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## Reading outcomes of children with delayed early vocabulary: A follow-up from age 2–16

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## ABSTRACT

**Background:** Delays in expressive vocabulary have been associated with lower outcomes in reading.

**Aim:** The aim is to conduct a long-term follow-up study to investigate if early expressive vocabulary delay (late talking) predicts reading development in participants age 16 and under. We examine further if the prediction is different in the presence of family risk for dyslexia (FR) and early receptive vocabulary delay.

**Methods:** Expressive and receptive vocabulary skills were assessed at the age of 2–2.5 years, and reading skills in Grades 2, 3, 8 and 9 (age 8–16). The longitudinal sample consisted of 200 Finnish-speaking children, of which 108 had FR for dyslexia and 92 came from families without reading difficulties. We compared the reading development of five subgroups: 1) FR and no vocabulary delay; 2) FR and late talkers; 3) FR, late talkers and co-existing receptive vocabulary delay; 4) no FR and late talkers; and 5) no FR and no vocabulary delay.

**Results:** The group with FR and expressive and receptive vocabulary delay had difficulties in reading comprehension, but not in reading fluency. The late talkers without receptive vocabulary difficulties tended to become typical readers.

**Conclusions and implications:** Delays in early vocabulary can lead to a reading comprehension deficit, with the specification that expressive vocabulary deficit alone can alleviate in time, whereas the combined deficit is a stronger risk marker.

### What this paper adds?

The present study extends the literature by investigating the reading development of children with early expressive vocabulary delay followed up to age 16 (Grade 9) in a Finnish language context in relation to both reading fluency and reading comprehension. In addition, we examine whether this relationship is different in the presence and absence of other co-occurring risk factors, in particular family risk for dyslexia and early receptive vocabulary delay. The existing literature on reading development of children with delays in early vocabulary is almost exclusively limited to findings concerning the early grades of primary school. Furthermore, all the previous studies spanning beyond Grade 2 have been conducted using English-speaking children; thus, further research in other orthographies is needed.

We compared the reading development of five subgroups: 1) FR and no vocabulary delay; 2) FR and late talkers; 3) FR, late talkers

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and co-existing receptive vocabulary delay; 4) no FR and late talkers; and 5) no FR and no vocabulary delay. Our findings add to the literature by suggesting that a trajectory of later reading comprehension difficulties is much more likely when early expressive vocabulary delay is accompanied by receptive vocabulary delay. Our findings suggest that a delay in early vocabulary can lead to a persistent deficit with the specification that expressive vocabulary deficit alone can be alleviated in time, whereas the combined deficit is a stronger risk marker. Early expressive vocabulary delay represented high risk only for reading comprehension development and only when it co-occurred with other risk factors (family risk for dyslexia and receptive vocabulary difficulties).

## 1. Introduction

Early years expressive language delay, or late talking, is one of the most common concerns of parents and early health care personnel, and it is one of the common reasons for referring young children for evaluation. This is not surprising, as early language development forms the foundation for later educational and academic achievement and has important links with social adaptation (Reilly et al., 2010). From a clinical and educational perspective, it is important to be able to predict as early as possible which children may be at risk for learning difficulties in their school years. Delays in expressive vocabulary have been associated with lower outcomes in reading (Rescorla, 2002, 2005, 2009), but apart from Rescorla's sample from the USA, little research has focused on literacy development after the early grades of primary school using longitudinal designs. Moreover, most of the previous studies have been conducted among English-speaking children and have focused almost solely on early expressive, but not receptive vocabulary.

The present study will extend previous studies (Duff, Reen, Plunkett, & Nation, 2015; Lyytinen, Eklund, & Lyytinen, 2005; Rescorla, 2002, 2005, 2009) to later years of schooling by examining if late talking (delays in early expressive vocabulary) predict reading development (fluency and comprehension) from early primary Grades 2 and 3 to lower secondary Grades 8 and 9 in Finland. We will also examine the effects of co-occurring receptive vocabulary delay and family risk for dyslexia on the relationship between early vocabulary skills and reading outcomes. Expressive vocabulary may not be a marker of subsequent language and literacy difficulties when it is not accompanied by co-occurring difficulties in receptive vocabulary (Lyytinen et al., 2005). It is also possible that family risk for dyslexia actually explains the link between expressive vocabulary delay because the children with family risk (due to parental language or reading difficulties) are shown to be at risk for both vocabulary delays (Duff et al., 2015; Lyytinen et al., 2005; Snowling, Gallagher, & Frith, 2003; Snowling, Muter, & Carroll, 2007) and for later language and reading outcomes (Lyytinen et al., 2005; Reilly et al., 2010).

Early vocabulary skills (expressive or a composite score of expressive and receptive vocabulary) have been shown to be associated with both reading fluency (Nation & Snowling, 2004; Snowling et al., 2003) and reading comprehension (Duff et al., 2015; Nation, Cocksey, Taylor, & Bishop, 2010; Ouellette 2006; Ouellette & Beers 2010). Theories on how early vocabulary skills and reading outcomes are linked depend, however, on the reading skill in question. According to the lexical restructuring hypothesis, the link between early vocabulary and reading fluency is indirect and mediated via phonological skills (e.g. Walley, Metsala, & Garlock, 2003). Phonological awareness plays a critical role in the development of decoding (Ehri et al., 2001; Hulme & Snowling, 2014; Melby-Lervåg, Lyster, & Hulme, 2012), and tasks requiring identification or manipulation at the phoneme level, in particular, have been found to be associated with variations in decoding skills (Georgiou, Parrila, & Papadopoulos, 2008; Lervåg, Bråten, & Hulme, 2009). Walley et al. (2003) suggested that phonological awareness may be linked to vocabulary via the process of restructuring phonological representations (the word *cat*, for example, first segmented at syllable level /k/-/æt/ becoming segmented at phoneme level /k/-/æ/-/t/). Vocabulary growth increases sensitivity towards phonological similarities between words, which elicits a restructuring of the already-existing phonological representations in the lexicon (Walley et al., 2003).

The link between reading comprehension and vocabulary skills may be more direct than that of vocabulary and reading fluency. According to the simple view of reading model (Gough & Tunmer, 1986; Hoover & Gough, 1990), reading comprehension is based on two core skills: decoding and language comprehension. Reading comprehension has been shown to rely on a variety of oral language comprehension skills (Hulme & Snowling, 2014), including expressive and receptive vocabulary (e.g. Nation et al., 2010) and listening comprehension (e.g. Catts, Adlof, & Weismer, 2006; Nation et al., 2010). Weaknesses in these skills have been found to be manifested before learning to read, thus providing a possible causal link between the influence of oral language comprehension on difficulties in reading comprehension (e.g. Catts et al., 2006; Nation et al., 2010). This association between vocabulary and reading comprehension has also been shown through intervention studies (Clarke, Snowling, Truelove, & Hulme, 2010; Fricke, Bowyer-Crane, Haley, Hulme, & Snowling, 2013).

The vast majority of studies on the reading development of children with expressive vocabulary delay have focused on language outcomes in kindergarten (age range between 2 and 5.5 years) (Feldman et al., 2005; Moyle, Weismer, Evans, & Lindstrom, 2007; Thal, Miller, Carlson, & Vega, 2005) or reading outcomes in the early grades of primary school (Grade 2) (Lyytinen et al., 2005). The documentation on the reading development of the children with expressive vocabulary delay beyond the early grades comes from one sample (Rescorla, 2002, 2005, 2009). Rescorla (2002) showed that children that had been identified as having expressive vocabulary delay in early childhood continued to manifest significantly poorer reading skills (i.e., decoding, comprehension, written language and spelling) than their peers at the ages of 8 and 9. At the age of 13, the children with expressive vocabulary delay demonstrated significantly lower vocabulary and reading comprehension skills than the comparison children (Rescorla, 2005), whereas no differences were observed in reading fluency (Rescorla, 2005). At the age of 17, the children with expressive vocabulary delay had average reading skills but below average vocabulary and verbal memory (Rescorla, 2009). Rescorla's findings show that early expressive vocabulary delay is negatively associated with reading achievement, especially after the initial stages of learning to read (Rescorla, 2002, 2005, 2009), and the effect is primarily seen on reading comprehension rather than reading fluency (Rescorla, 2005, 2009). Rescorla, however, did not control for other risk factors or co-occurring difficulties, and it is possible that late talking is not the

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