

# BEYOND FUNCTIONAL ASPECTS OF READING LITERACY: THEORETICAL STRUCTURE AND EMPIRICAL VALIDITY OF LITERARY LITERACY

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## Abstract

An important educational aim in secondary school is to impart sufficient literary literacy to ensure that students are able to understand and reflect literary texts, such as lyrics, epics, or dramas. This paper presents the theoretical framework, challenges of item design and empirical results from an interdisciplinary research project which was designed to analyze a central aspect of literary literacy (LL), i.e. the ability to understand literary texts. Our study explores two questions: First, can literary literacy be assessed and modeled as a multi-dimensional construct with respect to content, form, and context? Second, is literary literacy distinguishable from factual reading literacy for expository texts? A sample of 1300 9th-graders (49% girls) from 52 German school classes participated in the study and completed tests of literary literacy and factual reading literacy for expository texts. According to the theory of semiotic aesthetics, literary literacy can be described as an at least two-dimensional construct consisting of semantic and idiolectal literary literacy. This was confirmed by the data. Although literary literacy and factual reading literacy for expository texts were strongly correlated, they present partly distinct competencies. More generally, the project resulted in a reliable and valid measure of a theory-based construct of literary literacy which can be used in student assessments as well as in studies exploring the teaching and learning processes relevant to the development of this competence.

Key words: Literary literacy, reading literacy, reading competence, competence model

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## 1. THEORETICAL FRAMEWORK

An important educational goal in secondary-level schooling is to impart literary text comprehension, i.e. the ability to understand and reflect literary texts, such as poems, epics, or dramas in a competent way (e.g. *Ständige Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland*, 2004). Yet large-scale assessment studies, such as PISA, do not pay much attention to this concern. These studies primarily assess reading competence for expository texts. In PISA 2009, for example, only 15% of the texts were narrative, 23% argumentative, 31% expository, 8% instructive (for a detailed description see OECD, 2009, pp. 32-34). Moreover, current research on reading literacy primarily focuses on cognitive and functional aspects of reading comprehension and competence. Reading literacy in PISA is, for instance, defined as “an individual’s capacity to understand, use, reflect on and engage with written texts, in order to achieve one’s goals, to develop one’s knowledge and potential, and to participate in society” (OECD, 2009, p. 14). Due to this functional focus, very little attention has been paid to the specific demands of comprehending literary texts and the underlying cognitive, motivational and emotional processes (Kintsch, 1994; Janssen et al., 2006). Furthermore, neither a clear theoretical definition of literary text comprehension nor a valid and reliable instrument for its measurement exist. The lack of research on this issue is partly due to the openness of the artwork that involves an ambiguity of the artistic message and the polyvalence of literary texts (Eco, 1962, p. 11). This makes it more difficult to define, measure, and validate the construct of literary text comprehension in comparison to the comprehension of expository (factual) texts.

The PISA study itself, however, provides some indication that reading literacy related to literary texts and reading literacy related to other types of texts are distinct. A re-analysis of the German PISA data by Artelt and Schlagmüller (2004) shows that the relationships between literary texts on the one hand and continuous factual texts (composed of sentences that are organised in paragraphs) as well as non-continuous factual texts (represent information in lists, forms or graphs) on the other hand are even lower than the correlations among the three achievement domains assessed in PISA (mathematics, science, and reading). Based on these results, the authors concluded (p. 179, own translation): “None of the other subscales for reading show similarly low associations as the ability to process literary texts. This comparison in particular makes clear that processing literary texts competently should be regarded as a distinct aspect of reading literacy.” Artelt and Schlagmüller (2004) recommend further research in order to arrive at a better and more differentiated understanding of reading literacy with regard to literary texts. Therefore, a theoretic-

cally grounded and empirically tested model of the construct – we call it *literary literacy* (LL) – is needed in order to study processes of literary text comprehension as well as teaching and learning processes related to this specific domain.

The first theoretical question we focused on in our research project was: How can the construct of literary literacy be defined and assessed? The major challenge of this endeavor is the operationalization of literary literacy, as the openness of the artwork entails an ambiguity of the artistic message of literary texts (Eco, 1962, p. 11). This challenge is associated with a fundamental question: How can an interpretation of a literary text be judged as *true* or *false* when the literary message is polyvalent? Although understanding a literary text certainly is a cognitive construction, few theoretical approaches have been developed focusing on the cognitive processes of literary text comprehension (e.g. Zwaan, 1993). Moreover, cognitive models of reading literacy entail specific limitations, as Kintsch (1994, pp. 44-45) acknowledged: “Literary production entails a creative aspect; literary understanding entails an aesthetic one. Presently, the cognitive models of understanding have nothing to offer with regard to creativity or aesthetics.”

To tackle these challenges, we refer to a cognitive content model of semiotic aesthetics by Eco (1992) that was developed in literary studies. Eco distinguishes three layers of intentions of a literary text: The *intentio auctoris* (intention of the author), the *intentio lectoris* (intention of the text reader) and the *intentio operis* (intention of the text itself). *Intentio auctoris* and *intentio lectoris* depend on individual characteristics of the *real author* and the *real reader* of a text (emotions, beliefs, motivation, prior knowledge etc.). For this reason, they do not present a suitable basis for constructing objective measures of literary literacy. The *intentio operis*, (Eco, 1990, p. 40), in contrast, – the literal meaning of the text itself – can serve as a framework to establish objectivity or at least a high degree of intersubjective agreement about the meaning of a literary text. Eco (1990) concedes that even on the level of the *intentio operis* it is impossible to single out an interpretation as the one and only true interpretation of a literary text. Yet it is possible to rule out wrong interpretations because “between the undeterminable intention of the author and the disputable intention of the reader lies the transparent intention of the text – relative to which non-defendable interpretations will fail” (Eco, 1992, p. 87, own translation). Therefore, an interpretation can be judged as more or less appropriate as long as unsuitable interpretations can be falsified on the basis of the text. This basic assumption presents the starting point of our item construction process.

In addition, our theoretical approach uses Eco’s semiotic aesthetics (1962, 1972, 1990, 1992) as a foundation to differentiate and describe three dimensions of the ability to understand a literary text:

*Semantic literary literacy* (SLL) represents the ability to understand the content of a literary text. This dimension corresponds to the notion of reading literacy as it is measured in PISA. In addition, however, semantic literary literacy integrates genuine characteristics of literary texts, such as openness or ambiguity (Eco 1962, 1990). Item construction for this dimension therefore needs to take into account the “openness of the literary text” (Eco, 1962, p. 85) and its “semantic plurality” (Eco, 1962, p. 87) by presenting or allowing more than one correct answer or solution. At the same time, the number of correct solutions is limited by the “coherent meaning of the text” (Eco, 1962, p. 87).

*Idiolectal literary literacy* (ILL) refers to the ability to analyze the formal characteristics of a literary text with respect to their aesthetic functions. Eco proposed the concept of the *aesthetic idiolect* (Eco, 1972, pp. 157) referring to “the structural pattern” of a literary text (Eco, 1972, pp. 152, own translation). This pertains to an aesthetic core question with respect to literary texts, namely: “What are the structural features of the text which generates this or a different semantic interpretation?” (Eco, 1990, pp. 43, own translation). The idiolectal dimension is not represented in the assessment framework in PISA. Although a distinction between reflecting and evaluating on the content of a text and on the form of a text was made in PISA’s theoretical framework, the empirical data of the study did not confirm this differentiation (Kirsch et al., 2002, p. 36). Most importantly, PISA considers reflecting on and evaluating the form of a text as a dimension that is tied to the ability to draw upon external knowledge. In literary literacy, however, formal aspects of the text constitute text-based information that is crucial for its interpretation. In line with Eco’s (1992) theory of the aesthetic idiolect, then, our framework considers formal aspects as part of the meaning of the text.

*Contextual literary literacy* (CLL), finally, represents the ability to recognize implications associated with historical contexts, literary motives, epochs, genres, etc. that are relevant for a given text. Whereas SLL and ILL focus on internal aspects of a literary text, CLL pertains to the ability to use external information in interpreting a text. This dimension was not represented in the PISA studies at all. Some of the theoretical building blocks of our third dimension come from: Gérard Genette’s (1987) theory of the paratext, Umberto Eco’s (1992) and Fotis Jannidis’s et al. (1999) theories of the author, Gregory Currie’s (1990) theory of fiction, Julia Kristeva’s (1972) and Karlheinz Stierle’s (1984) theoretical approach to intertextuality as well as Wilhelm Voßkamp’s (1992) thoughts on questions of genre and Rainer Rosenberg’s (1992) thoughts on questions of epoch.

From a theoretical point of view, each of the three dimensions could be conceived of as distinct categories. However, it would also be plausible to assume that contextual literary literacy is a more complex version of the other

two dimensions, as all contextual items also entail semantic or idiolectal demands. Therefore, both a three-dimensional and a two-dimensional model of literary literacy would be in line with the theoretical framework. Testing these alternative models against each other is one aim of our study.

## 2. CHALLENGES OF ITEM DESIGN FOR LITERARY LITERACY ASSESSMENT

In order to assess students' ability to understand a literary text, we constructed items for each of the three theoretically derived dimensions of literary literacy described above. We used a multi-stage design in which items were developed and revised in a cognitive laboratory procedure and a pilot study before they were administered in the main study. This procedure was necessary to make sure that our test items are appropriate for 9th-grade students attending different school tracks in the German school system.

We constructed open and semi-open response tasks as well as multiple-choice and forced-choice items. Items are bundled in testlets. A testlet consists of a stimulus text and associated items, each representing one of the three dimensions of literary literacy.

Initially, 21 testlets were developed by research associates of the first author's chair of German language and literature education, most of whom are current or former teachers. The main criteria for text selection were (1) the texts are not included in the German school curricula (accordingly, students' self-rated familiarity of texts was less than 4%), (2) the texts were appropriate for the students' age, and (3) texts of all genres were represented equally (lyric, drama, epic). After the cognitive laboratory procedure, six testlets were sorted out because of problematic items or text difficulty and 15 testlets were examined in a pilot study ( $N=493$ ). Based on the results of the pilot study, we selected an optimal set of nine units with respect to length, difficulty and genre (three poems, three dramas, and three epic texts).

Most of the stimulus texts were administered in full length (three complete poems and two complete short epic texts), others as excerpts of longer texts (three dramas and one novel). The use of excerpts was necessary to ensure a balanced representation of literary genres and, hence, construct validity.

The following examples of LL-Items are derived from a LL-testlet which passed the cognitive laboratory procedure study but was dropped after the pilot study because it turned out to be too difficult for pupils in 9<sup>th</sup> grade. Another reason for presenting these particular items<sup>1</sup> here is that they are about

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<sup>1</sup> The items presented here were translated into English for the purpose of this article. The original German versions are published in Frederking et al. (2009), Frederking, Mei-

a well-known literary German text for which published English translations exist.

The stimulus text of this testlet is a short passage from the beginning of Rainer Maria Rilke's *The Notebooks of Malte Laurids Brigge*, first published in 1910 (Rilke, 1982; Hulse, 2009):

[...] That I cannot give up sleeping with the window open! The trams rattle jangling through my room. Automobiles drive over me. A door slams. Somewhere a window smashes; I hear the laughter of the larger shards and the sniggering of the splinters. Then suddenly a thudding, muffled noise from the other direction, inside the house. Someone is climbing the stairs, coming, coming steadily, reaches my door, pauses for some time, then goes on. And once again the street. A girl shrieks: 'Ah tais-toi, je ne veux plus!' The tram races up all agitated, then rushes on headlong. Somebody shouts. People are running, overtaking each other. A dog barks. What a relief: a dog. Around dawn, a cock even crows, affording balm unlimited. Then quite abruptly I fall asleep. [...]. (p. 4)

To assess semantic literary literacy, we developed, among other things, multiple-choice items that require the integration of text information and do not substantially differ from typical PISA items. However, this type of item has limitations when it comes to capturing the ability to deal with ambiguous aspects of a literary text. It was therefore only used for facts that are quite clearly stated in the text, for example:

Where is the first-person narrator situated? Please mark the appropriate box with an "x".

- on a farm
- in a small town
- in a big city
- in a village

In this example, only response alternative three is correct. The cognitive lab revealed this item to be more difficult than expected. In particular, students had problems with some distracting facts given in the text: the trams, for example, are an indicator for *a big city*, yet the crowing cock suggests that *in a village* or *on a farm* may be the correct answer. To capture students' understanding of this ambiguity, an open item would be more appropriate:

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er, Brüggemann, Gerner, and Friedrich (2011), Frederking, Roick, and Steinhauer (2011) and Meier, Henschel, Roick, and Frederking (2012).

The students of a literature class argue about the question where this story takes place. Barbara says: "I think, the story takes place in a big city." Steve says: "I believe the story takes place in a small village."

Discuss which student is right according to the text. Provide quotations which support your argumentation.

This type of an open question addresses several aspects of understanding literature which are important for our concept of literary literacy: first, it requires a closer examination of the text; second, the students have to be aware of different positions one might not have thought of at first sight; and third, it requires making an argument for one's understanding on the basis of the text. Of course, this type of open questions requires detailed coding guidelines, such as the following:

Coding guideline

Code 2:

At least one of the following words or passages from the text is quoted in support of Barbara's position: "tram", "automobiles", "people are running, overtaking each other"

and one of the following words is quoted for Steve's position: a "cock", a "dog"

and one of the following conclusions is drawn:

according to the text, there are more facts that support Barbara's answer: in a big city

or:

the crowing of a cock in a big city is so unusual that the scene might be a sort of daydream in a small village of the life in a big city

Code 1:

only one of the cited passages is found for Barbara's or Steve's position without taking into consideration the other position.

Code 0: all other answers

A more difficult open semantic question that requires students to write a comment on or an explanation for their opinion is the following:

Why is the first-person narrator happy about the barking of a dog and the crowing of a cock? Give a short explanation for your opinion.

According to the coding guidelines, students who realized that the sounds of the animals could be seen as an opposition to the sphere of the big city and might represent the rural sphere gained full credit with two points (for example, "because he is happy to hear something other than the noise of a big city and because these sounds remind him of his old home" or "because he is happy that there are still animals in the city"). Two points were also given for the idea that the crowing of a cock indicates the end of the night, and that the first

person narrator might feel relief because the night will soon be over and is therefore able to fall asleep. Students received only one point when they only mentioned that both noises stem from animals but failed to elaborate on what this could mean (e.g. "because he likes animals").

This item sample shows that coding guidelines often need to leave a certain degree of openness to an interpretation while, at the same time, having to be sufficiently precise to distinguish more convincing from less plausible interpretations.

In addition to semantic items, idiolectal tasks were constructed which focus on the formal aspects of a literary text. The following task is an example for a forced-choice item:

Decide whether the following statements on the narrative situation are correct or not. Please mark the appropriate box with an "x".

	correct	not correct
a) The first-person narrator talks about something that happened a long time ago.	<input type="checkbox"/>	<input type="checkbox"/>
b) The first-person narrator tells a story which doesn't concern him personally in a distant manner.	<input type="checkbox"/>	<input type="checkbox"/>
c) The first-person narrator talks about something that moves him very much emotionally.	<input type="checkbox"/>	<input type="checkbox"/>
d) The first-person narrator writes about himself as he would in a diary.	<input type="checkbox"/>	<input type="checkbox"/>
e) The first-person narrator tells a story about someone he has invented like he would in a novel.	<input type="checkbox"/>	<input type="checkbox"/>

The forced-choice item format in this task (correct are c and d, not correct are a, b, and e) illustrates on a simple level how falsification of unsuitable answers



was operationalized. A number of plausible and some clearly false interpretations are given. Students have to decide whether the interpretation is plausible or not. This type of item is also suitable for assessing the semantic dimension.

A main advantage of forced-choice items for capturing the idiolectal dimension is that they allow to ask questions on the form-content relation that would otherwise be very challenging for 9th-grade students. An example for this is the following:

Consider on the basis of the text whether the following statements concerning the relation between form and context are plausible or not.

The very short and sometimes incomplete sentences...	plausible	not plausible
a) correspond to the narrator's impression of the fast traffic outside his room.	<input type="checkbox"/>	<input type="checkbox"/>
b) correspond to the sleepy mood of the first-person narrator.	<input type="checkbox"/>	<input type="checkbox"/>
c) correspond to the narrator's agitation.	<input type="checkbox"/>	<input type="checkbox"/>
d) correspond to the narrator's relief of being finally able to fall asleep.	<input type="checkbox"/>	<input type="checkbox"/>

This type of item format (plausible are a and c, not plausible are b and d) is usually easier than open questions, where students are asked to find form-content correspondences themselves. Open-ended idiolectal questions require the students not only to identify a stylistic device, but also to explain the specific function of this device within the text. This appeared to be almost unsolvable for most of the students. To reduce the level of complexity and to ensure that students concentrate on the role of the stylistic device in the context of the text, we named and explained the device in the item stem. Students, then, were only asked to comment on its specific function in the text, which indeed made items like the following much easier:

"Somewhere a window smashes; I hear the laughter of the larger *shards* and the sniggering of the *splinters*."

The cited passage contains the stylistic device 'personification'. Human features ("laughter", "sniggering") are attributed to *things* ("*shards*", "*splinters*").

Explain the effect of this stylistic device in the given passage. In doing so, refer to the difference between "shards" and "splinters".

This item is an example of how we reduced the degree to which students need prior knowledge of formal aspects of literature to solve idiolectal items. This was necessary because literary literacy was tested with 9th-grade students from all school types (schools in the lower, intermediate and higher tracks of the German school system) who differ substantially in their prior knowledge.

Prior knowledge is also an important aspect of items assessing the third dimension of literary literacy, as they may refer to various kinds of contexts of literary texts. In all cases, prior knowledge was reduced to the extent possible by giving short explanations or literary "intertexts" that students are asked to relate to the main text. In order to assess contextual literary in our testlet on Rilke's "Malte", a text was selected that has many intertextual similarities with Rilke's passage but also interesting differences: Alfred Wolfenstein's expressionist sonnet "City Dwellers" ["Städter"], first published in 1914 (Wolfenstein, 1992; 1994).

City Dwellers  
 Windows are as close  
 As the holes in a sieve, houses push  
 And grab each other so firmly that the streets  
 Appear as grayly swollen as strangled bodies.

Firmly hooked into one another  
 The two façades of people sit  
 In the streetcars, where gazes project crampedly  
 And desire juts into desire.

Our walls are as thin as skin,  
 So that everyone is involved when I weep,  
 A whisper penetrates like shouting:

And as though silent in a hidden cave  
 Untouched and unregarded  
 Each of us is yet far away and feels: alone.

The major motifs of this text are very similar to those of the passage from "The notebooks of Malte Laurids Brigge". But the point of view in both texts differs in an interesting way. Items assessing contextual literary literacy can focus on

both the semantic and the idiolectal dimension. A semantic contextual item, for example, requires the reader to find a semantic parallel between Wolfenstein's and Rilke's texts in each stanza. An idiolectal contextual item, which, turned out to be almost unsolvable for 9th-grade students, however, requires the reader to compare the points of view from which the tram is described by Rilke and by Wolfenstein. As pointed out before, contextual items are always either primarily idiolectal or primarily semantic. Therefore, they can either be modeled as a separate third dimension or as part of the semantic and idiolectal dimensions, as the empirical results of our research project will show.

### 3. RESEARCH OBJECTIVE

Based on the theoretical model of literary literacy presented above, the study explores two questions concerning the dimensionality and validity of our construct:

The first set of analyses addresses the internal validity of the construct and focuses on the question if literary literacy can be modeled as a two-dimensional or as a three-dimensional construct. We expect that both, a two-dimensional model that distinguishes semantic literary literacy from idiolectal literary literacy and a three-dimensional model that additionally differentiates a contextual dimension provide a better fit to the data than a one-dimensional model.

The second set of analyses focuses on discriminant validity and examines if literary literacy is distinguishable from expository reading literacy assessed with factual texts. Because both competences are measured with continuous texts, we expect that they are strongly correlated but, at the same time, sufficiently distinguishable. Furthermore, construct validity is evaluated based on correlations with divergent and convergent criteria (factual reading literacy and academic attainment in different school subjects).

### 4. METHOD

#### 4.1 Participants

A sample of 1370 9th-grade students (49% girls, mean age 15.26 years,  $SD=0.84$ ) from 52 German school classes participated in the study and completed in two assessment sessions a questionnaire as well as tests of literary literacy and factual reading literacy. The students attended the lower school track (*Hauptschule*, 26 classes), the intermediate school track (*Realschule*, 22 classes) or the higher school track (*Gymnasium*, 15 classes) of the German school system. Data were collected by trained research assistants.

#### 4.2 Instruments

Based on our theoretical model of literary literacy, nine testlets with 62 test items (53% multiple-choice and forced-choice items) were administered in a cross-sectional design in the fall of 2008 to assess semantic literary literacy (21 items,  $r_{tt}=.76$ ), idiolectal literary literacy (23 items,  $r_{tt}=.74$ ) and contextual literary literacy (18 items,  $r_{tt}=.76$ ). The test was presented in a multi-matrix design, organized in nine booklets with four testlets each, such that every student answered only a subset of four testlets in a session of 90 minutes. In developing the design, we took into account booklet position, linking between the testlets as well as genre (epic, drama, lyric) and length of the stimulus text in each testlet. Open questions were initially scored independently by two trained master students of educational science. Interrater-reliability was on average  $\kappa=.61$ ,  $SD=0.16$  ( $\kappa_{min}=.35$ ,  $\kappa_{max}=.90$ ). A third trained rater recoded all diverging ratings between the first two raters.

To explore a core aspect of discriminant validity of the construct, students also completed a test of factual reading literacy in a second session of 45 minutes. The test consisted of four testlets with expository texts and a total of 18 items (83% in multiple choice format,  $r_{tt}=.73$ ; Institut für Qualitätsentwicklung, 2009) and was administered in two forms with different sequences of the same testlets (pseudo-parallel forms). In addition, self-reported school grades for verbal subjects (German, English), mathematical and science subjects (Mathematics, Physics, Biology), and artistic subjects (Arts, Music) were obtained for all participants.

#### 4.3 Statistical analyses

All analyses were conducted with SPSS 20, Mplus 6.12 (Muthén & Muthén, 1998-2011) and ConQuest 2.0 (Wu, Adams & Wilson, 2007). We applied item-response-theory (Yen & Fitzpatrick, 2006) to project students' test performance on the same scale with ConQuest (Wu, Adams, Wilson & Haldane, 2007). More specifically, the Rasch model approach was used to explore the internal structure of literary literacy. Model evaluation of alternative multidimensional Rasch models is based on the *deviance* index for nested models. A small deviance indicates a good fit of the model to the empirical data structure. The difference in the deviance between two nested models is distributed approximately as chi-square, with degrees of freedom equal to the number of additional parameters in the model with the larger number of dimensions.

Additionally, structural equation modeling was used to analyze divergent and convergent validity. In estimating the parameters, we used the *corrected full information maximum likelihood estimator* (MLR and FIML) implemented in

Mplus (Muthén & Muthén, 1998-2011). Because students were nested within school classes, we used the *complex* option implemented in Mplus to obtain correct standard errors for the model parameters and correct fit statistics. Structural equation models were evaluated with chi-square goodness-of-fit statistics. Because this indicator is highly sensitive to sample size, we also consulted several commonly used descriptive measures of overall model fit: the root mean square error of approximation (*RMSEA*) and the comparative fit index (*CFI*). *RMSEA* values below .06 and *CFI* values above .95 are considered to indicate a good model fit (Hu & Bentler, 1999).

Missing data are a practically unavoidable occurrence in educational research. Valid data for the measure of literary literacy were available for 1052 students (89%); 744 students (63%) completed both the literary literacy and the factual reading literacy tests. Missingness due to the multi-matrix design was modeled as missing completely at random (MCAR) (Little & Rubin, 2002). Items within a testlet that students failed to complete were coded 0 in the IRT scaling process.

## 5. RESULTS

### 5.1 Dimensionality of literary literacy (LL)

We used the valid data of 1052 students to analyze the dimensionality of literary literacy on the basis of the proposed theoretical dimensions. To examine the relationship between the two dimensions, multidimensional Rasch models (*multidimensional random coefficient multinomial logit model*; see Adams, Wilson & Wang, 1997) were applied. Further, a partial-credit approach was used because 44% of all test items entailed partial-credit scoring (range between score 0 and score 2).

The results of the analyses show that the three-dimensional model of literary literacy based on Eco (1962) (deviance=38918.96, parameter=93) fits the empirical data better ( $\chi^2_{\Delta}=28.18$ ,  $df=5$ ,  $p < .01$ ) than a one-dimensional model (deviance=38947.14, parameter=88). An even better fit shows a two-dimensional model (deviance=38905.28, parameter=90) distinguishing semantic and idiolectal literary literacy after allocating the contextual items *a priori* to one of these two dimensions (2d-model vs. 3d-model.:  $\chi^2_{\Delta}=13.67$ ,  $df=3$ ,  $p < .01$ ). In the two-dimensional model, the correlation between semantic and idiolectal literary literacy is very high ( $r=.91$ ,  $p < .01$ ), indicating that both dimensions share a large proportion of variance. Nevertheless, the better fit of the two-dimensional model supports the idea that contextual literary literacy represents complex semantic and idiolectal demands rather than a distinct dimension of literary literacy.

### 5.2 Construct validity of literary literacy (LL)

To examine the discriminant validity of literary literacy, it was analyzed together with factual reading literacy in a two-dimensional model (see figure 2). To do so, individual person parameters (WLEs) were obtained for semantic and idiolectal literary literacy as well as for factual reading literacy. For each of the dimensions we generated two Rasch-scaled parcels by an odd-even item split and submitted them to structural equation modeling. Using parcels instead of items as indicators has several psychometric and statistical advantages (e.g. higher reliability, fewer parameters need to be estimated; see Little, Cunningham, Shahar, & Widaman, 2002). The analyses were conducted in Mplus 6.12 (Muthén & Muthén, 1998-2011) taking into account school type as a covariate and the nested structure of students within school classes (see table 1).

Table 1. Model fit statistics

Model <sup>a</sup>	$\chi^2$	df	p	CFI	RMSEA	AIC	SCF
1-dimensional	201.20	19	<.01	.96	.09	17348.84	1.262
2-dimensional	112.77	16	<.01	.98	.07	17203.68	0.911
3-dimensional	11.18	12	.51	>.99	<.01	17119.83	0.974
3-dimensional (nested)	10.57	10	.39	>.99	<.01	17123.31	0.981

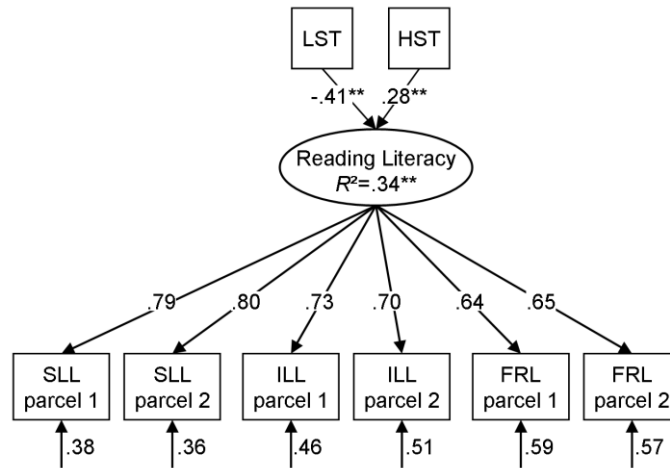
	Satorra-Bentler- $\chi^2$ -difference test											
	SC (vs.1d)	$\chi^2_{\Delta SB}$	df	p	SC (vs. 2d)	$\chi^2_{\Delta SB}$	df	p	SC (vs. 3d)	$\chi^2_{\Delta SB}$	df	p
2-dimension	3.13	28.22	3	<.01								
3-dimension	1.76	108.23	7	<.01	0.72	140.71	4	<.01				
3-d (nested)	1.57	121.10	9	<.01	0.79	128.66	6	<.01	0.94	0.65	2	.72

Note. <sup>a</sup> model estimator for nested data: MLR; df: degrees of freedom; CFI: comparative fit index; RMSEA: root mean square error of approximation; AIC: Akaike information criterion; SCF: scaling correction factor for models estimated with MLR; SC: difference test scaling correction; N=1179.

Results indicate that the two-dimensional model differentiating literary literacy and factual reading literacy ( $\chi^2/df=7.05$ , figure 2) shows a significantly better fit to the data than an alternative one-dimensional model ( $\chi^2/df=10.59$ ; figure 1). Furthermore, both factors – literary literacy as well as factual reading literacy –

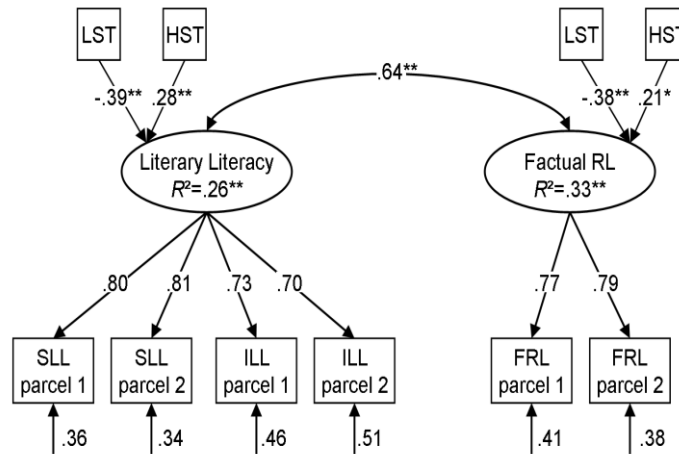
are significantly correlated with school type, suggesting that students from higher school tracks reached higher achievement levels than students from intermediate and lower school tracks. The school type covariates explain 26% of the variation in literary literacy and 33% of the variation in factual reading literacy. Furthermore, results show that factual reading literacy and literary literacy correlate moderately with  $r=.64$  ( $p<.01$ ). This result is in line with the re-analysis of the PISA 2000 data described above (Artelt & Schlagmüller, 2004) and supports the assumption that literary literacy should be regarded as a distinct aspect of reading literacy.

Fig. 1. The 1-dimensional model of reading literacy.



Note. Structural model with one dimension representing reading literacy. Standardized model parameters are shown; SLL: semantic literary literacy; ILL: idiolectal literary literacy; FRL: factual reading literacy; LST: lower school track; HST: higher school track; model fit statistic:  $\chi^2=201.20$ ,  $df=19$ ,  $p<.01$ ,  $CFI=.96$ ,  $RMSEA=.09$ ;  $p<.01$  for all factor loadings and residual variances;  $**p<.01$ ,  $*p<.05$ ,  $N=1179$ .

Fig. 2. The 2-dimensional model of literary literacy and factual reading literacy.

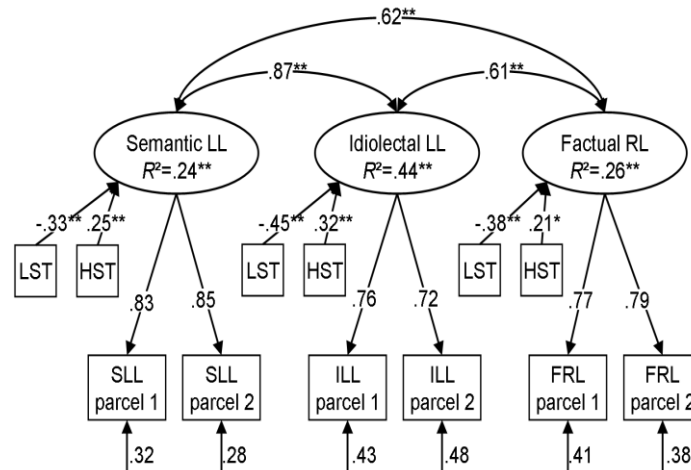


Note. Structural model with two dimensions representing literary literacy and factual reading literacy. Standardized model parameters are shown. SLL: semantic literary literacy; ILL: idiolectal literary literacy; Factual RL: factual reading literacy; LST: lower school track; HST: higher school track; model fit statistic:  $\chi^2=112.77$ ,  $df=16$ ,  $p<.01$ ,  $CFI=.98$ ,  $RMSEA=.07$ ;  $p<.01$  for all factor loadings and residual variances; \*\* $p<.01$ , \* $p<.05$ ,  $N=1179$ .

In a second step, we fitted a three-dimensional model (see figure 3) consisting of semantic literary literacy, idiolectal literary literacy and factual reading literacy ( $\chi^2/df=0.93$ ). This model yielded a better fit than both the one-dimensional model and the two-dimensional model (see table 1). As depicted in figure 3, we found a strong but not perfect latent correlation between semantic and idiolectal literary literacy and moderate correlations between both dimensions of literary literacy and factual reading literacy. The correlation between semantic literary literacy and factual reading literacy is not significantly higher than the correlation between idiolectal literary literacy and factual reading literacy (Wald- $\chi^2=2.48$ ,  $df=1$ ,  $p=.12$ ). Furthermore, the total proportion of explained variance is higher for idiolectal literary literacy ( $R^2=.44$ ,  $p<.01$ ) than for semantic literary literacy ( $R^2=.24$ ,  $p<.01$ ) and factual reading literacy ( $R^2=.26$ ,  $p<.01$ ).



Fig. 3. The 3-dimensional model of semantic literary literacy, idiolectal literary literacy and factual reading literacy.

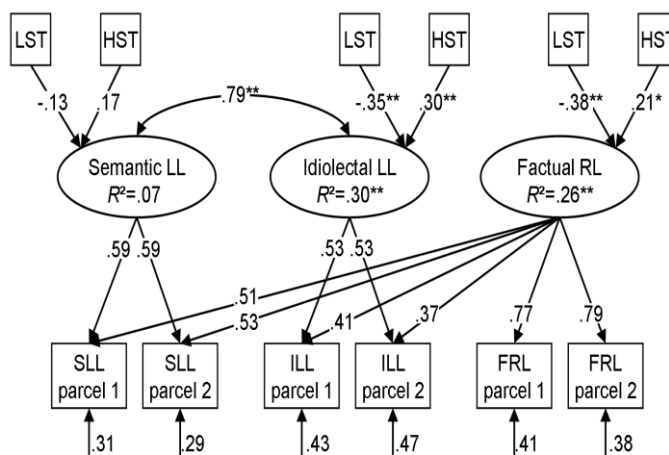


Note. Structural model with three dimensions representing semantic literary literacy, idiolectal literary literacy and factual reading literacy. Standardized model parameters are shown. FRL: factual reading literacy; SLL: semantic literary literacy; ILL: idiolectal literary literacy; LST: lower school track; HST: higher school track; model fit statistic:  $\chi^2=11.18$ ,  $df=12$ ,  $p=.51$ ,  $CFI>.99$ ,  $RMSEA<.01$ ;  $p<.01$  for all factor loadings and residual variances; \*\* $p<.01$ , \* $p<.05$ ,  $N=1179$ .

Both, the analyses of the internal structure of literary literacy based on the Rasch model approach and the analyses of discriminant validity in structural equation modeling indicate that semantic and idiolectal literary literacy share a large proportion of variance with each other as well as with factual reading literacy. In an additional step, we examined the extent to which factual reading literacy accounts for this relationship by controlling for differences in factual reading literacy. We applied the *correlated trait – correlated method minus one model* [CT-C(M-1)] approach that is based on recent developments in structural equation modeling (Eid, Lischetzke, Nussbeck, & Trierweiler, 2003). In this model, all indicators of factual reading literacy load exclusively on one factor, referred to as the reference factor. In order to contrast the two dimensions of literary literacy (semantic and idiolectal literary literacy) with the reference factor, two additional factors for semantic and idiolectal literary literacy are introduced. That is, all idiolectal and all semantic parcels of literary literacy load on (a) the common factor of factual reading literacy and (b) the factor of idiolectal or (c) the factor of semantic literary literacy (see figure 4). The correlation between semantic and idiolectal literary literacy, then, is a partial correlation corrected for differences in factual reading literacy. Both factors, idio-

lectal and semantic literary literacy capture that part of the specific variance, which cannot be predicted by factual reading literacy.

Fig. 4. The 3-dimensional CT-C(M-1) model of semantic literary literacy, idiolectal literary literacy and factual reading literacy.



Note. Nested model with three dimensions representing semantic literary literacy, idiolectal literary literacy and factual reading literacy. Analysis is based on a nested model design CT-C[M-1] in which differences in factual reading literacy are controlled; standardized model parameters are shown. Factual RL, FRL: factual reading literacy; Semantic LL, SLL: semantic literary literacy; Idiolectal LL, ILL: idiolectal literary literacy; LST: lower school track; HST: higher school track; model fit statistic:  $\chi^2=10.57$ ,  $df=10$ ,  $p=.39$ ,  $CFI>.99$ ,  $RMSEA<.01$ ;  $p<.01$  for all factor loadings and residual variances; \*\* $p<.01$ , \* $p<.05$ ,  $N=1179$ .

The model is shown in figure 4. It is obvious that the model fits well ( $\chi^2/df=1.06$ , see table 1) and is superior to the one-dimensional model as well as the two-dimensional model. However, the nested model does not fit significantly better than the three-dimensional model (see table 1). At the same time, the latent correlation between semantic and idiolectal literary literacy turned out to be lower ( $r=.79$ ) than in previous models. This implies two things: First, factual reading literacy accounts for a substantial amount of the covariance between the two dimensions of literary literacy. The lower correlation between semantic and idiolectal literary literacy supports the idea that both factors represent distinct dimensions of literary literacy. Second, a moderate correlation between semantic and idiolectal literary literacy remains after controlling for factual reading literacy. Thus, literary literacy seems to entail cognitive demands which are at least partly distinct from factual reading literacy.

Moreover, semantic literary literacy varies much less across school types now. Specifically, the regression parameter estimates for the school type covariates on semantic literary literacy decreased and are no longer significant. This, in turn, results in a reduced proportion of explained variance. In contrast, the regression parameter estimates for the school type covariates on idiolectal literary literacy as well as the proportion of explained variance in idiolectal literary literacy remain almost the same. Moreover, idiolectal literary literacy is more strongly correlated with the lower school track (Wald- $\chi^2=15.76$ ,  $df=1$ ,  $p<.01$ ) and with the higher school track (Wald- $\chi^2=4.00$ ,  $df=1$ ,  $p=.046$ ) than semantic literary literacy. The differential relationships of school type with semantic and idiolectal literary literacy thus provides further support for the distinction between the two dimensions of literary literacy. It also suggests that factual reading literacy accounts for a substantial proportion of school-type specific variance in semantic literary literacy but not in idiolectal literary literacy.

Finally, construct validity of literary literacy was explored by analyzing its relationships with academic attainment in different subject domains. For this purpose, we first examined the factorial structure of self-reported school grades which were standardized within school classes. A three-factor solution was identified in an exploratory factor analysis that yielded the best data fit ( $\chi^2=3.91$ ,  $df=3$ ,  $p=.27$ ) and accounted for 92% of the variance. Based on this finding, we estimated three latent variables with class-based school grades, namely *verbal academic attainment* (German, English), *mathematical and scientific academic attainment* (Math, Physics and Biology), and *artistic academic attainment* (Arts, Music). To explore the relationships between these variables with factual, semantic and idiolectal literary literacy, we modeled these variables together with the three-dimensional model (as depicted in figure 3). To obtain corrected correlations we used factual reading literacy and literary literacy respectively as a reference factor in a CT-C(M-1) model. We estimated partial correlation coefficients between the all reading dimensions (FRL, SLL, ILL) and attainment in each of the three subject domains controlling for attainment in the other two subject domains. As school grades as well as reading comprehension are generally associated with gender (OECD, 2009) and school type, we also controlled for these variables in the analyses. The nested data structure of students within school classes was taken into account as well.

Table 2. Correlations between semantic literary literacy, idiolectal literary literacy, factual reading literacy and academic attainment

	Verbal attainment		Mathematical-science attainment		Artistic attainment	
	<i>r</i>	<i>r<sub>par.</sub></i>	<i>r</i>	<i>r<sub>par.</sub></i>	<i>r</i>	<i>r<sub>par.</sub></i>
FRL	-.31**	-.04 <sup>a</sup>	-.21**	-.02 <sup>a</sup>	-.13	.07 <sup>a</sup>
SLL	-.38**	-.21** <sup>b</sup>	-.28**	-.12 <sup>b</sup>	-.23**	-.03 <sup>b</sup>
ILL	-.42**	-.24** <sup>b</sup>	-.32**	-.14 <sup>b</sup>	-.22*	-.04 <sup>b</sup>

Notes. Correlations between factual reading literacy, semantic literary literacy, idiolectal literary literacy and subject domains. *r<sub>par.</sub>*: Analysis is based on the CT-C[M-1] model in which <sup>(a)</sup>factual reading literacy or <sup>(b)</sup>literary literacy is held constant; FRL: factual reading literacy; SLL: semantic literary literacy; ILL: idiolectal literary literacy; correlations are negative due to the German grading system with smaller numbers representing better performance; \*\**p*<.01, \**p*<.05, *N*=1327

The results indicate that attainment in all subject domains are correlated with each other (range from *r*=.68 to *r*=.76, *p*<.01). As shown in table 2, all reading literacy variables correlate to a similar degree with attainment. The partial correlations analyses yield two main findings: First, the degree to which semantic and idiolectal literary literacy correlate with verbal attainment decreases after factual reading literacy and attainment in the other subject domains are controlled, yet the relationships are still significant. Second, factual reading literacy does not correlate with any subject domain after controlling for literary literacy and attainment in other subject domains. This means that literary literacy accounts for a large proportion of variation between factual reading literacy and subject domains but not vice versa.

## 6. DISCUSSION

This paper examined the dimensionality of literary literacy based on a theoretical model proposed by Eco (1962, 1972). According to the theory of semiotic aesthetics (Eco, 1962, 1972, 1990, 1992) literary literacy can be described either as a two-dimensional construct consisting of semantic and idiolectal dimensions or as a three-dimensional construct with an additional contextual dimension. Our analyses did not reveal a separate factor of contextual literary literacy as a third dimension. Instead, the contextual items could be integrated as complex aspects of semantic and idiolectal literary literacy. This finding also makes sense conceptually as contextual items are always related either to con-

tent (semantic) or stylistic (idiolectal) aspects of literary literacy. Thus, contextual items largely seem to represent complex semantic and idiolectal demands which require the integration of context information, such as information about an epoch or an author. However, this does not necessarily mean that literary literacy is not composed of additional sub-dimensions. For instance, coded emotions in literary texts are currently discussed (Frederking & Brüggemann, 2012).

The analyses addressed in this paper presents only a first step towards a better understanding of the dimensionality and the underlying cognitive processes of literary literacy. It is, for instance, conceivable that affective aspects (e.g. empathy, see Bourg, Risdén, Thompson, & Davis, 1993), specific prior knowledge on content or form of literary texts (Meier et al., 2012), or aesthetic awareness concerning literary features or stylistic devices of a text affect literary literacy. These aspects are associated with the reader's reactions and should influence an individual's interpretation of the text (*intentio lectoris*; Eco 1962). According to such authors as Iser (1976) or Rosenblatt (1978, 1998), they form an essential part of aesthetic experience.

Although literary literacy and factual reading literacy are strongly correlated, modeling them both on the same dimension yielded a poorer fit than a model with separate dimensions. Thus, our analyses suggest that factual reading literacy and literary literacy present distinct constructs. It should be noted, however, that the operationalization of factual reading literacy in this study only included continuous expository texts. Future studies should examine the relationship between literary literacy and a test of factual reading literacy that also entails items on non-continuous texts.

Our analyses also revealed that factual reading literacy and idiolectal literary literacy vary considerably with school type. Yet, the relationship between semantic literary literacy and school type disappeared, after factual reading literacy was controlled. Future studies should explore which aspects of teaching and learning in school are responsible for these school-type differences.

In addition, semantic and idiolectal literary literacy correlated significantly with verbal attainment even after factual reading literacy and the other subject domains were controlled. In contrast, factual reading literacy did not correlate with verbal attainment after controlling for literary literacy and the other subject domains. This suggests that literary literacy involves cognitive demands which are at least partly distinct from factual reading literacy.

In sum, our findings show that we were able to construct a reliable and valid measure of literary literacy consisting of the two dimensions of semantic and idiolectal literary literacy. This measure can be used for assessing and describing the level of literary literacy students have reached. In addition, it may be applied in studies that aim at exploring the effectiveness of classroom instruc-

tion. There is a dearth of intervention research in the domain of literary literacy which may be partly due to the lack of adequate outcome measures. The provision of a theoretical model and operationalization of this construct may make to spur research activities that could provide important information on how instruction can potentially be improved.

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