to achieve a better differentiation in the upper range of the ability continuum. It was also a particular aim of the present study to investigate potential sex differences in teachers' and parents' estimations of boys and girls.

The rating checklists for the assessment of intellectual (high)ability in the teachers' and in the parents' version showed satisfactory internal consistency and a relatively high correlation with the obtained intelligence test score. Moreover, we observed satisfying internal consistency in the creativity assessment scale (particularly in the teachers' version) and in the social ability assessment scale in both versions. With respect to the validity of the constructed rating checklists, the observed correlations suggest that the intelligence and creativity checklists can be considered as valid screening methods. According to Heller et al. (2005) congruence-coefficients for the correspondence between teachers' judgments and psychometric test results usually vary between .30 and .50 (see also Gear, 1976; Wild, 1993; Hany, 1991, 1995, 1997, 2004; Neber, 2004). Heller et al. (2005) report a correlation of $r = .38$ between teachers' nominations (identification of 10 percent of the most intelligent pupils in 4th grade of elementary school) and the intelligence test score (obtained in 3rd grade of elementary school: $r = .43$). Wild (1991), however, reports average to high positive correlations in the range of $r = .40$ up to $r = .70$ between teachers' estimations and intelligence test scores. In the study by Schiefer (2004), the correlation between teachers' estimation of intellectual abilities and the intelligence test score was $r = .44$, with respect to parents' estimation $r = .42$. Thus, we can conclude that the observed correlations concerning intellectual (high)ability in the present study are very satisfying (parents: $r = .50$; teachers: $r = .56$). Correlations between total estimation of creative (high)ability and the test results are smaller than in the intellectual ability domain, but they are still satisfying (parents: $r = .24$; teachers: $r = .34$). Unlike this, Heller et al. (2005) report a correlation of $r = .11$ between teachers' nomination of the 10 % best pupils in 4th grade elementary school concerning creativity and the psychometric creativity test score (the same result was obtained in 3rd grade elementary

school). Concerning the social competence dimension Heller et al. (2005) found a correlation of $r = .15$ in 4th grade between teachers' nomination and the social competence test result ($r = .05$ in 3rd grade elementary school). Based on the finding in our study, we may presume that it is most difficult for parents and teachers to estimate social (high)ability correctly ($r = .11$ for both, teachers' and parents' estimates).

In a next step, we investigated the relationship between single item responses of the rating checklists and the psychometric test result. In this context the literature suggests that teachers in primary schools are far better at identifying intellectually gifted pupils than those who are creatively and socially gifted (Heller et al., 2005). In agreement with this, we also observed comparatively high correlations between items for the assessment of intellectual (high)ability and the psychometric intelligence test results. The results also show that parents are better able to estimate intellectual characteristics than creative or social ones.

Thus, we can generally conclude that the estimation scales for the intellectual ability dimension are psychometrically very satisfying. However, the correlations between single creativity and social ability assessment items and the corresponding psychometric test result are partially rather low and, thus, not satisfying. It should be kept in mind, however, that the available psychometric tests for the assessment of creative and social (high)ability are not as psychometrically sound (particularly with respect to their reliability and validity) as intelligence tests. Insofar, the comparatively low correlations could partly also be the result of psychometric deficiencies of the employed tests. Particularly in the field of creativity it appears questionable whether and to which extent creative thinking can be measured by means of psychometric tests.

We also studied the relationship between responses to single items of the rating checklists and the global ability estimate in the corresponding dimension. Analyses revealed that all items in both, the teachers' and the parents' version, correlate significantly with the global judgement of the corresponding ability dimension. This result was insofar expected, as parents and teachers may base their global judgements of an ability dimension on single items of the respective scale.

Another aim of the present study was to analyse the relationship between parents' and teachers' estimates of ability dimensions. Correlational analyses reveal that the correspondence between teachers' and parents' estimates was highest with respect to the intellectual ability domain. Correlations between estimations of creative and social ability were significant as well, but for creative ability the observed correlation was comparatively low.

Additional analyses of potential halo tendencies in judgements of teachers and parents showed a significantly stronger halo-effect in girls than in boys. This result could probably be explained by the fact that (high)ability in girls is more striking for both teachers and parents. A common finding in the literature is that girls are less frequently identified as being highly gifted (cf. the introduction). Thus, it could be possible that if teachers and parents regard girls as being brighter in a certain domain, this is generalised to other domains as well.

It was also a particular aim of the present study to investigate possible differences in the estimation of girls' vs. boys' abilities. Especially in the field of cognitive ability, girls are considered to represent a risk group which is not identified. Results of this analysis do not support this view as girls and boys are estimated as equally bright. Also, in the domain of creativity girls receive similar estimates than boys. Moreover, a problem might be that social (high)ability of boys is not identified as girls are estimated as more gifted in this field. This

hypothesis could not be supported in the present study. Boys and girls are estimated as equally gifted by their teachers. Girls, however, tended to be estimated as more gifted by their parents.

In general, the developed rating checklists proved to be reliable and valid measures for the assessment of intellectual, creative and social abilities. This particularly applies to the global estimation score. The observed correlations of single rating items with the global estimation score of the respective ability dimension reflect the fact that parents and teachers base their ability estimations on single items describing facets of high ability. It may be possible that the items of the rating checklists have stimulated the judges to deal with a variety of important aspects of high ability, herewith facilitating a reliable and valid global ability judgement.

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