Grammatical morphology is not a sensitive marker of language impairment in Icelandic in children aged 4–14 years

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ABSTRACT

Purpose: Grammatical morphology continues to be widely regarded as an area of extraordinary difficulty in children with Specific Language Impairment (SLI). A main argument for this view is the purported high diagnostic accuracy of morphological errors for the identification of SLI. However, findings are inconsistent across age groups and across languages. Studies show morphological difficulty to be far less pronounced in more highly inflected languages and the diagnostic accuracy of morphology in such languages is largely unknown. This study examines the morphological use of Icelandic children with and without SLI in a cross-sectional sample of children ranging from preschool age to adolescence and assesses the usefulness of morphology as a clinical marker to identify SLI.
Methods: Participants were 57 monolingual Icelandic-speaking children age 4–14 years; 31 with SLI and 26 with typical language development (TD). Spontaneous language samples were coded for correct and incorrect use of grammatical morphology. The diversity of use of grammatical morphemes was documented for each group at different age and MLU levels. Individual accuracy scores were plotted against age as well as MLU and diagnostic accuracy was calculated.
Results: MLU and morphological accuracy increased with age for both children with SLI and TD, with the two groups gradually approaching each other. Morphological diversity and sequence of acquisition was similar across TD and SLI groups compared based on age or MLU. Morphological accuracy was overall high, but was somewhat lower in the SLI group, in particular at ages below 12 years and MLU levels below 6.0. However, overlap between the groups was important in all age groups, involving a greater tendency for errors in both groups at young ages and scores close to or at ceiling at older ages. Sensitivity rates as well as likelihood ratios for each morpheme were all below the range considered acceptable for clinical application, whereas better specificity rates in some age groups for some morphemes indicated that very low scores are indicative of SLI whereas high scores are uninformative. Age effects were evident in that the morphemes varied in the age at which they separate the groups most accurately.
Conclusions: The findings of this study show that Icelandic children with SLI are somewhat more prone to making morphological errors than their TD counterparts. However, great overlap exists between the groups. The findings call into question the view that grammatical morphology is a central area of deficit in SLI.

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1. Introduction

Morphosyntactic difficulty has long been widely regarded as a prominent or hallmark characteristic of Specific (or Primary) Language Impairment (SLI) (Leonard, 1998/ 2014), and has been studied extensively both to understand the underlying nature of SLI and in a search for clinical markers. Morphological patterns originally described in English have served as the point of reference for a considerable number of cross-linguistic studies (e.g., Bortolini, Leonard, & Caselli, 1998; Christensen & Hansson, 2012; Leonard, Dromi, Adam, & Zadunaisky-Ehrlich, 2000; Paradis & Crago, 2001; Sanz-Torrent, Serrat, Andreu, & Serra, 2008; Southwood & van Hout, 2008). Alongside studies emphasizing that morphology stands out as an area of vulnerability in SLI, a steady stream of studies conducted over the last two to three decades has been painting a different picture, showing that morphological difficulty can actually be much less prominent than it is in English, in particular in languages whose morphology is more complex, including for example Italian, Hebrew, Icelandic, French and German (Bortolini et al., 1998; Dromi, Leonard, & Shteiman, 1993; Elin Thordardottir, 2008; Elin Thordardottir & Namazi, 2007; Lindner & Johnston, 1992; Rom & Leonard, 1990). With the accumulation of such findings, researchers and clinicians working in highly inflected languages are faced with conflicting evidence regarding the prominence and significance or morphological errors.

In his influential book on SLI, Leonard (2014) states that one of the main types of evidence indicating that children with SLI have extraordinary difficulties with finite forms is that "Differences between SLI and typically developing peers are so robust that they may serve as a reliable basis for distinguishing these groups for diagnostic purposes . . . "(p. 250). In cross-linguistic studies, however, the focus tends to be chiefly on qualitative aspects of error patterns and their theoretical significance. Meanwhile, the diagnostic accuracy of the morphological patterns is seldom tested directly, although it may be mentioned or alluded to, and is thus unknown in most languages other than English (e.g., Southwood & van Hout, 2010; Verhoeven, Steenge, & van Balkom, 2011; see however Bortolini et al., 2006; Christensen & Hansson, 2012). This study examines the diagnostic accuracy of grammatical morphology for the identification of SLI in Icelandic, a highly inflected language. The morphological production of children with and without language impairment is documented in a cross-sectional sample of children covering a large age range, from 4 to 14 years, to establish how the two groups compare over age and developmental levels and to examine directly whether morphology is an accurate clinical marker for the identification of language impairment in Icelandic.

The now long standing interest in the morphological errors in SLI started with observations of English-speaking children, who have been shown repeatedly to have marked problems, in particular with verb morphology around age 5 years. An extensive literature has attempted to use morphological error patterns to infer the nature of the underlying problem. According to the Extended Optional Infinitive (EOI) account, one of the first and most prominent accounts in this literature, the problem comes down to rule representation, namely that the rule for finiteness marking of verbs is underspecified leading to such marking being treated as optional for a longer period by children with SLI than by children with typical language development (TD) (Rice & Wexler, 1996; see a review of more recent versions of this account in Leonard, 2014). The most prominent competing account for a long time, the Surface Account (Leonard, 1989), posited that the vulnerability of certain morphemes was related to their surface properties rather than their grammatical function. Accordingly, the most vulnerable morphemes might have different grammatical functions cross-linguistically, but a common characteristic would be low phonetic substance, making the affected morphemes less salient and therefore less likely to be processed efficiently. Many cross-linguistic studies, including recent ones, have undertaken to verify the applicability of one or both of these major accounts to other languages (for example Christensen & Hansson, 2012; Hansson & Leonard, 2003; Hansson, Nettelbladt, & Leonard, 2003; Paradis & Crago, 2001; Southwood & van Hout, 2010). Overall, this research has demonstrated that languages vary both in terms of qualitative error patterns and error frequencies. As a result, these particular accounts cannot explain error patterns across languages without modification (e.g. Christensen & Hansson, 2012; Paradis & Crago, 2001). Subsequently, studies have looked at alternative explanations for morphological error patterns. For example, recent studies have looked at the role of prosodic factors and frequency effects (e.g. Hansson et al., 2003; Kauschke, Renner, & Domahs, 2013; Rispens & De Bree, 2014). Increased cross-linguistic evidence has caused a broadening of the research focus from a predominant interest in verb morphology to other types of morphology, some types of which are not found in English. For example, in romance languages, there has been interest in the object clitic (a pronominal direct object which moves in front of the verb) (e.g. Bortolini et al., 2006; Grüter, 2005). Case marking has been examined in Hungarian (Lucacz, Kas, & Leonard, 2013) and Icelandic (Elin Thordardottir, 2008), the definite article has been studied in French (Roulet, 2007) and Swedish (Hansson et al., 2003). Although these studies have brought greater diversity to the research on SLI, it is remarkable that morphology has remained the main focus area. This has, in turn, continued to reinforce the concept that language impairment is strongly associated with morphological difficulty.

As mentioned previously, cross-linguistic studies tend to focus heavily on qualitative error patterns. A factor that becomes apparent when studies of morphology in SLI are examined closely but that has received relatively little attention in the interpretation of findings is a marked cross-linguistic difference in *accuracy rates*. Accuracy rates are often also quite different between spontaneous language and elicitation probes, with the latter typically producing lower accuracy (e.g., Hansson et al., 2003; Rice & Wexler, 1996; Southwood & van Hout, 2010). In English, however, very low accuracy rates emerge even in spontaneous language samples. In Rice and Wexler's (1996) study on 5-year-olds, children with SLI's accuracy rates were in the 30–46% range for different markers (past—*ed*, 3rd person—*s*, copula *be*) in spontaneous language, and even lower in a probe context. In the same study, younger children matched to the SLI group on MLU were 46–69% accurate on the same