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Enhancing the Pre-literacy Skills of Roma Children: The Role of Socio-economic Status and Classroom Interventions in the Development of Phonemic Awareness

Abstract

Literacy skills of Roma children throughout Europe are shown to be significantly lower compared with their non-Roma peers. This fact is frequently attributed to the substandard socio-economic status (SES) of the Roma population. However, there is little empirical substantiation for the extent to which the SES of Roma children can be associated with poor literacy skills, as well as the extent to which remedial programs aimed to enhance those skills can be effective after school starts. The presented study aimed to analyze comparatively the relationship between SES and one of the literacy predictors, phonemic awareness (PA), of 171 Roma ($n = 42$) and non-Roma ($n = 129$) first-graders, and the effectiveness of a classroom intervention program aimed to enhance this skill. Results showed that a) PA of Roma 1st graders is significantly lower than that of their non-Roma peers coming from the same community, but the difference is significantly reduced after accounting for SES, b) there are important inter-ethnical differences between Roma and non-Roma when PA is correlated with socio-economic indicators, c) intervention programs aimed to increase the PA of Roma children should begin earlier than 1st grade, if expected to produce significant effects above and beyond those generated by regular classroom activities and d) the development of the PA of Roma and non-Roma children has a similar growth rate once they start receiving formal education.

Keywords: *Roma, socio-economic status, literacy, phonemic awareness, randomized trial, intervention*

Introduction

The inclusion of Roma population in European communities has been a widely discussed topic in the past decades. Despite extended efforts by local, national and European institutions towards supporting the social and economic integration of the Roma, this ethnic group is among the most poorly educated in Europe (FRA, 2014; UNICEF, 2011). In particular, their literacy level is assessed as inadequate, particularly because of their substandard socio-economic status (SES) (Baucal, 2006; Kertesi & Kezdi, 2011; Kiprianos, Daskalaki & Stamelos, 2012). The empirical studies examining this problem in a rigorous manner are limited, and little is known about its underlying causality (Third Author et al., forthcoming). This is why rigorously conducted empirical investigations are warranted to help identify the causes of (and possible solutions) reported poor literacy skills of Roma children. The present study will address parts of this issue by putting the focus on the association between SES factors and phonemic awareness, which is one of the main skills that predict literacy development. In addition, the study aims at determining the extent to which intervention programs in schools can help improve those skills above and beyond regular classroom activities.

Phonemic Awareness and the Development of Literacy

Decoding printed words into speech lays at the foundation of literacy development, and among the most important and widely accepted predictors of decoding skills is phonemic awareness (PA) (Anthony, Williams, McDonald & Francis, 2007; Deacon & Kirby, 2004; Wagner & Torgesen, 1987). PA is a metalinguistic skill which, as defined by NRP (2000), "refers to the ability to focus on and manipulate phonemes in spoken words" (pp. 2-10).

The relationship between reading ability and PA is supported by a large body of research. For instance, PA tasks have a high correlation with word reading performance (e.g., Bruno, et al., 2007; Georgiou, Parrila, & Papadopoulos, 2008; Lervåg, Bråten, & Hulme, 2009). Also, poor PA performance was found to be one of the main characteristics of dyslexic children (e.g., Barbosa, Miranda, Santos & Bueno, 2009; Boada & Pennington, 2006; Melby-Lervåg, Lyster & Hulme, 2012). Moreover, explicit training of PA was found to lead to an improvement of reading skills (Cunningham, 1990; McGuiness, McGuiness & Donohue, 1995; NRP, 2000) and the causal relationship between the two variables seems to be similar across different alphabetic languages (Melby-Lervåg, Lyster & Hulme, 2012).

Considering the major role that PA plays in reading skills, several studies focused on the effectiveness of PA training and the results from such studies have been summarized in many meta-analyses (e.g., NRP, 2000; Suggate, 2016). The main findings from these summaries show that PA produced strong effect sizes immediately after the training (d = .86) and in long term (d = .73). Furthermore, training was found effective in teaching both normally developed and disabled students, registered in preschool and elementary school (up to 2nd grade), and small group instruction seems to be more effective than individual or whole-classroom instruction.

Phonemic Awareness and Socio-economic Status (SES)

Empirical findings indicate that the development of children's early literacy skills (and particularly of their PA) depends on the family's SES (Bowey, 1995; Lundberg, Larsman & Strid, 2012; McDowell, Lonigan, & Goldstein, 2007). This can be explained by the fact that in families with higher SES there are more parent-initiated conversations, more literacy-related talks and more alphabet-related utterances (Ghosh, 2013), which contribute significantly to the development of PA (Ehri & Roberts, 2006). Parents with a higher SES background also spend more time reading to their children (Raz & Bryant, 1990; Whitehurst, 1997), which turned out to be an effective method of improving pre-literacy skills, and particularly PA (Duursma, E., Augustyn, M & Zukerman, B, 2008). Furthermore, exposure to books (and to their content) is lower in low-income families (Feitelson & Goldstein, 1986) and children coming from these families are less likely to develop their early literacy skills by pretending to read compared with their peers coming from families above the poverty threshold (Nord, Lennon & Liu, 1999). This suggests that low SES can adversely affect children's opportunities to learn how to discriminate between the sounds of spoken language, as well as between their corresponding letters (Ehri & Roberts, 2006).

The Present Study

The presented study is part of a larger investigation focused on the literacy development of Roma children from Romania, whose initial results indicate that the PA of Roma children is significantly lower compared to their non-Roma peers at the beginning of 1st grade (First Author, 2015). This is why, one of the aims of the study was to replicate our previous findings using a different population sample, and to measure whether there are statistically significant differences between the PA of Roma children compared to their non-Roma peers coming from the same

communities, and having the same educational opportunities, after controlling for SES. A second aim was to identify the extent to which socio-economic factors are related to the differentiated development of PA among Roma children and compare those indicators with the ones of their non-Roma peers from the same communities. This aim is justified by the low SES and low literacy rate among the Roma population, as well as by the importance of PA in the development of early reading skills. The third aim of this study was to identify the extent to which a medium-term intervention program implemented during 1st grade with the focus on development of PA can significantly lead to an increase in performance among Roma children (and their non-Roma peers) above and beyond regular school activities. Backed also by existing literature, such a remedial intervention program is warranted to increase Roma children's chances of literacy attainment, but it is not clear whether this kind of program can be effective after school starts. Finally, we aimed to measure whether the PA skills of Roma children grow at similar or different rates compared with their non-Roma peers, once exposed to the same educational programs. Thus, our study would help clarify the extent to which the development of the PA skills of Roma children is linked to ethnicity (or they are just a consequence of poor socio-economic status).

Therefore, the research questions in our study were as follows:

1. Are there significant differences between the PA level of Roma and non-Roma 1st graders coming from the same communities (and after controlling for the effects of SES)?
2. To what extent are the SES factors associated with the PA of Roma children and their non-Roma peers?
3. Does a medium-intensity intervention program conducted during 1st grade significantly improve the PA skills of Roma and non-Roma children above and beyond the effects of regular classroom activities?
4. Will the development rate of PA skills differ between Roma and non-Roma children once they start receiving the same educational services?

Method

Participants

One-hundred and seventy-one children (87 boys), aged 6-9 years at the beginning of the study (*M* age = 89.32 months, *SD* = 5.13) participated in our study. The sample was composed of 129 non-Roma children (68 boys, *M* age = 88.33 months,

SD = 4.24), and 42 Roma children (19 boys, *M* age = 83.00 months, *SD* = 6.38). All the children attended 1ˢᵗ grade in one of 7 classes from 3 different schools, all part of medium-size communities in the north-west of Romania. Roma students attended the same classes as their non-Roma peers.

Measures

Phonemic awareness

PA was assessed with the use of an adapted version (for the Romanian population) of the Phonemic Awareness subscale of NEPSY inventory. The test has 36 tasks of increased difficulty, administered individually. The internal consistency of the instrument measured with our data sample was high (α = .86).

Socio-economic status

The socio-economic status of the participating children was measured by collecting the information regarding their parents' education level and the family income through a questionnaire administered by classroom teachers to the parents. The information regarding the parents' education was ranked on an 8-point scale, where 1 was the lowest level of education and 8 was the highest. The family income was ranked on a 13-point scale, with 1 being the lowest level and 13 being the highest income level. In order to control the effect of SES while comparing the level of PA between the Roma and non-Roma children, we generated a composite SES score by first converting the three aforementioned variables into *Z* scores and then computing the average.

Attendance

In order to measure the effects of the intervention program we controlled for the students' attendance throughout each intervention session, since attendance of Roma and non-Roma children from Romania seems to predict significantly the development of decoding skills (First Author, 2015). Each absence at each intervention session was marked by one point, and we added all the absences at the end of the intervention to create an attendance score.

Intervention procedure

The students from each of the 7 participating classrooms were randomly distributed to one of two groups (within each classroom): experimental and control. The intervention program started in the second semester of 1ˢᵗ grade and was implemented three times per week and lasted 14 weeks. Each intervention lasted

approximately 15 minutes. The students from both groups listened once to a new, age-appropriate story, about 70-120-word long, for about 2 to 4 minutes. Then, the students were divided into the two designated groups and they participated in the planned specific activities. The Roma and non-Roma children were represented in both the experimental and control groups (cf., Table 1). The students from the experimental group received 10-minute training of PA consisting in exercises on phonemic isolation (e.g., Where do you hear sound *l* in the word *gol?*), identification (e.g., What sound do you hear at the end of the word *cai*?), blending (e.g., What word do I make when I say *t-a-r-e?*), deletion (e.g., What sound was deleted if I first say *foi*, and then I say *oi*?), replacement (e.g., What word do you hear when you replace *s* in the word *soc*, with *f*) and word segmentation (e.g., What word can you make that ends with *_are?*). They practiced using the words from the story they had listened to. The students from the control group answered listening comprehension questions related to the newly presented story. In order to control for the teacher effect, the two teachers who organized the activities within each classroom alternated the leadership of the groups after each session.

Results

In the first part of our analysis, we conducted a non-parametric correlation analysis (Spearman's ρ) between PA at T1 and the three SES variables (Mother's Education, Father's Education and Family Income) to determine the extent to which SES factors are associated with PA across the two ethnic groups at the beginning of the intervention (T1). We chose to carry out a non-parametric correlation analysis because all three SES variables are ordinal. The results of this analysis are presented in Table 1.

Table 1. Correlations (Spearman's ρ) between PA at T1 and SES variables for Roma and Non-Roma children

	Roma				Non-Roma			
	PA(T1)	Mother's education	Father's education	Family income	PA(T1)	Mother's education	Father's education	Family income
PA (T1)	-				-			
Mother's education	.47*	-			.24*	-		
Father's education	.21	.51*	-		.49**	.67***	-	
Family income	.16	.28	.09	-	.30**	.57***	.55***	-

*$p < .05$; **$p < .01$; ***$p < .001$

As the results indicate, parents' education and family income tend to be more strongly correlated with PA for the non-Roma children. Additionally, for the non-Roma children, the father's education is more strongly correlated with PA than the mother's education, while the opposite is true for the Roma children.

In the second part of our analysis, we focused on determining whether there were any significant differences in PA scores at T1 between the Roma and non-Roma children, and whether these differences would still be present after controlling for SES. To this end, we generated a composite SES score, by transforming all the three variables into Z-scores, and then computing their average. Table 2 presents descriptive statistics for our variables of interest, for the Roma and non-Roma children included in the experimental and control groups. We then conducted two different analyses. The first was a univariate analysis of variance (ANOVA) with PA at T1 as the dependent variable, and it revealed that the Roma children had significantly lower PA scores than the non-Roma children, $F(1, 169) = 65.13, p < .001, \eta_p^2 = .28$. The second analysis was identical with the first, with the exception of the fact that SES was included as a covariate (ANCOVA), to statistically control its effect. This second analysis revealed a marginally significant difference in PA scores between the Roma and non-Roma children, $F(1, 130) = 3.80, p = .05, \eta p2 = .03$ (cf., Table 2).

Table 2. Descriptive statistics (means and standard deviations) of dependent variable (PA) and co-variates (Attendance and SES) grouped by experimental and ethnical groups

	Experimental		Control	
	Roma N = 27	Non-Roma N = 61	Roma N = 15	Non-Roma N = 68
PA (T1)	11.41 (4.27)	19.13 (6.27)	10.33 (3.37)	18.72 (5.61)
PA (T2)	16.40 (5.71)	25.49 (6.55)	14.80 (6.96)	24.37 (6.73)
Attendance	12.37 (6.25)	3.23 (3.46)	17.67 (12.42)	4.06 (5.78)
SES (Z-score)	-1.25 (0.27)	0.21 (0.84)	-0.96 (0.26)	0.29 (0.69)

Finally, to determine the effect of our intervention, we conducted a 2 (Group) × 2 (Ethnicity) × 2 (Time) mixed analysis of covariance (ANCOVA), including SES and Attendance as covariates, and PA as the dependent variable. Results indicated that while the Roma children had lower PA scores than the non-Roma children, $F(1, 124) = 6.30, p < .05, \eta_p^2 = .05$, there were no significant differences between the experimental and control groups, $F(1, 124) = 0.66, p = .42, \eta_p^2 = .005$, as well as no

Group × Ethnicity interaction effect, $F(1, 124) = 0.14$, $p = .71$, $\eta_p^2 = .001$. However, the PA scores improved significantly from T1 to T2 for all the children, $F(1, 124) = 24.39$, $p < .001$, $\eta_p^2 = .16$. We found no interaction effects between Time and any of the other variables: Group, $F(1, 124) = 0.22$, $p = .64$, $\eta_p^2 = .002$, Ethnicity, $F(1, 125) = 0.29$, $p = .59$, $\eta_p^2 = .002$, or Group × Ethnicity , $F(1, 124) = 0.02$, $p = .89$, $\eta_p^2 = 0$.

Discussion

In the present study, we investigated the extent to which socio-economic status and classroom remedial interventions play a role in the development of PA among Roma children, while comparing their performance with the one of their non-Roma peers.

To address the first question, we compared the PA skills of the Roma children and those of their non-Roma peers coming from the same communities (after controlling for SES). The results of the initial assessment (T1) were consistent with our previous findings (First Author, 2015). They showed that by 1st grade, the Roma children already had a significantly lower level of PA, compared to their non-Roma peers, and the difference was marginally significant even after accounting for SES. These findings predict a slower development rate of decoding skills of Roma children, which would eventually explain the poor development of their literacy skills (Baucal, 2006; FRA, 2012; Kiprianos, Daskalaki & Stamelos, 2012). This gap can be explained to a certain extent by SES, considering that the effect size of the difference between the two groups dropped from large ($\eta_p^2 = .28$) to small ($\eta_p^2 = .03$) after accounting for SES. However, it seems that SES does not fully explain the difference between the two groups, and we assume that other ethnicity-related factors influence the development of the PA of Roma and non-Roma children. Such factors could include (but not be limited to) inter-ethnical differences in the communication styles between parents and children, like the extent of error correction use (e.g., Roma parents might not correct the mispronunciation of their children as often as their non-Roma peers) or the ratio between heuristic questions vs. instructions and commands (non-Roma parents might use heuristic questions more often than their Roma peers) (cf., also Pan, Rowe, Singer, & Snow, 2005).

The second research question concerned the extent to which SES factors were associated with the PA of Roma and non-Roma children. The inter-ethnical contrasting results of our correlational analysis lead to two assumptions. First, we found a very weak correlation between the Roma children's PA and their fathers'

education, but a significant medium correlation between the Roma children's PA and their mothers' education. This implies that the PA of Roma children depends on the mother's education level, while the father seems to play very little role in the development of such pre-literacy skills. In the case of the non-Roma children, we found that the father's education correlated more strongly with the level of PA compared with the mother's education, and that both parents' levels of education were correlated significantly with the PA of the children. Consequently, these contrasting results suggest that, at least in the three communities where the data was collected, in non-Roma families the responsibility for the development of early literacy skills (such as PA) is shared by both parents, while in Roma communities, this responsibility is most likely taken by the mother. Second, our data shows that there is a non-significant (weak) relationship between the PA of Roma children and family income, but a significant (medium size) association between these two variables in the case of non-Roma children. This suggests that the PA of Roma children might not depend on the family income level. However, in the case of the non-Roma families, the better income the parents have, the more they tend to invest in the education of their children (e.g., more frequent kindergarten attendance, enrollment in early development classes or provision of educational software). This assumption is supported also by the fact that there was no significant association between family income and parents' education in the Roma families, but a very strong (and significant) correlation between family income and each parent's education in the non-Roma families. This suggests that the income of the Roma is less dependent on their education level, and therefore, Roma families might not place a great value on their education level, because their income does not depend on it; thus, Roma families might think that good pre-literacy skills at the beginning of school are not so important for their children.

The third question in our study focused on the effectiveness of a medium-intensity intervention program conducted during 1st grade towards the development of the PA skills of the Roma children (and their non-Roma peers) and whether such a program can enhance PA skills above and beyond the effects of regular classroom activities. To answer the question we conducted a randomized controlled trial. The four-month 3-sessions-a-week long training did not lead to a significant effect for the experimental group, suggesting that (at least for the Romanian speaking population) in order for such an intervention program to have a significant effect it needs to be implemented at an earlier age (at the kindergarten level) (cf., also Suggate, 2010). The results may also suggest that if we want to expect more dramatic and statistically significant increase in PA during first grade we might need to consider using a more intensive remedial program (e.g., five days a week,

one hour daily) or a variety of methods (and not just PA training exercises), such as reading or spelling.

The last research question sought to find whether the PA of Roma children develops at a different rate compared with their non-Roma peers, once school started. The rationale was that, since the development rate of the PA of Roma children would be lower, remedial programs would be strongly recommended in order to help children from this ethnic group to close the gap between themselves and their non-Roma peers. The non-significant interaction effect of ethnicity indicated that the development rate of PA skills was similar for the Roma and non-Roma children coming from the same community and attending the same classrooms. On the one hand, these findings suggest that ethnicity does not play a role in the PA achievement rate, and that Roma children are able to learn at the same pace as their non-Roma peers once the same quality of instruction is being provided. We believe these findings are relevant for the professionals in the field of education, because they contribute to disproving the opinions that Roma children might be less educable than their non-Roma peers due to their cognitive limitations (Baklar, 2004; Rushton, Cvorovic, & Bons, 2007). On the other hand, the overall significant increase in the PA of the Roma and non-Roma children (from both the experimental and control groups) suggests that, at least for the children from Romania, the 1st grade national curriculum for literacy development leads implicitly to a significant increase in PA. Such a conclusion is consistent with the previous studies that show that PA can be improved after regular classwork activities like storybook reading (Krashen, 2003) or language exposure (Chien, Kao & Wei, 2008). In other words, participation of Roma children in regularly conducted school activities can enhance their literacy attainment at rates similar to their non-Roma peers, and therefore a strong emphasis needs to be placed on adequate social and school integration of Roma children to ensure school performance.

Conclusion

The results of the present study suggest that the PA skills of Roma children are significantly lower than those of their non-Roma peers in 1st grade, and it seems very important to conduct interventions to improve such skills before school starts. These results also suggest that in the case of Roma children, the level of the mother's education makes the biggest difference with regard to the child's development of pre-literacy skills such as PA. Yet, unlike in the case of their non-Roma peers, those skills of Roma children are less dependent on the father's education and family

income. Although a medium-term intensity intervention program conducted during 1ˢᵗ grade did not produce significant effects beyond regular classroom activities, our study indicates that as soon as Roma children start school, their PA skills increase at the pace similar to that of their non-Roma peers.

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