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Cross-lagged Relations Between Teacher- and Parent-Ratings of Children's Task Avoidance and

Different Literacy Skills

Abstract

Background: Task avoidance is a significant predictor of literacy skills. However, it remains unclear if the relation between the two is reciprocal and if it is affected by the type of literacy outcome, who is rating children's task avoidance, and the children's gender.

Aim: The purpose of this longitudinal study was to examine the cross-lagged relations between teacher- and parent-ratings of children's task avoidance and different literacy skills.

Sample: One hundred seventy-two Greek children (91 girls, 81 boys) were followed from Grade 1 to Grade 3.

Methods: Children were assessed on reading accuracy, reading fluency, and spelling to dictation. Parents and teachers rated the children's task-avoidant behavior.

Results: Results of structural equation modeling showed that the cross-lagged relations varied as a function of the literacy outcome, who rated the children's task avoidance, and children's gender. Earlier reading and spelling performance predicted subsequent parent-rated task avoidance, but parent-rated task avoidance did not predict subsequent reading and spelling performance (with the exception of spelling in Grade 3). Teacher-rated task avoidance and reading fluency/spelling had a reciprocal relationship over time. In addition, the effects of teacher-rated task avoidance on future spelling were significantly stronger in boys than girls.

Conclusions: This suggests that poor reading and spelling performance can lead to subsequent task avoidance in both classroom and home situations. The fact that task avoidance permeates across different learning environments is alarming and calls for joint action from both parents and teachers in order to mitigate its negative impact on learning.

Keywords: task avoidance, reading, spelling, motivation, Greek, longitudinal.

Cross-lagged Relations Between Teacher- and Parent-Ratings of Children's Task Avoidance and

Different Literacy Skills

Literacy acquisition is known to be predicted by cognitive skills, such as phonological awareness, rapid automatized naming, orthographic knowledge, and morphological awareness (e.g., Georgiou, Parrila, & Papadopoulos, 2008; Kirby, Deacon, Bowers, Wade-Woolley, & Parrila, 2012; Muter, Hulme, Snowling, & Stevenson, 2004). However, irrespective of the number of cognitive processing skills used as predictors of literacy acquisition, a significant amount of variance in reading and spelling (30-40%) remains unexplained (e.g., Bowey, 2005; Scarborough, 1998). Subsequently, several researchers have suggested that in order to have a more comprehensive picture of literacy acquisition we need to also consider the role of non-cognitive factors, such as motivation (e.g., Guthrie, Wigfield, Metsala, & Cox, 1999). In this study we examined the cross-lagged relations between a motivational component (task-avoidant behaviour) and different literacy skills (reading accuracy, reading fluency, and spelling) in children learning to read Greek.

A handful of studies have shown that task avoidance, defined as the lack of effort a person demonstrates when encountered with challenging tasks, is a significant predictor of literacy acquisition in different languages (e.g., Chinese: Liao, Georgiou, Zhang, & Nurmi, 2013; English: Stephenson et al., 2008; Estonian: Mägi, Häidkind, & Kikas, 2010; Finnish: Hirvonen, Georgiou, Lerkkanen, Aunola, & Nurmi, 2010; Greek: Georgiou, Manolitsis, Nurmi, & Parrila, 2010). Its popularity has grown particularly after the findings of studies showing that it continues to predict reading/spelling after statistically controlling for the effects of key predictors of reading/spelling, such as letter knowledge (e.g., Manolitsis, Georgiou, Stephenson, & Parrila, 2009), phonological awareness (e.g., Stephenson et al., 2008), and rapid automatized naming (e.g., Georgiou et al., 2010). Some researchers have further argued that task avoidance and

literacy skills may form "cumulative cycles" of either success or failure (e.g., Aunola et al., 2002; Fyrstén, Nurmi, & Lyytinen, 2006; Lepola, Salonen, & Vauras, 2000; Metsäpelto et al., 2015; Onatsu-Arvilommi & Nurmi, 2000). If a child persists in the face of obstacles, then s/he will likely perform better academically, which, in turn, will lead to more task–focused behaviour in new learning situations.

Theoretically, these findings are related to the expectancy value theory of motivation, according to which earlier negative self-concept and low efficacy beliefs, originating from failures in previous learning experiences, increase the likelihood of expecting a failure in a particular task, which then leads to low interest in the task and low effort (e.g., Eccles et al., 1983; Onatsu-Arvilommi & Nurmi, 2000; Wigfield & Eccles, 2000; Wigfield, Tonks, & Eccles, 2004). Low levels of interest and effort, evidenced in high task avoidance, are then likely to lead to failures in various learning situations. This framework to motivation and its behavioral consequences is based on the notion that feedback from previous learning efforts in a particular kind of task provides a basis for children's future motivation in a similar task, that motivation can develop differently in different kinds of learning tasks, and that motivation may change if the feedback turns out to be negative (see also Onatsu-Arvilommi & Nurmi, 2000). Previous studies have also shown that not only task avoidance predicts reading performance, but also poor reading performance and related negative feedback increase the likelihood of developing task avoidance later on (e.g., Aunola et al., 2002; Fyrstén et al., 2006; Morgan, Farkas, Tufis, & Sperling, 2008; Metsäpelto et al., 2015; Onatsu-Arvilommi & Nurmi, 2000). Although motivation and related task avoidance is context specific and may differ in different school subjects, it may also be influenced by individual characteristics, such as temperament and personality (e.g., Elliot & Thrash, 2002; Hirvonen, Aunola, Alatupa, Viljaranta, & Nurmi, 2013).

The present study focused on examining the behavioral aspect of low motivation, namely task avoidance.

A careful look at the longitudinal studies that examined the cross-lagged relations between task avoidance and reading reveals that the pattern of relations found is not clear. Some studies have reported reciprocal relations between task avoidance and reading, but only between specific time points (e.g., Aunola et al., 2002; Hirvonen et al., 2010). In turn, some others have reported only unidirectional effects: earlier task avoidance predicted subsequent reading, but earlier reading did not predict subsequent task avoidance (e.g., Nurmi et al., 2003; Onatsu-Arvilommi, Nurmi, & Aunola, 2002). To explain these inconsistencies, Georgiou and colleagues (2010) proposed that the effects of task avoidance on reading may depend on the level of challenge that a child faces when making an effort to master a particular learning task: the more challenging the learning task is, the more detrimental effects task avoidance behavior will exert.

The challenge of the type of learning outcome (in this case of reading and spelling) is further determined by the consistency of the orthography children are learning to read. In transparent orthographies (e.g., Finnish, Greek), in which the relation between graphemes and phonemes is unambiguous, children master decoding relatively quickly and effortlessly (e.g., Seymour, Aro, & Erskine, 2003). As a result, task avoidance can predict reading accuracy only in kindergarten or early Grade 1. In contrast, in opaque orthographies (e.g., English, French), in which the relation between graphemes and phonemes is ambiguous, children continue to experience difficulties in reading accuracy even in upper elementary grades (e.g., Ellis et al., 2004). Thus, in opaque orthographies, the role of task avoidance in reading accuracy should extend beyond the first grade. In line with these expectations, studies in Finnish (Aunola et al., 2002; Fyrstén et al., 2006) have shown that task avoidance was predictive of reading accuracy either in Kindergarten or during the first half of Grade 1, but not later on. In turn, studies in

English (e.g., Georgiou, Hirvonen, Liao, Manolitsis, Parrila, & Nurmi, 2011) or Chinese (e.g., Liao et al., 2013) have reported significant effects of task avoidance on reading accuracy even in upper elementary grades.

However, orthographic consistency can be further divided into forward (from letters to sounds) and backward (from sounds to letters) consistency. Some languages such as Greek or German have high forward consistency, but relatively low backward consistency (Protopapas & Vlachou, 2009; Wimmer & Mayringer, 2002)[1]. For example, in the Greek word "ησυχία" /isihia/ (quiet), the letters "η", "ι", and "υ" are always pronounced the same way (/i/). However, when asked to spell the same word, one cannot tell which /i/ letter goes where, unless s/he knows how to spell the word from memory (see also Loizidou-Ieridou, Masterson, & Hanley, 2010). This implies that for the same children who do not experience any decoding problems, spelling may impose significant challenges. Several studies have documented these problems (e.g., Loizidou-Ieridou et al., 2010; Pittas & Nunes, 2014; Protopapas et al., 2013). If task avoidance is brought about by earlier failures in a particular task (Eccles et al., 1983; Wigfield & Eccles, 2000), then spelling should be associated with higher levels of task avoidance than reading accuracy. In addition, if learning outcomes and task avoidance form "cumulative cycles" of either success or failure (e.g., Onatsu-Arvilommi & Nurmi, 2000), then earlier task avoidance should exert a significant effect on future spelling but not reading accuracy. Georgiou et al. (2010) provided evidence in support of this hypothesis in their study with Greek children followed from Kindergarten until Grade 3. Unfortunately, Georgiou et al. (2010) did not examine if early spelling also influenced future task avoidance. Thus, a longitudinal study that examines possible differences in the size and direction of the relation between task avoidance and reading/spelling in an orthography with an asymmetry between forward and backward consistency is much needed.

An issue that has received less attention by researchers is also who is rating the children's task-avoidant behaviour. With the exception of Mägi et al. (2011), who employed parent ratings of children's task avoidance, most previous studies have used teacher ratings of children's task avoidance to predict literacy acquisition. Working with a group of Finnish children followed from kindergarten to Grade 2, Mägi and colleagues (2011) found that earlier reading ability (Grade 1) predicted future parent-rated task avoidance (Grade 2). This finding is in contrast to those of Aunola et al. (2002) and Hirvonen et al. (2010) who found that only teacher-rated task avoidance predicted future reading ability in Finnish, but not the opposite. Language, time of assessment, and reading outcomes cannot explain these differences since these factors were the same across studies. Thus, it is possible that parent ratings of task avoidance in homework situations may assess something different than teacher ratings of task avoidance during classroom situations. Teacher-rated task-avoidant behavior among children can also have an impact on parent ratings, if teachers provide feedback to parents concerning their children task avoidance in classroom.

Another factor that needs to be taken into consideration is children's gender. Gender differences in school-related attitudes, motivation, and behaviour have been reported in previous studies. For example, girls have been found to show more task-focused behaviour (Hirvonen et al., 2010) and engagement (Lam et al., 2012; Yeung, Lau, & Nie, 2011) compared to boys. Boys, in contrast, have been rated higher than girls in task-avoidant and disruptive behaviour (e.g., Mägi et al., 2013; Yeung et al., 2011). An explanation could be that boys do not find school-related tasks as interesting and appealing as girls do (e.g., Logan & Johnston, 2009; Yeung et al., 2011) and, consequently, invest less effort in these tasks. Alternatively, it may be that teacher or observer ratings of children's task-avoidant behaviour are influenced by gender stereotypes: behaviour that is valued as desirable in classrooms is considered to be more typical for girls than

for boys, and thus, boys' behaviour may be judged as less appropriate (e.g., Mullola et al., 2012; Younger, Warrington, & Williams, 1999). However, gender may also influence the associations between task-avoidant behaviour and children's literacy skills (e.g., Logan & Johnston, 2009). If boys perform worse than girls in literacy tasks (e.g., Clinton et al., 2014; Stoet & Geary, 2013; Voyer & Voyer, 2014) and teachers rate more accurately boys' task avoidance behavior (because boys' task avoidance would become more obvious in different classroom situations), then the associations between task avoidance and literacy skills may be stronger in boys than in girls.

The Present Study

The present study aimed to answer the following questions:

1. To what extent (a) does task avoidance longitudinally predict different literacy skills in Greek, and (b) do different literacy skills predict task avoidance? We expected that spelling would be reciprocally related to task avoidance over time, but that neither reading accuracy nor reading fluency would be predicted by task avoidance.

2. Do the results vary as a function of (a) who is rating the children (teacher vs. parent) and (b) children's gender? We expected that because teachers can compare the performance of each child against that of his/her classmates, teacher-rated task avoidance would be a better predictor of future reading/spelling than parent-rated task avoidance. In addition, we expected task avoidance to be more strongly related to reading/spelling among boys than among girls.

The current study makes three important contributions to the literature. First, to our knowledge, this is the first study in which parent and teacher ratings of children's task avoidance are used in the same study as predictors of subsequent reading and spelling. This allows us to obtain a more comprehensive picture of the effects of task avoidance since we now cover both home- and school-learning environments. Second, compared to previous longitudinal studies that

followed the same children for a short developmental period (e.g., Aunola et al., 2002; Manolitsis et al., 2009), we assessed the same children yearly from Grade 1 to Grade 3. Finally, we assessed not only reading but also spelling. This allows us to examine if, in the context of Greek language, task avoidance has a reciprocal relationship with spelling but not with reading.

Method

Participants

Children. One hundred seventy-two Grade 1 Greek children (91 girls, 81 boys; mean age = 75.94 months, SD = 3.32 at the first measurement point) attending six inner-city public schools in Heraklion and Rethymno, Greece, were recruited on a voluntary basis to participate in our study. The children were followed from Grade 1 to Grade 3 and were assessed once every year (October/November). By Grade 3, our sample consisted of 150 children. Twenty-two children either withdrew from the study or relocated and could not be detected. A comparison between those who left the study and those who remained did not reveal significant differences in any of the measures during the first measurement point (all ps > .06). All participants were Caucasian and native speakers of Greek. Immigrant children and children with sensory deficits were excluded from the study. Parental consent was obtained prior to testing.

Teachers. Teachers from the participating schools were asked to rate each of their students' task-avoidant behaviour (see below for details). The educational system in Greece is centralized and all teachers follow the same curriculum. All of the 44 participating teachers (13 teachers in Grade 1, 15 in Grade 2, and 16 in Grade 3) had a minimum of five years of teaching experience and taught the same grade for at least three years.

Parents. The parents of the participating children filled out a questionnaire regarding their children's task-avoidant behaviour (see below for details); 80% of the questionnaires were

filled out by mothers, 12% by fathers, and 6% by both parents (2% of the questionnaires had no designation who filled out the questionnaire).

Measures

Reading accuracy. Reading accuracy was assessed in Grades 1 and 2 with Word Identification and Word Attack (Papadopoulos, 2001). In Word Identification, children were asked to read as accurately as possible a list of 106 words of increasing difficulty. The test was discontinued after six consecutive errors and the participants' score was the total number of correctly read words. Cronbach's alpha reliability coefficient in our sample was .90 in Grade 1 and .83 in Grade 2. In Word Attack, children were asked to read 45 pseudowords that were derived from real words after changing two or three letters. Testing was discontinued after six consecutive errors and a participants' score was the total number of correctly read pseudowords. Cronbach's alpha reliability coefficient in our sample was .94 in Grade 1 and .90 in Grade 2. Word Identification and Word Attack correlated .86 with each other in Grade 1 and .65 in Grade 2. A composite score for reading accuracy was created by averaging the z scores in Word Identification and Word Attack.

Reading fluency. Reading fluency was assessed with Word Reading Efficiency (WRE) and Phonemic Decoding Efficiency (PDE), which were adapted in Greek from the Test of Word Reading Efficiency (Torgesen, Wagner, & Rashotte, 1999; see Georgiou, Papadopoulos, Fella, & Parrila, 2012, for details). In WRE, children were asked to read as fast as possible a list of 104 words of increasing difficulty, divided into four columns of 26 words each. In PDE, children were asked to read as fast as possible a list of 63 pseudowords. A short, eight-word/pseudoword practice card was presented prior to testing to ensure familiarity of the participants with the requirements of each test. The score in each task was the number of correct words/pseudowords read within a 45-second time limit. Georgiou et al. (2012) reported test-retest reliability for WRE

and PDE in Grade 2 to be .92 and .86, respectively. WRE and PDE correlated .94, .83, and .85 with each other in Grades 1, 2, and 3, respectively. A composite score for reading fluency was calculated by averaging the z scores in WRE and PDE.

Spelling to dictation. Spelling to dictation was adapted from Mouzaki, Protopapas, Sideridis, and Simos (2007) by adding 12 easier items (six letters and six letter combinations) for a total of 72 items. The words in the test have been taken from Grade 1 to 6 language arts textbooks and have been arranged in increasing difficulty. The administration procedure was typical of spelling to dictation tasks: First, the examiner pronounced each word in isolation and then in context to demonstrate its use. After repeating the word in isolation for a second time, the examiner asked each child to write the word on a numbered form corresponding to each item. The task was discontinued after four consecutive errors. A participant's score was the number of correctly spelled items. Cronbach's alpha reliability coefficient in our sample was .87 in Grade 1 and .90 in Grades 2 and 3.

Teacher ratings of task avoidance. Teachers were asked to evaluate each child's task avoidance using the Behavioural Strategy Rating Scale-II (BSR-II; Aunola, Nurmi, Parrila, & Onatsu-Arvilommi, 2000; see also Zhang, Nurmi, Kiuru, Lerkkanen, & Aunola, 2011 for validity information of the scale), which was adapted to Greek (see Authors, 2010). Teachers were first asked to consider how a certain child typically behaved in language arts classes and rate his/her behavior using five statements (*Does the student have a tendency to find something else to do instead of focusing on the task at hand? Does the student actively attempt to solve even difficult situations and tasks? Does the student give up easily? Does the student demonstrate initiative and persistence in his/her activities and tasks? If the activity is not going well, does the student lose his/her focus?*). The statements were assessed on a five-point Likert-scale that ranged from *very much/easily* to *not at all*. Cronbach's alpha reliability coefficient in our sample

was .81, .93, and .87 for Grades 1, 2, and 3, respectively. A composite score for teacher-rated task avoidance was created by adding up the scores in the five items (after reversing the scoring in items 2 and 4).

Parent ratings of task avoidance. Parents were asked to evaluate the behaviour of their child during reading/spelling homework activities using the same five questions from BSR-II (Aunola et al., 2000). A composite score for parent-rated task avoidance was created by adding up the scores in the five items. Cronbach's alpha reliability coefficient in our sample was .75, .73, and .73 for Grades 1, 2, and 3, respectively. Mother-rated task avoidance has been found to correlate .48 with teacher-rated task avoidance (see Zhang et al., 2011).

Analytical Strategy

To examine the cross-lagged relationships between task-avoidant behaviour and literacy skills across the three time points, we used structural equation modeling (SEM). Separate models were first tested for teacher-rated task avoidance paired with each literacy outcome and for parent-rated task avoidance paired with each literacy outcome. In the final models, teacher and parent ratings of task avoidance were entered in the same model in order to examine their joint and unique contribution to the three literacy outcomes (see Figure 1). Differences in the associations between literacy outcomes and parent and teacher ratings of task avoidance were tested by constraining all regression paths and covariances equal for parent and teacher ratings (one parameter at a time) and by comparing the restricted model with a model in which all parameters were freely estimated. If the fit of the model did not change significantly after the restrictions, the constrained associations could be assumed equal between parent and teacher ratings. Similarly, gender differences were tested by constraining all regression paths and covariances equal between girls and boys and by comparing this restricted model with a non-restricted model.

Because our relatively small sample size imposes restrictions on the number of parameters that can be estimated in the final model, we used composite scores for teacher- and parent-rated task avoidance instead of latent factors. However, we tested the factor structure and measurement invariance of the parent and teacher ratings both across time and across raters, following the procedure recommended for testing measurement invariance (van de Schoot, Lugtig, & Hox, 2012) and using the recommended cutoff criteria for fit indices (Chen, 2007). The results showed that full measurement invariance for the task avoidance scale could not be met, but partial metric invariance was established (details on the measurement invariance testing including the fit indices can be obtained from the authors upon request): Factor loading for the fourth item could not be set equal for teacher and parent ratings. In addition, in teacher ratings, factor loading for the first item in Grade 1 could not be set equal with the other time points.

<<INSERT FIGURE 1 ABOUT HERE>>

All models were estimated with maximum likelihood estimation with robust standard errors (MLR) using Mplus7 statistical program (Muthén & Muthén, 1998-2012). To evaluate the model fit, we used the χ^2 value, the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR). A non-significant χ^2 value along with fit indexes higher than .95 for CFI and TLI, and lower than .06 for RMSEA and .08 for SRMR indicate good fit (see Hu & Bentler, 1999). Gender differences were tested with multigroup analysis. The Satorra-Bentler formula was used to calculate the corrected value of χ^2 difference test for nested models.

Results

Descriptive statistics

Descriptive statistics for the measures used in the study as well as zero-order correlations between the measures are presented in Table 1, separately for girls and boys. A significant gender difference was found in parent ratings of task avoidance in Grade 1: boys were rated to be more task-avoidant than girls ($t(169) = 2.37$, $p = .019$, Cohen's $d = 0.36$). There were no gender differences in any of the teacher ratings of task avoidance. In addition, parents rated boys' task avoidance higher than teachers in Grade 1 ($t(78) = 2.14$, $p = .036$, dependent samples $d = 0.31$), and girls' task avoidance higher than teachers in Grade 3 ($t(61) = 2.69$, $p = .009$, dependent samples $d = 0.38$).

<<INSERT TABLE 1 ABOUT HERE>>

Cross-lagged Relations Between Reading Accuracy and Task Avoidance

The model for the cross-lagged relations between reading accuracy and parent- and teacher-rated task avoidance was saturated and no fit indices could be estimated. To test whether the associations between parent ratings of task avoidance and reading accuracy were similar to those with teacher ratings, each parameter was constrained equal one at a time and the resulting model was compared to a model with no restrictions. The results showed that the covariance between task avoidance and reading accuracy in Grade 1 was significantly different for parent and teacher ratings, whereas all other parameters could be constrained equal. After these restrictions were imposed, the model did not differ significantly from the one in which no restrictions were imposed, $\Delta\chi^2(3) = 4.97$, $p = .17$. The fit of the final model was good, $\chi^2(3) = 4.97$, $p = .17$; CFI = 0.99; TLI = 0.95; RMSEA = .06; SRMR = .03.

Gender differences were further checked for all regression paths and covariances. The results showed that all covariances and regression paths could be constrained equal across

gender: the fit of the gender-restricted model did not differ significantly from the non-restricted model, $\Delta\chi^2(12) = 7.88$, $p = .79$. The results of the final model (see Figure 2) showed that reading accuracy in Grade 1 did not predict parent or teacher ratings of children's task avoidance in Grade 2, and task avoidance in Grade 1 did not predict subsequent reading accuracy.

<<INSERT FIGURE 2 ABOUT HERE>>

Cross-lagged Relations Between Task Avoidance and Reading Fluency

The model for the cross-lagged relations between reading fluency and parent- and teacher-rated task avoidance fitted the data well, $\chi^2(9) = 10.03$, $p = .35$; CFI = 1.00; TLI = 1.00; RMSEA = .03; SRMR = .03. To test time invariance of the cross-lagged paths, a model in which the paths from task avoidance to reading fluency and vice versa were constrained to be equal across time, was compared against a model with no equality constraints. Results showed that the associations could be constrained equal across time and the fit of the time-restricted model did not differ from the fit of the non-restricted model, $\Delta\chi^2(6) = 2.45$, $p = .87$. Comparisons of the associations between reading fluency and parent and teacher ratings showed that the paths from task avoidance to subsequent reading fluency and the covariance between task avoidance and reading fluency in Grade 1 were significantly different for parent and teacher ratings. After these restrictions were imposed, the model did not differ significantly from the model with no restrictions, $\Delta\chi^2(3) = 1.38$, $p = .71$. The fit of the model was very good, $\chi^2(18) = 13.89$, $p = .74$; CFI = 1.00; TLI = 1.00; RMSEA = .00; SRMR = .03.

Next, gender comparisons revealed that the covariances between reading fluency and task avoidance in Grade 2 and between teacher- and parent-rated task avoidance in Grade 2 were significantly different for boys and girls, whereas all other regression paths and covariances

could be constrained equal across the two groups. After these restrictions were imposed, the gender-restricted model did not differ significantly from the non-restricted model, $\Delta\chi^2(16) = 14.62$, $p = .55$. The results of the final model (see Figure 3) showed that lower reading fluency in Grades 1 and 2 led to higher parent- and teacher-rated task avoidance later on. In addition, teacher-rated task avoidance in Grades 1 and 2 predicted reading fluency in Grades 2 and 3.

<<INSERT FIGURE 3 ABOUT HERE>>

Cross-lagged Relations Between Task Avoidance and Spelling

The fit of the model for the cross-lagged relationships between spelling and parent- and teacher-rated task avoidance was good, $\chi^2(9) = 10.90$, $p = .28$; CFI = 1.00; TLI = 0.98; RMSEA = .04; SRMR = .03. Time invariance could be set for the associations from spelling to parent-rated task avoidance and from teacher-rated task avoidance to spelling, but not from spelling to teacher-rated task avoidance or from parent-rated task avoidance to spelling. After these restrictions were imposed, the model fit was not significantly different from that of the non-restricted model, $\Delta\chi^2(4) = 2.52$, $p = .64$. Comparing the associations of parent and teacher ratings showed that the covariances between task avoidance and spelling in Grades 1 and 2, and the paths from task avoidance in Grade 1 to spelling in Grade 2 and from spelling in Grade 2 to task avoidance in Grade 3 were significantly different for parents' and teachers' ratings of task avoidance. After restricting all other regression paths and covariances, the model did not differ significantly from the non-restricted model, $\Delta\chi^2(3) = 1.45$, $p = .69$. The model fit the data well, $\chi^2(16) = 14.91$, $p = .53$; CFI = 1.00; TLI = 1.00; RMSEA = .00; SRMR = .04.

Finally, gender comparisons showed that the covariances between spelling and teacher-rated task avoidance in Grades 2 and 3, the covariance between teacher and parent ratings of task

avoidance in Grade 2, and the paths from earlier teacher-rated task avoidance to subsequent

spelling needed to be estimated separately for girls and boys. Once these restrictions were

imposed, the model fit was not significantly different from the non-restricted model, $\Delta\chi^2(16) =$

16.44, p = .42. The results of the final model (presented in Figure 4) showed that lower spelling

in Grades 1 and 2 predicted higher parent and teacher ratings of children's task avoidance later

on, and the effect was stronger for teacher ratings particularly from Grade 2 to Grade 3. Parent-

rated task avoidance in Grade 1 did not predict spelling in Grade 2, but higher parent-rated task

avoidance in Grade 2 predicted lower spelling in Grade 3. Teacher ratings of task avoidance in

Grades 1 and 2 predicted spelling later on, but the associations were significantly stronger among

boys than among girls.

<<INSERT FIGURE 4 ABOUT HERE>>

Discussion

The purpose of this longitudinal study was to examine the cross-lagged relations between

parent and teacher ratings of children's task avoidance and different literacy outcomes in Greek,

which is transparent in the direction of reading, but less transparent in the direction of spelling.

In general, our results showed that higher levels of task avoidance lead to lower reading and

spelling skills and that lower reading and spelling skills lead to more task avoidance. However,

these relations varied as a function of who rated children's task avoidance and children's gender.

Teachers' and parents' views on children's task avoidance may vary because of the different

contexts the ratings were done and because of different points of comparison teachers and

parents have in their use. When parents rated their children's task avoidance, our results showed

that, with one exception (task avoidance in Grade 2 predicting spelling in Grade 3), only earlier

reading or spelling predicted future task avoidance (see Mägi et al., 2011, for a similar finding). An explanation may be that because parents receive feedback from teachers regarding their child's performance in reading and spelling, they adjust their ratings of task avoidance later on to be in accord with the teacher's feedback concerning the child's performance. This is further supported by the finding that earlier teacher-rated task avoidance predicted subsequent parent-rated task avoidance. However, parent ratings did not predict children's future reading or spelling performance (with the exception of spelling in Grade 3). One possible explanation for this result is that parents do not know how well the rest of the children in the classroom will do compared to their child. In contrast, teachers know all children in a class and can differentiate between levels of task avoidance in their students, and therefore their ratings predict better the children's subsequent reading and spelling ability. This advantage shows up as early as in Grade 1 in which the relation between teacher-rated task avoidance and literacy skills was significantly stronger than the relations between parent-rated task avoidance and literacy skills.

Our cross-lagged analyses with teacher ratings of task avoidance further showed that there were reciprocal relations between task avoidance and reading fluency/spelling across all measurement points. These findings are in line with those of previous studies in Finnish (e.g., Aunola et al., 2002; Fyrstén et al., 2006; Onatsu-Arvilommi & Nurmi, 2000) as well as the findings of an intervention study (see Morgan et al., 2008) showing that task-avoidant behaviour and literacy skills form "cumulative cycles" of either success or failure. Repeated experiences of failure lead to the deployment of task-avoidant strategies, which, in turn, decrease the likelihood of succeeding in academic tasks later on (e.g., Morgan et al., 2008; Wigfield & Eccles, 2000; see also Morgan & Fuchs, 2007, for evidence from a meta-analysis). We extend these findings to spelling, which is arguably the most challenging literacy skill in Greek. In contrast, no cross-

lagged relations between task avoidance and reading accuracy were found because most Greek-speaking children do not experience any difficulties with reading accuracy beyond Grade 1.

Interestingly, the effects of teacher-rated task avoidance on future spelling were further moderated by gender: earlier task avoidance predicted future spelling more strongly in boys than girls. A possible reason could be that teachers are better able to calibrate task avoidance when they rate boys who tend to be more active in classroom situations than when rating girls who tend to be more passive in classroom situations. An alternative explanation could be that some girls - who generally have higher spelling scores - find spelling too easy and get bored. If this is the case, then task avoidance would be an expression of boredom and not that the task was more challenging.

The fact that task avoidance and reading fluency/spelling have reciprocal relations has some important educational implications. First, teachers should make sure that the learning experiences of the children are not excessively negative, because such experiences may create failure expectations and task avoidance, which leads to poor academic achievement (Aunola et al., 2002; Onatsu-Arvilommi & Nurmi, 2000). Second, attention should be paid to motivational factors, when children are given instructions on how to approach a challenging task. Studies have shown that in classrooms that emphasize emotional support and child-centered learning, children rate their abilities positively, have higher success expectations, and prefer more challenging tasks (e.g., Pianta, La Paro, Payne, Cox, & Bradley, 2002; Rimm-Kaufman, La Paro, Downer, & Pianta, 2005).

Some limitations of the present study are worth mentioning. First, we assessed reading accuracy and fluency, but not reading comprehension. Our decision was based on the fact that during the early phases of reading development children cannot comprehend unless they can decode and therefore reading comprehension measures tap decoding skills more than reading

comprehension skills. Second, we did not examine if the relations between parent ratings of task avoidance and literacy skills vary as a function of who filled out the questionnaire because 80% of our questionnaires were filled out by mothers and only 12% by fathers. Finally, we did not assess children's self-reported motivation, such as task-value, interest or level of effort. Although student reports have been used in many previous studies (Wigfield, & Cambria, 2010), children as young as our participants may have problems in accurately estimating their motivation and related task avoidance in a realistic way. The fact that we used teacher and parent reports to measure behavioral aspects of students' motivation should be taken into account when making any generalizations of our findings.

To conclude, our study has shown that task avoidance is an important non-cognitive factor that predicts future reading and spelling performance. However, task avoidance is also longitudinally predicted by earlier reading and spelling skills (irrespective of who is rating the child's task avoidance). This suggests that poor reading and spelling performance can lead to task avoidance in both classroom and home situations. The fact that task avoidance permeates across different learning environments is alarming and calls for joint action from both parents and teachers in order to mitigate its negative impact on learning.

Footnote

[1]. Protopapas and Vlachou (2009) quantified the consistency of Greek orthography as being

95.1% in the direction of grapheme to phoneme (reading) and 80.3% in the direction of phoneme

to grapheme (spelling).

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Table 1

Intercorrelations, Means, and Standard Deviations of the Variables Used in the Study for Girls (Above the Diagonal) and Boys (Below the Diagonal)

		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	*M*	*SD*
1.	Accuracy Gr1		.43***	.93***	.41***	.49***	.54***	.42***	.49***	-.14	-.21	-.31*	-.49***	-.45***	-.43***	0.08	1.07
2.	Accuracy Gr2	.30*		.39**	.53***	.46***	.27*	.41***	.23*	-.03	-.03	-.11	-.16	-.19	-.26*	0.02	0.92
3.	Fluency Gr1	.90***	.24*		.47***	.50***	.48***	.45***	.54***	-.18	-.23*	-.38**	-.44***	-.46***	-.43***	0.05	1.04
4.	Fluency Gr2	.46***	.49***	.48***		.79***	.22*	.41***	.60***	-.06	-.17	-.40**	-.26*	-.26*	-.22	0.01	0.95
5.	Fluency Gr3	.49***	.51***	.43***	.83***		.09	.21	.50***	-.06	-.03	-.29*	-.21	-.29**	-.29*	0.05	0.89
6.	Spelling Gr1	.54***	.21	.53***	.28*	.23		.44***	.29**	-.21*	-.27*	-.29*	-.61***	-.48***	-.43***	18.21	8.86
7.	Spelling Gr2	.48***	.25*	.44***	.64***	.63***	.25*		.49***	-.08	-.12	-.30*	-.29**	-.39***	-.32**	28.75	4.69
8.	Spelling Gr3	.52***	.29*	.45***	.69***	.77***	.32**	.72***		-.13	-.28*	-.55***	-.32**	-.32**	-.30**	37.95	7.29
9.	Parent-Rated TA Gr1	-.14	.16	-.13	-.05	-.07	-.09	-.17	-.11		.48***	.36**	.25*	.23*	.17	11.59	3.70
10.	Parent-Rated TA Gr2	-.22	.03	-.21	-.45***	-.50***	-.18	-.41**	-.57***	.44**		.57***	.33**	.34**	.18	12.45	4.08
11.	Parent-Rated TA Gr3	-.16	.04	-.12	-.41**	-.48**	-.27	-.49***	-.53***	.44**	.78***		.39**	.42**	.39**	13.00	3.67
12.	Teacher-Rated TA Gr1	-.48***	-.36**	-.42***	-.47***	-.53***	-.36**	-.44***	-.52***	.19	.33**	.42**		.69***	.42***	11.54	4.72
13.	Teacher-Rated TA Gr2	-.43***	-.15	-.37**	-.48***	-.58***	-.26*	-.56***	-.63***	.26*	.56***	.45**	.56***		.56***	12.06	5.56
14.	Teacher-Rated TA Gr3	-.44***	-.18	-.42***	-.48***	-.47***	-.30*	-.57***	-.60***	.15	.44**	.33*	.42***	.62***		11.51	4.31
M		-0.09	0.02	-0.05	-0.02	-0.06	18.38	29.43	37.20	12.98	12.82	13.63	11.71	12.81	12.23		
SD		0.83	0.89	0.92	0.97	1.04	8.94	5.67	8.11	3.94	3.73	3.89	4.58	6.15	5.59		

Note. Gr1 = Grade 1; Gr2 = Grade 2; Gr3 = Grade 3; TA = task avoidance. *N* = 91 for girls, 81 for boys. * *p* < .05. ** *p* < .01. *** *p* < .001.

Figure Captions

Figure 1. An illustrative figure of the associations between literacy skills and parent- and teacher-rated task avoidance.

Figure 2. Cross-lagged associations between reading accuracy and parent- and teacher-rated task avoidance, controlling for mother's and father's education. Non-significant estimates are not shown in the figure. Estimates in bold are constrained equal for parent ratings and teacher ratings. Estimates for girls are given first, for boys second. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 3. Cross-lagged associations between reading fluency and parent- and teacher-rated task avoidance, controlling for mother's and father's education. Non-significant estimates are not shown in the figure. Estimates in bold are constrained equal for parent ratings and teacher ratings. Estimates for girls are given first, for boys second. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 4. Cross-lagged associations between spelling and parent- and teacher-rated task avoidance, controlling for mother's and father's education. Non-significant estimates are not shown in the figure. Estimates in bold are constrained equal for parent ratings and teacher ratings. Estimates for girls are given first, for boys second. * $p < .05$. ** $p < .01$. *** $p < .001$.

Grade 1   Grade 2

Parent-Rated Task Avoidance → .36*** / .43*** → Parent-Rated Task Avoidance ← .77*** / .70***

-.13 / -.15*

.16* / .18

.23** / .21**

Reading Accuracy → .41*** / .34*** → Reading Accuracy ← .84*** / .89***

.25** / .25**

-.45*** / -.53***

Teacher-Rated Task Avoidance → .59*** / .55*** → Teacher-Rated Task Avoidance ← .54*** / .61***

Grade 1　　　　　Grade 2　　　　　Grade 3

Parent-Rated Task Avoidance → .38*** / .42*** → Parent-Rated Task Avoidance → .58*** / .55*** → Parent-Rated Task Avoidance

.52*** / .44***

-.15* / -.16*

-.18* / -.17*****

.12* / .12*

.75*** / .71***

-.18* / -.17*****

.14* / .16*

-.01 / -.43*

.11 / .41***

.23** / .21**

.74*** / .76***

Reading Fluency → .43*** / .40*** → Reading Fluency → .78*** / .75*** → Reading Fluency

.29*** / .29***

-.41*** / -.45***

-.15*** / -.16***

-.01 / -.28*

-.17*** / -.20***

-.13* / -.11***

.53*** / .64***

-.15* / -.12***

.63*** / .63***

Teacher-Rated Task Avoidance → .59*** / .52*** → Teacher-Rated Task Avoidance → .50*** / .48*** → Teacher-Rated Task Avoidance

Grade 1   Grade 2   Grade 3

Parent-Rated Task Avoidance — .38*** / .43*** → Parent-Rated Task Avoidance — .60*** / .56*** → Parent-Rated Task Avoidance

.76*** / .70***

-.13* / -.16*

.14** / .16**

-.08* / -.10*

.18** / .21**

.50*** / .47***

-.18* / -.15*

.15 / .37***

-.35*** / -.14

.23** / .20**

.85*** / .76***

-.10** / -.18***

Spelling — .26*** / .23*** → Spelling — .44*** / .48*** → Spelling

.70*** / .37***

-.18** / -.33***

-.26** / -.40***

-.14** / -.30***

-.55*** / -.46***

-.25*** / -.09

-.10* / -.10*

.55*** / .62***

-.22*** / -.24**

.63*** / .58***

Teacher-Rated Task Avoidance — .59*** / .54*** → Teacher-Rated Task Avoidance — .43*** / .44*** → Teacher-Rated Task Avoidance