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EDITED BY

Sandra Fernandes,
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Mackenzie Presbyterian University, Brazil
Ioannis Grigorakis,
University of Crete, Greece
Camila Peres Nogueira,
Federal University of Rio Grande do Sul, Brazil

*CORRESPONDENCE

Evdokia Pittas
✉ pitta.ev@unic.ac.cy

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Awareness of the phonetic distinctions between oral and written language mediates the connection between phonemic awareness and reading

Evdokia Pittas*

Department of Education, School of Education, University of Nicosia, Nicosia, Cyprus

The aim of this study was to examine the contributions of dialect awareness in children's reading when the children use a vernacular language that differs from the form of the language in which they learn to read and write. The target group ($N = 396$) consisted of children, aged 6 to 9 years, who learn literacy in Cyprus using Standard Modern Greek (SMG) but who, in everyday life, use Greek Cypriot that differs from SMG in phonological features. Greek Cypriot children are exposed to oral SMG in formal settings, and it is the medium of instruction in school. Fixed order multiple regression analysis showed that dialect awareness predicted performance in the reading test over and above grade level, the estimated verbal ability and phonemic awareness. The results of the path model with phonemic awareness as the predictor variable, dialect awareness as the mediator and the reading test as the outcome variable, demonstrated that dialect awareness mediates the connection between phonemic awareness and reading. This study makes theoretical and empirical contributions to understanding the connections between oral language and reading.

KEYWORDS

dialect awareness, vernacular language, phonemic awareness, reading, mediator, phonetic distinctions

Introduction

Many countries around the world (e.g., Switzerland, United States of America) share the same pattern of language variation: in a language community two varieties of the same language, linguistically distinct but closely related, are used for different purposes, e.g., Standard German and Swiss German (Ferguson, 1991). The standard variety is used in writing and in formal situations and is learned in school where it is the medium of instruction whereas the vernacular language (non-standard variety) is used in oral communication within the family and among friends. The two varieties differ in phonological and grammatical rules and in lexicon (Ferguson, 1959). It was shown that children who use two varieties of the same language, need to invest more linguistic and cognitive effort to master word reading and spelling (e.g., Labov, 2003). In solving this issue, education policies proposed the extreme approach of the use of dialect in writing, whereas at the other end it was recommended that children were practiced in speaking the standard language (Feitelson et al., 1993). Different researchers (Pittas and Nunes, 2014a, 2018; Terry, 2006; Terry et al., 2018), however, proposed that dialect awareness could be used to promote reading and spelling among dialect users.

One of the reasons that dialect users produce dialect related intrusions in speech, reading and writing concerns the phonological and morphological differences between the two forms of language. For example, [Saiegh-Haddad et al. \(2011\)](#) showed that, in cases where the phonemes occur in the standard form of language but do not exist in the vernacular language, Arabic dialect learners achieve lower scores in phonological awareness tasks. Similar results were reported by [Hendricks and Adlof \(2020\)](#) who showed that children speaking nonmainstream American English made significantly more errors in past tense and third-person singular in comparison to children who speak mainstream American English. With regard to spelling, [Kemp \(2009\)](#) showed that Australian children significantly outperformed British children with spelling words such as “ticket” in which the Australian pronunciation is closer to the spelling than the British form.

A number of studies further examined whether the occurrence of specific aspects of oral language has any connections with children’s learning to read and spell ([Fitton et al., 2021](#); [Johnson et al., 2017](#); [Terry and Connor, 2010](#); [Terry et al., 2010](#); [Pittas and Nunes, 2014a, 2018](#)). [Craig et al. \(2004\)](#) showed that, after controlling for socio-economic status and language measures, the number of dialect related intrusions in writing had a significant direct effect on reading. In the same vein, [Terry and Connor \(2010\)](#) found that the higher the number of oral language aspects in children’s speech the lower their scores in reading, spelling and vocabulary tests. In another well-argued study, [Terry \(2006\)](#) investigated the relation of dialect related intrusions with spelling and also with morphological awareness. Multiple regression analysis showed that the Dialect Density Measure explained 14.1% of unique variance in spelling; however, when productive morphology was entered into the model the Dialect Density Measure did not account for any variance in spelling. [Terry](#) suggested that it is possible that productive morphology mediates the connection between the occurrence of intrusions from the dialect and spelling. [Terry et al. \(2010\)](#) went further by arguing that low dialect awareness skills (children’s awareness of the phonological and morphological differences between the two varieties) are responsible for dialect users’ low performance in standardized reading and spelling tests. To this end, [Pittas and Nunes \(2018\)](#) explored the idea of whether becoming aware of the phonological and morphological differences between written and oral language positively affects reading and spelling. The results confirmed the existence of a strong link between the children’s dialect awareness and their success in literacy learning. More specific, it was found that dialect awareness contributes unique variance to the prediction of reading and spelling independently of children’s estimation of IQ and phonological awareness.

Overall, these sets of findings provide considerable support for the argument that the connection between literacy learning, and specific aspects of oral language could be mediated through dialect awareness. In this paper, dialect awareness refers to the ability to intentionally recognize that there are phonological and/or morphological differences between the two varieties and that these differences are not random, but systematic and predictable. This study focuses on the phonetic distinctions between the two varieties and explores the hypothesis that if children were aware of the phonological differences between the two forms of language, they would master the task of learning to read more comfortably. It is

possible for learners to distinguish the two varieties because the phonetic and morphological differences between the Greek Cypriot Dialect (GCD) and Standard Modern Greek (SMG) are specific and consistent ([Pittas and Nunes, 2014b, 2018](#)). For example, with reference to phonetic differences, the sounds/d₃/and/tS/, in the GCD, correspond to/k/ before front vowels in SMG (e.g., [d₃e] vs. [ke], meaning “and”). An example of morphological differences concerns the different endings for the active and passive voice first conjugation singular and plural verbs in the past and present. Additionally, considering that data from longitudinal studies in Greek (e.g., [Pittas, 2017](#)) have supported strong connections between phonemic awareness and literacy, even after controlling for intervening variables, it would be possible that children’s phonological awareness skills would help them in distinguishing the two varieties. Taken together, the objective of the study is to examine whether awareness of the phonetic distinctions between oral and written language mediates the connection between phonemic awareness and reading among Greek Cypriot children.

Method

Participants

The children ($N = 396$) were in Grade 1 (98 boys; 90 girls) or Grade 3 (101 boys; 111 girls). Their age range was 6;06 to 9;08, in Grades 1 and 3, and they were of different reading and spelling abilities (mean age in months; Grade 1: 82.0 [SD = 3.91] and Grade 3: 100.0 [SD = 3.94]). The sample was drawn from 15 state supported primary schools situated in rural and urban areas in Cyprus. The schools, which were randomly selected, represented a range of socioeconomic status levels, ranging from low to high SES. Additionally, the schools use the same books and follow the same guidelines by the Cyprus Ministry of Education as there is a centralized educational system in Cyprus. The children who spoke languages other than Standard Modern Greek and the Greek Cypriot Dialect were excluded from the sample.

Measures and procedure

The author/s administered the tests during the school morning hours in the children’s classroom. The phonemic and dialect awareness tasks were always given together on the same day with a break of 15 min halfway through the tasks and the whole test including the break taking ~55 min. The reading test was usually administered separately on a different day taking exactly 40 min for completion. The children were assessed in four predictive measures (one phoneme task and three dialect awareness tasks); in one outcome measure (reading); and in one control measure (WISC-III similarities subtest).

Predictor

The phoneme task

This task was inspired by [Bradley and Bryant’s \(1983\)](#) oddity task. The children heard three words that were also illustrated by pictures on PowerPoint and were then asked to choose the two

words beginning with the same sound. The items chosen for each trial had the same initial consonantal sound: in one word, the initial consonant was part of a cluster whereas in the other it was not, i.e., in English: brake/ball/rat; in Greek: [trox'os]/[til'efono]/[rol'oi]. Eight trials were used for this task; children were given one point for each correct choice.

Mediator

Dialect awareness measures

Dialect identification task: This oral task was designed to test whether the children recognize SMG and the GCD when hearing them. It was adapted from Baratz's (1969) task and required children to distinguish between words in GCD and SMG. The pictures of two characters—a boy and a girl—were shown on the PowerPoint screen and at the same time the children heard a recording of the two characters reading a story. The children were told that one character used SMG and the other used the GCD. After the children heard the recorded story, the tester said 10 words pronouncing half the words in their SMG form and the other half in the GCD. The items examined the most important phonological differences between the two varieties of Greek. For example, an item in the GCD was 'τρερι', [d₃er'i], 'candle'. The children were given one point for each correct choice.

Sentence transformation task: This written task was designed to test whether the children realize that an oral form in the Greek Cypriot dialect may not be represented in writing because changes are made to transform it into Standard Modern Greek, but that the transformations of oral to written form are consistent and predictable. It was developed on the basis of work by Fogel and Ehri (2000), who adapted a method originally tested by Baratz (1969). The children heard sentences in the GCD and were instructed to write them in SMG. An example of phonological transformation in a sentence from the GCD to SMG was: "Αγαπω την Μαρια τσαι τον Νικο" [Aγap'o tin Mar'ia d₃e ton N'iko] would be equivalent to: "Αγαπω την Μαρια και τον Νικο" [Aγap'o tin Mar'ia ke ton N'iko] (I love Maria and Niko). There was a total of 11 sentences to be transformed: eight sentences concerned both phonological and morphosyntactic transformations and three sentences concerned phonological transformations only. The items requiring phonological transformations examined all the phonological differences between the two varieties. Each word was scored using one for the correct transformation and zero for an incorrect transformation.

Pseudoword transformation task: This written task was inspired by Nunes and Bryant (2006) pseudoword interpretation task. The children heard some pseudowords spoken one at a time with the GCD pronunciation and were asked to write them in SMG. This was achieved because the phonetic differences between Cypriot Greek and Modern Greek are consistent and predictable. For example, an item in the GCD was "σσεβατα" [ʃ'evata] and the equivalent in SMG was "χεβατα" [ç'evata]. The pseudowords followed the phonotactic principles of Cypriot Greek. Correct use of the Greek sound scored one point; words with unexpected spelling or representing the Greek Cypriot pronunciation scored zero. There were eight trials, all involved only phonological transformations.

Outcome measures

The reading test: The standardized reading test (Tafa, 1995) consists of 42 sentences and is timed; 40 min are allowed for completion. The children were presented with sentences that contained a blank; they were required to choose and underline from four alternative words the one that would correctly complete the sentence. Four examples were presented prior to conducting the test. Items left blank were considered incorrect and each correct choice scored one point.

The control measure

WISC-III similarities subtest: The WISC similarities subtest standardized in Greek was administered as an estimate of general verbal ability.

Results

Preliminary analysis

The aims of the preliminary analyses were to examine: (a) whether items differentiate well between the participants, (b) whether the tasks are reliable and valid, and (c) whether the factors of phonemic and dialect awareness are related to reading by analyzing the correlations among these variables. Table 1 presents the mean accuracy and percentage scores, standard deviations, and Cronbach's α for the different measures by grade level.

The measures discriminate well between participants by describing the awareness of the differences between the GCD and SMG. No ceiling or floor effects were observed with the exception of the phonemic awareness and the dialect identification tasks, which were easy for Grade 1 children, and the sentence translation and the dialect identification tasks, which were relatively easy for Grade 3 children. The children's high performance in the phonemic awareness task, in both Grades, is consistent with findings from the literature (e.g., Porpodas, 2006) as word reading in SMG mostly depends on simple letter-sound correspondences. This task is appropriate for identifying children who continue to find this challenging, even in Grade 3, and may be at risk for reading problems later, therefore, it is suitable for use as a predictor. The dialect identification task is still useful for identifying children in Grade 1 who would need additional support in developing dialect awareness. The negative skewness in Grade 3 for the sentence transformation and the dialect identification tasks is not a problem as these tasks were designed to measure progress from Grade 1 to Grade 3. With reference to internal consistency, this was at a satisfactory level (close to Cronbach's α 0.7) for most of the measures.

The construct validity of the tasks was analyzed by performing inter-correlations between the measures and conducting Principal Component Analysis. All the correlations between the three dialect awareness measures were statistically significant ($***p < 0.001$). With reference to Principal Component Analysis, results showed that only one component was extracted explaining 60% of total variance (factor loadings >0.7). From Table 2, it is concluded that one component is identified for the dialect awareness measures.

TABLE 1 Mean accuracy (proportion in brackets), standard deviations (SD), and Cronbach’s α for the phonemic and dialect awareness measures, WISC-III similarities and reading by grade level.

Tasks	Grade 1 (<i>N</i> = 187)			Grade 3 (<i>N</i> = 209)		
	Mean (proportion in brackets)	SD	Cronbach’s alpha	Mean (proportion in brackets)	SD	Cronbach’s alpha
Sentence translation (max: 10)	6.34 (0.63)	2.6	0.77	8.26 (0.83)	1.8	0.72
Pseudoword translation (max: 8)	2.06 (0.26)	1.8	0.65	3.04 (0.38)	1.9	0.63
Dialect identification (max: 8)	5.61 (0.74)	1.5	0.64	6.53 (0.82)	1.0	0.45
Phonemic awareness task (max: 8)	5.91 (0.74)	2.3	0.84	6.99 (0.87)	1.9	0.86
WISC-III Sim. (max: 19)	8.70 (0.46)	2.7		9.72 (51)	2.2	
Reading (max: 42)	10.22 (0.24)	5.5	0.82	21.08 (0.50)	8.0	0.8

TABLE 2 The proportion of total variance explained by the dialect awareness principal component after extraction.

Component	Total variance explained					
	Initial Eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	1.796	59.877	59.877	1.796	59.877	59.877
2	0.686	22.856	82.733			
3	0.518	17.267	100.000			

Extraction method: Principal component analysis.

TABLE 3 Pearson’s correlations between the predictor, the mediator and the outcome variables.

Variable	1	3	4
1. Phonemic awareness	–		
3. Dialect awareness	0.341**	–	
4. Reading test	0.315**	0.524**	–

***p* < 0.01.

TABLE 4 Regression analysis of the concurrent relations between dialect awareness and reading.

Steps in regression	<i>R</i> ² change	B	SE B	Beta
1. Grade level	0.347***	5.947	0.834	0.334
2. Estimation of Verbal IQ	0.084***	0.525	0.161	0.161
3. Phonemic awareness	0.023***	0.308	0.175	0.077
4. Dialect awareness	0.030***	1.809	0.466	0.200

Main analysis

Table 3 shows that the predictor variable—phonemic awareness—was positively and significantly correlated both with the outcome variable—Reading test—and the mediator variable—dialect awareness. The correlations were carried out using the dialect awareness component scores derived from Principal Component analysis.

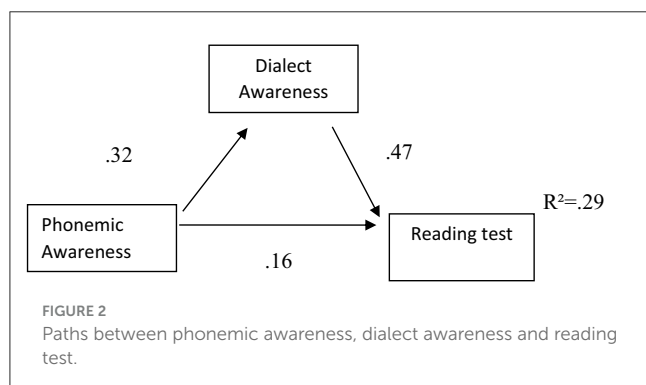
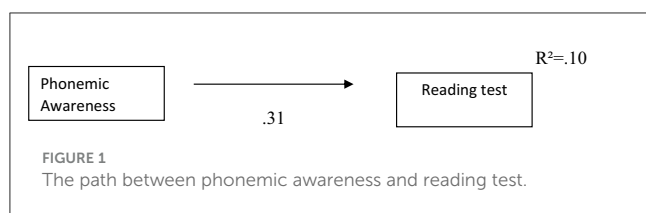
The second step in examining whether there is mediation among the variables was to analyse whether phonemic and dialect

awareness independently contribute to the prediction of reading. Table 4 shows that after controlling for grade level, estimated verbal ability and phonemic awareness, dialect awareness still made a significant contribution to the prediction of reading. Although phonemic awareness did not significantly contribute to reading after controlling for grade level, estimation of IQ, and dialect awareness, it did significantly contribute to reading after grade level and the estimation of verbal IQ were held constant.

The results of the path model with phonemic awareness as the predictor variable, dialect awareness as the mediator variable and the reading test as the outcome variable, demonstrated that dialect awareness mediates the connection between phonemic awareness and reading test. When dialect awareness and phonemic awareness were entered into the model simultaneously, regression path *c*’ was reduced from 0.31 to 0.16 (*p* < 0.001). When phonemic awareness increased by one standard deviation from its mean, dialect awareness increased by 0.32 standard deviations from its own mean (*p* < 0.001), and when dialect awareness increased by one standard deviation, reading test increased by.47 standard deviations (*p* < 0.001) (see Figures 1, 2). Additionally, with the inclusion of dialect awareness into the model, the variance explained by the outcome variable increased from *R*² = 0.10 to *R*² = 0.29.

Discussion

The current study examined whether dialect awareness mediates the connection between phonemic awareness and reading in Greek. The results revealed that dialect awareness predicted



performance in the reading test over and above grade level, the estimated verbal ability and phonemic awareness. Most importantly, the path model showed that dialect awareness is a partial mediator of the connection between phonemic awareness and literacy because the regression path c' was always reduced and was never zero. A model with dialect awareness as a mediator between phonemic awareness and reading fitted the data better than a model with phonemic awareness as mediator. Thus, the findings confirmed the hypothesis that dialect awareness serves a mediating role between phonemic awareness and literacy, which explains why dialect awareness was found to be a strong predictor of reading and spelling in different studies (e.g., Pittas and Nunes, 2014a, 2018; Terry, 2006; Terry et al., 2010). In simple words, the contribution of dialect awareness to reading is related to levels of phonemic awareness. Dialect awareness mediates the connection between phonemic awareness and reading; phonemic awareness facilitates dialect awareness and dialect awareness enhances reading achievement. The evidence from this study provides considerable support for the argument that the awareness of distinctions between the dialect and the standard variety facilitates children's reading and spelling. Hence, the children who have good phonemic awareness skills grasp the differences between the standard variety and the vernacular language and therefore perform better in reading. As Verhoeven and Perfetti (2022) argued, children profit from the relation between writing systems and spoken languages in mastering letter-sound correspondences. The present study expands this conclusion to the case of dialect users. The findings of the present study extend this conclusion to the context of dialect use.

Some studies (e.g., Fogel and Ehri, 2000) have suggested that dialect awareness may possibly mediate the connection between literacy learning and specific aspects of oral language. Terry et al. (2010) and Terry (2006), for example, argued that children who produce oral language aspects in reading and writing are less

aware of the differences between the two varieties and therefore, they find reading and spelling more demanding. This conclusion emerged from her findings of negative correlations between the use of African American English and dialect sensitive measures, e.g., rhyme recognition and the measures of literacy that are not dialect sensitive, e.g., knowledge of the alphabet. This led her to hypothesize that there might be a more general explanation for these correlations, i.e. children who use African American English in situations where it is not the expected form of the language are less aware of language and thus perform less well in all emergent literacy measures. The present study developed this argument by hypothesizing that if children are aware of the phonemic differences between the two varieties, they will learn to read more comfortably. As mentioned in the introduction, this is because the differences between the two varieties are systematic and predictable. The children who were implicitly aware of the phonological differences between the two varieties performed better in reading. Hence, in order to better master reading and spelling, dialect users need to become aware of the differences between the standard variety and the dialect. Taken together, these findings provide evidence to support that dialect awareness can be seen a key skill in promoting reading in settings where children use a vernacular language that differs from the form of the language in which they learn to read.

The main limitation of the present study is that it must be combined with intervention studies in order to establish causal inferences. Intervention studies should test whether systematic training for raising dialect awareness would lead to higher performance in reading. A second limitation is the single measure of phonemic awareness. Although the task was found to be significantly correlated with reading and dialect awareness, it is possible that a stronger correlation would have been observed if more than one phonemic awareness tasks were used. A third limitation of this study is that it did not include a separate control for vocabulary, independently of verbal ability. Although the reading test assesses both reading fluency and comprehension, due to the use of a cloze procedure and time limits for responding, it could be the case that the WISC-III vocabulary subtest could be used as an extra control variable.

Finally, this study makes theoretical and empirical contributions. The present study offers theoretical contributions to the understanding of children's learning of reading in settings where children use a vernacular language that differs from the written language. Empirically, the results of the present study shed light on the connection between children's awareness of the differences between the two varieties and reading as it is confirmed that children who have grasped the phonological differences between the two varieties find it easier to master reading.

Data availability statement

The datasets presented in this article are not readily available because of personal data. Requests to access the datasets should be directed to pitta.ev@unic.ac.cy.

Ethics statement

The studies involving humans were approved by Cyprus Ministry of Education, Sport and Youth. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

EP: Writing – review & editing, Methodology, Investigation, Writing – original draft, Formal analysis, Conceptualization.

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