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Screening language skills at 2;0

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ABSTRACT

Early screening of children at risk for language difficulties is challenging. This study aimed to analyze the specificity and sensitivity of two screening methods at 2;0 years of age. In addition, the matter of what kind of information the use of word combinations and parental concern provide for screening was analyzed. The subjects were 78 children. The screening methods used were the Finnish versions of the short-form version of the MacArthur Communicative Development Inventories (FinCDI-SF) and the Communication and Symbolic Behavior Scales, Developmental Profile, Infant-Toddler Checklist (FinCSBS). The specificity and sensitivity of the screening methods were analyzed based on result of the Reynell Developmental Language Scales III. Both screening methods had high specificity but only moderate sensitivity. The use of word combinations and parental concern provided relevant information on early language development. The results imply that it is important to take into consideration receptive language development in early screening.

1. Introduction

The effect of language difficulties is far reaching and affects various aspects of life, such as learning and the quality of relationships (Durkin & Conti-Ramsden, 2007; Lyytinen, Eklund & Lyytinen, 2005; Rescorla, 2009). Screening for children who are at risk of language difficulties helps with early identification and provides them the support they need. Early intervention is cost-efficient if compared to later intervention (Chowdry & Oppenheim, 2015) and it also diminishes parental concern. The question is how to clinically identify those children, who are at risk for persistent language difficulties, in the best and most economical way. This study compares two screening methods and evaluates their sensitivity and specificity in identifying children with weak language skills (WLS), when measured using a standardized language test at 2;0 years of age.

Expressive lexicon size at 2;0 years is a strong predictor of language skills at 3;0, and even at 5;0 years of age, especially in high-risk children (Korpilahti, Kaljonen & Jansson-Verkasalo, 2016; Lee, 2011; Stolt, Matomäki, Lapinleimu, Haataja & Lehtonen, 2014). At two years of age, children have typically acquired approximately 300 words in their expressive lexicons (Fenson et al., 2007; In Finnish, Lyytinen, 1999; Stolt et al., 2008). Children with small expressive lexicons, in the absence of other neurological pathologies, at 2;0 years of age, are called late talkers (Rescorla, 1989; Rescorla & Dale, 2013). Their prevalence varies between 13% and 20% of 2-year-old children (Reilly et al., 2007; Rescorla, 1989; Zubrick et al., 2007). Although most late-talkers, especially those with no difficulties in receptive language skills, catch up with their peers between the ages of 3;6 and the age of entering school, being a late talker is a risk factor for persistent language difficulties (Lyytinen et al., 2005; Lyytinen, Poikkeus, Laakso, Eklund & Lyytinen, 2001; Rescorla, 2011; Rescorla & Dale, 2013).

The emergence of word combinations can be regarded as a significant developmental milestone for syntactic and semantic

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development (Bates, Bretherton & Snyder, 1988; Bates, Dale & Thal, 1995). Word combinations typically emerge between 1;6 and 2;0 years of age usually after the child has acquired a sufficient number of words in their expressive vocabulary (Fenson et al., 2007; Fenson et al., 2000; Rhea and Norbury, 2012; Stolt, Haataja, Lapinleimu & Lehtonen, 2009). At 2;0, roughly 90% of children use word combinations (Fenson et al., 2000; Stolt et al., 2009). The clinical importance of the emergence of word combinations was noted by Rescorla (1989) when she examined several different screening thresholds for late talkers. If the child had not yet started using word combinations or had 50 or less words when measured using the Language Development Survey, a parental-based word checklist, at 2;0, he/she was identified as a late talker (Delay 3 criterion). Failure to use word combinations at 2;0 roughly corresponds to the clinically significant weakest 10% performance in expressive lexicon size at 2;0 (Bates et al., 1995; Stolt et al., 2009).

The challenge with screening is to identify as accurately as possible the true positives and true negatives, and thus, obtain good sensitivity and specificity numbers. Regarding language development, true positives include children with delayed or atypical language skills and true negatives are those with no difficulties in language skills. Klee, Pearce and Carson (2000) conducted further studies on how to reduce the number of those children who were identified as late talkers but were actually typically developing children (a.k.a. false positives) by revising the Delay 3 (Rescorla, 1989) criterion. By adding parental concerns about a child's language development or if the child had experienced six or more ear infections by the age of two years to the Delay 3 criterion (Delay 3+ criterion), the probability of identifying those children with WLS improved. The value of parental concern has also been examined in other studies and it has been shown to correlate with weak language test results, especially weak expressive language skills (Hayiou-Thomas, Dale & Plomin, 2014; Korpilahti et al., 2016; McLeod & Harrison, 2009).

Also emotions, gaze, non-verbal communication, receptive lexical skills and the use of objects have been found to be associated with concurrent and later language skills (Laakso, Eklund & Poikkeus, 2011; Lyytinen et al., 2005; Stolt et al., 2016; Stolt, Mäkilä et al., 2014; Watt, Wetherby & Shumway, 2006; Wetherby & Prizant, 2002). These skills provide important information on very early language and communication and can be used for screening purposes (Laakso et al., 2011; Wetherby & Prizant, 2002).

The main aim of this study was to analyze the specificity and sensitivity of two screening methods: the short form version of the MacArthur Communicative Development Inventories (Fenson et al., 2000); Finnish version: FinCDI-SF, Stolt & Vehkavuori, in press) and the Communication and Symbolic Behavior Scales, Developmental Profile, Infant-Toddler Checklist (Wetherby & Prizant, 2002; Finnish version: Esikko method, FinCSBS, Laakso et al., 2011) at 2;0. The exact study questions were: 1) How specific and sensitive is the FinCDI-SF in identifying children with WLS at 2;0?, 2) How specific and sensitive is the FinCSBS in identifying WLS at 2;0? and 3) Does the use of word combinations and/or parental concern about their child's language development provide relevant information for screening at 2;0?

This study is part of the ongoing norming study of the FinCDI-SF (Project Leader Dr. Stolt). Permission to adapt the short-form version of the CDI in Finnish was received from the CDI Advisory Board in September 2010. The Ethics Committee of the University of Turku approved the procedure of the FinCDI-SF norming study, in December 2010. Permission to recruit the participants to the norming study, from child welfare clinics in the Turku area, was granted by Turku Health Services, in March 2011. Parents received written feedback from the test results. If the child's skills were delayed, parents were advised to contact their local child welfare clinic.

2. Participants and methods

2.1. Participants

The participants were 78 healthy, full-term children from monolingual Finnish families (35 boys, 45%; 43 girls, 55%). Parents were not known to have any problems with alcohol consumption, drug uses or mental health issues, when the study began. All parents had finished at least nine years of compulsory schooling. Seven mothers (9%) had finished high school (12 years of basic education) and 71 (91%) had studied further (more than 12 years of basic education). Three fathers (4%) had finished compulsory schooling, 14 (18%) had finished high school and 59 (76%) had studied further. The education level of the parents in this study is parallel to the education levels of young adults in Finland (Official Statistics of Finland, 2014).

2.2. Measures and procedure

The original versions of the screening methods used in the present study are well known. Both methods are also rather new and there is a need for research on what kind of information they provide for the clinicians. Both the short form version of the CDI and the CSBS, developmental profile, have been validated in the Finnish population (Laakso et al., 2011; Stolt & Vehkavuori, in press).

The FinCDI-SF and the FinCSBS consist of checklists and are filled out by parents. The short form version of the FinCDI includes two versions, one for the age period 0;9–1;6 and one for the age period 1;6-2;0. The latter one was used in the present study. It is possible to obtain information on the expressive lexicon and on the use of word combinations by using it. The *number of words* in the checklist is 100 (one word = one point) parallel to Fenson et al. (2000). The words in the checklist represent different semantic lexical categories (early social terms, nouns, verbs, adjectives, words about time and closed class words) parallel to Fenson et al. (2000). Only the expressive lexicon can be measured with the toddler version of the FinCDI-SF. The method also includes one question on the use of *word combinations* (Does not use = 0, Uses sometimes = 1, Uses often = 2 points). Thus, the possible *total score* is 102 points. The 10th percentile values (number of words < 16, total score < 17 points) of the FinCDI-SF were used as a marker for WLS. The validity of the FinCDI-SF is good especially at the end of the second year (Stolt & Vehkavuori, in press). The simultaneous Spearman's correlation co-efficient values between the total number of words measured using the FinCDI-SF and other measures are