Journal of Experimental Child Psychology 109 (2011) 248–255

Contents lists available at ScienceDirect

Journal of Experimental Child Psychology

journal homepage: www.elsevier.com/locate/jecp

Brief Report

Age and schooling effects on early literacy and phoneme awareness

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ARTICLE INFO

Article history:
Received 31 August 2010
Revised 24 December 2010

Keywords:
Reading
Spelling
Phoneme awareness
Letter knowledge
Dynamic assessment
Age effects

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.

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/

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doi:10.1016/j.jecp.2010.12.005

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 supersede 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