Interpretation of complex syntax in aphasic adults and children with focal lesions or specific language impairment.

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The differential sensitivity of syntactic comprehension to brain injury has been fairly well established; for instance, adult aphasics' interpretation of active and subject cleft sentences remains relatively intact, while comprehension of passive and object cleft sentences is significantly hindered. Indeed, this particular comprehension profile has been termed "the core data of agrammatism" (Hickok & Avrutin, 1995), and has served as a lynchpin for several theories of adult language organization and breakdown (Grodzinsky, 1995; Grodzinsky, in press). At this juncture, however, it is unclear how acquisition of complex syntactic forms is affected by early focal lesions or by developmental disorders such as specific language impairment; in fact, the normal developmental trajectory of syntactic comprehension is only sparsely mapped. Results of previous experiments suggest that normally developing children, and particularly language-impaired children, may have more difficulties acquiring the same sentence types that are hardest for adult aphasics to comprehend. However, the effects of early brain damage on syntactic comprehension may be less severe than those observed in adults with brain injury.

In the present study, we examined interpretation of active, passive, subject cleft, and object cleft sentences in English-speaking normal and language-impaired children (ages 7 - 15), as well as in age-matched children with early-onset focal lesions; the children's performance was compared to that of normal adults and Broca's, Wernicke's, anomic, and conduction aphasics. Sentence type was also crossed with presence or absence of a disambiguating subject-verb agreement cue; an agreement cue is present if only the subject agrees with the matrix verb in number, and absent if both subject and object agree with the verb. All subjects heard sentences involving animate nouns and an action verb while viewing "mug shots" of the two participants (animals randomly assigned to conditions) presented on a computer screen; they were instructed to press the button under the "animal who does the action". Both accuracy and reaction time (measured from the end of the sentence) were recorded automatically.

As reported in Dick, Bates, Wulfeck, & Dronkers (1998), accuracy across sentence types reflected the expected profile for all adult aphasics, where active and subject cleft sentences were comprehended more accurately than passives and object clefts, with the latter comprehended especially poorly. This pattern was mirrored in the reaction time data, with active and subject cleft sentences responded to fastest, passives somewhat less so, and responses to object cleft sentences severely slowed.

Interestingly, accuracy and reaction time profiles in our large group of normal children fell somewhere in between normal and aphasic adults: While normal children performed at near-ceiling levels with active and subject cleft sentences, they were less accurate in understanding passive sentences and even less so with object clefts. The severity of this "selective deficit" was not as great as in adult aphasics, but is quite similar in form, as demonstrated by the lack of a subject group - sentence type interaction. (Similar profiles of reaction time were also observed). Indeed, the normal children's profile was strikingly similar to that of normal college students under a single stress such as a noise mask (Dick et al., 1998). Normally developing children, like mild adult aphasic patients, were also able to use subject-verb agreement cues to improve their comprehension accuracy on object cleft sentences.

The interpretation profile of our group of children with early-onset focal lesions fell between that of the neurologically unimpaired children and adults with brain damage. Children with focal lesions were somewhat less accurate overall in comprehending these sentences, and had particular problems accurately understanding passive and object cleft sentences, with the latter especially hard hit (a profile again echoed in the reaction time data). However, these children were able to use an agreement cue to substantially improve their comprehension of object cleft sentences, and to a lesser extent, active sentences; such a cue was significantly more useful for the neurologically impaired children than for their intact counterparts. Unlike most findings in adult aphasia, however, this deficit in sentence interpretation does not correspond to lesion side; both right- and left-hemisphere lesions appear to have equal impact on sentence interpretation ability in this group.

Finally, language-impaired children's syntactic comprehension was also significantly less accurate across the board than either normally developing children or focal lesion children. Indeed, language-impaired children were almost indistinguishable from adult anomic or conduction aphasics in their profile, where passive sentences were very poorly interpreted, and object clefts were at chance levels. The results from these children reflect a dramatic developmental delay, in that their profile mirrored that of the youngest children in both our normally developing and focal lesion samples.

These results suggest that the "agrammatic profile" can occur not only in adult aphasics, but to varying degrees in normally developing and language-impaired children, as well as those with early-onset focal lesions in either hemisphere. It is especially interesting to note that interpretation profiles of language-impaired children, who have no frank lesions, most closely follow the prototypic agrammatic pattern of comprehension. These results, like those reported previously (Dick et al., 1998) demonstrate that the "core data of agrammatism" is apparent in many types of language- and brain-injured groups.

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