



ELSEVIER

Contents lists available at ScienceDirect

Research in Developmental Disabilities



Lexical access in children with hearing loss or specific language impairment, using the cross-modal picture–word interference paradigm



Brigitte E. de Hoog^{a,*}, Margreet C. Langereis^b, Marjolijn van Weerdenburg^a, Harry Knoors^{a,c}, Ludo Verhoeven^a

^a Behavioural Science Institute, Radboud University Nijmegen, P.O. Box 9104, 6500 HE Nijmegen, The Netherlands

^b Department of Otorhinolaryngology, Head and Neck Surgery, Hearing and Implants, Radboud University Medical Center, Donders Institute for Brain, Cognition and Behaviour, P.O. Box 9101, 6500 HB Nijmegen, The Netherlands

^c Royal Dutch Kentalis, Kentalis Academy, P.O. Box 7, 5270 BA Sint-Michielsgestel, The Netherlands

ARTICLE INFO

Article history:

Received 15 July 2014

Received in revised form 7 November 2014

Accepted 9 November 2014

Available online 26 November 2014

Keywords:

Lexical access

Picture naming

Children

Cochlear implants

Hard-of-hearing

SLI

ABSTRACT

In this study we compared lexical access to spoken words in 25 deaf children with cochlear implants (CIs), 13 hard-of-hearing (HoH) children and 20 children with specific language impairment (SLI). Twenty-one age-matched typically developing children served as controls. The children with CIs and the HoH children in the present study had good speech perception abilities. We used a cross-modal picture–word interference paradigm to examine lexical access. Results showed that children with SLI revealed overall slower reaction times and produced more errors than the children with CIs, the HoH children, and the control children. Reaction times of children with CIs and the HoH children did not differ from those of the control children. Thus, problems with spoken language processing, as is the case in children with SLI, seem to affect lexical access more than limitations in auditory perception, as is the fundamental problem in children with hearing loss. We recommend that improvement of lexical access in children with SLI deserves specific attention in therapy and education.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

Lexical access is a crucial aspect of language acquisition in general and of word learning in particular. It is highly dependent on qualitatively good speech perception and auditory processing skills (Hansson, Forsberg, Löfqvist, Mäki-Torkko, & Sahlén, 2004), since perception and processing contribute to building stable lexical representations in the mental lexicon. Lexical access may be endangered in children with sensorineural hearing loss, given their fundamental problems with speech perception (sometimes resulting in processing problems as well), and in children with SLI, who have intact hearing but may suffer from predominantly auditory processing difficulties. Children with hearing loss often show less well-defined phonological categories in long-term memory (Jerger, Lai, & Marchman, 2002b; Svirsky, Robbins, Kirk, Pisoni, & Miyamoto, 2000), whereas many children with SLI show poorly defined semantic categories as well (McGregor, Newman,

* Corresponding author. Tel.: +31 243617702; fax: +31 243616211.
E-mail address: b.dehoog@pwo.ru.nl (B.E. de Hoog).

Reilly, & Capone, 2002; Seiger-Gardner & Schwartz, 2008). To examine the impact of such limitations on children's lexical development, this study will relate the nature of these children's semantic and phonological representations in the mental lexicon and the speed with which these representations are accessed during picture naming. The comparison of children with hearing loss and children with SLI will make it possible to investigate the implications of auditory perception and auditory processing problems on lexical access in picture naming.

1.1. Lexical access and the cross-modal picture–word interference paradigm

The selection and retrieval of a stored word from the mental lexicon are referred to as lexical access (e.g., Bock, 1996; Dell, Schwartz, Martin, Saffran, & Gagnon, 1997; Levelt, Roelofs, & Meyer, 1999). It involves the process of competition between continuously activated stored candidate words out of which the intended word is retrieved (Levelt et al., 1999; McQueen & Cutler, 2001). Models of lexical access explain the activation of semantic and phonological information in time during processing. Findings from studies with adults have led to the proposal of three different models, focusing on language production. These models are the serially ordered two-step model (e.g., Levelt et al., 1991, 1999; Schriefers, Meyer, & Levelt, 1990), the cascaded processing model (e.g., Jescheniak & Schriefers, 1998; Jescheniak, Hahne, Hoffmann, & Wagner, 2006; Peterson & Savoy, 1998), and the interactive spreading activation model (e.g., Dell, 1986; Dell, Burger, & Svec, 1997). All models propose that lexical access is divided into semantic and phonological stages of processing, while they conceptualize the relations between the processing stages in different ways.

The cross-modal visual-auditory picture–word interference (PWI) paradigm has been adopted frequently in research studying adult's and children's picture naming skills, in order to trace access to and the time course of semantic and phonological processing during lexical access. In this paradigm, participants are asked to name (using spoken words) target pictures as quickly and accurately as possible, while ignoring related and unrelated aurally presented distractor words. The distractor words have a semantic, a phonological or no obvious relation with the target picture. A valuable characteristic of the paradigm is the possibility to manipulate the appearance of the distractor words at different points in time compared to the target picture. The distractor words can either appear before the picture, simultaneously with the picture or after the appearance of the picture, i.e., the stimulus asynchrony condition. Speed and accuracy for the semantically and phonologically related conditions are analyzed relative to the unrelated condition, to be able to determine the effect of the distractor words on picture naming. In that way, semantic and phonological inhibition and facilitation over time in spoken word production can be examined.

1.2. Lexical access in adults and children

Studies with adult participants about lexical access using the cross-modal PWI paradigm mainly demonstrated semantic interference effects (Jescheniak & Schriefers, 1998; Schriefers et al., 1990; Seiger-Gardner & Schwartz, 2008), followed by phonological facilitation effects (Brooks & MacWhinney, 2000; Jescheniak & Schriefers, 1998; Meyer & Schriefers, 1991; Schriefers et al., 1990; but see Seiger-Gardner & Schwartz, 2008, for contrary results). This means that adults showed slower reaction times when semantically related distractor words were presented relative to unrelated distractor words, and faster reaction times in the presence of phonologically related distractor words relative to unrelated distractor words. However, differences in the time course of the semantic and phonological effects were found as well, pointing to inter-individual variation in the exact time course of processing stages.

Even more individual variation in interference and facilitation effects has been demonstrated in typically and atypically developing children. In some studies early phonological facilitation effects were found (Jerger et al., 2002b; Jerger, Martin, & Damian, 2002), whereas in other studies early phonological interference effects were reported (Brooks & MacWhinney, 2000; Seiger-Gardner & Brooks, 2008; Seiger-Gardner & Schwartz, 2008). In many studies, early semantic interference effects were found (Jerger, Martin, & Damian, 2002; Jerger, Tye-Murray, Damian, & Abdi, 2013; Seiger-Gardner & Schwartz, 2008). Only few studies investigated lexical access in children with hearing loss or in children with SLI using the cross-modal PWI paradigm. Table 1 provides an overview of the semantic and phonological interference and facilitation effects found in studies of adults and children (typically developing [TD] children, children with SLI, and HoH children).

1.2.1. Lexical access in children with hearing loss

Lexical problems have been identified in many children with hearing loss (e.g., Schorr, Roth, & Fox, 2008; Schwartz, Steinman, Ying, Mystal, & Houston, 2013). These problems can at least partly be explained by their limited auditory access to new spoken words and, as a consequence, their slower rate of word learning (Houston, Carter, Pisoni, Kirk, & Ying, 2005; Pittman & Schuett, 2013; Spencer, Barker, & Tomblin, 2003). Lexical problems of children with hearing loss correspond to the degree of hearing loss (Kiese-Himmel, 2008; Sarant, Holt, Dowell, Rickards, & Blamey, 2009) and, if they wear cochlear implants, the age of implantation (Nicholas & Geers, 2007; Schorr et al., 2008). Cochlear implantation helps profoundly deaf children in accessing spoken language, with, compared to deaf children without implants, higher levels of speech perception, improved speech intelligibility and better spoken vocabulary skills (e.g., Houston & Miyamoto, 2010; Svirsky et al., 2000). Indeed, implantation has been shown to be successful in improving the auditory perception and as a result spoken language proficiency of these children, but not in all deaf children and not to a level comparable to that of hearing children (Knors & Marschark, 2014). Children with CIs can develop (nearly) age-equivalent lexical skills, but they still experience substantial

Download English Version:

<https://daneshyari.com/en/article/371308>

Download Persian Version:

<https://daneshyari.com/article/371308>

[Daneshyari.com](https://daneshyari.com)