RELATIONSHIP OF STUTTERING TO WORD INFORMATION VALUE IN A PHONEMIC CLAUSE

M. JAYARAM

Introduction

There have been a number of studies which have demonstrated a relation between word position in a sentence and stuttering (Brown, 1938; 1945; Hejna, 1955; Quarrington, 1956; Quarrington, Conway and Siegel, 1962). In general, these studies have reported a higher stuttering on the initial words of a sentence than on the subsequent words. Blankenship (1964) found this to be true of non-stutterers and Bloodstein and Gantewerk (1967) of young stutterers, Taylor (1966) showed that word position was a more important determiner of the loci of stuttering instances than either word length or the phonetic factors. The initial words of a sentence carry more information than the subsequent ones as there will be more uncertainty at the beginning of the sentences. Thus a relationship can be established between word information value and the occurrence of stuttering in a sentence. However, McClay and Osgood (1959) and Boomer (1965) suggest that encoding unit in speech is a sequence of words where both grammatical and lexical decisions are made. Soderberg (1967) found more information and more stuttering on the initial words of a phonemic clause (encoding unit) than on the subsequent words. In the Soderberg study, 86 per cent of the words in the initial position and 92 per cent of the words in the final position of a phonemic clause were function words and lexical words respectively. Probably, this has induced a biasing effect into his results. The higher stuttering on the initial words may be because they are function words and not necessarily because they carried high information. The present study, apart from removing this bias, further attempts a bilingual analysis of the problem. The two languages employed in this study were English and Kannada (a dravidian language).

Method

Subjects: Ten monolingual stutterers (who knew only Kannada language and who were not exposed to any other language) and ten bilingual stutterers (who knew both English and Kannada languages but were not exposed to any other language), all males, served as experimental subjects. The monolingual stutterers ranged in age from 17 to 34 years (mean age 24.8 years) and bilingual stutterers from 19 to 32 years (mean age 25.6 years).

Dr. M, Jayaram,, Foreign Languages Section,Indian Institute of Science, Bangalore-560 012.

Material: The reading material was a 149 word passage in the English language and a 122-word passage in the Kannada language. English passage was the translation of the Kannada passage. All the words in these passages oceurred in the 1000 most frequent words of their respective languages (cf. Jayaram, 1979). There were almost equal number of lexical (55 per cent) and function words (45 per cent) in the English passage while the percentage of lexical words (71 per cent) was higher than that of function words (29 per cent) in the Kannada passage.

Estimation of word information: The amount of information carried by each word in these passages was estimated following Schlesinger *et al.* (1965). The method (a modification of Shannon's (1951) letter guessing technique) consisted of determining the extent to which each word could be predicted by a group of 30 normal speakers. A practice session was given to these speakers a day before the actual testing. On the testing day, the experimenter presented a recording of these passages to the subjects. The passages were recorded by the experimenter word by word, at a rate of one word per 10 seconds (10 seconds interval was decided after the practice session). Punctuation marks following the words, wherever they occurred, were also announced together with the word. After the subjects predicted the initial word of a sentence and wrote it down in one column of the paper, they heard the actual word on the tape and wrote it down in an adjacent column. The subjects then preceded to predict the next word in the ten second interval that followed. Upon hearing the word they continued the procedure of alternately predicting and hearing the succeeding words until the prediction for each word in these passages was obtained. The information value of each word was the percentage of subjects who incorrectly predicted the word. A word was judged correct if it contained the essential linguistic units for making it comparable to the word in the passage, that is, prefix, stem, stem but not including the correct suffix. Omitted words were considered as wrong guesses. As it has been shown that there is no difference between the word predictability scores of stutterers and non-stutterers (Soderberg, 1967), no attempt was made in the present study to obtain word predictability scores from stutterers. The same 30 normal speakers predicted words in both the languages. The subjects were tested individually.

Procedure: The passages in each language were typed as a single paragraph and were given to the subjects to be orally read by them. The two passages were randomly presented in the case of bilingual stutterers. The subjects were instructed to read these passages in their habitual reading rate and style. The subjects read these passages in the presence of two listeners—the experimenter and another listener accompanying the subject. All readings were recorded for further analysis.

Reliability of Measures: The assessment of the stuttering instances was done by the experimenter alone. To check the experimenter's reliability, later a Speech Pathologist assessed the reading material and marked the instances of

stuttering. A correlation of 0.96 was obtained between the two judgements. The experimenter's reliability was further checked by correlating his first set of judgements with that of a second. A correlation of 0.97 was obtained between the two sets of readings. Only those instances of stuttering marked by the experimenter were considered for analysis. Only repetitions and prolongations were considered for analysis, following Wingate (1964).

Determination of Phonemic Clauses: The phonemic clause was used as the encoding unit of speech in the present study. It is a phonologically marked macrosegment which contains only a primary stress and ends in one of the three terminal junctures/I, II,#/ (Trager and Smith, 1962). A linguist listening to the recordings of each subject and following a transcript of the passage marked the boundaries of the clause by locating their terminal junctures. As much listening as necessary was allowed until the linguist was satisfied that an accurate identification of all clauses was achieved. The linguist was instructed to make the judgement of the phonemic clauses independently of stuttering.

Results and Stuttering

The total stuttering, total number of clauses and the total information content of the two passages are summarized in Table 1. The analysis was made on a

TABLE 1

Total stuttering, total number of clauses and total information content of the two passages. The correlation between word information value and stuttering for successive words in a phonemic clause for the three groups—monolingual stutterers (MSG); bilingual stutterers—Kannada group (BSK) and bilingual stutterers—English group (BSE) are also shown.

Group	Total Stuttering	Number of Clauses	Total Infn. (Bits)	Correlation
MSG	297	345	6236	0.90
BSK	284	358	6236	0.84
BSE	299	359	7562	0.83

total of 1062 clauses* in the two passages. Phonemic clauses varied in length from 2 to 9 words. Short clauses (containing 4 words or less) accounted for roughly 70 per cent of the total number of clauses.

Figures 1 to 3 compare the stuttering and word information percentages for successive words in the entire sample of phonemic clauses. The correlation

• A fairly large number of clauses were similar in length and occurred at the same position in the passages because of the manner in which the passages were punctuated. However, as the subjects demonstrated different phrasing patterns, the number of clauses elicited from the subjects varied considerably. The least number of clauses elicited from any subject was 26 while the largest number was 42.

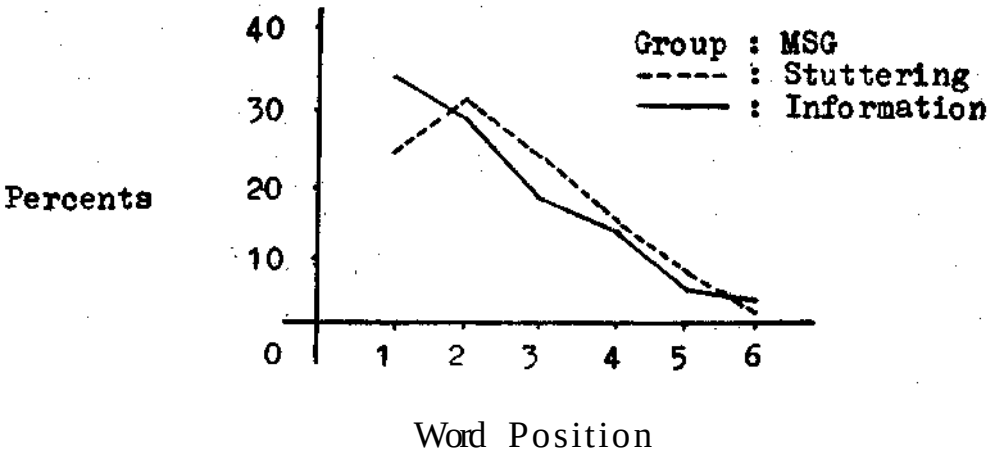

Figure 1: Comparison of information value and stuttering percentages for successive words in phonemic clauses—monolingual stutterers group (MSG).

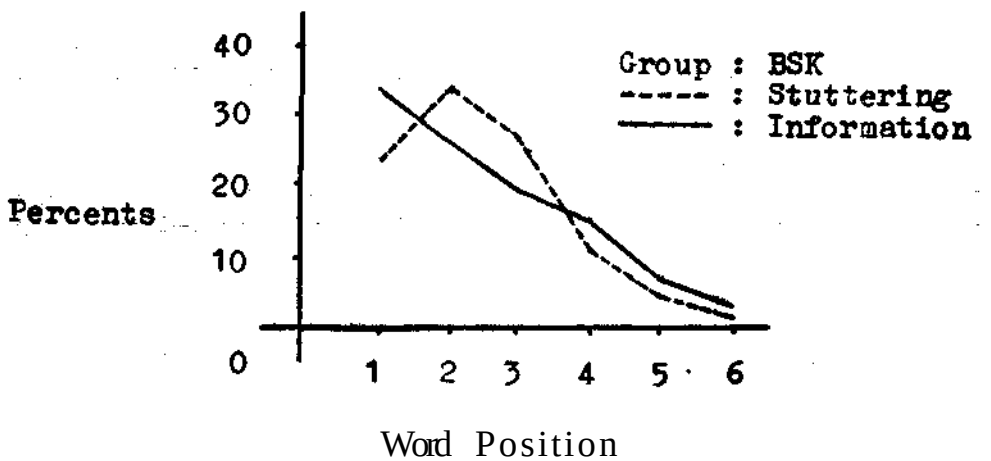

Figure 2: Comparison of information value and stuttering percentages for successive words in phonemic clauses—bilingual stutterers Kannada group (BSK).

between the two measures varied from 0.83 to 0.90 (Table 1) and they were all statistically significant. These figures show that stuttering varied according to word information values in a phonemic clause, with some exceptions. The notable exception was the first word of a phonemic clause. In none of the groups was there more stuttering on the first word of a phonemic clause, although the first word carried more information than the second word. This is totally unexplainable in view of our understanding of the encoding process of speech. If both normal hesitation and stuttering are associated with high points of infor-

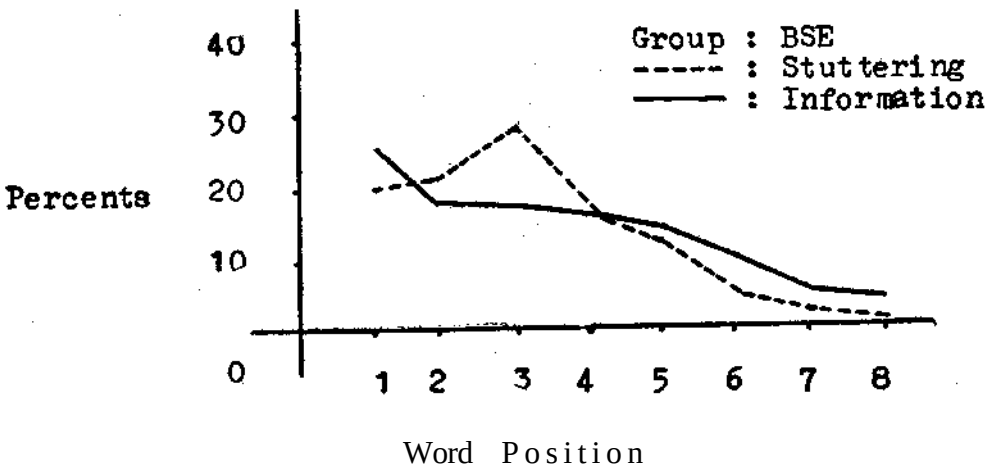

Figure 3: Comparison of information value and stuttering percentages for successive words in phonemic clauses—bilingual stutterers English group (BSE).

mation in the speech sequence (Aborn, Rubenstein and Sterling, 1959; McClay and Osgood, 1959; Quarrington, 1965; Schlesinger, *et al.* 1965; Soderberg, 1967; Taylor, 1966) then we should have observed more stuttering on the first word of a phonemic clause than on the second word. Soderberg (1967) found more stuttering and more information on the initial word of a phonemic clause than on the subsequent words. Probably, the reason for the higher stuttering on the second word of a phonemic clause than on the first word lies in the relative influence of grammatical and lexical uncertainties on stuttering. If grammatical uncertainty was more potent of the two in its influence on stuttering, then probably we would have observed more stuttering on the first word of a phonemic clause than on the second word, since grammatical uncertainty is more evident at the beginning of the clauses. Lexical uncertainty implies that the problem can occur anywhere in a clause and we have observed more difficulty on the second word of a phonemic clause. We must also mention here that though all possible care was taken in the judgement of a phonemic clause, still the judgement is subjective.

Another significant difference between the result of Soderberg (1967) and those of the present study is that Soderberg found stuttering to occur in vollies in a phonemic clause whereas such a thing was not observed in the present study. In the entire sample of phonemic clauses, we observed the highest stuttering on the second word of a phonemic clause and then stuttering decreased with decrease in word information.

Notwithstanding the exception of the first word position of a phonemic clause, we can conclude with reasonable certainty that stuttering is related to word information value in a phonemic clause and that words of high information

are more likely to be the points of stuttering than words of low information. Probably this shows that stuttering is related to encoding of speech. However, this needs to be examined in spontaneous speech. As regards the tendency of stuttering to decrease with decrease in word information was concerned, there was no difference (except quantitative) either between the monolingual and bilingual stutterers or between the two languages of a bilingual stutterer.

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