

Analysis of Language Factors in a Multilingual Stutterer

Nola Watt

Department of Speech Pathology and Audiology
University of the Witwatersrand, Johannesburg

ABSTRACT

The apparently predictable occurrence of stuttering in English-speaking stutterers has been well documented and has revealed a number of rules regarding stuttering loci known as the language factors. This study investigated the presence of these language factors (the phonetic, grammatic, word and sentence locus, word length and syllabic stress factors) in the spontaneous speech of a multilingual stutterer. The subject (B) was a 19-year old male with a severe stutter who spoke four languages, structurally divisible into two main groups: English and French (largely analytical word based languages), and Swahili and Kinyarwanda (African languages with rich morphology). Results confirmed the presence of the phonetic and word locus factors in English and French but this was not observed in the African languages, indicating distinct structural variation between languages. The grammatic factor was the only factor significant across all four languages, while the sentence position factor was not significant in any language. The word length factor was significant for all languages except Swahili, perhaps confounded by the over-representation of long words in this language. Syllabic stress was significant in both English and Swahili indicating a strong robustness of this factor across both a stress-timed and syllable-timed language.

KEY WORDS: stuttering, multilingual, language factors.

INTRODUCTION

LANGUAGE FACTORS

Since the late 1930s with the publication of a series of studies by Spencer Brown (Brown, 1937, 1938, 1945; Brown & Moren, 1942; Johnson & Brown, 1935), researchers have been interested in documenting the apparently predictable occurrence of stuttering. Studies suggest that the locus of stuttering events is to some extent rule-governed, and these rules have been termed the language factors as they appear to be explicable in terms of the structure of the language under study. Studies have focussed primarily on English speakers and have identified rules or factors: stuttering appears to occur more on consonants than vowels, more on content than function words, more on longer words, at the beginning of words and sentences and on stressed syllables. Other less frequently studied observations include more stuttering on less frequently used words and more stuttering at the onset of major sentence parts.

Wingate (1988) provides an excellent review of many of the studies that have been conducted on each of these rules, and stresses the identification of these factors is important for our theoretical understanding not only of the language of the stutterer but also of the nature of stuttering itself. Theoretical accounts to explain the language factors have traditionally focussed on either psychological or physiological explanations. Psychological explanations for most of the factors were proposed by Brown in his original studies (Brown, 1945) and focussed on the anticipatory struggle hypo-

thesis. This posits that the speaker anticipates stuttering and the resulting attempt to not stutter on particular words then increases the likelihood of stuttering. The anticipation of stuttering on a particular word is influenced by the perceived evaluation of the word by the speaker as being "conspicuous, prominent or meaningful" (Brown, 1945, p192). Once this evaluation is made, the resulting desire not to stutter on the word results in various hesitant "reactions which are termed stuttering" (p192). Physiological accounts cite the factors of articulatory and prosodic complexity as being responsible for increased stuttering on stressed syllables, consonants, longer words, and at the beginning of words and sentences (Wingate, 1967, 1988).

Neither theory is entirely supported by or can entirely explain, all the language factors that have been documented. In order to develop these theories more fully, ongoing research appears to be focussing on two main directions. The first is the search for the factor that would underlie the other apparent factors. For example, some theorists argue that it is likely that the factor of syllabic stress can account for all the other observations of stuttering loci. This is perhaps because of all the factors, these two are most closely related to the speech production process (Wingate, 1988; Prins, Hubbard & Krause, 1991; Packman, Onslow, Richard & Van Doorn, 1996). The second avenue of interest is whether these language factors are universal or robust across structurally different languages. Needless to say, most studies of these language factors have been conducted with English speaking subjects and there is little cross-linguistic research or evidence from multilingual stutterers to confirm or refute the findings of English

studies. There are, however, some cross-linguistic monolingual and bilingual data for some of the language factors and these are discussed below for each factor.

The *phonetic factor* is defined as the tendency for more stuttering to occur on consonants than vowels. It has been confirmed in a number of studies of monolingual English stutterers (Johnson & Brown, 1935; Fairbanks, 1937; Hahn, 1942a; Quarington, 1965; Soderberg, 1966). This factor has been investigated in two studies of monolingual Afrikaans stutterers (Develing, 1943; Uys, 1970) both of whom found more stuttering on vowels than consonants. The explanation offered for these contradictory findings related to the different method of vowel initiation in Afrikaans, namely a harder glottal attack in Afrikaans as opposed to the smoother softer attack in English. This theory was not supported, however, by Yudaken (1975), whose English-Afrikaans bilingual subject was found to stutter more on vowels than consonants in both of his languages, despite spectrographic evidence of softer vowel attacks in English. Bernstein Ratner and Benitez (1985) found a similar result in their English-Spanish bilingual stutterer, who stuttered more on vowels than consonants. The authors acknowledged, however, that it was extremely difficult to tease out this phonetic effect from grammatical effects (see below), particularly in Spanish. While the results of these latter studies need to be considered with caution due to their single case study designs, they do suggest that the phonetic factor is far from universal.

The *grammatical factor* refers to the tendency for more stuttering to occur on content than function words. As with the phonetic factor, this has been shown in numerous studies of monolingual English speakers (Brown, 1937; Hahn, 1942b; Quarington, 1965; Soderberg, 1966) and has generally found to be independent of, and often more robust than, the phonetic factor (Wingate, 1988). Cross-linguistic studies of this factor in monolingual stutterers of other languages seem to be rare but one such study (Khoza, 1996) found more stuttering on function morphemes than stem (or content) morphemes in a Zulu-speaking stutterer. This finding, however, could have been confounded by the word locus factor (see below), as most function morphemes exist as prefixes at the beginning of words. Hence, the greater proportion of stuttering on functional morphemes could have been the result of their word position rather than their grammatical class. In addition, Khoza (1996) also found more stuttering on possessives, copulatives and relatives, which further challenges the grammatical factor evident in many studies in English.

Studies of the grammatical factor in bilingual speakers have found conflicting results. Yudaken (1975) found more stuttering on function than content words in her English-Afrikaans stutterer in both languages. This was attributed to the possibility that more function words appeared to start with vowels and could hence have been confounded by the unusual phonetic factor mentioned earlier. In contrast, Bernstein Ratner and Benitez (1985) found their English-Spanish bilingual was more likely to stutter on or before major and minor sentential constituents, particularly the verb phrase, thus supporting not the content versus function word debate, but the importance of overall sentential grammatical structure in stuttering locus. On the other hand, Jayaram (1981, cited in Wingate, 1988) found a consistent grammatical effect, with more stuttering on content words in both monolingual Kannada speakers and bilingual Kannada-English speakers.

The *word length* factor refers to the tendency for more stuttering to occur on longer than shorter words. It was first identified by Brown and Moren (1942) and soon supported by others (Soderberg, 1966; Silverman, 1972; Wingate, 1967) in their monolingual English studies. This factor was confirmed in Khoza's (1996) study of a monolingual Zulu stutterer. He also found that longer words were more likely to elicit stuttering. However, in her study of a bilingual English-Afrikaans stutterer, Yudaken (1975) found contradictory results, with more stuttering observed on shorter words in English, and no significant differences observed in Afrikaans. No definitive explanation could be provided for this finding.

The *word locus* factor refers to the tendency for more stuttering to occur at the beginning of words than in the middle of words. This was a robust factor initially found by Brown (1938) and subsequently corroborated by others (Hahn, 1942a; Sheehan, 1974). Note is taken of Wingate's (1988) assertion that it is syllable initial position rather than word initial position that is the most important to note regarding stuttering locus. Khoza's (1996) study of a monolingual Zulu stutterer found that more than 90% of stutters occurred on the initial syllables in words, and within word stutters occurred in syllable initial position as well.

The *sentence locus* factor refers to the tendency for more stuttering to occur at the beginning of sentences, or at least within the first three words of each sentence. It was found initially by Brown (1938) and later by others (Hejna, 1955; Quarington, 1965). This factor was corroborated by Khoza (1996) in her monolingual Zulu speaker and by Yudaken (1975) in her English-Afrikaans bilingual speaker.

The *syllabic stress* factor refers to the tendency for more stuttering to occur on stressed syllables. Although this factor was originally documented by Brown (1938), particularly for stressed first syllables, it was subsequently not listed in his final synopsis of his series of studies in 1945 and hence received little corroborating interest or support until more recently. Hejna (1955) found that stress certainly accounted for the incidence of stuttering in polysyllabic words in spontaneous speech, while Prins, Hubbard and Krause (1991) found a similar result for a group of stutterers using a reading passage. In contrast, Weiner (1984) found no relationship between stuttering locus and syllabic stress in single read bisyllabic words. Regarding the relationship between stuttering and stress in other languages, this author is unaware of any cross-linguistic or bilingual studies that have investigated this factor specifically, although Packman et al. (1996) suggest that the study of stuttering locus in syllable-timed languages (as opposed to English which is stress-timed) is necessary to support theories regarding stuttering and syllable stress. Of particular interest, however, is Nwukah's (1988) study of bilingual English-Igbo (a west African tonal language) stutterers. She asserted that the prosodic patterns of each language could not be used to account for stuttering loci differences as her stutterers tended to transfer the prosodic features of Igbo (their indigenous language) to English.

It appears that the language factors are relatively widely accepted for the English language, and are being used to justify various theoretical explanations for stuttering. However, there is little evidence to either support or refute their applicability to other languages. This is particularly the case for structurally different languages. The need for further study of these factors in other languages is therefore evident. However, there are numerous methodological

difficulties and issues that are important to consider when undertaking research of communication phenomena in multilingual populations.

ISSUES IN BI-/MULTILINGUAL STUTTERING RESEARCH

When considering stuttering research with multilingual speakers, it is important to note that little is known about how language proficiency, length of exposure to each language or frequency of use may affect stuttering patterns in the various languages of multilingual speakers. Some imbalances in stuttering severity between languages of bilingual speakers have been reported in the literature. Bernstein Ratner and Benitez (1985) found their bilingual to be more dysfluent in English than in Spanish but could not explain this finding according to language exposure. Nwokah (1988) also found consistent differences in stuttering severity between Igbo and English in her bilingual sample. Interestingly, she attributed these differences not to language exposure, history or structure but to both information processing and sociopsychological factors - subjects stuttered more in the language in which they had had the most negative experiences related to their stuttering, a finding supported by Inbar and Ezrati (1996). Jankelowitz and Bortz (1994) found a more predictable result in that their English-Afrikaans bilingual stuttered less in his predominant language. This issue is clearly not resolved in the literature.

The languages under investigation in this study included English, French, Swahili and Kinyarwanda, which are structurally divisible into two groups (see table 1 below).

Table 1 clearly demonstrates that English and French are examples of analytical word based languages, while Swahili and Kinyarwanda are richly morphological languages (Kimenyi, 1979,1980; Welmers, 1973). While these two broad groups exist, there are differences between languages; for example, Kinyarwanda, like most African languages, remains a tonal language but Swahili does not (Hinnebusch, 1979). Similarly, English is the only stress-timed language, while the other three are syllable-timed. This means that the rhythm of spoken English is determined by strong beats falling on stressed syllables in words, and normal tempo, unstressed syllables are greatly reduced (Clark & Yallop, 1990). The three other languages, in contrast, are syllable-timed, which suggests that stress beats are less regular and unstressed syllables are not as

reduced. This makes the duration of an utterance more dependent on the number of syllables than the position of stressed syllables. It is unknown to what extent these language differences could affect stuttering severity or symptomatology. Difficulties in this endeavour have been highlighted by Nwokah (1988) in that multilingual speakers may transfer some of the features of one language into another, such as prosodic features. This study, therefore, undertook an exploratory investigation of all six of the above-mentioned language factors in a multilingual speaker of four languages that belong to structurally different language families.

METHODOLOGY

AIM

The aim of the study was to analyse the stuttering pattern across the four languages of a multi-lingual stutterer. Specifically, the study aimed to determine the following:

- Was stuttering severity the same in each language?
- Was there more stuttering on consonants or vowels (phonetic factor)?
- Was there more stuttering on content or function words (grammatic factor)?
- Was there more stuttering at the beginning or middle of words (word locus factor)?
- Was there more stuttering at the beginning of sentences (sentence locus factor)?
- Was there more stuttering on longer words (word length factor)?
- Was there more stuttering on stressed syllables (syllable stress factor)?

DESIGN

The investigation was exploratory and took the form of a single case study. This has limitations in terms of generalising results.

SUBJECT

The subject (B) was a 19-year old severe stutterer who had never received any stuttering therapy. This is an important aspect to consider for the possible effects of

Table 1: Language Features

Language	Family	Morphology	Prosody	Tone
English	European (Germanic)	Analytic, fusional	Stress-timed	-
French	European (Romantic)	Inflectional	Syllable-timed	-
Kinyarwanda	African (Niger-Congo)	Extensive, agglutinative	Syllable-timed	+
Swahili	African (Niger-Congo)	Extensive, agglutinative	Syllable-timed stressed penultimate syllable	-

therapy on stuttering symptomatology. A detailed language history questionnaire and interview revealed that he spoke four languages, as mentioned earlier, namely: English, French, Kinyarwanda and Swahili. B was not equally proficient in each language and had varying ages of acquisition of each language, which may influence his stuttering patterns in each of his languages (see table 2 below).

DATA COLLECTION

The raw data used for analysis consisted of a spontaneous language sample. This consisted of a narrative discourse task where B recounted a story of his choice, the same story in each language. The story he chose was a well-known South African story known as "The Suit" written by Can Themba, which he had apparently learned in school. This was conducted with a five-minute distracter between story recounts in order to control for the possible effect of adaptation, should this phenomenon occur across languages. The samples were audiotaped, and this is a limitation of the study as video analysis would be a more appropriate data collection method for stuttering analysis. The samples were then transcribed and translated with the help of first language English and French speakers and second language Swahili and Kinyarwanda speakers. The first 200 syllables of each story were used for analysis, except for Swahili which consisted of only 179 syllables in total. This was due to B telling a more summarised version of the story in this language, which in turn is probably related to the fact that he is least proficient in this language.

DATA ANALYSIS

Coding of stuttering moments

Each written transcript was used in conjunction with the audiotapes to mark moments of stuttering. The criteria for identifying a stuttering moment were derived from Wingate's (1964) standard definition of stuttering, this being a "disruption in the fluency of verbal expression characterised by involuntary audible or silent repetitions or prolongations in the utterance of short speech elements, namely sounds, syllables, and words of one syllable" (p488). As this subject had varying levels of proficiency in each language, only sound repetitions, sound prolongations and blocks were coded as stuttering moments, and not word

and phrase repetitions, revisions and interjections, as these may have been due to second language influences. Their inclusion as stuttering moments may therefore have "obscured the object of enquiry" (Wingate, 1988, p93), and reflected second language influences as opposed to true stuttering moments.

Reliability

A major drawback of this study is the lack of inter-rater reliability measures for the identification of stuttered moments, as all coding was conducted by the author. This does, however, lend itself to more internal consistency in coding across the four languages.

Computerised database

Once marked, the transcripts were coded into three spreadsheet databases. The first was a syllable-based database in which each syllable was marked as:

- Stuttered or not stuttered (in order to calculate stuttering severity in percentage syllables stuttered (%SS)). Stuttering severity was calculated based on the %SS and the rate of speech as measured in syllables per minute (SPM).
- consonant or vowel initial (in order to calculate the phonetic factor)
- stressed or non-stressed (in order to calculate the syllabic stress factor). This factor was investigated only in the English and Swahili samples. In Swahili all penultimate syllables of words were coded as stressed (Welters, 1973; O'Grady, Dobrovolsky & Aronoff, 1993). In English only the multi-syllabic words were used for the stress analysis and the stressed syllables were coded as they would be pronounced in context by a fluent speaker.
- and, serial position of the syllable within the word (in order to calculate word locus factor).

A word-based database was also used in which each word was coded as:

- content or function word (in order to calculate the grammatic factor in English and French, each word was coded as being either content (noun, verb, adjective, adverb) or function (all other words))
- number of syllables (in order to calculate the word length

Table 2: Self-Reported Language Acquisition, Proficiency and Stuttering Severity

Language	Age of Acquisition		Proficiency (1-7)*		Use (1-3)**	Severity
	Oral	Written	Oral	Written		
English	19y	19y	3	3	Daily	3
French	0y	14y	4	5	Daily	3
Kinyarwanda	0y	8y	6	6	Weekly	1
Swahili	17y	-	2	1	Weekly	2

* Self-reported proficiency on a scale of 1 to 7 where 1 = very poor & 7 = excellent

** Self-reported severity on a scale of 1 to 3 where 1 = least severe and 3 = most severe

- factor)
- and serial position in the sentence (in order to calculate the sentence position factor).

A third mixed database was required in order to analyse the grammatic factor in Swahili and Kinyarwanda. This is because content and function meaning units are usually coded by bound morphemes but can be more than one syllable or even a single word or free morpheme. In Swahili and Kinyarwanda the transcripts were translated and all stems and affixes were identified and coded as being either content (stems) or function (affixes) morphemes.

Statistical analysis

Once coded, the data was analysed using chi-squared calculations to reveal significant differences between groups.

RESULTS AND DISCUSSION

The results are presented and discussed according to the aims of the study.

STUTTERING SEVERITY

According to the measures of %SS and SPM, B was found to have a severe stutter in all four of his languages (Riley, 1994). However, as table 3 below indicates, he was not equally severe in all his languages.

Table 3: Severity of stuttering across languages

Language	%SS ¹	SPM ²	Severity
English	40.5%	28.17	Severe
French	24.5%	46.69	Severe
Kinyarwanda	24.5%	60.3	Severe
Swahili	29.8%	41.01	Severe

¹ %SS = percentage of syllables stuttered

² SPM = syllables per minute

Table 4: X² values for the language factors (df = 2)

Factor	English	French	Kinyarwanda	Swahili
Phonetic	15.738***	5.684*	1.171	1.929
Grammatic	48.906***	4.518*	11.926***	9.257**
Word Locus (first syll)	44.56***	17.54***	1.344	6.162*
Sentence (first 3 words)	2.658	3.099	.009	.052
Word Length	18.463***	7.952*	8.323*	5.956
Syllabic Stress	6.345*	-	-	35.407***

*** = significant at $\alpha = 0.001$

** = significant at $\alpha = 0.01$

* = significant at $\alpha = 0.05$

By taking into account the SPM measure, it can be seen that he was relatively most severe in English, followed by Swahili, French and Kinyarwanda. When analysed in conjunction with the linguistic features of each language as depicted earlier in table 1, this result does not appear to have any relationship with any of the structural aspects of the languages. It also does not seem to correlate with B's self-reported level of oral proficiency or his reported frequency of use at the time of the study. It does correlate well, however, with B's self-reported severity in each language as well as with the reported age of acquisition of each language, possibly indicating that this has a greater impact on fluency than the other factors for this speaker. This may lend some support to Packman and Lincoln's (1996) variability model of stuttering. This suggests that the acquisition of the ability to produce the variable syllabic stress patterns of connected speech is a normal speech milestone that tends to destabilise the speech systems of those who stutter. While B still did not manage to overcome this milestone in his first language of Kinyarwanda, he appears to have overcome it to a greater extent to his languages learned later.

THE LANGUAGE FACTORS

Table 4 summarises the relationships found between each of the six language factors investigated and B's four languages. Each will be discussed separately.

Phonetic Factor

The results in table 4 clearly support a significant relationship between the phonetic factor and B's European languages i.e. he was significantly more likely to stutter on consonants than vowels in English and French, which supports the original findings of Brown (1935) and others. This finding, however, was conspicuously absent from both of B's African languages. (Although B still produced more stuttered consonants than vowels in these languages, the proportion of vowels and consonants stuttered in Kinyarwanda and Swahili were not significantly different.) It was important to measure this effect in proportion of consonants and vowels stuttered as clearly it was not possible to control for relative consonant and vowel representation. This finding supports other studies that

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question the notion of consonants being inherently more difficult to pronounce than vowels (Soderberg, 1962).

As the representativeness of the different phonemes was not controlled for within or across languages, B's difficulty with specific sounds was not formally analysed. However informally, B appeared to have difficulty with different sounds across his four languages, with most stutters on /w, t, d, m/ in English, /f, s, l/ in French, /k, t, m/ in Swahili, and, /g, k, t/ in Kinyarwanda. This again suggests that sounds are not inherently easy or difficult to produce. An interesting observation in B's Kinyarwanda sample was that although most dysfluencies in this language occurred on /g/ and /k/, not one of these were on phonetically velarised or palatalised consonants (Kimenyi, 1979). For example, in the word "witwaga" (meaning "called") the /tw/ cluster is realised as /tkw/. This word occurred twice in the sample, but in both cases only the initial /w/ was stuttered, and not the velarised consonant /tw/. Similar observations were noted on the words "yibagirwa" ("rw" realised as /rgw/), "amubwirako" and "ababwirako" ("bw" realised as /bgw/), and "rye" ("ry" realised as /rg/ where the /g/ is palatalised). It is interesting to note that none of these velarised consonants occurred in the initial position of stressed syllables, and this could account for the absence of stuttering on these velar consonants.

Grammatical Factor

As depicted on table 4, this factor was significant across all four of B's languages, indicating that he was significantly more likely to stutter on content words than function words in English and French, and on stem morphemes than functional affixes in Kinyarwanda and Swahili. This supports many previous findings in English, including Brown's initial studies, which indicated the grammatical factor to be a more consistent and significant factor than the phonetic factor (Brown, 1937; Soderberg, 1962; Wingate, 1979; Griggs and Still, 1979; Jayaram, 1983; Wingate, 1988). This effect may again be confounded in the African languages by syllabic stress where the stem morphemes are more likely to be stressed within the multisyllabic words. It must be noted that this finding is in contrast to Khoza (1996), who found most stuttering to occur on functional morphemes at the beginning of words.

Word locus

This factor was significant for all languages except Kinyarwanda. B was more likely to stutter at the beginning of words in English, French and Swahili, but not Kinyarwanda. It must be noted, however, that this result was significant for English only when all the one-syllable words (a total of 126 words) were excluded from the calculation. In other words, due to the over-representation of one-syllable words in English, a clear word-initial effect was not observed. These findings therefore do not typically support the literature for English but suggest a strong word locus factor for French.

The finding for Kinyarwanda does not support Khoza's (1996) results for her Zulu-speaking subject. She found that more than 90% of stutters occurred in word-initial position. In contrast to this, visual inspection of the data revealed that B's stutters were more or less equally distributed between initial and medial word positions for both Swahili (26 and 27 stutters respectively) and Kinyarwanda (20 and

29 stutters respectively) indicating that more than half of B's stutters occurred in the middle of words in his African languages. This finding could be attributed to the greater number of longer words in Swahili and Kinyarwanda, resulting in many more opportunities for stuttering in the middle of words. For Swahili, this finding could also be attributed to the fact that the strongest stress falls on the penultimate syllable in words (Hinnebusch, 1979; Welmers, 1973) which would increase the likelihood of stuttering within words. In this respect, it appears that the structures of these two African languages had a significant effect of stuttering locus within the word and that the factors of word locus, word length and syllabic stress are very closely related in these African languages.

It is important to note, however, that all stutters in all word positions in all languages were consistently in syllable-initial position, thus confirming Wingate's (1988) assertion that stuttering is essentially a syllabic phenomenon.

Sentence locus

This factor was found not to be significant in any of B's four languages. This may have been as a result of the nature of the sample, a spontaneous story retell, in which it was sometimes difficult to determine the exact beginning and end of sentences, and where many new sentences started with markers of ongoing narrative, for example "And then...". This finding therefore does not support previous findings for monolingual English (Brown, 1938; Hejna, 1955; Quarrington, 1965) and Zulu (Khoza, 1996) studies, or bilingual English-Afrikaans studies (Yudaken, 1975).

Word length

This factor was found to be significant in all of B's languages except Swahili. Visual inspection of the data indicated that the proportion of longer words stuttered was higher than for shorter words, including Swahili (20% of one-syllable words, 61% of two-syllable words and 74% of three or more syllable words contained stutters). The effect in Swahili may not be significant as a result of the fact that there were so few one-syllable words in Swahili (only 5 out of a total of 63 words, making up to total of 178 syllables in this sample). These findings support the previous studies mentioned for English (Brown & Moren, 1942; Soderberg, 1966; Wingate, 1967) and Zulu (Khoza, 1996).

Syllabic stress

Due to methodological constraints, this factor was assessed only in English and Swahili. In both languages syllabic stress was found to be a highly significant predictor for stuttering locus. This confirms Brown's (1938) early finding as well as the later findings of Hejna (1955) and Prins et al. (1991), and supports Wingate's (1988) hypothesis regarding the important relationship between stuttering and syllabic stress. It is noteworthy that this factor appeared to be robust across two languages of differing prosodic patterns, English being a stress-timed and Swahili being a syllable-timed language. This lends support to Packman et al.'s (1996) variability model of stuttering, which as yet has little supporting evidence from studies of languages other than English. This finding may also represent a starting point in explaining what is thought to be a higher incidence of stuttering among speakers of

syllable-timed languages, particularly West African (Nwokah, 1988).

It has been mentioned how syllabic stress could be an underlying variable for a number of other findings that have emerged, particularly in B's two African languages, namely, more stuttering on longer words (word length factor), the greater incidence of stuttering in the middle of words (word locus factor), the tendency for more stuttering on stem morphemes (grammatical factor), and the lack of stuttering on velarised consonants in Kinyarwanda (phonetic factor). Although specific statistical confirmation of this confounding effect was not determined, these findings again support Wingate's (1988) assertion that syllabic stress is the one factor that can alter the usual relationship between stuttering locus and many of the language factors.

As a multilingual speaker with a severe stutter, B provided a unique opportunity to analyse stuttering severity and locus of stuttering across four different languages. The results showed that B's stutter was severe in all languages, but ranged from least to most severe in order of the age of acquisition of each language. This suggests that the age at which B started speaking each of his languages was possibly a more important predictor of stuttering severity for him than language proficiency or frequency of use.

Regarding the presence of language factors in each of his languages, it appears that many that have been identified for the English language are not robust across structurally different languages. In particular, in his African languages, no phonetic factor was found (B was not more likely to stutter on consonants than vowels) and the word locus factor was not clear-cut (B was not more likely to stutter at the beginning of words, particularly in Kinyarwanda). The sentence locus factor was not observed in any language, possibly due to the nature of the sample. In all his languages, however, there was a clear grammatic factor (he was more likely to stutter on content as opposed to function words or morphemes), word length factor (significantly more stuttering on longer words), and syllabic stress factor. In addition, the syllabic stress factor was found to be related to a number of the other factors observed and this lends support to Wingate's (1988) hypothesis that syllabic stress is somehow more intrinsically related to stuttering locus due to the fact that it is directly related to the speech production process.

CONCLUSION

These findings suggest a number of further research avenues including replication within a larger group, extension of stressed syllable investigations into other syllable-timed languages and inclusion of reading material as well as spontaneous speech for data analysis. Certainly the findings confirm the importance of cross-linguistic investigations of stuttering locus research, otherwise, as Bernstein Ratner and Benitez (1985) eloquently state "we may find that our elegantly derived models account beautifully for the behaviours of... English speaking stutterers, but say little about the nature of stuttering itself" (p218).

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