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Noun and predicate comprehension/production and gestures in extremely preterm children at two years of age: Are they delayed?

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ABSTRACT

Extremely low gestational age (ELGA, GA < 28 weeks) preterm children are at high risk for linguistic impairments; however, their lexical comprehension and production as well as lexical categories in their early language acquisition have not been specifically examined via direct tools. Our study examines lexical comprehension and production as well as gestural production in ELGA children by focusing on noun and predicate acquisition. Forty monolingual ELGA children (mean GA of 26.7 weeks) and 40 full-term (FT) children were assessed at two years of corrected chronological age (CCA) using a test of noun and predicate comprehension and production (PiNG) and the Italian MB-CDI. Noun comprehension and production were delayed in ELGA compared with FT children, as documented by the low number of correct responses and the large number of errors, i.e., incorrect responses and no-response items, and by the types of incorrect responses, i.e., fewer semantically related responses, in noun production. Regarding predicate comprehension and production, a higher frequency of no responses was reported by ELGA children and these children also presented a lower frequency of bimodal spoken-gestural responses in predicate production than FT children. A delayed vocabulary size as demonstrated by the MB-CDI, was exhibited by one-fourth of the ELGA children, who were also unable to complete the predicate subtest.

These findings highlight that noun comprehension and production are delayed in ELGA children at two years of CCA and are the most important indexes for the direct evaluation of their lexical abilities and delay. The types of incorrect responses and bimodal spoken-gestural responses were proven to be useful indexes for evaluating the noun and predicate level of acquisition and to plan early focused interventions.

Learning outcomes: After reading this manuscript, the reader will understand (a) the differences in noun and predicate comprehension and production between ELGA and FT children and the indexes of lexical delays exhibited by ELGA children at 2;0 (CCA); (b) the relevance of evaluating errors (incorrect response and no response), the types of incorrect responses (semantically related and unrelated) and the modality of the responses

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(unimodal spoken and bimodal spoken-gestural) in noun and predicate production to understand the difficulties experienced by ELGA children in representing and expressing meanings; and (c) the need to plan specific interventions to support spoken and gestural modalities in lexical comprehension and production in ELGA children by focusing on noun and predicate acquisition.

1. Introduction

The survival rate of preterm children [i.e., with a gestational age (GA) < 37 weeks] and extremely low gestational age (ELGA; GA < 28 weeks) children, who comprise approximately 5% of the entire preterm population and have the highest risk of impairments, has significantly increased in the last fifteen years, which raises questions regarding their developmental sequelae (Saigal & Doyle, 2008). Impairments at the preschool and school ages in one or more domains, such as the cognitive, motor and linguistic domains, have been identified in 20–50% of the preterm population, and a higher incidence is observed in ELGA children (Marlow, Wolke, Bracewell, Samara, & EPICure Study Group, 2005; Woodward et al., 2009). Delayed growth curve trajectories in motor, linguistic and cognitive domains have been obtained for ELGA children from the first year of life to the third year of life (Sansavini et al., 2014).

With regard to the linguistic domain, the majority of studies have focused on the preschool and school ages, particularly including samples of very preterm children (GA < 32 weeks). The results of these studies reveal that the scores for receptive and expressive lexicon and receptive grammar were 0.38–0.77 *SD* less than the scores obtained for the control samples (for a meta-analysis, refer to Barre, Morgan, Doyle, & Anderson, 2011), and an increase in language delay was observed for one in four preterm children at 2;6 to one in three at 3;6 (Sansavini, Guarini, et al., 2010).

Concerning early linguistic abilities, the majority of studies have been performed using samples of preterm children with an extensive range of gestational ages and have primarily focused on expressive abilities. Lags in the expressive lexicon of very preterm children at 2;0 (corrected chronological age – CCA) have been reported by several studies using the MacArthur-Bates Communicative Development Inventory (MB-CDI) parental questionnaire, i.e., an indirect assessment tool (Foster-Cohen, Edgin, Champion, & Woodward, 2007; Kern & Gayraud, 2007; Sansavini, Guarini, Savini, et al., 2011; Stolt et al., 2007). However, few studies have confirmed these lags in very preterm children via direct tools, such as a structured language test (Jansson-Verkasalo et al., 2004; Stolt et al., 2009) or spontaneous speech (Fasolo, D'Odorico, Costantini, & Cassibba, 2010), administered to very preterm children at 2;0 (CCA). In the latter studies, the MB-CDI was also employed, but these lags were not highlighted by this parental questionnaire.

Conversely, early lexical comprehension and gestural communication associated with spoken production, which are important indexes of language development in the second year of life (Caselli, Rinaldi, Stefanini, & Volterra, 2012), have rarely been investigated in the preterm population. A few studies have highlighted a slower development of these abilities in very preterm children in the second year of life compared with full-term (FT) children using the indirect assessment tool MB-CDI at CCA (Sansavini, Guarini, Savini, et al., 2011; Stolt et al., 2009; Stolt et al., 2014) or at chronological age – CA (Cattani et al., 2010). However, only one study has examined the use of gestures by direct observation and discovered similar types and numbers of gestures between very preterm children and FT children, with the exception of fewer gesture-word combinations at 1;6 and 2;0 years of CCA (Suttora & Salerni, 2012). The partially contrasting results of these studies may be partly due to methodological differences among the employed tools. The use of direct assessment tools, in addition to the indirect assessment tool MB-CDI, to examine lexical comprehension and production and gestural production appears important for obtaining a detailed view of preterm children's language development at 2;0 years of CCA (Sansavini, Guarini, & Caselli, 2011).

Using a direct assessment tool, this study investigates early receptive and expressive lexicon acquisition at two years of CCA in ELGA children, who, among preterm children, are at higher risk for language delays. Their acquisition of nouns and predicates and their associated spontaneous gestural production were investigated to understand the verbal and gestural modalities used by these children to access the lexicon as a function of the acquired lexical category. The indirect assessment tool MB-CDI was also employed to obtain a global measure of the lexical repertoire and the language delay of these children.

1.1. Early lexical comprehension and production in typically developing and preterm children

The second year of life is a critical period for language acquisition because an increase in the lexical repertoire—first in comprehension, and then in production—is usually observed in typical development with a greater repertoire of comprehended words compared with produced words (Bello, Giannantoni, Pettenati, Stefanini, & Caselli, 2012; Caselli et al., 2012; Gershkoff-Stowe & Hahn, 2013). This increase in the lexical repertoire is characterized by quantitative and qualitative changes. Nouns are acquired before predicates and are the most common lexical category until the third year of life, whereas the acquisition of predicates gradually increases with increases in the lexical repertoire (Caselli et al., 1995; Fenson, Marchman, Thal, Reznick, & Bates, 2007; Sansavini, Bello, et al., 2010; Waxman, Fu, Arunachalam, Leddon, & Geraghty, 2013).