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ABSTRACT

Early childhood learning of language has led some to postulate innate knowledge of an abstract symbolic linguistic system. However, if the child's abstract understanding initially requires concrete support in the form of agreement of the message with his nonlinguistic experience, the indication would be that the development of syntactic comprehension does not derive from genetic prewiring. Rather it indicates that syntactic comprehension develops through concrete experiences from which abstractions are only gradually derived by the child. In order to test abstract knowledge, which requires the removal of concrete sources of support for comprehension, probable and improbable active and passive sentences were presented to 120 three- and four-year-olds. The results showed that age, syntactic voice, semantic probability, and the interaction of voice and probability had significant effects. Passive voice still required support from semantic features. Syntactic concepts apparently mature from concrete understanding to abstract knowledge, in the same manner as other aspects of cognitive development. (Author/LG)

# HOW ABSTRACT IS A YOUNG CHILD'S KNOWLEDGE OF SYNTAX?

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Children learn language, an abstract symbolic system, very early, leading some to postulate innate knowledge of abstract form of language. An adequate test of abstract knowledge, however, requires that concrete sources of support for comprehension be removed.

Probable and improbable active and passive sentences were presented to 120 3- and 4-year olds. Age, Syntactic Voice, Semantic Probability and the interaction of Voice and Probability had significant effects. Passive voice still required support from semantic features. Syntactic concepts apparently mature from a concrete, context-bound understanding to abstract knowledge, in the same manner as other aspects of cognitive development.

Very young children use and understand language, an abstract symbolic system. Noting the early, rapid development of syntactic comprehension, Chomsky (1965) expressed little hope that "much of the structure of language can be learned by an organism initially uninformed as to its general character," and postulated a qualitative difference in approach to learning language and nonlinguistic systems.

A question which has received too little attention is "How abstract is a child's knowledge of syntactic form?" If his understanding initially requires concrete support in the form of immediate context or agreement of the message with his nonlinguistic experience, this would indicate that the development of syntactic comprehension is not an isolated phenomenon which requires specific genetic prewiring. It would indicate that syntactic comprehension develops through simple concrete experiences from which abstractions are only gradually derived by the child.

Such an interpretation is supported by studies which have found that comprehension of passive sentences (Gowie and Powers, 1972; Powers, 1973) and promise/tell constructions (Gowie, 1973) is aided when semantic aspects of the sentence agree with the child's expectations. Similarly, Hutson, Moyer and Powers (1973) found that the semantic probability of a sentence was a significant factor in the comprehension of passive sentences, but had little effect in active sentences by kindergarten. These studies indicate that syntactic voice, semantic probability, age and the interaction of voice and probability are sig-

nificant factors in comprehension for children in kindergarten through third grade.

In order to determine whether these factors operate in the same way in the richest years of language acquisition, three- and four-year old children were tested for comprehension of probable and improbable sentences in active and passive voice. The order of sentence types was predicted as Probable Active > Improbable Active > Probable Passive > Improbable Passive.

METHOD:

Subjects:

Responses of 120 children from six nurseries were analyzed. Boys and girls in the age range 3-0 to 3-11 and 4-0 to 4-11 were randomly assigned to hear probable or improbable sentences.

Materials:

A box of small toys was used for testing. Four forms each listed eight sentences which had been randomly assigned to position and to voice prior to testing. Each sentence appeared in a different sentence type (Probable Active, Improbable Active, Probable Passive and Improbable Passive) on each of the forms. Each form contained either probable or improbable sentences, in both active and passive voice.

Examples of the forms in which a sentence might appear are:

| | |
|---|---|
| Probable Active | The mother washes the baby. |
| Improbable Active | The baby washes the mother. |
| Probable Passive | The baby is washed by the mother. |
| Improbable Passive | The mother is washed by the baby. |

Procedure:

Each child was individually tested in his classroom or another familiar room. A cowboy and a lion were presented, with the instructions, "The lion chases the cowboy. Show me." Prompting or demonstration was provided only in the two sample items if the child hesitated to act out the sentence with the toys. The examiner read each sentence and noted which toy was chosen to perform the action.

Design:

Age, sex, probability and voice were factors in a 2 x 2 x 2 x 2 factorial design with repeated measures. Each subject received either probable or improbable sentences. Voice was crossed with probability, with repeated measures on the dimension of voice. Significance of the difference of means involved in interactions was analyzed using Tukey's procedure.

RESULTS:

Analysis revealed significant main effects for Age ($p < .01$), Probability ($p < .001$), and Voice ($p < .001$). The interaction of Probability and Voice was significant ($p < .05$). The interaction of Age and Voice was not significant at the .05 level, although it was significant at the .10 level. Sex was significant neither as a main effect nor in any interaction. The analysis of variance is shown in Table I.

(INSERT TABLE I ABOUT HERE)

Age

The four-year olds comprehended sentences accurately more often than did the three-year olds. The absence of interactions of age with other factors indicates that although four-year olds are more accurate, both age groups respond in essentially the same way.

Probability:

Probable sentences were comprehended accurately more often than were improbable sentences, indicating that semantic content plays a role in comprehension in this age range.

Voice:

Active sentences were interpreted correctly more often than were passive sentences, confirming previous results.

Voice by Probability:

The means involved in the Voice by Probability interaction were analyzed by Tukey's procedure, with 4 means and 112 degrees of freedom. The order of the means, from high to low, was Probable Active, Improbable Active, Probable Passive, and Improbable Passive. Improbable Passive was significantly different from Probable Passive, and Probable Passive was significantly different from Improbable Active. Although the difference in Improbable Active and Probable Active was greater than had been found for older children, it was not significant.

CONCLUSIONS:

The central question of this study was, "How Abstract is a young child's knowledge of language?" The answer appears to be "Not very." Semantic support, as found previously for school-age children, was a significant factor in comprehension of passive sentences, indicating that abstract knowledge of the passive form has not yet fully matured.

These results indicate that comprehension of a given syntactic form initially requires support from semantic features, and that the abstract

nitive development and requires of the child no innate knowledge of the abstract form of language. Comprehension of any syntactic form may appear several years earlier for sentences supported by semantic features than for sentences without such support. This echoes the finding of Piagetian studies that when conservation is tested by presentations that minimize perceptual miscues or use nonrigorous criteria for success, conservation appears to be achieved earlier than when a critical test and rigorous criteria are applied.

In both fields of study the two types of criteria tap the upper and lower limits of comprehension of a concept, and indicate the span of several years from the point at which the concept is understood only with strong concrete support to the point at which the same concept is reliably established in a stable, abstract form independent of contextual or experiential support. Exclusive use of the lower limit criterion for syntactic comprehension can lead to the mistaken assumption that a young child possesses great sophistication in language.

The findings of this study strongly indicate that syntactic comprehension develops in much the same way as general cognitive development. The complex system of dimensions uncovered by extensive investigations of logical development (Flavell, 1970) may well guide systematic investigation of the nature and development of syntactic comprehension.

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TABLE I

ANALYSIS OF VARIANCE[1]

Age by Sex by Probability by Voice

| Source | df | SS | MS | F |
|---|---|---|---|---|
| Age (A) | 1 | 8.542 | 8.542 | 7.63*** |
| Sex (S) | 1 | 0.808 | < 1 | NS |
| Probability (P) | 1 | 21.108 | 21.108 | 18.86**** |
| A X S | 1 | 0.833 | < 1 | NS |
| A X P | 1 | 0.067 | < 1 | NS |
| S X P | 1 | 0.000 | < 1 | NS |
| A X S X P | 1 | 0.108 | < 1 | NS |
| Error 1 | 112 | 125.333 | 1.119 | |
| | | | | |
| Voice | 1 | 105.442 | 105.442 | 132.98**** |
| A X V | 1 | 2.500 | 2.500 | 3.15* |
| S X V | 1 | -0.067 | < 1 | NS |
| P X V | 1 | 5.000 | 5.000 | 6.31* |
| A X S X V | 1 | 0.609 | < 1 | NS |
| A X P X V | 1 | 0.808 | 0.808 | 1.02 |
| S X P X V | 1 | 0.308 | < 1 | NS |
| A X S X P X V | 1 | 0.100 | < 1 | NS |
| Error 2 | 112 | 88.800 | 0.793 | |
| | | | | |
| Total | 239 | 360.116 | | |

*p < .10, **p < .05, ***p < .01, ****p < .001

[1]These significance levels are the same using normal and conservative F procedures.

FIGURE 1

Interaction of Voice and Probability