Brief Report

Age and schooling effects on early literacy and phoneme awareness

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Abstract

Previous research on age and schooling effects is largely restricted to studies of children who begin formal schooling at 6 years of age, and the measures of phoneme awareness used have typically lacked sensitivity for beginning readers. Our study addresses these issues by testing 4 to 6 year-olds (first 2 years of formal schooling in the United Kingdom) on a sensitive dynamic measure of phoneme awareness and tests of early literacy. There were significant effects of both age and schooling on the dynamic measure of phoneme awareness, word reading, spelling, and letter name knowledge, but there were no significant Age × Time interactions. This indicates that older children within this age group generally outperform their younger classmates (although they do not make faster progress) and that this advantage is developed prior to the start of school.

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Introduction

There are well-established effects of schooling on phonemic awareness (Christian, Morrison, Frazier, & Massetti, 2000), with evidence of only minimal levels of this skill in preschoolers (Carroll, 2004). Similar results have been shown with regard to early literacy, with the effect of one year of schooling being consistently stronger than the effect of one year extra age on reading and spelling during the first years of school (Crone & Whitehurst, 1999; Morrison, Griffith, & Alberts, 1997). However, it may be that significant age effects have been underestimated by previous research because (a) the children tested all began formal schooling at around 6 years of age, thereby minimizing differences in relative age within the sample and (b) the phoneme awareness measures used lacked sensitivity/
reliability. The current study investigated these possibilities by examining age and schooling effects on dynamic and static measures of phoneme awareness, reading, and spelling in 4- to 6-year-olds (first two years of formal schooling in the United Kingdom). The “cutoff” method was used, whereby the oldest and youngest children in first grade (age effect) were compared with the oldest children in kindergarten (schooling effect).

Age effects may be more visible in children who begin schooling at a younger age. For example, the difference in performance between 4 and 5 year-old kindergartners (25% difference in age) may be greater than that between 5- and 6-year-old kindergartners (20% difference in age). Children in Australia and the United States, as well as in most European countries, typically begin formal reading instruction in first grade at 6 or 7 years of age. However, letter learning and instruction in phonics usually begins in kindergarten (5 or 6 years of age) and many children pursue reading-related activities earlier at home and in preschool (National Reading Panel, 2000). In the United Kingdom, children are 4 or 5 years old when they begin learning how to read at school, and there are associated concerns about the performance of the youngest children (e.g., Alexander, 2009; Sharp, George, Sargent, O’Donnell, & Heron, 2009). Therefore, it is of increasing relevance to know about age effects on reading in children under 6 years of age.

Floor effects often are evident on tests of phoneme awareness in children who have been in formal schooling for less than a year, leading to a variable that is not statistically viable for analyses due to a positive skew and lack of variation (e.g., Carroll, Snowling, Hulme, & Stevenson, 2003). The current study avoided these difficulties by using a dynamic measure of phoneme awareness. During a dynamic test, if a child initially provides an incorrect answer, the experimenter gives gradually increasing assistance to guide the child to the correct response (Spector, 1992). The level of assistance required can be used as an indication of learning potential as well as current attainment. This approach should reduce poor scores due to lack of understanding and also should increase reliability. Consequently, if there are age effects, they should be reflected more accurately.

Age effects on literacy and phoneme awareness are likely to be caused by informal experience of language outside of school. For example, activities such as rhyming games, music, and poetry can enhance phonological awareness (Fazio, 1997). Reading and spelling skills can be stimulated by exposure to “reading readiness” activities such as alphabet learning and word recognition games. It follows that older children would begin school with higher levels of phoneme awareness and early literacy than their younger peers due to longer exposure to these activities both at home and in preschool. This hypothesis is supported by evidence of a significant age effect on phoneme awareness prior to the start of school (Bentin, Hammer, & Cahan, 1991; Cunningham & Carroll, 2011; Morrison, Smith, & Dowehrensberger, 1995) and emergent literacy (Crone & Whitehurst, 1999; Morrison et al., 1997).

The picture after the onset of school is less clear. Studies have shown that by the end of first grade or the beginning of second grade, there is no longer a significant difference in phoneme awareness between older and younger children in the same grade (Bowey & Francis, 1991; Morrison et al., 1995). This implies that once formal reading instruction begins, its effect on phoneme awareness is so strong as to supersedes the age effect. Similarly, a large-scale study by Crone and Whitehurst (1999) found no significant age effects on measures of reading and spelling in first and second grades despite such effects during kindergarten, whereas a similar study by Morrison and colleagues (1997) found a small but significant age effect on reading in first grade. Such evidence implies that, in general, older children fail to maintain a lead in literacy and phonological skills after formal schooling begins. However, in all of the above studies, mean differences were in favor of the older children and it is possible that age effects were underestimated.

In the case of Bowey and Francis (1991), one possibility is that an age effect was present but that it was not detected due to the nature of the phonological awareness tasks used. First, oddity tasks were used, and these often lack reliability (Hulme et al., 2002) and do not require explicit phoneme awareness (Carroll & Snowling, 2001). Second, none of the kindergartners scored above chance on the task requiring phonemic analysis, suggesting a lack of sensitivity. The use of a dynamic test of phoneme segmentation in the current study would improve reliability and sensitivity. This is particularly important when testing very young children who are more likely to exhibit floor effects on static tasks.

Finally, other studies in this area, including those mentioned above, have typically tested children who begin formal reading instruction no earlier than 5 or 6 years of age. Our sample is unique in
consisting of children who are particularly young at the onset of formal schooling (4 or 5 years old). Children of this age enter the “reception” year (roughly equivalent to kindergarten in the United States), where they are taught reading via systematic instruction in synthetic phonics. Therefore, we hypothesized that our sample would be more likely to exhibit significant age effects than previous samples. In addition, children in our study were reassessed after 6 months to test for Age \times Time interactions. This allowed us to see whether the older children made faster progress than their younger counterparts.

Method

Participants

Participants were 45 children recruited from one state-funded school in England. At this school, all children entered reception in September regardless of their birth date. To be consistent with other studies in the area, reception is referred to as kindergarten and year 1 is referred to as first grade in the current article. However, it should be noted that children in the United Kingdom begin reading instruction from the start of kindergarten. 15 of the oldest children in kindergarten were compared with 15 of the youngest children in first grade, who in turn were compared with 15 of the oldest children in first grade.

All groups completed the British Picture Vocabulary Scale (BPVS) (Dunn, Dunn, Whetton, & Burley, 1997) at the start of kindergarten. BPVS data for the two first-grade groups were collected one year prior to the other measures during screening for a previous longitudinal study (see Cunningham & Carroll, 2011). There were 15 older children in kindergarten born within 3 months of the cutoff date (31 August); therefore, all were included in the final sample. In first-grade, there were 22 older children and 17 younger children, allowing some degree of selection to take place. 15 children in each group were matched pairwise on vocabulary score (within 4 points).

At Time 1, the average age in the old kindergarten group was 5 years 0 months (5;0 years, range = 4;11–5;2). In the young first-grade group the average age was 5.2 years (range = 5.1–5.4), and in the old first-grade group it was 5;11 years (range = 5;10–6;0). Word reading data were not collected from one child in the old kindergarten group due to refusal to participate. There were no significant differences between the groups in standardized vocabulary, maternal and paternal education level, shared book reading at home, family literacy, or age that parents began reading to their child. However, as expected, the young first-graders had spent fewer months in preschool than the old kindergartners, \( t(38) = 2.15, p < .05, r = .33 \), and the old first-graders, \( t(38) = 3.08, p < .01, r = .45 \), due to the month of their birth (see Table 1).

Design and procedure

The full sample was tested at two time points during the course of one school year: once during October–November (Time 1) and again 6 months later during April–May (Time 2). Children were tested by the first author in a quiet corner of the school:

- **Time 1:** word reading, letter-sound knowledge, letter-name knowledge, phoneme deletion, dynamic (and static) phoneme segmentation, vocabulary, home literacy environment;
- **Time 2:** word reading, spelling, letter-sound knowledge, letter-name knowledge, static phoneme segmentation.

Materials

**Phoneme awareness tasks**

**Dynamic phoneme segmentation.** A dynamic test of phoneme segmentation was developed based on the task presented in Spector (1992). Children were asked to segment 12 nonwords into their constituent phonemes (e.g., “What are the sounds in shreb?”) and were given increasingly explicit prompts to
Table 1
Background characteristics, phoneme awareness, literacy scores, and between-group ANOVAs.

<table>
<thead>
<tr>
<th></th>
<th>Maximum score</th>
<th>Old kindergartners</th>
<th>Young first-graders</th>
<th>Old first-graders</th>
<th>ANOVA</th>
<th>$r^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at Time 1 (months)</td>
<td>–</td>
<td>60.20 (0.94)</td>
<td>62.07 (1.01)</td>
<td>71.27 (0.70)</td>
<td>609.72 (2, 42)**</td>
<td>.97</td>
</tr>
<tr>
<td>Age at Time 2 (months)</td>
<td>–</td>
<td>65.93 (0.88)</td>
<td>68.80 (1.01)</td>
<td>77.53 (0.74)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Standardized vocabulary</td>
<td>160</td>
<td>112.57 (12.22)</td>
<td>112.07 (9.95)$^a$</td>
<td>112.20 (10.04)$^a$</td>
<td>0.01 (2, 42)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Maternal education</td>
<td>7</td>
<td>3.31 (1.06)</td>
<td>2.71 (0.83)</td>
<td>2.71 (0.91)</td>
<td>0.97 (2, 40)</td>
<td>.05</td>
</tr>
<tr>
<td>Paternal education</td>
<td>7</td>
<td>3.21 (1.63)</td>
<td>2.71 (0.83)</td>
<td>3.00 (1.62)</td>
<td>0.45 (2, 39)</td>
<td>.02</td>
</tr>
<tr>
<td>Shared book reading at home</td>
<td>55</td>
<td>42.80 (6.35)</td>
<td>42.71 (8.01)</td>
<td>45.20 (5.96)</td>
<td>0.64 (2, 41)</td>
<td>.03</td>
</tr>
<tr>
<td>Family literacy</td>
<td>18</td>
<td>8.79 (2.08)</td>
<td>9.79 (2.19)</td>
<td>9.67 (1.35)</td>
<td>1.17 (2, 40)</td>
<td>.06</td>
</tr>
<tr>
<td>Age began reading to child (months)</td>
<td>–</td>
<td>6.87 (5.13)</td>
<td>6.36 (4.73)</td>
<td>7.93 (4.62)</td>
<td>0.40 (2, 41)</td>
<td>.02</td>
</tr>
<tr>
<td>Months in preschool</td>
<td>–</td>
<td>27.86 (10.68)</td>
<td>18.38 (9.33)</td>
<td>31.93 (13.69)</td>
<td>4.95 (2, 38)*</td>
<td>.21</td>
</tr>
<tr>
<td>Dynamic phoneme segmentation, Time 1</td>
<td>72</td>
<td>20.73 (17.07)$^b$</td>
<td>45.40 (15.49)</td>
<td>56.13 (11.76)$^c$</td>
<td>22.15 (2, 42)**</td>
<td>.51</td>
</tr>
<tr>
<td>Phoneme deletion, Time 1</td>
<td>16</td>
<td>3.73 (5.15)$^b$</td>
<td>9.53 (5.15)</td>
<td>12.60 (4.32)$^c$</td>
<td>12.72 (2, 42)**</td>
<td>.38</td>
</tr>
<tr>
<td>Static phoneme segmentation, Time 1</td>
<td>12</td>
<td>1.73 (2.34)$^b$</td>
<td>4.73 (2.60)</td>
<td>6.93 (2.96)</td>
<td>6.20 (2, 41)**</td>
<td>.23</td>
</tr>
<tr>
<td>Static phoneme segmentation, Time 2</td>
<td>12</td>
<td>8.21 (3.77)</td>
<td>9.53 (1.85)</td>
<td>9.53 (2.30)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Word reading, Time 1</td>
<td>90</td>
<td>0.64 (0.93)$^b$</td>
<td>13.73 (10.88)</td>
<td>21.60 (12.93)$^c$</td>
<td>14.82 (2, 41)**</td>
<td>.42</td>
</tr>
<tr>
<td>Word reading, Time 2</td>
<td>90</td>
<td>12.64 (7.91)</td>
<td>28.60 (15.51)</td>
<td>36.67 (14.95)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Letter sound knowledge, Time 1</td>
<td>26</td>
<td>12.20 (7.17)$^b$</td>
<td>23.67 (2.23)</td>
<td>24.40 (2.77)</td>
<td>32.87 (2, 42)**</td>
<td>.61</td>
</tr>
<tr>
<td>Letter sound knowledge, Time 2</td>
<td>26</td>
<td>24.53 (1.46)</td>
<td>24.80 (1.57)</td>
<td>25.20 (0.86)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Letter name knowledge, Time 1</td>
<td>26</td>
<td>7.07 (7.32)$^b$</td>
<td>12.87 (7.42)</td>
<td>18.87 (5.03)$^c$</td>
<td>12.41 (2, 42)**</td>
<td>.37</td>
</tr>
<tr>
<td>Letter name knowledge, Time 2</td>
<td>26</td>
<td>13.40 (7.81)</td>
<td>20.00 (4.96)</td>
<td>22.73 (4.70)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Spelling, Time 2</td>
<td>75</td>
<td>8.60 (3.48)$^b$</td>
<td>16.93 (6.86)</td>
<td>21.93 (7.91)$^c$</td>
<td>14.22 (2, 42)**</td>
<td>.40</td>
</tr>
</tbody>
</table>

Note: Degrees of freedom reflect reduced sample sizes due to no responses on some of the home literacy environment questions and the refusal of one old kindergartner to participate in the word reading tasks. Standardized vocabulary = BPVS; phoneme deletion = Phonological Abilities Test of Phoneme Deletion (beginning and end sounds); word reading = BAS 2 word reading test; and spelling = BAS 2 spelling test.

$^a$ Measured 1 year earlier when the young first-graders were 51.93 months old and the old first-graders were 60.93 months old.

$^b$ Schooling effect.

$^c$ Age effect.

$^* p < .05.$

$^{**} p < .01.$
help them do this (e.g., “What is the first sound you hear in shreb?”). There were seven prompts that were negatively coded. Sample-specific reliability was high (Cronbach’s $\alpha = .94$).

**Static phoneme segmentation.** A static phoneme segmentation score for Time 1 was derived from the dynamic assessment by giving a score of 1 if no prompts were required and a score of 0 if any prompts were required (as would be the case had it been administered as a static task). At Time 2, the same items from the dynamic task were administered again as a static task. No prompts were given. Sample-specific reliability was good (Cronbach’s $\alpha = .81$).

**Phoneme deletion.** The phoneme deletion (beginning and end sounds) subtest from the Phonological Abilities Test (PAT) (Muter, Hulme, & Snowling, 1997) was administered as an additional static measure of phoneme awareness. This task was not administered again at Time 2 due to ceiling effects at Time 1. Sample-specific reliability was high (Cronbach’s $\alpha = .95$).

**Literacy tasks**

- **Letter-sound knowledge.** Each of the 26 lowercase letters was presented individually on cards in random order. Children were asked to pronounce the sound of the letter. Sample-specific reliability was high (Cronbach’s $\alpha = .95$).

- **Letter-name knowledge.** This task was the same as the previous one except that children were asked to pronounce the name of the letter instead of the sound. Sample-specific reliability was high (Cronbach’s $\alpha = .94$).

- **Word reading.** This test was from the British Ability Scales 2 (BAS) (Elliot, Smith, & McCulloch, 1996). Children were asked to read as many words as possible from a list. The published split-half reliability of this test was high at .88.

- **Spelling.** Spelling was measured using the BAS spelling test (Elliot et al., 1996). Children were asked to spell individual words presented orally by the experimenter within a sentence. Sample-specific reliability was high (Cronbach’s $\alpha = .94$).

**Home literacy environment**

A questionnaire was sent home to parents. It consisted of 16 questions focusing on their children’s exposure to literacy-related activities in the home, 1 question on the number of months their children spent in preschool, and 2 questions on parental education level.

**Results**

Table 1 shows descriptive statistics and between-groups analyses of variance (ANOVA) results for the phoneme awareness and literacy measures at Times 1 and 2. In total, 13 ANOVAs and 20 pairwise comparisons were conducted. In the case of multiple comparisons, procedures for controlling family-wise error rate (e.g., Bonferroni) are usually conducted. These are conservative but are performed at the expense of power. Therefore, adaptive linear step-up procedures were adopted instead to control the false discovery rate (i.e., the expected proportion of false positives among significant results) at 5% (Benjamini, Krieger, & Yekutieli, 2006). Because a large number of our comparisons were highly significant (14/33 with $p < .001$), linear step-up resulted in an increase in the critical value required for significance. In total, 18 null hypotheses were rejected at the first stage of the two-stage procedure run at level 0.05/1.05. At the second stage, the procedure was run at level $(0.05/1.05) \times 33/(33 – 18) = 0.105$, resulting in the rejection of 25 null hypotheses. Adjusted $p$ values are given below using Eq. (15) reported in Dudoit, Gilbert, and van der Laan (2008, p. 723).

Three 3-way mixed ANOVAs were conducted on scores for the static phoneme segmentation task, word reading, and letter-name knowledge at Times 1 and 2. Improvement in letter-sound knowledge was not analyzed due to ceiling effects at Time 2. Time was entered as a two-level within-participants
factor, and group was entered as a three-level between-participants factor. Planned contrasts comparing the young first-graders with the old first-graders revealed age effects, whereas contrasts between the old kindergartners and the young first-graders showed schooling effects. There was a significant effect of time on all tasks, indicating that groups made significant progress between Time 1 and Time 2. Contrasts between the progress (from Time 1 to Time 2) of the old kindergartners and the young first-graders showed Schooling × Time interactions, whereas Age × Time interactions were determined by comparing the progress of the young and old first-graders.

There were significant schooling effects on word reading (mean scores across time points: old kindergartners = 6.65, young first-graders = 21.17), \( t(41) = 3.48, p < .01, r = .48 \), letter-name knowledge (old kindergartners = 10.24, young first-graders = 16.44), \( t(42) = 2.91, p < .01, r = .41 \), and static phoneme segmentation (old kindergartners = 5.04, young first-graders = 7.14), \( t(41) = 2.28, p = .02, r = .34 \). There were significant age effects on word reading (old first-graders = 29.14), \( t(41) = 1.94, p = .04, r = .29 \), and letter-name knowledge (old first-graders = 20.80), \( t(42) = 2.05, p = .04, r = .30 \), but not on the static phoneme segmentation task (old first-graders = 8.24), \( t(41) = 1.22, p = .13, r = .19 \).

For the word reading measure, contrasts revealed nonsignificant Schooling × Time, \( t(41) = 1.13, p = .14, r = .17 \), and Age × Time interactions, \( t(41) = 0.08, p = .45, r = .01 \). For letter-name knowledge, there was no Schooling × Time interaction, \( t(42) = 0.44, p = .33, r = .07 \). However, there was a significant Age × Time interaction in a negative direction; the young first-graders made more progress than the old first-graders (mean change scores: young first-graders = 7.13, old first-graders = 3.87), \( t(42) = -1.78, p < .05, r = .27 \). For static phoneme segmentation, both interactions were significant in a negative direction; the old kindergartners made more progress than the young first-graders (old kindergartners = 6.36, young first-graders = 4.80), \( t(41) = -1.95, p = .03, r = .29 \), and the young first-graders made more progress than the old first-graders (old first-graders = 2.60), \( t(41) = -2.81, p < .01, r = .40 \). It is likely that these effects are due to ceiling effects on these measures at Time 2.

Four one-way ANOVAs were performed to look for between-group differences on measures performed at one time point only. Contrasts revealed that there were significant schooling effects on dynamic phoneme segmentation (mean scores: old kindergartners = 20.73, young first-graders = 45.40), \( t(42) = 4.52, p < .01, r = .57 \), phoneme deletion (old kindergartners = 3.73, young first-graders = 9.53), \( t(42) = 3.25, p < .01, r = .45 \), letter-sound knowledge (old kindergartners = 12.20, young first-graders = 23.67), \( t(16.67) = 5.91, p < .01, r = .82 \), and spelling (old kindergartners = 9.60, young first-graders = 16.93), \( t(20.76) = 3.69, p < .01, r = .63 \). There were significant effects of age on dynamic phoneme segmentation (old first-graders = 56.13), \( t(42) = 1.97, p = .04, r = .29 \), and spelling (old first-graders = 21.93), \( t(27.45) = 1.85, p < .05, r = .33 \), and there was a nearly significant effect on phoneme deletion (old first-graders = 12.60), \( t(42) = 1.72, p = .06, r = .26 \). There was no significant age effect on letter-sound knowledge, \( t(26.75) = 0.80, p = .22, r = .15 \).

Discussion

This study investigated age and schooling effects on the development of phoneme awareness and early literacy skills in 4 to 6 year-olds during the first two years of formal schooling. We found significant effects of age and schooling on nearly all measures, with the effect of one year of schooling being roughly twice as large as the effect of up to one year’s difference in age. There were no significant Age × Time interactions, indicating that the old first-graders did not make faster progress across the year than the young first-graders. This would suggest that the advantage of the elder group was developed during the preschool and kindergarten years and was maintained, rather than increased, in first grade.

The existence of strong schooling effects is unsurprising given that the young first-graders had received an additional year of school-based instruction compared with the old kindergartner group. There is also a strong focus on reading tuition via a phonics approach during the first two years of school in the United Kingdom that may have enhanced the observed schooling effects. More novel is the discovery of significant age effects in first grade. This is in contrast to previous research that found no significant effect of age on similar measures of phoneme awareness (Bowey & Francis, 1991; Morrison et al., 1995) and literacy (Crone & Whitehurst, 1999; Morrison et al., 1995) in first
grade. A possible explanation for these different findings may be the relative ages of our children. Samples from the above studies were 1 year older at the onset of formal schooling (5 or 6 years of age) than the current UK sample (4 or 5 years of age). The difference in performance between 4 and 5 year-olds may be greater than that between 5 and 6 year-olds, thereby leading to larger age effects. With regard to phoneme awareness, there was a significant age effect found on the dynamic task but not on the two static tasks. This may be because our dynamic test was a more sensitive measure of phoneme awareness than the oddity tasks used by Bowey and Francis (1991) that showed floor effects.

All groups experienced significant improvement during the 6 months between Time 1 and Time 2, but there were no Age x Time interactions. This is inconsistent with the hypothesis that older children respond better to instruction than their younger classmates and raises the question of how mean level differences in favor of the older children developed in the first place. A possible explanation is that the older children entered school with higher levels of skill than their younger peers but that once formal reading instruction began, its influence was so strong that it affected all children equally regardless of starting ability. Older children may develop better phoneme awareness prior to school as a result of longer exposure to phonologically enhancing activities such as rhyming games, music, and poetry at home and in preschool (Fazio, 1997). With regard to word reading and letter knowledge, it may be that parents of relatively older children do more reading readiness activities (e.g., alphabet learning, word recognition games) at home prior to school because they know that children of the same age are being exposed to these activities at school.

Negative interactions for the phoneme segmentation task (the old kindergartners made more progress than the young first-graders, who in turn made more progress than the old first-graders) may be explained by ceiling levels of performance on this task for the two first-grade groups. It may also be reflective of the efficacy of the synthetic phonics approach, particularly during the first year when growth in phoneme awareness may be at its highest. The better progress of the young first-graders compared with the old first-graders on letter-name knowledge is most likely due to the fact that letter knowledge is expected to be complete by the end of first grade; therefore, given their initial advantage, the older children had less room for improvement than their younger counterparts.

There are two main limitations to the current research. First, our sample was from an area of relatively high socioeconomic status. It is possible that more affluent parents spend more time on reading readiness activities with their older children prior to school than less affluent parents, thereby leading to an exacerbation of the age effect. However, although the school was in a middle-class area, the average maternal education level was not particularly high: between the equivalent of a school certificate (16 years of age) and a high school certificate (18 years of age) for the two first-grade groups and just beyond a high school certificate for the old kindergartner group. Second, the small sample size raises issues of power, although the adoption of linear step-up procedures reduces this problem in the current experiment. Nevertheless, further research with a larger, more diverse sample would be necessary to test the robustness of our results.

The significant age effects observed are especially relevant in light of recent concerns about the performance of the youngest children during the first years of school, which would appear to be warranted to some extent (e.g., Alexander, 2009; Sharp, George, Sargent, O’Donnell, & Heron, 2009). It would be useful for educators to know that older children, on average, are likely to have better reading and phoneme awareness skills during the first two years of school, although they are not expected to develop these skills faster. Educators could then take this into account when organizing ability groups and differentiating lessons. There are also implications in terms of standardized cognitive tests that normally use either age or school year based standardization. For this age group, both types of standardization may be prudent to take into account age and schooling effects.

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References


