behavioral consequence of the first impression response might clarify the implications of such interaction effects. A plausible hypothesis in this context might be that unattractive males are perceived more adept at compensating for their unattractiveness than are females, i.e., if one must be unattractive, it is a better fate to be male than female.

Most significant, in view of the present data, is the relative paucity of experimental interest in the attractiveness variable, as Sigall & Aronson (1969, p. 93) have indicated. For it seems quite probable that this dimension has real significance as an antecedent of "liking" or interpersonal attraction, in addition to such well-studied factors as propinquity (Newcomb, 1961), cognitive balance (Aronson & Cope, 1968), and attitude similarity-dissimilarity (Byrne, Clore, & Griffitt, 1967). Questions suggestive of needed research are: When do the trait implications of physical attractiveness appear, developmentally, and what are the sources of these relationships? To what extent are correlates of physical attractiveness empirically based, in addition to being assumed, as shown in the present data? Does attractiveness influence social interaction in the manner of a self-fulfilling prophecy, i.e., if unattractive persons are perceived as inadequate on personality factors, are such assumed correlates subsequently "validated" in interaction? What social context and individual difference factors increase or decrease the importance of—or interact with—the attractiveness variable?

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NOTE

1. The writer would like to thank Wesley Penn and Betty Jerger for their assistance and David Probert of the Miami University Computing Center.

The effects of sentence length and grammatical structure in a serial learning task¹

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Nonsense strings containing four, five, six, and seven nonsense words were constructed for three grammatical structure conditions: morphology and syntax, morphology alone, and syntax alone. Analysis of the percentage of words recalled revealed a significant learning effect that was inversely related to sentence length. More important, however, was a failure to find any facilitation effects on recall due to morphology and/or syntax.

Although the facilitative effects of structure (i.e., syntax and/or morphology) on recall of nonsense strings have been demonstrated by Epstein (1961, 1962) and Forster (1966), a number of recent studies have failed to find such positive effects. Bogartz & Arlinsky (1966) did not obtain syntactical facilitation when immediate ordered recall of strings that possessed both function words and bound morphemes in syntactic order was compared to recall of strings possessing either function words or bound morphemes alone. However, the facilitative effects of function words and bound morphemes were found to be significant

when compared to appropriate control strings that lacked either of them. Bogartz and Arlinsky, however, did not include a control condition in which both function words and bound morphemes were present but not in syntactic order. O'Connell, Turner, & Onuska (1968), using orally presented strings in which such a control was present, found that syntax did not facilitate recall. Further negative findings were reported by Rosenberg (1964), who found that the addition of bound morphemes in syntactic order to short (five-unit) strings did not facilitate their immediate recall. Bryk & O'Connell (1967), using strings (10 units) adopted from Epstein's (1961) original strings, tested for immediate recall under three levels of constraint: no morphology and no syntax (NS), morphology alone (LS), and morphology and syntax (HS). They found that the high structure condition (morphology and syntax) was significantly different from the condition of no structure. The difference between the high and low levels of structure was nonsignificant.

Consideration of the available evidence suggests that the influence of syntactic and/or morphological cues may, among other things, be dependent upon the length of the string itself. Bryk (1968) suggests that syntactic facilitation may occur primarily because of "S's facility in organizing the individual items in a string to form more easily storable and recallable chunks of information [p. 3]." Extending Miller's (1956) concept of chunking, Bryk states that the advantages of grammatical structure should increase as the amount of information to be stored increases. Thus, for relatively longer strings "prechunked" syntactic strings should be more apparent than for the relatively shorter strings. In a 3 by 3 factorial design, Bryk used immediate written recall of nonsense strings to study the effects of: structure (NS, LS, HS), meaningfulness of nonsense stems, and string length (5, 9, 12). He states that his results revealed that recall of HS strings relative to NS and LS strings increased as a function of increases in the meaningfulness and length of the nonsense string. His failure to find syntactic facilitation for the five-unit strings suggests that previous failures (e.g., Rosenberg) to find such facilitation are explainable in light of the relatively short string length used. However, careful examination of the procedure and results leads to a different interpretation. Since the lengths of strings contained different numbers of items, analysis of the mean number of items recalled, rather than the percentage of items recalled, indicates a possible confounding. It is impossible to determine

whether the mean number of items recalled is due to the effects of structure or to the fact that there were simply more items in the longer lengths. A plot of the percentage of items recalled reveals that the percentage decreases as list length increases (the same relative superiority of HS to LS and NS still remains).

A review of the literature revealed that Bryk's study was the only one wherein an attempt was made to control for length of string. In that study, independent groups were run at each string length so one cannot appropriately evaluate Bryk's assertion concerning the enhancement of syntactic facilitation with relatively longer string lengths for an individual S. The present experiment was designed, therefore, to test both the effects of structure and the effects of string length upon responding with the same S.

Rosenberg (1966), in examining the effects of syntactic and associative relationships between real words upon performance, required Ss to reproduce the words in each of four sequences after the fourth sequence was presented. Although a different order of sentences was used on each trial, analysis of variance of total number of words recalled as a function of sentence position revealed the main effects of position and groups (HS vs LS) and the groups by position mean square to be significant. Having an S reproduce four sentences simultaneously would tend to maximize interference effects.

Although the present experiment required S to learn a number of sentences simultaneously, the likelihood of interference was assumed to be reduced to a minimum by a single sentence procedure employing a serial anticipation method.

METHOD

The Ss were 72 undergraduate students at the University of Cincinnati and were assigned at random to each of three experimental groups described below.

Stimuli were nonsense strings containing four, five, six, and seven nonsense words constructed for three conditions: *Morphology and syntax* (MS), (4) The yun zots bep the miver. (5) The dax wogs nided the ruyer sebly. (6) The kazest moj fegs rixed the cuwer vahly. (7) The zirest tuv joms yated the hific kexer wubly.; *Morphology alone* (M), (4) The bep the miver yun zots the. (5) Dax ruyer sebly wogs the nided the. (6) Cuwer vahly the

kazest fegs moj rixed the. (7) Kexer tuv joms the zirest wubly hific the yated.; *Syntax alone* (S), (4) The yun zot bep the miv. (5) The dax wog nid the ruy seb. (6) The kaz moj feg rix the cuw vah. (7) The zir tuv jom yat the hif kex wub. All the sentences began with a capital letter, ended with a period, and contained the same function word twice (i.e., the). Three booklets (4 x 8½ in.) were given to each S. Each of the four sentences was printed one per page on the first four pages of the first booklet. The fifth page had an "X" printed on it and was followed in succession by a blank yellow page, a blank white page, and a page with the first sentence printed on it, etc.

All Ss received instructions to memorize their four nonsense sentences in order. When Ss had gone through the entire list once, they were asked to write the first sentence on the first yellow page. S had 30 sec to write the sentence. When 30 sec elapsed, S turned a blank spacer page to the page that contained the sentence he was trying to reproduce. S had 30 sec to recommit to memory the correct sentence. Ss were then instructed to turn to the next yellow page and to try to reproduce the second sentence. This procedure was continued until each sentence was seen and/or reproduced 10 times. Four sentences yield 24 combinations of order, thus, throughout the experiment for each group, each S received a different order of presentation.

RESULTS AND DISCUSSION

The percentage of words recalled in the correct order for each sentence and for each S was recorded and transformed via the arcsin transformation (Snedecor, 1956). The transformed data were then treated in a repeated measures analysis of variance (Winer, 1962). The main effects of trials and sentence length, and the Sentence Length by Trials mean square were found to be significant ($p < .01$). However, neither the structure nor the Structure by Sentence Length mean square was significant.

The results of the present experiment support the findings of Bryk (1968) with regard to the inverse relationship between the percentage (rather than mean number) of items recalled and sentence length. In addition, the present findings, considered along with the previously mentioned experiments, suggest that syntax and/or morphology do not uniformly facilitate recall.

The present experiment employed a serial anticipation procedure. Thus, recall of each sentence was emitted on a separate trial. The procedure was designed to minimize interaction effects due to order of sentences, yet this procedure may have, in fact, reduced the sensitivity of the experiment. It may well be that positive effects due to morphology and syntax must be the product of a complex set of interacting variables and not these two variables alone.

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NOTES

1. The authors wish to acknowledge the help of Liz Ellison, who played the primary role in gathering the data, and Charlene Schumsky, who helped with the data analysis. Part of the costs of gathering the data were borne by NSF Grant GE 2896 to the second author.
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