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van Steensel, R.; Oostdam, R.; van Gelderen, A.

DOI

[10.1111/1467-9817.12281](https://doi.org/10.1111/1467-9817.12281)

Publication date

2019

Document Version

Final published version

Published in

Journal of Research in Reading

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Citation for published version (APA):

van Steensel, R., Oostdam, R., & van Gelderen, A. (2019). Affirming and undermining motivations for reading and associations with reading comprehension, age and gender. *Journal of Research in Reading*, 42(3-4), 504-522. <https://doi.org/10.1111/1467-9817.12281>

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Affirming and undermining motivations for reading and associations with reading comprehension, age and gender

Roel van Steensel 

Department of Psychology, Education, and Child Studies, Erasmus University, Rotterdam, The Netherlands and Department of Language, Culture, and Communication, Free University Amsterdam, The Netherlands

Ron Oostdam 

Centre for Applied Research in Education (CARE), Amsterdam University of Applied Sciences, Amsterdam, The Netherlands

Amos van Gelderen 

University of Amsterdam, Amsterdam, The Netherlands

Background: There has been an increasing interest in negative or ‘undermining’ motivations for reading. In this study, we aimed to strengthen knowledge on the validity of the distinction between affirming and undermining motivations. First, we examined whether the structure of a questionnaire based on this distinction could be confirmed. Second, we examined the predictive value of undermining motivations for reading comprehension. Third, we studied moderator effects of gender and age.

Methods: We administered a reading motivation questionnaire and a reading comprehension test to 324 low-achieving adolescents. The questionnaire included items on affirming and undermining motivations for school and leisure time reading: intrinsic motivation and avoidance, self-efficacy and perceived difficulty.

Results: Confirmatory factor analyses supported the assumed structure of the questionnaire. Undermining motivations, particularly perceived difficulty, explained unique variance in reading achievement. Gender and age did not moderate effects of motivational variables.

Conclusions: Educators need to be aware of the role of undermining motivations. Future research should examine if interventions can lead to the reduction of such motivations.

Keywords: reading motivation, low achievers, adolescents, reading comprehension

Highlights

What is already known about this topic

- Undermining motivations for reading appear to be distinct from affirming motivations.

- Undermining motivations are related to differences in primary and secondary schoolers' reading comprehension.

What this paper adds

- Advanced analyses provided a more solid basis for the distinction between undermining motivations and affirming motivations.
- Undermining motivations explain unique variance in reading comprehension of low-achieving adolescents.
- Undermining motivations occurred more often among older students and boys.

Implications for theory, policy or practice

- Researchers should take into account undermining motivations in studies on reading motivation.
- Educators need to be aware of the role of undermining motivations for low achievers.
- Future research should examine if interventions can lead to the reduction of undermining motivations.

It is well established that reading motivation, generally defined as a person's goals, values and beliefs with regard to reading (Guthrie & Wigfield, 2000), is a predictor of reading performance (Baker & Wigfield, 1999; Becker, McElvany, & Kortenbruck, 2010; Guthrie, Wigfield, & You, 2012; Mol & Bus, 2011; Petscher, 2010; Schaffner, Schiefele, & Ulferts, 2013; Schiefele, Schaffner, Möller, & Wigfield, 2012; Wigfield, Gladstone, & Turci, 2016), even when taking cognitive variables such as previous reading performance, decoding speed, background knowledge, cognitive strategy use and general cognitive abilities into account (Anmarkrud & Bråten, 2009; McGeown, Duncan, Griffiths, & Stothard, 2015; Retelsdorf, Köller, & Möller, 2011; Taboada, Tonks, Wigfield, & Guthrie, 2009). Reading motivation can be operationalised in different ways: researchers use concepts such as intrinsic motivation, extrinsic motivation, reading attitude, task value, reading self-concept, self-efficacy and goal orientations to describe a person's reasons for reading (Schiefele, Schaffner, Möller, & Wigfield, 2012). Much of the research so far has started from the idea that such motivations can be expressed on unidimensional scales that go from positive to negative: people can be more or less intrinsically motivated to read, they can have more or less positive attitudes or value beliefs, they can be more or less efficacious and so forth. In qualitative studies of students' reading and learning behaviour using interviews (Dowson & McInerney, 2003; Smith & Wilhelm, 2002), variables such as work avoidance and perceived lack of competence were identified as separate motivational constructs. On the basis of these observations, the notion of negative motivations has recently gained interest in reading motivation research (Coddington, 2009; Guthrie & Coddington, 2009; Guthrie, Coddington, & Wigfield, 2009; Guthrie, Klauda, & Ho, 2013; Ho & Guthrie, 2013; Klauda & Guthrie, 2012; Rosenzweig & Wigfield, 2017). The general assumption behind this notion is that positive or 'affirming' motivations and negative or 'undermining' motivations are not different ends of a continuum but represent separate constructs, implying that a low score on an affirming motivations scale is not necessarily

the same as a high score on an undermining motivations scale. This difference is explained by suggesting that affirming and undermining motivations are associated with ‘qualitatively different affects’ (Guthrie, Coddington, & Wigfield, 2009: 341). High intrinsic motivation, for instance, is related to positive affect, but low intrinsic motivation is not necessarily related to negative affect: people with low intrinsic motivation might feel indifferent (little affect) or may be hostile, averse and avoidant (negative affect). One of the implications of the assumed distinction between affirming and undermining motivations is that, when analysing the effects of motivation on reading performance, adding undermining motivations should explain additional variance in performance measures (Coddington, 2009).

Previous studies have found some evidence for the distinction between affirming and undermining motivations. Coddington (2009) administered a reading motivation questionnaire – the Adolescent Motivations for (Out of) School Reading or AM(O)SR – to 247 seventh graders in the United States, which included items on three pairs of affirming and undermining motivations for both school and leisure time reading: intrinsic motivation and avoidance; self-efficacy and perceived difficulty; and prosocial and antisocial goals. In line with motivation theory (Bandura, 1986; Ryan & Deci, 2000), intrinsic motivation was defined as the enjoyment of reading for its own sake and self-efficacy as the beliefs about one’s ability to perform reading activities. Avoidance was defined as the inclination to avoid engaging in reading tasks or minimise the effort required to complete those tasks, perceived difficulty as ‘beliefs that reading activities are hard, and problematic’ (Coddington, 2009: 9), prosocial goals as the desire to help, cooperate and adapt to classroom rules, and antisocial goals as the tendency to avoid helping other students with reading tasks, interacting with other students about texts and make fun of other students’ opinions and comments about reading. Using principal component analysis, Coddington (2009) found support for the distinction between affirming and undermining motivations in each pair, with the exception of intrinsic motivation for and avoidance of leisure time reading. Based on the same questionnaire, Guthrie, Coddington, and Wigfield (2009) analysed affirming and undermining motivations among 245 fifth graders and, using a similar procedure, came to comparable conclusions for two pairs of motivations (intrinsic motivation/avoidance and self-efficacy/perceived difficulty). They also found that the results were the same across two groups: Caucasian and African-American students. Guthrie, Klauda, and Ho (2013) present evidence for the presence of eight different factors on the basis of another reading motivation questionnaire, the Motivations for Reading Information Books in School, administered to 1,159 students in Grade 7: intrinsic motivation and avoidance, self-efficacy and perceived difficulty, prosocial and antisocial goals, and value (the belief that reading is important) and devalue (the belief that reading is useless).

These and other studies show that undermining motivations explain unique variance in reading achievement (Coddington, 2009; Guthrie, Coddington, & Wigfield, 2009; Guthrie, Klauda, & Ho, 2013; Ho & Guthrie, 2013; Rosenzweig & Wigfield, 2017). Perceived difficulty, in particular, appears to play a role in students’ reading outcomes. Guthrie, Coddington, and Wigfield (2009), for instance, found that, for Caucasian fifth graders, reading comprehension, reading fluency and word recognition were predicted by intrinsic motivation and perceived difficulty. For their African-American peers, reading comprehension and fluency were predicted by both self-efficacy and perceived difficulty, and word recognition was predicted by perceived difficulty only. In her study among seventh graders, Coddington (2009) observed that perceived difficulty and antisocial goals for school and

leisure time reading explained additional variance in both standardised reading test scores and Language/Arts grades when included in a regression model together with affirming motivations. Ho and Guthrie (2013) examined to what extent seventh graders' information and literary text reading comprehension were predicted by different types of affirming motivations (intrinsic motivation, self-efficacy, value and peer value for reading) and undermining motivations (avoidance, perceived difficulty, devalue and peer devalue of reading). They showed that the latter – in particular, perceived difficulty – predicted reading achievement more strongly than the former.

Notwithstanding these results, questions remain with respect to the evidence supporting the validity of the distinction between the different affirming and undermining motivations. In three of the studies described earlier (Coddington, 2009; Guthrie, Coddington, & Wigfield, 2009; Guthrie, Klauda, & Ho, 2013), exploratory factor analyses (i.e., principal component analyses) were used to find support for this distinction. However, these were *separate* analyses, either of pairs of affirming/undermining motivations – intrinsic motivation/avoidance, self-efficacy/perceived difficulty, prosocial/antisocial goals (Coddington, 2009; Guthrie, Coddington, & Wigfield, 2009) – or even of single assumed constructs (Guthrie, Klauda, & Ho, 2013). The question is whether these distinctions still hold when included in one confirmatory factor analysis (CFA) combining all assumed constructs. The first goal of the current study therefore is to examine whether the structure of a questionnaire based on the hypothesised distinction between affirming and undermining motivations can be confirmed using CFA.

The second goal is to analyse whether different undermining motivations make unique contributions to the explanation of variance in reading scores. As described previously, various studies made comparisons between the roles of affirming and undermining motivations in students' reading achievement. However, not all studies combined the different undermining motivations in one analysis. In both Coddington (2009) and Guthrie, Coddington, and Wigfield (2009), separate multiple regression analyses were conducted to determine the relative weight of pairs of affirming and undermining motivations in explaining variance in reading performance. However, exactly how the contributions of different undermining motivations compared was not examined. Rosenzweig and Wigfield (2017) did combine different motivations in one analysis, but they used a cluster-analytic approach and were not able to analyse the relative weight of distinct undermining motivations. Two studies were able to draw conclusions on how the roles of different undermining motivations compared. Guthrie, Klauda, and Ho (2013) included various undermining motivations in one structural model, finding that perceived difficulty had the strongest direct effect on text comprehension. Ho and Guthrie (2013) applied canonical correlation analysis to analyse patterns of associations among multiple affirming and undermining motivations and different reading proficiency measures. Like Guthrie, Klauda, and Ho (2013), they found that for both information and literary text reading, perceived difficulty was the strongest among the motivational predictors. Following the latter two studies, the second goal of the current study is to establish the relative weight of different undermining motivations and to determine whether the important role of perceived difficulty can be corroborated.

The third and final goal is to analyse how the role of undermining motivations is affected by age and gender. On average, reading motivation is known to decline when children move through primary education and enter secondary education (Eccles, Wigfield, Harold, & Blumenfeld, 1993; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Kush & Watkins, 1996; Lepper, Corpus, & Iyengar, 2005; Wigfield et al., 1997), and their motivation

decreases even further during the middle and high school years (Kelley & Decker, 2009; Lau, 2009; Lepper, Corpus, & Iyengar, 2005; McKenna, Conradi, Lawrence, Jang, & Meyer, 2012; Unrau & Schlackman, 2006; Wolters, Denton, York, & Francis, 2014). Many studies additionally found that boys are generally less motivated to read than girls. This difference in motivation arises in primary school (Baker & Wigfield, 1999; Eccles, Wigfield, Harold, & Blumenfeld, 1993; Kush & Watkins, 1996; Lau, 2009; Logan & Johnston, 2009, 2010; Marinak & Gambrell, 2010; McKenna, Kear, & Ellsworth, 1995; Wigfield & Guthrie, 1997), extends to middle and high school years (Kelley & Decker, 2009; Lau, 2009; McKenna, Conradi, Lawrence, Jang, & Meyer, 2012) and is found for both academic and recreational reading. It could be expected that the observed differences in affirming motivations between younger and older students and between girls and boys are also reflected in differences in undermining motivations: undermining motivations may become more prominent as students grow older, and they may be more relevant for boys than for girls. As a consequence, it could be expected that undermining motivations are more important in explaining variance in reading proficiency for older students and for boys. So far, this has not been analysed in studies on undermining motivations.

The goals of the current study, then, are to examine whether the structure of a questionnaire based on the hypothesised distinction between affirming and undermining motivations – the AM(O)SR (Coddington, 2009; Guthrie, Coddington, & Wigfield, 2009) – can be confirmed using CFA and to examine relationships between affirming/undermining motivations, reading comprehension, age and gender. The AM(O)SR is additionally based on the assumption that reading motivation varies with context (McKenna, Kear, & Ellsworth, 1995) and therefore includes both motivations for school reading and leisure time reading. Consequently, we also examined whether affirming/undermining motivations for reading in both contexts should be distinguished. We conducted the study in a sample of relatively low-achieving students (i.e., students in prevocational secondary education), as it can be expected that undermining motivations are particularly prominent among these students, because their low achievement has likely resulted in unsuccessful reading experiences. The aforementioned goals result in the following research questions:

1. Can the structure of a questionnaire based on the hypothesised distinction between affirming and undermining motivations for school and leisure time reading be confirmed?
2. Do undermining motivations make unique contributions to the explanation of variance in reading comprehension scores?
3. Are relationships between undermining motivations and reading comprehension different for younger than for older students and for girls than for boys?

Given the aforementioned limitations in previous studies, answers to these questions will add to our knowledge of the validity of the concept of undermining motivations. In answering Research Question 1, we test whether the presupposed distinction between affirming and undermining motivations is reflected in the internal structure of the questionnaire; outcomes might thus provide support for the construct validity of the notion of undermining motivations. In answering Research Questions 2 and 3, we test whether theoretically grounded hypotheses about the predictive value of both types of motivations are supported by empirical data; outcomes might thus provide support for the predictive validity of undermining motivations.

Method

Participants

The sample consists of Grade 7 and 9 students from schools for prevocational secondary education in the Netherlands. The Netherlands has a tracked system of secondary education. There are three main tracks: prevocational education, senior general secondary education and pre-university education. At the time of our study, students were mainly designated to one of these tracks on the basis of their scores on a national test administered at the end of primary education, developed by the National Institute of Test Development. Reading comprehension is one of the main components of this test (Board of Tests and Examinations, 2015). Standardised scores on the test have a minimum of 501 and a maximum of 550, with students scoring 501–536 designated to prevocational education. This implies that students in prevocational education in general have relatively poor reading skills, as was confirmed by previous studies (Gille, Loijens, Noijons, & Zwitser, 2010).

Schools were recruited in two ways. First, we contacted schools that had participated in an earlier study on students in prevocational secondary education. Second, we contacted schools via a digital community of Dutch language teachers. Thirteen schools agreed to participate, from which 23 classes took part, including 441 students. Because of the time investment for teachers, schools decided how many and which classes could participate. Of these students, 324 (73%) were included in the final analyses; the other 117 students either were not able to attend all test sessions or had incomplete scores on either of the two instruments. Participating students were spread across 12 Grade 7 classes (169 students; 52%) and 11 Grade 9 classes (155 students; 48%). The number of students per class as included in the analyses ranged from 7 to 20. The sample included 182 girls (56%) and 142 boys (44%). The Grade 7 students' mean age was 13.0 years, and the Grade 9 students' mean age was 15.2 years.

Instruments

Reading motivations questionnaire. For measuring reading motivation, we used the eight sets of items from the AM(O)SR questionnaire used in the study by Guthrie et al. (2009; see Introduction). Based on Self-Determination Theory (Ryan & Deci, 2000) and Social-Cognitive Theory (Bandura, 1986), these items aim to measure two pairs of affirming and undermining motivations (intrinsic motivation/avoidance; self-efficacy/perceived difficulty), for both school and leisure time reading. The items were translated from English to Dutch by a professional translator and subsequently back translated by a bilingual researcher who had native proficiency in both English and Dutch. In most cases, there were no substantial differences between the phrasing of the original items and the back translations, apart from small differences such as the use of 'outside school hours' (back translation) instead of 'outside of school' (original version). The few more substantial differences pertained to differences in the choice of specific words, for instance, 'I'd rather do other things ...' (back translation) instead of 'I choose to do other things ...' (original version). In all these cases, the Dutch translation was closer to the original item than the back translation was, so the Dutch translation was retained. The questionnaire was piloted in one class not participating in the main study in order to verify whether the items were suitable and comprehensible, by having students fill in the questionnaire

and indicate any unclarities; this led to minor rephrasing of some items. The questionnaire included a total of 54 items: seven items per assumed construct, with the exception of the intrinsic motivation for school/leisure time reading scales, which included six items each (one item was excluded because in the Dutch translation, it turned out to be identical to another item). Table 1 contains sample items of each assumed construct. Further information on the validity and reliability of the questionnaire will be given in the Results section.

Reading comprehension test. Reading comprehension was measured with a test designed for students in Dutch prevocational secondary education (Van Steensel, Oostdam, & Van Gelderen, 2013). The test consists of eight tasks, each based on one or two texts. The texts cover different genres (narrative, argumentative, expository and instructive) and are from media that students come across in daily life. For instance, one task involved a set of house rules (as are present in any school); another involved two newspaper articles about a school ban on cell phones (newspapers are often used in Dutch education). Students were instructed to read the text(s) and answer comprehension questions about those texts (five to nine items per task, 59 items in total). The questions aim to measure three different sub-skills of reading comprehension: the ability to retrieve relevant details from the text, make local inferences (e.g., draw cause–effect relationships between sentences) and develop an understanding of the text’s macrostructure (e.g., infer main idea). The test has been shown to represent one underlying factor and has sufficient reliability (Cronbach’s $\alpha = .80$) (Van Steensel, Oostdam, & Van Gelderen, 2013).

Procedure

The reading motivation questionnaire and the reading comprehension test were administered to whole classes in three sessions. Administration of the questionnaire comprised one session of about 20 minutes. The reading comprehension test covered two sessions of 40 minutes each. We scheduled no more than two sessions per day to minimise test weariness. The tests were administered mostly during Dutch language classes. All

Table 1. Sample items per construct.

Construct	Sample item
Affirming motivations	
Intrinsic motivation (school reading)	I enjoy reading for school.
Intrinsic motivation (leisure time reading)	I enjoy the challenge of reading outside of school.
Self-efficacy (school reading)	I am good at reading for school.
Self-efficacy (leisure time reading)	I believe I am a good reader outside of school.
Undermining motivations	
Avoidance (school reading)	I read as little as possible for school.
Avoidance (leisure time reading)	Reading outside of school is a waste of time.
Perceived difficulty (school reading)	I make lots of mistakes reading for school.
Perceived difficulty (leisure time reading)	I think reading outside of school is hard.

sessions were supervised by trained test leaders who gave oral instructions and provided explanations of the purpose of the study, the goal and format of the tests and behaviour rules during test administration. A teacher was present to maintain order. Questions were answered by the test leaders following a standardised protocol. Students' parents were informed of the study by the schools and could object if they did not want their child to participate.

Data analysis

To answer Research Question 1, we conducted CFA using structural equation modeling in Mplus (Version 7; Muthén & Muthén, 1998-2011). We compared the theoretically assumed eight-factor model, which includes separate factors for affirming and undermining motivations for school and leisure time reading, with three four-factor models. In the first four-factor model, no distinction was made between affirming and undermining motivations. In the second, no distinction was made between motivations for school reading and leisure time reading to additionally check the validity of this distinction. In the third four-factor model, no distinction was made between intrinsic motivation and self-efficacy and between avoidance and perceived difficulty. Because there was some indication of multivariate nonnormality on the basis of univariate kurtosis values (Byrne, 2012), we used maximum likelihood estimation with robust standard errors. We used several indicators to judge model fit (Hu & Bentler, 1999; Ullman, 2001): the χ^2 test, which should be nonsignificant; the ratio χ^2/df , which should be less than 2; the comparative fit index, which should be above 0.90; the standardised root mean square residual, which should be below 0.08; and the root mean square error of approximation, which should be below 0.06. Because the use of maximum likelihood estimation with robust standard errors does not allow a regular χ^2 difference test for comparing models, we used the procedure described by Satorra and Bentler (2010).

To answer Research Questions 2 and 3, we conducted multilevel regression analyses using MLwiN 2.16 (Rasbash, Steele, Browne, & Goldstein, 2009), because the sample was hierarchically structured (students in classes in schools), and there was a significant amount of class-level variance in reading comprehension scores. We entered predictors in the following order. First, we entered the covariates (gender and grade). Second, we entered the motivational predictors, taking two steps: in the first step, we included the affirming motivation scales, and in the second, we added the undermining motivation scales. The motivation scales were centred around the mean. Third, we tested possible interaction effects on level 1, that is, interaction effects of gender and the motivational variables. Fourth, we tested the presence of possible cross-level interaction effects of grade and the motivational variables, by first testing whether there was random slope variance in the motivational predictors (Hox, 2010). If the association between affirming/undermining motivations and reading comprehension varies across classes, this is possibly accounted for by the class-level predictor grade. Assumption checks for the multilevel regression model revealed no indications of nonnormality, heteroscedasticity or residual dependence (Durbin Watson = 1.62). Collinearity statistics showed that in no case the tolerance was below 0.2, neither were there variance inflation factors larger than 10, although the average variance inflation factor was larger than 1 (2.14), which provides some indication of collinearity (Bowerman & O'Connell, 1990; Field, 2009).

Results

Confirmatory factor analyses

To answer Research Question 1, we ran four confirmatory factor models. A summary of the outcomes is presented in Table 2. Note that the χ^2 difference tests do not equal the subtractions of the χ^2 values of the different models as presented in the table, because of the correction made in the Satorra–Bentler test.

In the first step, we ran our theoretically predicted eight-factor model, in which we included all items according to their assumed factor membership. The initial model did not have an optimal fit: although the χ^2/df ratio (1.98), the root mean square error of approximation (0.05) and the standardised root mean square residual (0.07) met the norms, the χ^2 was statistically significant (2,666.89, $df = 1349$, $p < .001$), and the comparative fit index was too low (0.82). We then modified the model in a number of steps, using the modification indices. This first of all led to two changes in factor membership (the items ‘I feel successful when I read for school’ and ‘I feel successful when I read in my free time’ were moved from the intrinsic motivation to the self-efficacy factors). Additionally, 14 of the initial 54 items were excluded. Four items were excluded because the modification indices implied that these items should be assigned to another factor, but, as there was no theoretical support for this decision, it seemed more likely that this was the result of an unclarity in the items themselves. For instance, according to the modification index, the item ‘Texts I read in my free time make me think’ should be assigned to ‘perceived difficulty of leisure time reading’, but the item was intended to signify intrinsic motivation. The remaining 10 items were excluded because of covariances between error terms of these and other items. These error covariances seemed the result of redundancy: the 10 items resembled other items in the questionnaire. For instance, the item ‘I like to read in my free time’ was excluded because of its resemblance to ‘I enjoy reading in my free time’. The final model (a) had a good fit to

Table 2. Model comparisons of the four confirmatory factor models.

	(a) Eight factors	(b) Four factors (affirming + undermining)	(c) Four factors (school + leisure time)	(d) Four factors (intrinsic motivation + self-efficacy; avoidance + perceived difficulty)
χ^2	1,263.15, $df = 712$, $p < .001$	2,029.08, $df = 734$, $p < .001$	1,871.92, $df = 734$, $p < .001$	2,452.50, $df = 734$, $p < .001$
χ^2/df	1.77	2.76	2.55	3.34
CFI	0.90	0.75	0.78	0.67
RMSEA	0.05	0.07	0.07	0.08
SRMR	0.06	0.09	0.07	0.11
Satorra–Bentler scaled χ^2 difference test		(b) – (a): $\Delta\chi^2 = 603.09$, $df = 22$, $p < .001$	(c) – (a): $\Delta\chi^2 = 405.84$, $df = 22$, $p < .001$	(d) – (a): $\Delta\chi^2 = 813.76$, $df = 22$, $p < .001$

CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardised root mean square residual.

the data (see Table 2). A subsequent comparison with the three four-factor models using the Satorra–Bentler scaled χ^2 difference test showed that model (a) fit the data significantly better than the three more parsimonious models (b), (c) and (d). It can thus be concluded that the assumed structure of the questionnaire, based on the theoretical distinction between affirming and undermining motivations for school and leisure time reading, was confirmed.

Multilevel regression analyses

To answer Research Questions 2 and 3, we analysed the relationships between the affirming and undermining motivation scales resulting from the CFA, gender, grade and reading comprehension. Table 3 presents the descriptive statistics, scale reliabilities and the correlation matrix. Note that the descriptives of the predictor variables are those based on raw scores (before centring).

We then conducted a multilevel regression analysis with reading comprehension as the dependent variable. The results are presented in Table 4. We first examined whether the data had a multilevel structure. A model with only a student level had an Iterative Generalised Least Squares (*IGLS*) of 2,208.47. A model with both a student level and a class level had a significantly better fit (*IGLS* = 2,160.83; Δ *IGLS* = 47.64, *df* = 1, $p < .001$). Adding a school level did not improve model fit (*IGLS* = 2,160.83; Δ *IGLS* = 0). Therefore, all further analyses included two levels: student and class.

We started by entering gender and grade (Models 1 and 2). A comparison with the unconditional model showed no significant improvement in model fit when gender was included, implying that there was no difference in reading comprehension scores between boys and girls. However, because we were also interested in the interaction effects of gender and motivational variables, we did not exclude gender from the model. The addition of grade did improve model fit, implying that, as could be expected, Grade 9 students had higher reading scores than Grade 7 students; grade explained 31% of the class-level variance in reading comprehension.

In the second step, we entered all affirming motivations simultaneously (Model 3). This model was a significant improvement of Model 2, explaining 1% of the class-level variance in reading scores and 5% of the student-level variance. It revealed only one significant predictor, namely, self-efficacy for school reading, implying that students who have more confidence in their ability to perform reading tasks at school had higher scores on the reading comprehension test. Separate multilevel analyses of each of the affirming motivations (not presented in Table 4) showed that, when entered individually, intrinsic motivation for leisure time reading ($B = 0.87$, $SE = 0.38$, $p < .05$) and self-efficacy of leisure time reading ($B = 1.43$, $SE = 0.48$, $p < .01$) were positively related to reading comprehension as well.

In the third step, we added all undermining motivations (Model 4). This resulted in a significant improvement in model fit compared with Model 3, implying that undermining motivations had an additional effect on reading comprehension. The model explained an extra 8% of the class-level variance in reading scores and an extra 4% of the student-level variance. Model 4 revealed only one significant predictor, perceived difficulty of leisure time reading, implying that students who felt reading in their free time was too difficult overall had lower scores on the reading comprehension test. However, separate multilevel analyses of each of the undermining motivations (not presented in Table 4) showed that, when entered individually, perceived difficulty of school reading was negatively related to reading comprehension as well ($B = -1.63$, $SE = 0.55$, $p < .01$). Together, affirming and

Table 3. Descriptive statistics, scale reliabilities and correlation matrix.

	Mean (SD)	Cronbach's α										
		1	2	3	4	5	6	7	8	9	10	11
1. Gender		1										
2. Grade		-.18**	1									
3. Intrinsic motivation school (1-5)	2.79 (0.87)	.68	.16**	1								
4. Self-efficacy school (1-5)	3.26 (0.70)	.80	-.02	.52***	1							
5. Intrinsic motivation leisure (1-5)	2.66 (1.02)	.76	.23***	-.04	.39***	1						
6. Self-efficacy leisure (1-5)	3.31 (0.77)	.82	.06	.46***	.67***	.56***	1					
7. Avoidance school (1-5)	2.92 (0.85)	.82	-.19***	-.62***	-.36***	-.52***	-.34***	1				
8. Perceived difficulty school (1-5)	2.30 (0.72)	.82	.05	-.15**	-.43***	-.19***	-.30***	.34***	1			
9. Avoidance leisure (1-5)	3.06 (1.02)	.88	-.29***	.07	-.52***	-.29***	-.46***	.61***	.24***	1		
10. Perceived difficulty leisure (1-5)	2.11 (0.69)	.76	-.05	.10	-.30***	-.23***	-.30***	.28***	.61***	.31***	1	
11. Reading comprehension (0-59)	41.42 (7.32)	.80	.01	.26***	.05	.12*	.19***	-.03	-.21***	-.09	-.23***	1

* $p \leq .05$.** $p \leq .01$.*** $p \leq .001$.

Table 4. Results of multilevel analyses.

Parameter	Model 0	Model 1	Model 2	Model 3	Model 4
	Fixed effects				
Intercept	41.08 (0.82)	40.47 (0.95)	38.50 (1.12)	38.53 (1.11)	38.40 (1.08)
Gender (0 = male)		1.05 (0.79)	1.14 (0.79)	1.11 (0.79)	1.25 (0.78)
Grade (0 = Grade 7)			4.09 (1.45)**	4.09 (1.44)**	4.21 (1.40)**
Intrinsic motivation school				-0.54 (0.56)	0.20 (0.63)
Self-efficacy school				1.77 (0.75)*	0.76 (0.80)
Intrinsic motivation leisure time				0.54 (0.50)	0.54 (0.59)
Self-efficacy leisure time				0.23 (0.70)	0.13 (0.70)
Avoidance school					0.57 (0.62)
Perceived difficulty school					-0.97 (0.68)
Avoidance leisure time					0.25 (0.58)
Perceived difficulty leisure time					-1.62 (0.67)*
	Random parameters				
Level 2					
Random intercept variance	12.41 (4.58)	12.950 (4.73)	8.89 (3.53)	8.79 (3.46)	8.07 (3.21)
Level 1					
Random intercept variance	41.08 (3.35)	40.74 (3.32)	40.72 (3.32)	38.81 (3.16)	37.12 (3.03)
Deviance (<i>IGLS</i>)	2,160.83	2,159.09	2,152.19	2,137.26	2,122.12
Difference		1.74	6.90**	14.93**	15.14**
<i>df</i>		1	1	4	4

* $p \leq .05$.** $p \leq .01$.*** $p \leq .001$.

undermining motivations explained 9% of both class-level variance and student-level variance in reading comprehension scores.

In the fourth step, we tested whether there were interaction effects of gender and the motivational variables, but there were none. In other words, the relationship between affirming/undermining motivations and reading comprehension does not differ for girls and boys. Finally, we tested whether there was random slope variability in the motivational

predictors, to establish whether there was reason for testing cross-level interaction effects of these predictors and the class-level predictor grade. None of the models including random slopes resulted in a significant increase in model fit. Consequently, no cross-level interaction effects were analysed, implying that relationships between motivational variables and reading comprehension did not vary across grades.

Discussion

Over the past years, there has been increasing research interest in the distinction between affirming and undermining motivations for reading (Coddington, 2009; Guthrie & Coddington, 2009; Guthrie, Coddington, & Wigfield, 2009; Guthrie, Klauda, & Ho, 2013; Ho & Guthrie, 2013; Klauda & Guthrie, 2012; Rosenzweig & Wigfield, 2017). In this study, we examined whether the structure of a questionnaire designed to measure both types of motivations could be confirmed. We also examined relationships between affirming and undermining motivations, reading comprehension, gender and age. First, the outcomes of our confirmatory factor models provided support for the construct validity of the questionnaire: a model based on this distinction had an overall good fit to the data and a better fit than a model that collapsed affirming and undermining motivations on the same scales. The outcomes also showed that affirming/undermining motivations for school and leisure time reading should be distinguished. Second, we found that undermining motivations explained a significant and unique part of the variance in students' reading comprehension scores, providing support for the predictive validity of the questionnaire: the total share of student-level variance explained by motivational variables almost doubled after inclusion of the undermining motivations, and the share of class-level variance explained raised by 7%. However, we also observed that the correlations between the motivational variables and reading comprehension were, at best, small (ranging from $-.23$ to $.19$).

These small correlations differed from those found in previous studies: in her study on seventh graders, Coddington (2009) found correlations with reading comprehension ranging from $.29$ to $.45$ for affirming motivations and from $-.52$ to $-.26$ for undermining motivations, whereas Guthrie, Coddington, and Wigfield (2009) found correlations for fifth graders ranging from $.21$ to $.36$ (affirming motivations) and from $-.60$ to $-.26$ (undermining motivations). Although these differences may be partly explained by our choice of sample – focusing on low achievers restricts the variance in scores, thus decreasing the chance of finding large associations – the correlations we found are not uncommon in reading motivation research, especially for adolescent students. In a meta-analysis on the relationship between reading attitudes and reading achievement, Petscher (2010) found a mean correlation of $.24$ for middle school students (in comparison, for primary schoolers $r = .44$). In a study of students in Grades 6 to 8, Unrau and Schlackman (2006) observed correlations of no higher than $.23$ between the different subscales of the Motivations for Reading Questionnaire and reading achievement. In Lau and Chan's (2009) study of seventh graders, correlations between motivation and comprehension were between $.12$ (for self-efficacy) and $.34$ (for intrinsic motivation). Retelsdorf, Köller, and Möller (2011) analysed relationships between motivation and reading longitudinally, from Grades 5 to 8. They found correlations ranging from $.05$ (for reading for interest) to $.38$ (for reading self-concept).

In the final multilevel model, perceived difficulty of leisure time reading was the only motivational variable that made a unique, significant contribution to explaining variance in reading comprehension. The absence of effects of other motivational variables in this model was likely a result of collinearity. Although the CFA provided evidence for the distinction between the different types of motivation, the factors were correlated, and the outcomes of the multilevel regression analysis suggest that the intercorrelations between (many of) the motivational predictors were larger than those between the motivational predictors and the criterion (i.e., reading comprehension). Still, the presence of collinearity does not alter the fact that undermining motivations explain a unique part of the variance in reading comprehension scores that is not explained by affirming motivations alone. Together, these results imply that, when accounting for variability in adolescent low achievers' reading comprehension, undermining motivations have an added value, but that, within the categories of affirming and undermining motivations, it is advisable to be parsimonious in one's choice of predictors.

The significance of perceived difficulty was established in earlier studies on undermining motivations (Coddington, 2009; Guthrie, Klauda, & Ho, 2013; Ho & Guthrie, 2013). Guthrie, Coddington, and Wigfield (2009) found that this variable was especially relevant for disadvantaged students, which parallels the outcomes of our sample of low achievers. It can be hypothesised that the sense these students have that reading is hard and problematic is associated with feelings of frustration when engaging in reading tasks, which hamper students' successful fulfilment of such tasks. Against this background, it is interesting to refer to a study conducted by Nielen, Mol, Sikkema-De Jong, and Bus (2016), who found evidence for the presence of a form of 'reading anxiety' among students who were comparable with those in our study (i.e., students in Dutch prevocational secondary education). They used a psychological task commonly used to assess threat and applied it to the context of reading. Following the attentional bias paradigm (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & Van IJzendoorn, 2007), the task was based on the assumption that people have a natural inclination to focus on (and thus respond quicker to) sources of threat. Nielen, Mol, Sikkema-De Jong, and Bus (2016) found that students in prevocational secondary education responded significantly faster to reading-related pictures (e.g., a child reading a book) than to neutral pictures compared with their peers in higher tracks. It would be interesting to examine whether there is an association between undermining motivations and such feelings of threat or anxiety.

We did not find differential effects of undermining motivations on reading comprehension for different age groups or genders. Apparently, these motivations have as much weight for younger as for older students in prevocational secondary education and for girls as for boys. The correlation matrix did show that age was related to avoidance of school reading, suggesting that older students tend to avoid school reading more than younger students do, which mirrors the relationships found in previous research on adolescents' affirming motivations (Kelley & Decker, 2009; Lau, 2009; Lepper et al., 2009; McKenna, Conradi, Lawrence, Jang, & Meyer, 2012; Unrau & Schlackman, 2006; Wolters, Denton, York, & Francis, 2014). Correlations also showed that girls were more intrinsically motivated for both school and leisure time reading than boys, whereas boys were more avoidant of both types of reading; no relations were found between gender and self-efficacy/perceived difficulty. This corresponds with earlier studies in which gender effects were found on variables such as intrinsic motivation, reading enjoyment and value, but no or minimal effects on self-efficacy or reading self-concept (Kelley & Decker, 2009; Marinak & Gambrell, 2010; Smith, Smith, Gilmore, & Jameson, 2012).

Given the observation that undermining motivations had a unique effect on reading comprehension in our sample of low achievers, the question is whether undermining motivations are sensitive to interventions and whether motivational interventions aiming to decrease undermining motivations should be different from interventions aiming to increase affirming motivations. To the best of our knowledge, only one study has been conducted examining intervention effects on undermining motivations. Guthrie, Klauda, and Ho (2013) analysed whether Concept-Oriented Reading Instruction – an intervention characterised by the integration of content and reading education, strategy instruction, autonomy support and collaborative learning – resulted in higher levels of affirming motivations and lower levels of undermining motivations. In addition to positive intervention effects on intrinsic motivation, self-efficacy, valuing of reading and prosocial goals, the authors found that participation in Concept-Oriented Reading Instruction resulted in lower levels of perceived difficulty and less devaluing of reading. Which elements specifically contributed to the reduction of undermining motivations remains unclear, however, which provides ground for further research.

There are a number of limitations to our study. First, as a consequence of several modifications made during the structural equation modeling analyses, the final set of items was different from those in the original study by Coddington (2009), which limits precise comparisons between the two studies. However, the modification indices pointed to some inadequacies in the original instrument (in terms of factor membership and redundancy of items), suggesting that the adapted version provides a more reliable estimate of students' motivations. Second, the study was cross-sectional. This implies that, although one of our aims was to examine the effect of age, we could not monitor the development of students' motivations: we were only able to make a comparison of two cohorts. In future research, a longitudinal approach could be taken. A longitudinal study would also allow to analyse the possible reciprocal relations between undermining motivations and achievement (Morgan & Fuchs, 2007). Second, the sample size combined with the relatively large number of items in the reading motivation questionnaire limited the degrees of freedom in the confirmatory factor analyses. This prevented us from conducting additional analyses, particularly multigroup CFAs for the variables of interest (grade and gender). A replication study using a larger sample that allows for multigroup analyses would thus be warranted. Third, our sample consisted of mainly low-achieving students. Although we found that undermining motivations play a role in low achievers' reading comprehension, we were not able to test the hypothesis that this role is more prominent for low than for high achievers, for want of a subsample of students from other educational tracks. Making such comparisons is necessary to further validate the motivational constructs under investigation. Fourth, the questionnaire we adopted might need further scrutiny. Although the reliabilities of the motivational scales were generally sufficient, the reliability of the intrinsic motivation for school reading scale was relatively low (.68). This may be a result of the fact that this scale consisted of only three items. The lower reliability may have resulted in the nonsignificant correlation with reading comprehension, although other researchers found similar results. De Naeghel, Van Keer, Vansteenkiste, and Rosseel (2012), for instance, found that recreational but not academic motivation was a significant predictor of reading comprehension. Additionally, it could be argued that avoidance, although taken as an aspect of motivation (see also Wigfield & Guthrie, 1997), is more behaviour than motive. Other operationalisations of undermining motivations might thus be explored. Also, there is some discussion in the field whether variables such as self-efficacy and perceived difficulty should be considered as 'genuine' motivation or as antecedents of motivation (Schiefele, Schaffner, Möller, & Wigfield, 2012).

Given that the motivational variables in our study explained nearly a tenth of the reading comprehension differences between individual students and between classes, investing in reading motivation as part of comprehension instruction could significantly contribute to improving reading proficiency in adolescent low achievers. Our outcomes also suggest that teachers need to be aware of motivational differences between students. Guthrie, Coddington, and Wigfield (2009), Ho and Guthrie (2013) and Rosenzweig and Wigfield (2017) observe the presence of different motivational patterns, implying that, whereas some students are primarily guided by affirming motivations, for others, undermining motivations are more prominent. Guthrie, Coddington, and Wigfield (2009) argue that in the case of such 'averse readers' a strong structure of motivational support is vital. Put differently, they suggest that reducing undermining motivations particularly implies *more*, rather than *different* support. A recent meta-analysis (Van Steensel, Van der Sande, Bramer, & Arends, 2016) provides evidence for which motivational interventions are effective. It shows that students particularly benefit from interventions that provide autonomy support (e.g., self-selection of books), that trigger students' personal or situational interest (e.g., by individually mapping students' interests and providing books that match their interests), that help students set mastery goals and support their self-efficacy (e.g., by carefully matching books to reading levels and by monitoring and discussing students' development) and that trigger social motivation by stimulating students to discuss books together and collaborate around reading tasks. However, how such activities combine to reduce undermining motivations is still an unanswered question.

Conclusion

In this study, we found support for the construct validity of a questionnaire based on the theoretical distinction between affirming motivations (intrinsic motivation and self-efficacy) and undermining motivations (avoidance and perceived difficulty) for school and leisure time reading. We also found that undermining motivations explained significant and unique variance in students' reading comprehension scores, providing support for the predictive validity of the questionnaire. Effects on reading comprehension were not moderated by age or gender, but analyses did show that older students and boys were more avoidant of reading. These outcomes strengthen the research base supporting the hypothesised distinction between affirming and undermining motivations, suggesting that reading motivations should not be expressed on unidimensional scales.

Acknowledgements

We would like to thank the students and schools participating in this study. Additionally, we would like to thank the Dutch Organisation for Scientific Research (NWO, project 411-06-504) for funding the study.

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Roel van Steensel works as a professor of Reading Behavior at the Free University Amsterdam and as an assistant professor of Educational Sciences at Erasmus University Rotterdam. His research interests are reading comprehension and motivation, reading education and emergent literacy development and family literacy. Contact details: Erasmus University, P.O. Box 1738, 3000 DR Rotterdam, e-mail: roelvansteensel@gmail.com.

Ron Oostdam is a professor in Learning and Instruction at the Research Institute of Child Development and Education of the University of Amsterdam. He is also a professor in Learning and Instruction at the Amsterdam University of Applied Sciences and a research director of Knowledge Centre for Teaching and Education.

Amos van Gelderen is a researcher at the Kohnstamm Institute of the University of Amsterdam and a professor of Language Acquisition and Development at Rotterdam University of Applied Sciences. His research interests are language learning and instruction at the primary, secondary and tertiary levels both for mother tongue and second or foreign languages.

Received 6 April 2018; revised version received 28 May 2019.

Address for correspondence: Roel van Steensel, Department of Psychology, Education, and Child Studies, Erasmus University, Rotterdam, The Netherlands and Department of Language, Culture, and Communication, Free University Amsterdam, The Netherlands. E-mail: roelvansteensel@gmail.com