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Bettina Harder
University of Erlangen-Nuremberg

Susanna Trottler
University of Erlangen-Nuremberg

Wilma Vialle
University of Wollongong, wvialle@uow.edu.au

Albert Ziegler
University of Erlangen-Nuremberg, albert.ziegler@ewf.uni-erlangen.de

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Keywords
learning, effective, resources, diagnosing, teacher, checklists, via, parent

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Diagnosing Resources for Effective Learning via Teacher and Parent Checklists

Bettina Harder[1], Susanne Trottler[2], Wilma Vialle[3] & Albert Ziegler[2]

Abstract

Checklists are an economical form of diagnostic instruments and are therefore well suited to support decision making on individual fostering of students in every day school life. We developed a teacher and a parent checklist based on the theory of educational and learning capital (Ziegler & Baker, 2013), that is, assessing the students' resources for learning. A study with 5th to 8th graders demonstrated the checklists' diagnostic properties. Overall, the teacher ratings of students' capitals proved to be reliable, objective and highly valid while parent ratings turned out to be less valid. Implications and possibilities of practical usage are discussed.

Keywords: educational capital, learning capital, giftedness, checklist, teacher, parent

[1] *Correspondence concerning this article should be addressed to:* Albert Ziegler, PhD, Chair of Educational Psychology and Excellence Research, University of Erlangen-Nuremberg, Regensburger Straße 160, 90478 Nuremberg, Germany; email: albert.ziegler @fau.de

[2] Chair of Educational Psychology and Excellence Research, University of Erlangen-Nuremberg, Nuremberg, Germany

[3] School of Education, University of Wollongong, Wollongong, Australia

Traditionally gifted identification is person-centered and targets only single attributes of individuals as indicators of their giftedness. For example, in the famous *Genetic Studies in Genius* conducted by Lewis Terman at Stanford University, the sample of approximately 1,500 Californian students was identified by their extremely high IQ (Terman, 1925; Terman & Oden, 1947). Another important single attribute that is frequently used for gifted identification is high achievement. For example, in *The Study of Mathematically Precocious Youth,* the gifted are identified by scores of 700 or higher on a section of the SAT Reasoning Test (Benbow, 1992; Lubinski, 2000; Lubinski & Benbow, 1994). However, this single-variable approach does not offer reliable identification. Even those who became Noble Laureates were excluded from gifted samples earlier in their lives (Subotnik & Arnold, 1994). As a consequence, the idea that giftedness might correspond to just one personal attribute has been discarded. Numerous models have been proposed in which giftedness was viewed as the combination of several personal attributes such as cognitive abilities, task commitment, creativity, or wisdom (e.g., Renzulli, 2005; Sternberg, 2003). However, with the advent of contextual approaches in gifted education, this new multiple-attribute approach also received severe critique. Firstly, the improvement in identification was only marginal and secondly the neglect of environmental variables was increasingly considered a serious theoretical short-coming (Feldman, 1992; Tannenbaum, 1986). Thus, most recent models of giftedness emphasize the need to include internal as well as external moderators that transform gifts into extraordinary achievements (e.g., Gagné, 2009, 2013; Heller, Perleth, & Lim, 2005).

However, contextual factors have almost never been implemented in gifted identification instruments. Most scholars, while conceding the importance of internal and external factors other than gifts or talents, still insisted that talents or gifts should be the sole core of identification (e.g., Gagné, 2013). Others would measure internal and external factors in the identification process (Heller & Perleth, 2010), but still insist that identification is solely based on gifts and talents in the traditional sense. However, this procedure renders the inclusion of the contextual factors in the theoretical model to lip service only. It leaves us with the conclusion that, despite the widely acknowledged importance of contextual factors in conceptions of giftedness, these factors have not yet been systematically considered in gifted identification. To the best of our knowledge, the only exceptions are two measurement instruments developed within the framework of the Actiotope Model of Giftedness (Ziegler, 2005): The Nuremberg Gifted Identification Checklist (NGIC; Harder, Trottler, & Ziegler, 2013; Ziegler, Harder, Mahn, & Trottler, 2013) and the Questionnaire of Educational and Learning Capital (QELC; Leana-Taşcilar, 2015; Vladut, Liu, Leana-Taşcilar, Vialle, & Ziegler, 2013; Vladut, Vialle, & Ziegler, 2015).

In the definition offered by Ziegler, Vialle, and Wimmer (2013), "an actiotope includes an individual and the material, social and informational environment with which that individual actively interacts" (p. 3). In such person-environment systems, gifts and talents are considered an attribute of the system and not just the person (for details see Ziegler, Stoeger, & Balestrini, in press). Consequently, the aim of gifted identification in this paradigm is identifying those actiotopes which are most conducive to successful learning and growth. It is assumed that such actiotopes are learning resource-rich actiotopes (Ziegler & Baker, 2013). Both the QELC and the NGIC assess the available learning resources in an actiotope.

In the Actiotope Model of Giftedness two kinds of resources are distinguished: exogenous resources which are part of the environmental component of the actiotope and endogenous resources which are part of the person component of the actiotope (Ziegler & Baker, 2013). In the following sections, exogenous resources will be addressed as Educational Capital and endogenous resources as Learning Capital. Educational and Learning Capital comprise five forms of resources, respectively, which are defined in the first column of Table 1 below.

Assessing Giftedness via Checklists

Traditional gifted identification instruments followed the logic of achievement tests whereby a person has to exhibit top performance over a limited period of time. Thus, an atypical behavior is regarded as representative of everyday learning abilities. The underlying logic of resource measurement is very different. Instead of top performance under ideal conditions, we are looking for the typical availability and quality of exogenous and endogenous resources for learning. Thus, the possibilities of measuring students' capitals are more limited: they can neither be tested comprehensively nor can one easily observe them. This leaves us with self-report instruments and third-party assessments as the most economic methods to measure them. A self-report questionnaire, the QELC, for students has already been successfully implemented (Vladut, Liu, Leana-Taşcilar, Vialle, & Ziegler, 2013), however, it has two disadvantages. It takes a long time for students to complete the 50-item questionnaire and its use is limited to students aged about 10 years and above, to assure sufficient reading ability and content comprehension. An alternative that complements questionnaires might be checklists. They have been widely used to identify gifted students and predict academic performance. Often teacher ratings are used for these purposes, but parent ratings have also been examined.

By and large, today's body of research demonstrates that teacher ratings are better than parent ratings. This might be due to their professional knowledge and that teachers have a large reference group with which to compare a student when they are asked to rate him/her, although this also comes with reference group effects biasing teacher judgments (Südkamp & Möller, 2009). A recent meta-analysis by Südkamp, Kaiser, and Möller (2012) found an overall effect of r=.63 for teachers' judgments of students' academic achievement and their actual performance in standardized tests across different school types, grade levels and subject areas. For the identification of gifted students Heller, Reimann, and Senfter (2005) found the highest correlations between teacher ratings and measures of verbal and mathematical reasoning (r=.41–.43) while nonverbal reasoning correlated lower (r=.27) and creative and social ability ratings showed even lower correspondence to the respective test results on creative and social giftedness (r=.11 resp. r=.15). The higher validity of ratings of some characteristics over others (see also Urhahne, 2011) were explained by clearer salience or plain detectability of the associated characteristics to the teacher which also coincides with the finding of better teacher predictions the more information they receive on the external criterion with which their judgment is to be compared (Südkamp et al., 2012). In brief, when told what to rate, teachers can provide valid information on students.

Parents usually lack representative referencing possibilities when rating their child but should be able to compensate their lack thereof to some extent through knowing their child better and longer, as well as knowing their child's various environments outside of school (Wolfer, 2010). Nevertheless, their ratings correspond moderately (r=.20–.85) with actual cognitive and academic test scores (Helmke & Schrader, 1989; Schrader, 2006) and do not allow differentiation of gifted from regular students (Buch, Sparfeldt, & Rost, 2006; Perleth, 2010). Parents often overestimate their child's ability and rate mathematical and language abilities in a gender-stereotypic way (Frischknecht, Reimann, Gut, Ledermann, & Grob, 2014).

Considering these findings, teacher ratings of educational and learning capital can be expected to provide better diagnostic information than parent ratings, although the latter should be able to add aspects that teachers cannot access and thereby contribute valuable information.

The Nuremberg Gifted Identification Checklist (NGIC)[4]

The Nuremberg Gifted Identification Checklist (NGIC) contains 20 items – two for each form of educational and learning capital. They are targeted to the raters so that items on educational capital cover the environmental aspects that teachers versus parents have knowledge about and therefore can rate. Table 1 gives an overview of the capitals as well as the item content. It also highlights differences between the teacher and parent versions. Each item is presented as a statement of positive capital expression, for example, "The student/our child has above average verbal skills of expression" (Actional Capital). Teachers and parents answer on three response options, which are "not true", "partly true", and "totally true". Teachers provide their answers in a matrix where lines represented the items and columns represented their students. Answers were then coded by +, 0, and – instead of crossing the respective response for each item as in the parent checklist. This format allows a rater to fill out the checklist for one student in 3–5 minutes.

In pilot-studies, a shorter version with only 15 identical items for parents and teachers showed very promising quality indices (Harder, Trottler, & Ziegler, 2013). For example, correlations with standardized school performance tests and grades in mathematics and German (native language) were comparable to or superseding correlations of intelligence tests with the same variables. The teacher checklist overall score correlated r=.72 and r=.70 respectively with the German test and grades; and the parent checklist had somewhat lower coefficients with r=.62 and. r=.55 respectively with German test and grades. For mathematics the respective correlations were r=.43 and r=.32 (test and grades with teacher checklist score) while for the parent checklist, the correlations did not reach significance. To further improve the checklists, we added items to represent educational capital with two items each instead of one item each and tailored item content to the areas in which teachers or parents have good insight.

[4] The NGIC is available from the authors on request

Table 1:
Comparison of the Teacher and Parent Version of the Capital Checklist (differences emphasized)[5]

Capital and its definition	Teacher checklist	Parent checklist
Educational Capital		
Cultural educational capital includes value systems, thinking patterns, models and the like, which can facilitate - or hinder - the attainment of learning and educational goals. (p. 27)	Family's appreciation of learning/education Appreciation of learning new things by the **students' friends in class**	Family's appreciation of learning/education Child's friends' appreciation of learning new things
Infrastructural educational capital relates to materially implemented possibilities for action that permit learning and education to take place. (p. 28)	**School's extracurricular offers e.g., mentorships** **School's equipment e.g., computers, learning material**	Access to learning facilities e.g., books, music school Access to computer for learning purposes
Social educational capital includes all persons and social institutions that can directly or indirectly contribute to the success of learning and educational processes. (p. 28)	Family's personal support of learning **Trustful relationship between student and teacher**	Parents' personal support of learning Parent-child communication about school, learning, homework
Economic educational capital is every kind of wealth, possession, money or valuables that can be invested in the initiation and maintenance of educational and learning processes. (p. 27)	Family's financial effort to enable extracurricular fostering e.g., software, special training **School's financial support of special learning activities**	Parents' financial effort to enable extracurricular fostering e.g., software, special training Level of parents' expenses for learning support
Didactic educational capital means the assembled know-how involved in the design and improvement of educational and learning processes. (p. 29)	**Teacher's** effort to match lessons to student's abilities **Teacher's effort to continually optimize teaching**	Match between school's support and child's abilities Quality of extra-curricular fostering

[5] The definitions are quotes from Ziegler & Baker (2013).

Capital and its definition	Teacher checklist	Parent checklist
Learning Capital		
Organismic learning capital consists of the physiological and constitutional resources of a person. (p. 29)	Student's health condition Student's ability to handle work load/stress	Child's health condition Child's ability to handle work load/stress
Actional learning capital means the action repertoire of a person - the totality of actions they are capable of performing. (p. 30)	Student's capabilities of verbal expression Student's complex thinking abilities	Child's capabilities of verbal expression Child's complex thinking abilities
Telic learning capital comprises the totality of a person's anticipated goal states that offer possibilities for satisfying their needs. (p. 30)	Student's choice of learning goals and motivation Student's extraordinary interests	Child's choice of learning goals and motivation Child's extraordinary interests
Episodic learning capital concerns the simultaneous goal- and situation-relevant action patterns that are accessible to a person. (p. 31)	Student's above average capabilities in specific domains Student's repertoire of effective learning strategies and procedures	Child's above average capabilities in specific domains Child's repertoire of effective learning strategies and procedures
Attentional learning capital denotes the quantitative and qualitative attentional resources that a person can apply to learning. (p. 31)	Student's use of time for learning Student's concentration during working	Child's use of time for learning Child's concentration during working

Method

Participants

Participants attended grades 5 to 8 of an urban "Gymnasium" (highest level track, university preparatory, secondary school in the German tracking system). The sample consisted of n=192 students with n=49 (25.5 %) fifth-graders, n=60 (31.3 %) sixth-graders, n=42 (21.9 %) seventh-graders, and n=41 (21.4 %) eight-graders (two classes per grade). Students' mean age was 12.2 years (SD=1.2) while the gender distribution showed a slight overrepresentation of boys with 67.0 %.

These students' parents and class teachers contributed the main data to the study. The eight teachers ranged in their professional experience between 1 and 22 years with a mean of 10.6 years (*SD*=7.7). Two of them were aged 21–30 years, two were 31–40 years and four were 41–50years old; concerning gender, three teachers were male and five female. All of them taught one of the main subjects in their classes with equal frequencies of mathematics, German, Latin (first foreign language) and English (second foreign language) teachers. The teacher questionnaires were filled out for all participating students. For parent questionnaires, the return rate was 91.1%. Demographic information on the parents could not be obtained due to the school's privacy policy.

Measures

Report card grades

Students indicated their last report card grades in the main subjects of mathematics, German and their first foreign language of Latin. Grades were then inverted for high grades to indicate high achievement and z-standardized within each class to account for individual differences in teachers' grading styles.

Teacher and parent data

Teachers and parents filled out the 20-item capital checklists which have already been described in detail above. In addition to the checklist items, teachers were also asked for personal and demographic data. For parents no additional information was assessed.

Procedure

In the middle of the school year of 2013/2014, parents were informed about the study and gave their written consent for participation. Together with the information letter and agreement, they received the parent checklist and returned all documents to the school anonymously. Teachers and parents filled out their questionnaires at home while students worked on their questionnaires during a regular lesson. All documents were de-identified by providing them with a student ID code allowing their correct assignment to the student evaluated and were then sent to the investigators.

Analyses

Reliabilities of the checklists were calculated by Cronbach's α and additionally checked by means of the item inter-correlations. Objectivity was tested first by rater agreement, that is, considering discrepancies between teacher and parent checklist ratings in the scale mean scores via *t*-tests which should be small if both raters come to objective estimations of capital (also giving Cohen's *d*, moderate effects indicated by $0.5<d<0.8$; Cohen, 1988). As mean scores do not depict the pairings of teacher and parent ratings, bivariate Pearson-correlations are reported additionally and also interpreted according to

Cohen (1988; moderate values .3<*r*<.5). Secondly, ratings were checked for gender biases by using analyses of covariance (ANCOVAs). If there were gender effects in achievement they would reflect differences in capital availability to girls and boys. To account for these real gender effects, achievement (grades in the three main subjects) was entered as the covariate into the analyses. Then the residuals of the capital scores underwent the standard analysis for gender differences, that is, bias. As we were seeking *not* to find a gender effect in the ANCOVAs, we were at risk of committing a type-II-error (stating no effect although there actually is one) instead of a type-I-error. Therefore we did not rely on the non-significance of a gender effect but also considered the effect size of η^2 (calculated as $SS_{between}/SS_{total}$, moderate values $0.06< \eta^2< .13$, Cohen, 1973; Cohen, 1988).

Validity was evaluated by investigating bivariate Pearson-correlations (interpreted according to Cohen, 1988) between the teacher and parent checklists respectively and the grades in the three above-mentioned subjects. Correlations were analyzed on the scale level (educational, learning and overall capital) as well as on the item level.

Results

Reliability of the Checklists

The *teacher checklist* showed good reliabilities for the overall capital scale with Cronbach's α=.86 and for learning capital with Cronbach's α=.88. Only the educational capital's α fell below the satisfactory level with α=.54. Further, item-intercorrelations (Table 2, above the diagonal) showed some correlations around zero and also four negative correlations between the items on infrastructural capital provided by the school and social capital 2 (teacher's relationship to student) and economic capital 1 (parents' expenses for learning support). For the items of learning capital, item-intercorrelations were positive throughout the entire checklist and mostly significant with only some values around zero (Table 3, above the diagonal).

For *parent checklist* ratings, reliabilities were a bit lower but showed the same pattern. The overall capital and learning capital scales showed satisfactory Cronbach's αs with values of α=.75 and α=.79 respectively. Educational capital, on the other hand, fell below the critical value with Cronbach's α=.60. As can be seen in Table 2 (below the diagonal) no item-intercorrelations were significantly negative but some were around zero as in the teacher checklist. The learning capital items correlated positively throughout the checklist and were generally significant (Table 3, below the diagonal).

Table 2:
Item-Intercorrelations for the Teacher Checklist Ratings (Above the Diagonal) and the Parent Checklist Ratings (Below the Diagonal) of Educational Capital.

	cult. 1	cult. 2	infra. 1	infra. 2	social 1	social 2	econ.1	econ. 2[a]	did. 1	did. 2
cultural 1		.34**	-.08	-.05	.53**	.16*	.36**		.02	.14
cultural 2	.19*		.08	.00	.25**	.25**	.09		.20**	-.01
infrastructural 1	.22**	.27**		.37**	-.10	-.28**	-.53**		.41**	.48**
infrastructural 2	.06	.04	.16*		-.03	-.21*	-.35**		.23**	-.06
social 1	.19*	.27**	.32**	.15*		.18*	.48**		.11	.26**
social 2	.12	.19*	.15*	-.07	.22**		.20*		.16*	-.10
economic 1	.26**	.09	.10	.18*	.26**	.15*			-.08	.12
economic 2	.05	.15*	.15*	-.03	.32**	.17*	.36**			
didactic 1	.09	.24**	.18*	-.03	.16*	.02	-.10	.07		.16*
didactic 2	.11	.11	-.03	.10	.12	.26**	.22**	.08	-.05	

Note. **p<.01, *p<.05; [a] Teacher ratings on item economic 2 were constant as it rated the schools financial support to students.

Table 3:
Item-Intercorrelations for the Teacher Checklist Ratings (Above the Diagonal) and the Parent Checklist Ratings (Below the Diagonal) of Learning Capital.

	org. 1	org. 2	act. 1	act. 2	telic 1	telic 2	epis. 1	epis. 2	atten. 1	atten. 2
organismic 1		.38**	.24**	.21**	.30**	.14	.11	.33**	.38**	.21**
organismic 2	.45**		.43**	.47**	.53**	.47**	.43**	.55**	.45**	.35**
actional 1	.13	.16*		.37**	.50**	.41**	.57**	.51**	.44**	.40**
actional 2	.33**	.24**	.22**		.39**	.44**	.59**	.37**	.15*	.26**
telic 1	.21**	.45**	.27**	.21**		.50**	.51**	.59**	.68**	.59**
telic 2	.18*	.12	.19*	.12	.32**		.57**	.33**	.33**	.22**
episodic 1	.24**	.13	.38**	.28**	.27**	.42**		.52**	.31**	.37**
episodic 2	.19*	.30**	.23**	.26**	.46**	.12	.17*		.66**	.58**
attentional 1	.09	.26**	.20**	.11	.57**	.17*	.16*	.51**		.64**
attentional 2	.24**	.40**	.19*	.23**	.57**	.21**	.25**	.50**	.53**	

Note. **p<.01, *p<.05.

Objectivity of the Checklists

Discrepancies between teacher and parent ratings

Figure 1 displays the teacher and parent checklist mean scores for educational and learning capital as well as for the overall scale of capital, which all lay above the medium rating of 2 on the response scale (the three response options corresponded to low, medium, and high capital respectively). Mean differences were rather small and only reached significance for the ratings of educational capital with $t(367)=-2.38$, $p<.05$, Cohen's $d=-0.25$ and a mean of $M=2.49$ ($SD=0.26$) for teacher ratings and $M=2.42$ ($SD=0.25$) for parent ratings. The means of learning capital scores of teachers and parents, on the other hand, did not differ ($M=2.25$, $SD=0.44$ resp. $M=2.27$, $SD=0.36$) just as the overall scores did not ($M=2.36$, $SD=0.32$ resp. $M=2.37$, $SD=0.24$). The effect size indicates that this is still a small effect delineating the mean scores as comparable between raters.

However, the correlations of the pairings of teacher-parent ratings for each student unveiled more heterogeneous views of the capitals: educational capital ratings by teachers and parents only correlated by $r=.16$ ($p<.05$) while learning capital scores showed a moderate association with $r=.43$ ($p=.00$). Overall, capital ratings correlated by $r=.29$ ($p=.00$). Although all correlations reached significance, rather substantial differences between teacher and parent ratings became evident in the small to medium sized coefficients.

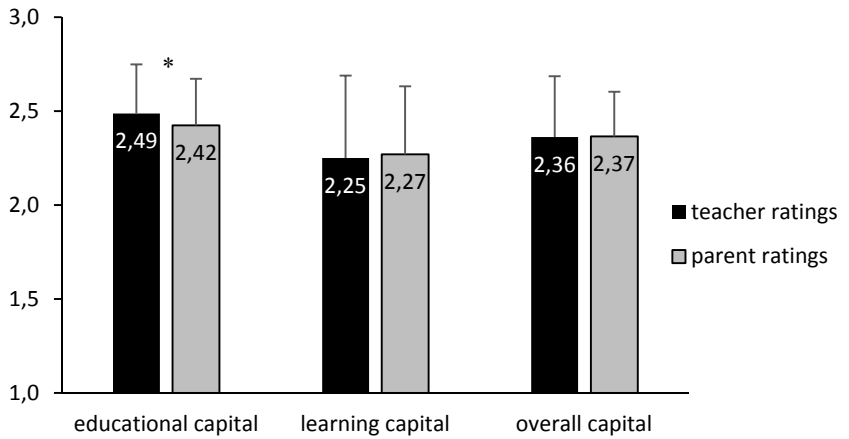

Figure 1:
Mean scores (+ 1 SD) of teacher and parent ratings for educational capital, learning capital and overall capital.

Gender effects in checklist ratings

Detailed results of all ANCOVAs on gender effects are displayed in Table 4 for better readability. First, we examined *teacher ratings,* which showed no gender bias. For teachers' educational capital scores, only the covariate Latin grade reached significance. No further gender differences in teachers' educational capital ratings could be found which

Table 4:
Results of the ANCOVAs on Teachers' and Parents' Ratings of Educational, Learning and Overall Capital.

Dependent variable	Effect	df_{effect}	df_{error}	F	p	η^2
Teacher ratings:						
educational C.	math grade	1	167	0.02	.89	.000001
	German grade	1	167	3.01	.09	.0001
	Latin grade	1	167	14.20	.00	.0007
	gender	1	167	0.29	.59	.00001
learning C.	math grade	1	167	7.62	.01	.0008
	German grade	1	167	22.69	.00	.002
	Latin grade	1	167	24.81	.00	.002
	gender	1	167	2.13	.15	.0002
overall C.	math grade	1	167	3.87	.05	.0002
	German grade	1	167	16.69	.00	.0009
	Latin grade	1	167	25.23	.00	.001
	gender	1	167	0.48	.49	.00003
Parent ratings:						
educational C.	math grade	1	160	1.41	.24	.00008
	German grade	1	160	0.00	1.00	.00000
	Latin grade	1	160	0.23	.64	.00001
	gender	1	160	0.34	.56	.00002
learning C.	math grade	1	160	0.35	.56	.00004
	German grade	1	160	7.92	.01	.0009
	Latin grade	1	160	5.73	.02	.0007
	gender	1	160	0.63	.43	.00008
overall C.	math grade	1	160	0.10	.75	.000005
	German grade	1	160	2.40	.12	.0001
	Latin grade	1	160	2.85	.09	.0001
	gender	1	160	0.68	.41	.00004

Note. Grades were entered as covariates; medium effects $.06 < \eta^2 < .13$ (Cohen, 1988)

became evident by the high *p*-value [$F(1,167)=0.29$, $p=.59$] and the minimal effect size of $\eta^2=.00001$. Teachers' learning capital ratings were significantly determined by all three covariates (mathematics, German, Latin grades) and then showed a comparably lower *p*-value for the gender effect [$F(1,167)=2.13$, $p=.15$] which nonetheless constitutes a negligible effect of $\eta^2=.0002$, that is, 0.02 % of capital score variance was explained by gender. The teacher ratings of overall capital had German and Latin as significant covariates and clearly no gender effect with $F(1,167)=0.48$, $p=.49$, $\eta^2=.00003$.

Parent ratings did not show gender bias either. Their ratings of educational capital showed no significant covariates and clearly no gender effect with $F(1,160)=0.34$, $p=.56$, $\eta^2=.00002$. For the learning capital scale of the parent checklist, the covariates of German and Latin grades reached significance, but the gender effect did not, with $F(1,160)=0.63$, $p=.43$, $\eta^2=.00008$. Parents' overall capital ratings showed no significant covariate influences and, again, no gender effect with $F(1,160)=.68$, $p=.41$, $\eta^2=.00004$.

Validity of the Checklists

To assure criterion validity, teacher and parent ratings were correlated with report card grades in mathematics, German and Latin. For the *teacher ratings* scale, scores correlated significantly with all grades with mainly medium to large coefficients (Table 5). The overall capital scale was strongly correlated to grades, especially German and Latin ($r=.44–.56$). The subscale of learning capital seemed to match grades very well with large correlations ($r=.50–.57$) while educational capital showed a small correlation with mathematics ($r=.22$) and medium correlations with German and Latin ($r=.31$ and $r=.40$). As illustrated in Table 5, the single items explain the differences between educational and learning capitals' correlation with grades. While all learning capital items display significant correlations with all grades, this does not hold true for educational capital items. Several items did not show substantial correlations: Economic 2 on the school's financial support of students was constantly rated as high and thereby of no use for correlation analysis. Infrastructural 1 and 2 and didactic 2 (school's infrastructure, teacher's attitude) were constant for each class, that is, had limited variance and were then correlated with grades which were z-standardized per class, thereby levelling out variance between classes. Hence, small correlations were reduced to zero-correlations. The other items show partially good correlations, cultural capital (family and peer attitudes to learning) is well related to grades; additionally, didactic 1, which asks to what extent lessons are individually tailored to students, and social capital items correspond to German and Latin grades.

Parent ratings showed lower correlations compared to teacher ratings. The overall capital scale only correlated significantly with German and Latin grades, and not with mathematics grades. However, coefficients were small, ranging from $r=.11$ (mathematics) to $r=.22$ (Latin). In the educational capital and learning capital scales, it became evident that parents did not rate educational capital validly while the learning capital scores significantly match the three grades but with rather low correlations of $r=.26$ to $r=.37$ (math and German). In other words, parents could not estimate environmental conditions

well but could do so with their child's attributes to a certain degree. A closer look at the single items reveals that among the items of educational capital only very few correlate with grades and we find more negative than positive correlations. Infrastructural 2 (computer access for learning purposes) displays the only positive correlation while social 2 (parent-child communication about school, learning and homework) and didactic 2 (supplementary learning support aside of school) display negative correlations. Moreover, we

Table 5:
Correlations of Teacher and Parent Checklist Ratings (Scales and Single Items) with Report Card Grades in Math, German and Latin

	Teacher ratings x			Parent ratings x		
	Math	German	Latin	Math	German	Latin
overall C.	.44**	.52**	.56**	.11	.21**	.22**
educational C.	.22**	.31**	.40**	-.09	-.02	.00
learning C.	.50**	.56**	.57**	.26**	.37**	.35**
cultural 1	.19*	.36**	.40**	-.07	-.04	.01
cultural 2	.33**	.36**	.50**	.09	.12	.10
infrastructural 1[b]	.00	.00	.00	.11	.15	.09
infrastructural 2[b]	.00	.00	.00	.20*	.04	.04
social 1	.05	.20*	.20*	-.04	-.02	-.01
social 2	.10	.15*	.17*	-.23**	-.08	.01
economic 1	.02	.00	.07	-.05	.02	-.04
economic 2[a]				-.02	.02	.06
didactic 1	.20**	.16*	.20**	.04	.07	.09
didactic 2[b]	.00	.00	.00	-.12	-.22**	-.19*
organismic 1	.22**	.24**	.21**	.23**	.19*	.21**
organismic 2	.29**	.31**	.30**	.19*	.31**	.30**
actional 1	.20**	.39**	.38**	.05	.42**	.14
actional 2	.49**	.43**	.42**	.28**	.20**	.04
telic 1	.38**	.42**	.43**	.31**	.30**	.41**
telic 2	.28**	.25**	.33**	.05	.02	.11
episodic 1	.47**	.41**	.42**	.13	.17*	.17*
episodic 2	.42**	.53**	.53**	.17*	.13	.27**
attentional 1	.27**	.38**	.36**	.08	.12	.20*
attentional 2	.35**	.39**	.44**	.21**	.26**	.39**

Note. **p<.01, *p<.05; [a] teacher ratings on item economic 2 were constant over the complete sample impeding calculation of correlations; [b] teacher ratings on these items were constant per class leading to limited variance

find many small, non-significant correlations of educational capital items with grades. Among learning capital items, however, we find many significant correlations of moderate and small size. Only the item telic 2 on extraordinary interest was unrelated to school grades.

Discussion

The NGIC is a 20-item teacher and parent checklist based on educational and learning capital which should help teachers and other professionals make decisions about individual fostering needs by monitoring their students' capitals for learning. The checklists' reliability, objectivity and validity were investigated in the study at hand and revealed that the teachers' checklist had high diagnostic quality while parent judgments proved less valid but should not be completely disregarded as will be discussed in the following.

Reliability

According to the standard interpretation, the checklists' reliabilities were good except for the educational capital scores of teacher and parent ratings. Items on learning capital were positively correlated overall in both checklists with only very few small correlations. This indicates that the students' characteristics in terms of the inherent learning capitals are quite homogeneous and allow the student to handle his/her everyday learning challenges. This should be the result of successful co-evolution of all actiotope parts (Ziegler et al., 2013) to the extent demanded by school tasks, which does not mean that capitals are fully exhausted and no further support is needed.

However, when it comes to educational capitals, homogeneity cannot be expected when heterogeneous environments are assessed (Ziegler et al., in press). The items comprised very different contents ranging from peers' attitudes to parents' support and schools' infrastructure. These influences on a student can of course be different, even contrary to each other, for example when peers do not value learning while parents or teachers try to convince students of the opposite. In this vein we found four highly interesting negative item-intercorrelations which indicate logical compensatory mechanisms. For example, low infrastructural capital provided by the school comes with high engagement of the teacher and high financial support on the part of the family. On the other hand, we also found many positive correlations, indicating that often capitals propel a student in the same direction, for example, social support normally coincides with appreciation of learning and education as well as with financial support of learning activities. Moreover, the small item-intercorrelations either point to a mix of effects whereby the capitals compensate for one another in some students and in others are positively correlated, or really depict independent factors such as the family's appreciation of school matters (cultural 1) and the teacher's effort to match lessons to students (didactic 1). Although independent of each other and therefore not reliable, that is, homogeneous, both items contribute relevant information to the checklist score.

Taken together, these heterogeneous influences are exactly what the systemic theory of students' actiotopes and the capitals at work predict and also what realistically has to be expected. To assess the different interactions of capitals in more detail would be fascinating and worth knowing but cannot be expected from a 10-item scale of a checklist whose primary purpose is to serve as an economical screening and diagnostic instrument.

Objectivity

Concerning gender bias in rater judgments, the checklists proved to be very objective. For teacher ratings this corresponds to the findings of Karing, Matthäi, and Artelt (2011) who also found no biases in teacher ratings and other findings attesting good quality ratings to teachers (Schrader, 2006). In contrast to the stereotype-congruent findings on parent judgments reported by Frischknecht et al. (2014), our parent ratings also proved to be unbiased. This should not be attributed to the fact that the NGIC did not ask for subject-specific capitals but capitals for learning and education in general, as we previously found no gender biases in studies with subject-specific capital ratings (Harder et al., 2013; Ziegler, 2013).

In addition to gender bias, discrepancies between teacher and parent ratings were investigated which clearly showed by their interrelatedness that parents and teachers view the same student quite differently. The learning capital scores showed the highest correlation with r=.43 which one might expect to be higher given that identical items were answered on the same student. The low correlation (r=.16) for the educational capital scores can be explained by the different contents of the teacher and parent checklist which led to a school versus home/peer focused rating of the students' educational capitals. On the other hand, the learning capital scores had suggested that at least one group might misjudge the capitals, so this is also likely to apply to educational capital ratings. According to the literature (e.g. Schrader, 2006), our previous findings (Harder et al., 2013) and the validity results of this study, the parents' ratings have to be assessed as being less objective possibly due to their lack of a reference group.

Validity

Teacher checklist

Overall, the teacher ratings correlated very well with the assessed report card grades and thereby proved highly valid. As expected by means of the capital theory, high capitals came with high academic achievement. Most notably, the attained correlations of r=.44–.56 for the overall capital scale completely match the correlations found for intelligence and grades whereby intelligence is widely assumed to be the best predictor of academic performance (Neubauer & Opriessnig, in press). According to a reanalysis of meta-analyses (Fraser, Walberg, Welch, & Hattie, 1987), correlations found for IQ and grades fall between .34 and .51, Jensen (1980) reports correlations of .50-.60 for high school students, Renzulli's literature review (2005) yields a range of .40 to .50, and Neisser and colleagues (1996) settle on about .50. Measured against the best predictor of academic

success, the teacher checklist ratings demonstrate enormous predictive power and at the same time represent a much more economical instrument in terms of time affordance (few minutes per student) and test administration (no trained instructors necessary).

A review of the items reveals that all learning capital items correlate substantially with grades. For educational capitals, however, the situation is more complex. First, we found positive correlations between grades and general teachers' behaviors such as matching lessons to students' needs (didactic 1) or having a trustful relationship with students (social 2). We also found positive correlations with each student's individual cultural capital. Then we had several uncorrelated items, which need to be discussed. The items on infrastructural capital and the item didactic 2 assessed the school's infrastructure and the teachers' effort put into optimizing teaching. This resulted in constant values, that is, restricted variance per class as these capitals are not assigned to individual students but to the whole class. Correlating these restricted values with class-wise z-transformed grades, which levelled out differences between classes, restricted variance even further and finally led to zero correlations. However, we know that these items add helpful information when the sample is drawn from different schools or non-standardized grades or tests instead of grades are used. Infrastructural and didactic capital correlated r=.72 and r=.62 with German grades in a study with fourth-graders (Harder et al., 2013).

Parent checklist

The correlational pattern of the parent checklist ratings was much less clear. First, learning capital only displayed small to medium correlations to grades while educational capital did not.

Some explanation of this phenomenon can be found in the items' correlations with grades. Learning capital items display positive or zero correlations which are lower than the same correlations of the teacher ratings. This corroborates the finding of parents' poorer judgment quality (Helmke & Schrader, 1989; Schrader, 2006) probably due to lack of professional knowledge and/or lack of comparative standards against which to measure their child's capital.

In the correlations of educational capital items and grades, we found only four correlations – three of them negative – and other small and zero-correlations. We expected parents to act in a "proactive" manner most of the time, which means providing their child with optimal capitals whenever they can. However, the data suggest many more "remedial" tendencies in parents' attitudes to making capitals available. The negative correlations are indicative of remedial measures taken when students' performance decreases such as talking more about school matters (social 2) or engaging a private tutor (didactic 2). The many small correlations of educational capital items and grades can either reflect remedial tendencies mixed with proactive capital application or they are due to the parents' poorer rating abilities.

This raises the question of the parent checklist's justification or added value. For educational capital, we had seven items that differed from the teacher's version. Three of those seven parent-specific items were related to achievement and thereby yielded information that could not be obtained by the teacher ratings. This unique parent information referred

to access to a computer for learning purposes which correlated positively with the mathematics grade, and the negative correlations already mentioned for more communication about school and better extracurricular support the more grades deteriorate. Hence, we mainly gain information on compensatory mechanisms applied at home, which teachers cannot report on. The other four parent-specific items did not contribute to a valid prediction of achievement, probably because parents were unable to rate them appropriately, as they also were with the learning capital items. Taken together, the parent ratings provide little, given their poorer comparison with teacher ratings and weighing the added value against the effort it takes to collect them.

Conclusion

To conclude, teacher ratings prove very valid due to good reliability (in the sense that they capture the logical structure of capital interaction, not homogeneity of items) and objectivity. The checklist items ask teachers for judgments on salient and detectable phenomena, enabling them to deliver useful information on students' capital situation. Parent ratings showed much lower validity, although they were comparably reliable but not as objective as the teachers, which became evident in the rating discrepancies. Hence, our results concur with the literature on the diagnostic quality of teacher versus parent ratings.

The practical implications of these findings, first and foremost, concern the teacher checklist's applicability. As an economic, objective, reliable, and valid instrument it can be used for screening complete classes in three to five minutes per student even in the absence of those students. When deemed necessary, teachers should collect the information unique to parents in the most economical way, for example, with single items from the parent checklist that proved valid or by interviewing parents when the teacher's rating suggests that more information is needed and/or action has to be taken. For practical purposes, teachers can use the checklist information to plan interventions to enhance capital access for students on their own. Teachers need to be familiar with the theory behind the checklist to apply appropriate measures based on their diagnostic results. A second possibility consists in referring students and parents to professionals such as school counselors or external institutions for further diagnostics and interventions. A third option is counseling parents on how to support their child based on the teacher's observations. The capital situation can be made transparent or more salient to parents to encourage a comprehensive, proactive learning support system.

The parent checklist might be a means of assessing the unique parent information or a substitute for the teacher checklist when teachers cannot or do not wish to be involved. This might be the case when parents seek advice in counseling agencies. A parent checklist may then serve as a first screening of the child's situation to inform the counselor which areas to pay special attention to in the following diagnostic process. The checklist should be interpreted with care and should not build the diagnostic basis for intervention decisions but provide the starting point for the counseling process.

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