

Memory Span for Nouns, Verbs, and Function Words in Low SES Children: A Replication and Critique of Schutz and Keislar

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Children at three age levels were administered Schutz and Keislar's (1972) word-span task using nouns, verbs, and functors as stimuli. Functors were either mixed prepositions and conjunctions, or separate sublists of prepositions or conjunctions alone. In Experiment I the subjects were white and black school children of working-class background. In Experiment II subjects were black residents of a poverty neighborhood. The experiments were designed to test the hypothesis that Schutz and Keislar's finding of a deficit when low SES children recall function words could be attributed to ambiguities in the stimulus materials and not to a general population characteristic. The hypothesis was supported.

Schutz and Keislar (1972) reported a social class difference in young children's memory span for common one-syllable words as a function of the grammatical class of the words presented. Using a within-subjects design, they found a significantly shorter memory span for function words (to be defined below) than for nouns and verbs for children from a lower socioeconomic status (SES) neighborhood, whereas middle-class children repeated the items from the three word classes with about equal facility. These results were interpreted as support for Bernstein's (1960, 1961) theory of social class differences in language which held that speakers of low SES are

deficient in the use of function words, defined as conjunctions, prepositions, and negation.

The present study is a replication and extension of the work of Schutz and Keislar. It was motivated by our concern that the Schutz and Keislar results were unique to the specific words used rather than the word class and did not represent a stable characteristic of the populations studied. In particular, we noted that Schutz and Keislar's function word list had an ambiguous character: In contrast to the noun and verb lists, which, by definition, were composed of words of one form class, the function word list was composed of words of two form classes—prepositions and conjunctions. We hypothesized that either differences in phonological characteristics or the "mixed" nature of the Schutz and Keislar functor list with respect to grammatical class might be sufficient to account for the poor performance of low SES children on the list. The function word list also differed from the noun and verb lists in its phonological characteristics; and functor words were also predominantly quite short. Its structure, therefore, was not equivalent to that of the other two lists to which it was being compared.

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431

Our hypothesis was tested by comparing performance of low SES children on the original list and two word lists in which members of one form class were substituted for Schutz and Keislar's "functors"; in one of these lists, a set of prepositions was substituted for the mixed function words of the Schutz and Keislar list and a set of conjunctions was substituted in the second. In addition to "unmixing" the functor list, our choice of prepositions and conjunctions allowed us to determine if word length was an important feature of the original word list.

EXPERIMENT I

Method

Subjects. The subjects in this experiment were 90 working-class children living on Staten Island in the City of New York. Equal numbers of kindergartners, third-, and fifth-graders from two public elementary schools in racially mixed neighborhoods participated in the study. Average age of the kindergartners at time of testing was 5 years, 8 months, while the third-graders averaged 9 years, 1 month and the fifth-graders as a group were 11 years, 2 months old. Within each grade and each experimental condition, approximately one-half of the children were black and the others white.

Procedure. The children were tested individually in a small room near their classroom. The session lasted approximately 20 min, since additional vocabulary data, not to be discussed here, were collected from each subject prior to the word-span task.

The word-span task was introduced by telling the child, "I'm going to say some lists of words. Listen carefully and when I'm finished saying all the words in a list, you say the words back to me in the same order I said them. Ready? Okay, listen carefully". Following these instructions, a set of three practice lists, two items in length, was given, one list each of nouns, verbs, and function words. The function words in the practice list were

always of the same type as those used on standard trials. Once the experimenter was assured that the child understood the procedure, the word-span task itself was begun. The words were read once at the rate of one word per second and the child responded to each list as soon as it was completed. When a subject repeated a list incorrectly, he was administered no additional lists of that word class. Thus, following the procedure of Schutz and Keislar, the task was terminated when the child added, omitted, or rearranged the words once in each of the three word class lists.

The task was administered by three testers, two white females and one black male. Each tester worked with approximately an equal number of subjects from each grade, race, and school.

Materials and design. Following Schutz and Keislar, the lists consisted of consecutive sets of function, verb, and noun stimuli of the same length with each set. Thus, the first set of stimuli was three items in length, the second set had four items, up to the fifth set with a length of seven items. Each new list length contained all words in the previous presentation of that list plus one additional item.

Five types of word lists were used. Three of these were as follows: NOUNS—*tree, chair, boy, leg, hat, fish, cup*; VERBS—*grow, drive, hit, run, swim, cry, build*; FUNCTORS—(referred to hereafter as MIXED)—*if, down, front, or, and, on, of*. The two single form-class function word lists prepared for this study were: PREPOSITIONS—*of, on, at, with, front, down, out*; CONJUNCTIONS—*so, as, while, and, or, than, if*. For each word list type, there were three different permutations of word order which were assigned randomly to subjects within groups defined by type of function word list.

Subjects were randomly assigned to one of the three experimental conditions distinguished by the type of function word list administered. All subjects received the standard noun and verb lists. But in the Mixed condition the third list was the Schutz and Keislar

mixed function list, in the Preposition condition the third list was the preposition list, and in the Conjunction condition it was the conjunction list. Order of administration of the list (function, verb, noun) was randomized for each list length and each subject.

Results

The average word span for each word type within each of the List Types (Mixed, Preposition, or Conjunction lists) is presented in Table 1, along with the number of subjects presented the particular lists and the standard errors of the means. Extreme inequalities in sampling across grades and conditions made application of analysis of variance techniques extremely difficult and problematic. However, the tabulated data present such a clear picture that further analysis seemed unwarranted.

Looking first at the results for the Mixed Functor list, we see a clear replication of the Schutz and Keislar results: Nouns (N) are best recalled, followed closely by verbs (V), with a substantial deficit for the functor (F) words. However, when we examine the pattern for the Preposition and Conjunction lists, the functors are recalled as least as well as verbs, and only slightly less well than nouns.

Two conclusions follow from these results

First, there is something special about the Schutz–Keislar list that does *not* apply to functors in general. Second, the difference in lists is not attributable to word length—the lengths of the prepositions and conjunctions did not differ from the word lengths in the mixed functor list.

EXPERIMENT II

In order to check the robustness of the phenomenon found in Experiment I, a replication was carried out under the same conditions and using the same stimulus materials in an all-black poverty neighborhood in New York City.

Method

Subjects. Seventy-two black children from two elementary schools were the subjects of this study. There were 24 subjects each from kindergarten, third, and fifth grade. Mean age of the kindergartners was 5 years, 9 months, while the third grade was 9 years, 1 month, and the fifth grade was 11 years, 3 months. The tester for this replication was the black male experimenter from Experiment I.

Procedure. The procedure and task materials were identical to those from Experiment I.

TABLE 1
WORD SPAN AS A FUNCTION OF GRADE, LIST TYPE, AND WORD TYPE: EXPERIMENT I

		Kindergartner			Third grade			Fifth grade		
		F	V	N	F	V	N	F	V	N
Mixed functors	\bar{x}	3.2	3.5	3.4	3.6	4.5	4.8	4.2	4.5	4.9
	σ	.3	.3	.3	.2	.1	.2	.3	.2	.2
	<i>n</i>	13	13	13	31	31	31	20	20	20
Preposition	\bar{x}	3.1	3.1	3.6	4.1	4.0	4.7	4.4	4.4	4.8
	σ	.7	.7	.8	.2	.1	.2	.2	.1	.2
	<i>n</i>	20	20	20	21	21	21	44	44	44
Conjunction	\bar{x}	3.7	3.7	3.7	4.5	4.5	4.8	4.3	4.3	5.0
	σ	.2	.2	.2	.2	.2	.2	.2	.2	.3
	<i>n</i>	20	20	20	19	19	19	18	18	18

TABLE 2
WORD SPAN AS A FUNCTION OF GRADE, LIST TYPE, AND WORD TYPE: EXPERIMENT II

		Kindergartner			Third grade			Fifth grade		
		F	V	N	F	V	N	F	V	N
Mixed functors	\bar{x}	2.9	3.9	3.8	3.5	4.2	4.9	4.1	4.9	5.0
	σ	.3	.2	.3	.2	.2	.2	.3	.3	.4
	<i>n</i>	8	8	8	13	13	13	13	13	13
Preposition	\bar{x}	3.6	3.8	4.4	4.4	4.7	5.2	4.3	4.4	5.0
	σ	.4	.3	.3	.3	.3	.3	.4	.3	.3
	<i>n</i>	8	8	8	14	14	14	9	9	9
Conjunction	\bar{x}	4.1	3.9	3.6	4.3	4.3	4.7	4.9	4.4	4.9
	σ	.4	.3	.3	.3	.1	.2	.4	.3	.3
	<i>n</i>	8	8	8	11	11	11	9	9	9

Results

Examination of the results of Experiment II, presented in Table 2, shows that the two experiments replicate each other almost exactly. The close correspondence in the absolute values within each cell is worth noting because the lower socioeconomic status of the children and the fact that all were black might have led some to expect that the performance in Experiment II would not match that in Experiment I. We can also use the similarity of results in the two experiments to make a more formal test of the hypothesis that functor words will be less-well remembered only in the case of the Mixed List by combining data from the two studies.

From Tables 1 and 2 we find that the fewest subjects are to be found in the Mixed List condition for Kindergartners (13 from Experiment I, eight from Experiment II). Using the total number of Kindergartners in the combined cells for the Mixed list from Experiments I and II, we have a minimum of 21 subjects per cell. By using a table of random numbers to exclude subjects in cells containing more than 21 subjects, we produced an average for the two studies presented as Table 3. Table 3 differs from Tables 1 and 2 only in that results are combined over grades. We did this to highlight the main point of the study: Although the

TABLE 3

COMBINED WORD SPAN FOR WORD TYPE AS A FUNCTION OF LIST TYPE

List	Function	Verb	Noun
Mixed	3.6	4.2	4.5
Preposition	3.9	3.9	4.5
Conjunction	4.3	4.2	4.5

effect of Grade was highly significant, $F(2, 180) = 34.3$, $p < .01$, Grade did not interact with List Type. However, there was a highly significant interaction between List and Word Type, $F(4, 360) = 6.8$, $p < .01$. As can be seen in Table 3, there is a significant deficit for function words vis-à-vis verbs and nouns only for the mixed list, our major result and the cause of the significant interaction.

DISCUSSION

Many comparative studies of psychological and linguistic skills interpret ethnic and social class performance differences in terms of general population characteristics without sufficient exploration of the stimulus and task characteristics that might be regulating performance. When the set of list comparisons is extended, as in the present study, the frailty of

such inferences becomes clear. Manipulation of the stimulus materials reveals that what was considered a general "deficit" is dependent on the organizational structure of the word list used rather than on the linguistic category of function words *per se*. Why a combination of functor word form classes depresses memory span performance, and whether compound lists of other form classes (nouns and verbs, for example) would induce similar memory span losses are important questions for future investigation. It seems premature and inappropriate, however, to make generalizations about language incompetencies among working-class children such as those proposed by

Schutz and Keislar on the basis of the present evidence.

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