Development of a measurement instrument for upper primary students' reading strategy use

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Abstract

Despite the importance of reading comprehension, many students struggle with it. In this respect, upper primary education is a critical period in the development of reading comprehension strategies. However, there is a lack of appropriate measurement instruments to map these students' strategy use. Therefore, a new task-specific Reading Comprehension Strategies Questionnaire (RCSQ) was developed in this study. Explorative (*n* = 1585) and confirmative factor analyses (*n* = 1585) were performed. The RCSQ emerged from these analyses, containing five subscales: (1) overt cognitive reading strategies, (2) covert cognitive reading strategies, (3) monitoring, (4) evaluating, and (5) using home language in view of comprehending texts. Based on the findings, the theoretical and educational significance of the RCSQ is discussed.

Extended summary

Theoretical background

Reading comprehension strategies play an important role in achieving effective reading comprehension skills (e.g., Follmer & Sperling, 2018), a key competence to participate successfully in the current society. Upper primary education is a critical period in the development of these strategies (Keresteš, Brkovic, Siegel, Tjus, & Hjelmquist, 2019). Unfortunately, appropriate measurement instruments are lacking to map this age group's reading comprehension strategy use.

Despite the fact that various instruments have already been published, these instruments are not suitable in several respects. More specifically, previous instruments focus mostly on older students (e.g., secondary education; Mokthari & Reichard, 2002; higher education; Zhang, 2018). Further, they focus exclusively on either non-native students (e.g., Shih, Chern, & Reynold, 2018) or native students (e.g., Mokthari & Reichard, 2002), while in the context of our increasingly diverse society (Tenenbaum, Leman, & Aznar, 2017) current classes consists of a mixture of diverse student groups. Finally, most

available instruments to map students' reading strategy use are general self-reports. Self-reports are easy to implement in large-scale studies and disrupt less the reading process than when using online measurement methods (e.g., Schellings & van Hout-Wolters, 2011). However, the accuracy of the answers can be questioned (e.g., Bråten & Samuelstuen, 2007). In this respect, the literature points at the fact that task-specific instead of general self-reports respond better to this concern (Authors, 2014; Schellings, Van Hout-Wolters, Veenman, & Meijer, 2013). More specifically, task-specific self-reports investigate students' strategy use immediately after completing a reading comprehension task and with reference to that specific reading task.

The aim of this study is, therefore, to develop a task-specific reading comprehension strategy use questionnaire for upper primary students, including both native and non-native students.

Method

Participants. A total of 3170 Flemish (Belgium) upper primary students from 163 classes in 68 schools participated in this study. Their average age was 11.38 years (*SD* = 0.93). 87.3% were native students (i.e., speaking Dutch, which is the instructional language, at home), 7.1% non-native (i.e., speaking another language than Dutch at home), and 5.6% were bilingual students (i.e., speaking Dutch combined with another language at home).

Instrument development. The instrument was developed through a multistep process, based on the Standards for Educational and Psychological testing (AERA, APA, & NMCE, 2014). An item pool of 61 items, deducted from current available instruments on reading comprehension strategy use (e.g., Mokthari & Reichard, 2002; Phakiti, 2008; Limei Zhang, 2018) served as a base. Next, experts on reading comprehension and instrument development and a primary school teacher and her students reviewed the items.

Data-analysis. Parallel analysis (PA), exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and reliability analysis were conducted with the lavaan package 0.6-5 in R. The sample was randomly split to conduct the EFA (*n* = 1585) and CFA (*n* = 1585) on two independent subsamples.

Results

PA and EFA were performed iteratively. Three criteria were used to determine the remaining items: a) significance level, b) factor loadings, and c) theoretical relevance of the items. After five iterations, an acceptable factor structure appeared, consisting of 26 items over five factors (see Table 1). The CFA confirmed these results (YB χ^2 = 898.260, *df* = 289, $p < .001$, CFI = .93, TLI = .92, RMSEA = .04 with a 90% confidence interval = [.03, .04], SRMR = 0.06). Based on the literature and expert input, the five remaining factors were labelled as: 'overt cognitive reading strategies', 'covert cognitive reading strategies', 'monitoring', 'evaluating', and 'using home language in view of comprehending texts'. The items within the last category were only completed by the non-native and bilingual students. Benthler's rho reliability coefficients are provided in Table 2.

Theoretical and educational significance

The newly developed Reading Comprehension Strategies Questionnaire (RCSQ) responds to the lack of appropriate measurement instruments mapping upper primary students' reading comprehension strategy use. Moreover, the RCSQ takes into account the context of a worldwide growing diverse society by focusing on native, non-native, and bilingual students within one instrument. The RCSQ can

also inform upper primary teachers on their students' strategy use to align their instruction with the students' strengths and weaknesses.

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Table 1

Pattern and Structure Coefficients of EFA (sample 1): Significance level and factor loadings.

Item	OCOG		CCOG		MON		EVA		HL	
	FL	p-value	FL	p-value	FL	p-value	FL	p-value	FL	p-value
OCOG1	**0.559**	**0.000**	0.296	0.074	0.065	0.462	0.007	0.898	0.049	0.597
OCOG2	**0.812**	**0.000**	0.176	0.426	0.012	0.838	-0.069	0.408	0.055	0.628
OCOG3	**0.950**	**0.000**	-0.042	0.722	-0.105	0.366	-0.020	0.680	-0.113	0.296
OCOG4	**0.894**	**0.000**	-0.259	0.031	0.148	0.351	0.095	0.160	0.033	0.496
OCOG5	**0.867**	**0.000**	0.052	0.602	-0.145	0.296	0.081	0.204	0.009	0.881
OCOG6	**0.672**	**0.000**	0.235	0.301	-0.060	0.404	-0.184	0.051	0.001	0.982
OCOG7	**0.596**	**0.000**	0.190	0.436	0.053	0.492	-0.115	0.268	-0.055	0.450
CCOG1	0.059	0.550	**0.530**	**0.010**	0.047	0.721	0.032	0.710	-0.269	0.067
CCOG2	0.018	0.845	**0.535**	**0.007**	0.132	0.402	0.028	0.732	0.027	0.835
CCOG3	-0.102	0.266	**0.384**	**0.012**	0.185	0.199	0.285	0.003	-0.088	0.296
CCOG4	0.024	0.840	**0.658**	**0.000**	0.033	0.807	-0.110	0.406	0.006	0.949
CCOG5	0.061	0.650	**0.462**	**0.066**	0.269	0.092	0.066	0.562	0.154	0.220
CCOG6	0.035	0.708	**0.631**	**0.025**	-0.252	0.127	0.136	0.359	0.066	0.574
CCOG7	0.114	0.190	**0.305**	**0.151**	0.188	0.120	0.200	0.114	-0.169	0.110
MON1	-0.024	0.691	0.061	0.744	**0.847**	**0.000**	0.062	0.512	0.054	0.536
MON2	0.157	0.220	-0.020	0.765	**0.724**	**0.000**	-0.218	0.114	-0.035	0.606
MON3	-0.028	0.645	0.088	0.571	**0.896**	**0.000**	-0.025	0.620	0.058	0.534
EVA1	-0.071	0.483	-0.014	0.916	-0.162	0.177	**0.475**	**0.000**	0.101	0.294
EVA2	-0.075	0.409	0.048	0.672	-0.040	0.604	**0.526**	**0.000**	-0.118	0.134
EVA3	-0.061	0.536	0.206	0.175	0.050	0.485	**0.579**	**0.000**	0.099	0.334
EVA4	0.018	0.778	-0.009	0.939	-0.088	0.433	**0.809**	**0.000**	-0.074	0.424
EVA5	0.058	0.378	0.206	0.137	0.116	0.376	**0.595**	**0.000**	-0.058	0.390
EVA6	0.082	0.372	-0.042	0.735	-0.012	0.834	**0.715**	**0.000**	0.117	0.320
HL1	-0.015	0.635	0.441	0.209	-0.288	0.136	-0.013	0.668	**0.841**	**0.000**
HL2	0.317	0.034	0.126	0.553	0.010	0.863	-0.112	0.357	**0.679**	**0.000**
HL3	0.308	0.088	-0.054	0.367	0.066	0.441	0.078	0.548	**0.950**	**0.000**

Note. FL = factor loadings; OCOG = overt cognitive reading strategies; CCOG = covert cognitive reading strategies; MON = monitoring; EVA = evaluating; HL = using home language in view of comprehending texts.

Table 2

Descriptive statistics of the RCSQ subscales (sample 2).

	M	*SD*	n_{items}	Bentler's ρ
Overt cognitive reading strategies	1.68	0.71	7	0.84
Covert cognitive reading strategies	2.93	0.72	7	0.66
Monitoring	2.88	1.09	3	0.74
Evaluating	3.60	0.71	6	0.75
Using home language in view of comprehending texts	2.33	1.12	3	0.79