
Working memory and inhibition tasks: diagnostic instruments for SLI?

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Abstract

Children with Specific Language Impairments (SLI) often show problems in information processing abilities and executive functions. They have problems in, for instance, repeating information of different types (Henry et al. 2012) and in attention, planning or inhibition (Im-Bolter et al. 2006). The most robust differences between SLI and typical development are reported in auditory working memory, visuo-spatial working memory and non-verbal inhibition (Lopez-Jenssen and Baker, in press). Whether impairments in these aspects of information processing are of any diagnostic value in identifying language impairments is, however, a question that still remains open for debate.

In this paper the diagnostic value of a visuospatial working memory task (the odd-one-out, Henry, 2001), different auditory working memory tasks (WISC digit span, Kort et al. 2005a, CELF Sentence Recall, Kort et al. 2005b) and a motor response inhibition task (VIMI hand-fist game, Henry et al. 2012) are evaluated. A sample of children with SLI (N=63) was investigated, divided in a younger group (SLI-Y: 6;0-10;11) and an older group (SLI-O: 12;0-15;11) to examine age differences. The SLI subjects were matched to two typically developing age-matched groups (TD-Y and TD-O) to explore whether children with and without language impairments differed. Sensitivity and specificity of each information processing task (Visuospatial WM, auditory WM for digits, auditory WM for sentences and Response Inhibition) and a combination of tasks was measured in order to establish the diagnostic value of the different information processing tasks in younger (Y) and older (O) children.

The group comparisons show significant differences between the younger SLI and TD group on the three working memory tasks, but not on the response inhibition task (see figure 1 to 4). In the older SLI and TD group, only sentence recall reveals a significant difference between the groups. The effect sizes increase as the amount of language load increases. In both groups, effect sizes are smallest in response inhibition and the recall of pictures, and largest in the recall of sentences. The measurement of sensitivity and specificity shows similar results (table 1): sensitivity and specificity increase as the language load increases (inhibition is not shown since sensitivity and specificity were very low). In the younger groups (Y), the sensitivity and specificity of sentence recall is remarkably high, although digit recall still has fairly high discriminative power. Visual recall was significantly different between SLI and TD, but does not have good discriminative power. In the older groups (O), only the recall of sentences has good sensitivity, although the specificity is not that high.

The more language loaded tasks are better in discriminating SLI and TD groups, although

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the discriminative power decreases as children become older. Sentence recall or a combination of general language tests thus remain the best diagnostic tool for monolingual children with language impairments, although other processing measures can provide complementary information. For multilingual populations with SLI, where language loaded tasks are not usable because of the confound due to bilingualism, processing measures like digit span may be promising.

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