

Grammatical Context of Stuttered and Nonstuttered Words

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Abstract

This study investigates the influence of grammatical context on stuttering in two languages - English and Kannada. Ten Kannada speaking monolingual adult stutterers read 3 passages in Kannada while a group of 10 bilingual adult stutterers, speaking English and Kannada, read 6 passages (3 in each of the 2 languages). Grammatical context of stuttered and nonstuttered words, defined in terms of preceding and succeeding words, was analysed in the read passages and spontaneous speech, the latter obtained from each subject under structured conditions. Results indicated that

- (a) the frequency of stuttering in each of the 4 contexts (content-content, content-function, function-content, and function-function) was in proportion to the number of words occurring under each context, and
- (b) the frequency of stuttering on content words was significantly more in the content-content word context than on either content or function words in other contexts in the English language speaking conditions.

The results, apart from implying the possibility of cross cultural differences in stuttering, also may have some significance for the anticipatory struggle hypothesis or the speech breakdown views of stuttering.

Key words -

Stuttering,
Grammatical context,
Content,
Function,
Bilingualism,
Monolinguals

The anticipatory struggle hypothesis has been described by Bloodstein [1] as one in which the stutterers slutter because they have come to believe in the difficulty of speech, anticipate failure and struggle to avoid it. The hypothesis received its early support through studies which indicated that there were some linguistic factors may precipitate stuttering. According to research done mostly in oral reading and with subjects of school age and older, a higher incidence of stuttering has been generally found on longer than short words [2], [3], [4], [5], [6], earlier than later words in a sentence [7], [8], [9], less familiar than more familiar words [10], [11], [12], [13], higher than low information words [14], words of heavier than lighter stress [15], and content than function words [8], [12], [16], [17], [18], [19]. Words more frequently stuttered are more likely to have more of these linguistic cues associated with them. The anticipatory struggle hypothesis

appears to have a parsimonious integration of a broad range of observation above [20].

The role of grammatical factors in stuttering with reference to the relationship between stuttering and the grammatical function of words has been extensively researched in the past [8], [12], [16], [17], [18], [19], [21], [22]. However, the relationship between stuttering and grammatical word context, defined in terms of the grammatical function of the preceding and succeeding words of the stuttered words has not received the same attention from the researchers. If a word, by virtue of it being a content or a function word, triggers a differential response from the stutterer in reading or speaking, then, it can be predicted that different grammatical contexts may also trigger differential response from the stutterers. In other words, the occurrence of stuttering on a given word may depend not only on the grammatical class of the word (content or function) but also on the particular grammatical context (content-content, content-function, function-content and function-function) in which it is occurring. Therefore, the purpose of the present study was to investigate the grammatical context of the stuttered and nonstuttered words with respect to two modes of speaking (oral reading vs. spontaneous speech), two languages (Kannada vs. English) and two groups of speakers (monolingual vs. bilingual). Although the two methods of speaking in two different languages provided a cross check of the findings, the bilingual analysis was also undertaken to determine if the effects of grammatical context on stuttering in Kannada were dependent on the number of languages spoken by the subjects. Two considerations prompted us to undertake a study of bilingual differences on stuttering in different grammatical contexts. First, reported research [9], [14], [17] has indicated that a stutterer speaking two languages does not stutter in the same way or to the same extent in the two languages. Second, it is a common clinical observation that stutterers, speaking two or more languages, report that they experience more difficulty in one of the languages compared to the other. Kannada - a Dravidian language spoken in South India [23] - and English were selected for bilingual comparison in this study because:

- (1) stutters exposed to both English and Kannada are available in this part of India,
 - (2) the two languages are syntactically different, particularly in regard to word order in sentences. According to [24], [25] Principle of Prepositioning and Postpositioning, Kannada falls under the prepositioning category whereas English falls under the postpositioning category. Simple sentences in English follow subject-verb-object order whereas in standard spoken and written forms of Kannada simple sentences follow the subject-object-verb order though subject-verb-object, object-verb-subject, verb-object-subject and verb-subject-object orders are also permissible,
 - (3) the prefixes and the suffixes, the words can take is more flexible in Kannada compared to English. By virtue of this flexibility, a sentence in Kannada, to mean the equivalent of 'my name is Joe', may either consist of a sequence of three words (function-content-content) or a sequence of just 2 words (content-content). In the latter sequence, the first content word is a combination of the function-content words in the former sequence. Whether a sequence consists of 3 words or 2 words is determined depending on the presence or absence of a vowel at the end of the word. If a vowel is present at the end, then it is considered a separate word. 99.99 per cent of the words in Kannada end with a vowel which is a powerful criterion to mark the word boundary. For example, if the intended vowel was present at the end of the function word in the first sequence above, then the sequence would be of function-content-content words. If the intended vowel was not present, then it can be assumed that the function word has been combined with the succeeding content word resulting a content-content word sequence and
 - (4) in Kannada, written or spoken, function words always have a low percentage of occurrence than the content words, for the simple reason that they can simply be suffixed on to content words. Consequently, more number of words can be expected to occur in the content-content word contexts than in other combinations in Kannada.
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Method

Subjects

Ten monolingual male stutterers who knew only Kannada (and who had not been exposed to any other language) and 10 bilingual male stutterers who knew both Kannada and English (but had not been exposed to any other language) served as subjects. The monolingual stutters were aged 17-34 years (mean age: 24.8 years) and the bilingual stutterers 19-32 years (mean age: 25.6 years). To be included in this study the bilingual stutterers were required to pass a written achievement test in English to ensure proficiency for at least the limited purpose of this study. The 10 monolingual and 10 bilingual stutterers participated in the study as follows:

- (a) monolingual Kannada-reading (MKR),
- (b) bilingual-Kannada reading (BKR),
- (c) bilingual-English reading (BER),
- (d) monolingual Kannada spontaneous speech (MKS),
- (e) bilingual-Kannada spontaneous speech (BKS), and
- (f) bilingual-English spontaneous speech (BES).

Material

Six passages, 3 each in Kannada and English, were employed as reading material. The passages were controlled, both within and across the languages, for factors known to influence stuttering, including phonetic factors [8], [9], [15], word length [2], [4], [6], word familiarity [10], [11], [12], [13], and sentence type [26]. All words in the passages, in both the languages, started with a voice sound, were of 1 or 2 syllables and occurred in a list of 1000 most familiar words in their respective languages. Besides, only simple-affirmative-active-declarative sentences of equal length were employed in all the passages. The number of words in the three passages varied from 120 to 122 in Kannada and from 141 to 149 in English. Altogether there were 362 and 435 words in the Kannada and the English passages, respectively.

The words in these passages were broadly classified into content words (nouns, verbs, adjectives, and adverbs) and function words (articles, pronouns, prepositions, conjunctions and auxiliaries). Personal pronouns were also grouped under function words, following Francis [27]. Seventyone per cent of the words in the Kannada passages were content words while the remaining were function words. The proportion of content and function words in the English passages was 55 and 45 per cent, respectively.

Collection of spontaneous speech

Samples of the spontaneous speech of all the subjects were obtained and audiotape-recorded for further analysis (National Panasonic, r100 S). Each subject spoke on four different topics presented by the experimenter to two listeners - the experimenter and another person familiar to the subject. Five of the 10 bilingual stutterers spoke in English first while the remaining spoke in Kannada. Spontaneous speech and oral readings were obtained in different sessions. Words in the spontaneous speech material were categorised into content and function words in the same way as in oral reading.

Incomplete sentences in spontaneous speech were excluded from analysis. There were a few problems in the determination of the grammatical context of words in a sequence from Kannada spontaneous speech, specifically, the determination of whether a sequence consists of a 'function-content-content' words or 'content-content' words (see point 3 in the section on introduction earlier). This was resolved by subjectively looking for the presence or absence of the intended vowel at the end of the first function word. If the intended vowel was present, then it was assumed to be an independent word and the string to consist of 'function-content-content' words. Otherwise, it was taken as a 'content-content' string. Possibly, the subjective satisfaction of the experimenter in marking the boundary of the words in spontaneous speech could be a limitation in the method of this study, although the extent to which this procedure could have affected the present results is not known. There were 189 occasions (out of 18357 occasions of word boundary marking) when the experimenter had to take recourse to the above method of word boundary making.

Procedure

Each monolingual stutterer read the three Kannada passages in a randomized order, while each bilingual stutterer read the three passages in each language in a randomized order to two listeners- the experimenter and another person who was familiar to the subject. English passages were followed by Kannada passages for 5 of the 10 bilingual stutterers, while the reverse order was presented to the remaining subjects. All readings were audiotape-recorded for further analysis.

Analysis

The readings of the three passages in each language were combined for analysis. Identification of the instances of stuttering from audiotape recordings of the subjects speaking was performed solely by the experimenter. Later, another judge, a speech-language pathologist evaluated the audiotape-recorded material and marked the instances of stuttering. A product-moment correlation of 0.96 was obtained between the experimenter's judgements and those of the second judge. The reliability of the experimenter's judgement of the instances of stuttering was further checked by correlating his first set of judgements with a second set of judgements. A correlation of 0.97 was obtained. Stuttering was defined as silent or audible sound prolongations, following Wingate [28]. Three types of analyses were made, both in oral reading and spontaneous speech, with the data.

- (a) comparison of the grammatical word context of the stuttered and non-stuttered words (preceding and succeeding; content vs function words)
- (b) independent comparison of the grammatical nature of the words preceding and succeeding the stuttered as well as the non-stuttered words, and
- (c) comparison of the frequency of stuttering on content and function words in the 6 conditions.

Results

The reading and spontaneous speech samples of all the subjects were analysed as follows for the grammatical context. Assuming that a stutterer read a 'content-content-function-content' word sequence like 'give' (non-stuttered) Joe (stuttered) a (stuttered) book (non-stuttered)'. The first stuttering on 'Joe' was analysed to occur in a 'content-function' context ('give' - stuttered word - 'a') while the second stuttering was analysed to occur in 'content-content' grammatical context ('Joe' - stuttered word - 'book'). Table 1 gives the proportion of stuttered and non-stuttered words in each of the 4 grammatical contexts of content-content (CC), content-function (CF), function-content (FC) and function-function (FF).

In Table 1, the expected frequencies of stuttering (shown in parentheses) were calculated based on the present occurrence of words in the 4 contexts. The logic was as follows: if the words read or spoken distributed themselves in the proportion of 45, 24, 24 and 7 percentage points over the 4 contexts of CC, CF, FC and FF respectively, then for the two variables of stuttering and context not be related, stuttering should also be distributed in the same proportion as the words over the 4 contexts. This procedure was necessary because Kannada passages, both read and spoken, contained a higher percentage of content words compared to the English passages. Otherwise, any result on the influence of grammatical context on stuttering would have been an artefact of the more numerous content words in the Kannada material. Chi-squares [29] computed were based on the per cent occurrence of words in each of the 4 contexts. The results indicated that the differences in stuttering on the 4 contexts were not significantly different (0.05 level) for any of the language groups, either in oral reading or spontaneous speech.

The data in Table 1 pertain to a combined analysis of both the preceding and the succeeding words of stuttered words. Tables 2 and 3 provide the results of a separate analysis involving only the preceding or succeeding words of stuttered words in reading and speaking conditions, respectively. The data in Tables 2 and 3 should be interpreted as follows: of the 883 occasions of the occurrence of stuttering (total of column 1, row 1 & 2: succeeding words) in MKR condition, the stuttered words was preceded by a content word on 634 occasions while a function word preceded on 249 occasions. Similarly, of the 883 occasions of the occurrence of stuttering (total of column 1, row 1 & 2: preceding), content words succeeded on 245 occasions. The results indicated that there was no significant difference (0.05 level) in the frequency of stuttering on words succeeding or preceding either content or function words.

Table 1 - The proportion of stuttered and non-stuttered words in the content-content (CC), content-function (CF), function-content (FC) and function-function (FF) grammatical contexts.

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The figures in parentheses refer to the expected frequencies of stuttered and nonstuttered words calculated by using a chance estimate based on the percentage of words occurring at each of the 4 contexts. Results from oral reading and spontaneous speech are shown for monolingual Kannada - reading (MKR), bilingual - Kannada reading (BKR), Bilingual - English reading (BER), monolingual Kannada - spontaneous speech (MKS), bilingual Kannada -spontaneous speech (BKS), and bilingual English - spontaneous speech (BES). A chi square (p) of 7.815 ($df=3$) is significant at the 0.05 level.

Table 2 - The proportion of stuttered and non-stuttered words succeeding and preceding the content and function words in reading conditions in the two languages

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The expected frequencies of stuttered and non-stuttered words calculated on the basis of a chance estimate based on the per cent occurrence of words in each instance are shown in parentheses. A Chi square (p) of 3.84 (df=1) is significant at the 0.05 level.

Table 3 - The proportion of stuttered and non-stuttered words succeeding and preceding the content and function words in spontaneous speech conditions in the two languages

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The expected frequencies of stuttered and non-stuttered words calculated on the basis of a chance estimate based on the per cent occurrence of words in each instance are shown in parentheses. A Chi square (p) of 3.84 (df=1) is significant at the 0.05 level.

Further analysis was made of the frequency of stuttering on content and function words in the 4 grammatical contexts. The results, summarised in Table 4, indicated that for the 4 Kannada conditions (MKR, BKR, MKS and BKS), the frequency of stuttering on content and function words in the 4 contexts was in proportion to the per cent occurrence of content and function words in each of the 4 contexts. However, in the case of English language conditions of BER and BES, the difference in the frequency of stuttering on content words in the 4 contexts was significant in oral reading ($X^2=13.54$; df=3; $p<0.05$) as well as in spontaneous speech ($X^2=18.75$; df=3; $p<0.05$). Specifically, the data showed that there was more than expected frequency of stuttering on the content words in the content-content context.

Table 4 - Frequency of stuttering on content words (CW) and function words (FW) in the 4 contexts

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The figures in parentheses refer to the expected frequency of stuttering calculated by using a chance estimate based on the per cent occurrence of CW and FW's in each of the 4 grammatical contexts. A Chi square (p) of 3.815 (df=3) is significant at the 0.05 level.

Table 5 - Mean percentage and standard deviation (in parentheses) of stuttering on content and function words in oral reading and spontaneous speech tasks. A t-score (p) of 2.26 (df=9) is significant at the 0.05 level.

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On an average, there was significantly more stuttering on content words compared to function words, in all the 6 conditions of reading and speaking in the two languages (Table 5). The t-scores

for all the difference in mean stuttering on content and functioning words were all significant at 0.05 level.

Discussion

Overall, the results indicated that the occurrence of stuttering depended more on the grammatical nature of the words themselves rather than on the particular context in which it occurred. The results in Table 1 suggested that stuttering occurred in the 4 contexts in the same proportion as the number of words in each context thus indicating no relationship between the occurrence of stuttering and the grammatical context. Tables 2 and 3 indicated that the grammatical nature of neither the preceding nor the succeeding words influenced the occurrence of stuttering on the ensuing or preceding words, as the case might be. The results in Tables 1 to 3 together may have some significance for either the anticipatory struggle hypothesis or speech breakdown views of stuttering. Linguistic variables may act as clues to the occurrence of stuttering, but grammatical context of the words may not be one among them.

Analysis of the frequency of stuttering separately on content and function words in the 4 contexts indicated no significant difference for the 4 Kannada speaking conditions (MKR, BKR, MKS, and BKS) but demonstrated a significant difference for the two English conditions of BER and BES (Table 4). Specifically, there was more stuttering on content words in the content-content word context compared to words in other contexts. Significantly higher stuttering on content words in the content-content word context was one bilingual difference observed between the two languages of Kannada and English on the influence of grammatical context on stuttering. A speculative explanation can be offered at this stage to explain this difference. The significant difference in stuttering on content words in the content-content word context in English language might have been due to the fact that the bilingual speakers in this study were speaking two languages. The implication being that the first language of the speaker (Kannada in this instance) might have influenced stuttering in the acquired language (English in this instance) although the mode of interaction is not known. The implications of such an explanation are far from simple, however, and would be obscured if we merely said that the results were due to the fact that the subjects in this study (native speakers of Kannada) were speaking English, a foreign language to them. Bilingualism, of course, may be confounded with so many other factors that we cannot be sure of the relevance of these findings to the subject we have been discussing. Further research should be initiated to test the adequacy or otherwise of the explanation above. No speculations or conclusions on whether or not the effect of grammatical context on stuttering depends on the specific language being spoken are warranted in view of the fact that no comparable data on the effect of grammatical context on stuttering from a group of monolingual stutterers speaking only English language are available. This is a topic for future research.

An incidental result of this study was the finding that there was significantly more stuttering on content words rather than on function words. The results from BER and BES are in agreement with those of earlier investigations. Significantly higher stuttering on content words compared to function words can be explained as the effect of information load (majority of the content words carry high information), though, recorded research has not accorded a high degree of importance to the information load or word uncertainty in its influence on stuttering [30]. It can also be explained on the basis of word fear

or specific word anxiety [31]. Since this feature characterizes advanced stuttering more than it does incipient stuttering the stutterer is more likely to anticipate or avoid difficulty on meaningful and thus content words. The results also indicated that the influence of grammatical function of words on stuttering was not dependent on the number of languages spoken by the subjects, even when the two languages spoken were as divergent as English (Indo-European) and Kannada (Dravidian).

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