

The Investigation of Relationship Between Severity of Stutter and Frequency of Core Vocabulary in Children Who Stutter

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Abstract: *Background and Aim:* The continuous work in the field of vocabulary's skills in stutter's people help in to percept language abilities profile in start time of stutter in this people. The aim of this research is investigate of relationship between severity of stutter and core vocabulary frequency in children who stutter. *Material and Method:* This research was a descriptive-analysis study and 50 children who stutter was selected in speechtherapy clinics were in primary school. Speech samples were analyzed andobtained relationship between Stutter' severity and core vocabulary frequency in children who stutter *Result:* The results reveal that there was negative significant correlation between stutter' severity andfrequency of perceptive vocabulary in category of noun,verb and adjective and too positive significant correlation between stutter' severity and frequency of expressive vocabulary in category of Noun, verb and adjective in children who stutter. *Discussion:* The study of lexical skills in children who stutter and prepare of language skills profiles helps to therapists that offer appropriate rehabilitation in children who stutter. The results indicates that severity of stutter is different in lexical categories.

Key word: Stutter · Expressive vocabularies · Perceptive vocabularies · Stutter's severity

INTRODUCTION

Stuttering is a complex psychomotor extraordinary phenomenon that occurs when the normal flow of speech, interrupted by sudden and abnormal repetition of sounds, words and even phrases,prolongations of sounds and words, the additional sounds and words and locking mouthand sometimes is associated with associated behaviors. Stuttering can be appeared in form of mild, moderate, severe and occur momentarily and temporarily during speech andanother moments the speech is uttered smoothly and fluently [1]. Psycholinguistic approaches in stuttering was began in 1988 may be attributed Wingate when he stated that there is evidence that stuttering isn't a simple flaw in coordination or motor control of speech, but the central activities is involved in the language production system language [2]. Yet, stuttering has been studied from various perspectives and aspects. One of the issues, examine how linguistic factors linked with the stuttering. The results of this studies show how the relationship between linguistic factors like syntactic structure, syntactic complexity and place and type of word and information is relate to the occurrence of

stuttering [3]. Previous research has been in relationship between stuttering and delayed phonology development includes studies in correlation between the frequency of dysfluency and the number of phonological errors [4-7], behavior of the children with disturbed and normal phonology children [8, 9], phonology behavior of normal children who stutter [8] relationship between phonological skills and stuttering development [12, 5, 10, 11]. While Yairi and Paden's study [10] and paden *et al* [11, 12] focused about the development of stuttering (resistant versus improved) and development of phonology skills. Luco *et al.* [4] compare the phonological skills in children who stutter with fluent children and the correlation of stuttering frequency with phonology errors. Therefore, it has been studied the relationship between stuttering and aspects of language including phonology for many years. However, little information there is about the manner and extent of the errors of speech sounds in young children who stuttering close to the starting stuttering in relationship with stuttering characteristics like severity. The information more focused on the effects of phonological skills in children who may play role in stuttering severity [13, 47]. People who stutter may show

communication disorders such as articulatory phonological disorders [14] although the expressive language disorders appear to be not large in children who stutter, assessing the individual patterns of function has central role for definition the relationship between language dominance and production of fluent speech [15].

The probability that stutter related more likely to the planning process (more than performance) to be supported by the results of studies that people who stutter process phonologic-semantic information slower than people who do not stutter and the hypothesis of slowness speech programming ability children who stutter is confirmed [16, 17]. And in word frequency, the word familiarity is important factor that plays a role in the frequency of words and problem of word access and phonological encoding is the main source that resulted in stuttering [18]. The word frequency- the number of times that a word occur in the language-effect on speech production [18-27]. Generally, words that occur more frequent in language are produced the more correct, faster and with more frequent than word with less frequency. Therefore, The high-frequency words are easier to achieve than low-frequency words that creates the possibility that high-frequency words will be produced better, smoother and faster than low frequency words [19, 29-32]. The results of some studies show that children and adults who stutter tend to stutter rather on the words that occur less in language (have low-frequency) and are longer [18, 25, 33-35]. Many children with language disorders due to lack of synchronization in the development of syntactic and lexical aspects of the language or the discrepancy between the demand and capacity to talk are at risk for failure in the speech fluency and phonological and syntactic encoding processing may has been damaged in children who stutter [18]. On the base of assumptions the main cause for stuttering events is inappropriate regulation of speech code. In a study the effects of word frequency and syllable-stress patterns in the frequency of stuttering were assessed by oral reading of sentences by 10 stutterers and 10 non-stutterers. Results revealed statistically significant differences in frequency of stuttering between the sentences with high-frequency words and low- frequency, but not between sentences with syllable-stress patterns. Analysis of correlations between scores of word recognition in children who stutter and the stuttering in sentences with the high-frequency words with and low-frequency has confirmed that familiarity with the word is an important factor

influencing the word frequency. Access to word and phonological encoding problems is main factor underlying stuttering events [18]. Taylor in his book "The Psychology of Language" discuss in detail about frequency of phonemes, syllables and words and stated the relationship between the frequency and language disorders and adds that problem of patients with aphasia and stuttering are worsens when dealing with low-frequency words [36]. In general, most research on the semantics and stutter have been done in the field of lexical category and locus of the stuttered words and all studies suggest that children who stuttering stutter in function words more than the content words [37-42]. Adult who stutter show more significantly stutter in content words. Yet, There is doubt that the factor responsible for the differences in the frequency of stuttering in adults who stuttering placed in differences of word frequency between the two category of the word frequency. That is because the function words are limited in terms of number and are applied frequently, repeated use leads to a generalized effect of adaptation to functional words and hence reduce the stuttering [42]. Dayalu, Kalynovski, Stuwart found that stutterers when content words are presented as separate have more frequency of stuttering. Results of a study that examined the effects of word frequency in the stuttering-like dysfluency has been suggested that variables of word frequency, not only effect on the fluency of speech production but also effect type of stutter-like dysfluency [43]. Ongoing work in the field of lexical skills of children who stutter helps to develop understanding the language abilities profile in children who stutter in onset of stuttering. Creating profile of the language skills determined the role of linguistic mismatches and lexical skills at the onset and growth of stuttering. Therapists practitioners equipped with this knowledge are more ready to address the needs of the person who stutters [39]. Since the aim of study was determination the relationship between stuttering severity and core vocabulary frequency in children who stutter, this question was introduced- Is there the relationship between stuttering severity and frequency of expressive and receptive vocabulary in semantic category of noun in children who stutter? Is there the relationship between stuttering severity and frequency of expressive and receptive vocabulary in semantic category of verb in children who stutter? - Is there the relationship between stuttering severity and frequency of expressive and receptive vocabulary in semantic category of adjective in children who stutter?

MATERIAL AND METHODS

This research is a descriptive-analytic and case-control study. The research was conducted on 50 males children who stuttering, as case and control groups respectively. The former was assessed in clinic of Rehabilitation Faculty, Tehran University of Medical Sciences and the latter was randomly assessed in primary schools. It is worth considering that both groups have similar educational success. It was tried to control the study in similar conditions with regards to place, temperature, light and time. The criteria for choosing participants were:

- Lack of speech and language disorder (other than stuttering); it was based on their files at the clinic.
- lack of neurological disorder, they were tested by overall assessment by a speech therapist and their files at the clinic and, in case of any doubt regarding a neurological disorder, they were referred to neurology clinic for detailed assessment.
- Lack of color-blindness: participants were primarily tested by a speech therapist and, in case of any doubt regarding color-blindness, they were referred to an optometrist for detailed assessment.
- With more than 3-5% dysfluencies in speech for any participant. Reading a 100-word text (related to educational level), subjects' voice sample was recorded and analyzed. Then the percentage of stuttered words was calculated.

Information this study was gather by completion of questionnaire, administration of expressive and perceptive word test and 100-word text. Expressive word test has 12 picture of different action. Perceptive word test has 1038 colored picture that related to noun, verb and adjective. This tests have been devised by Nematzadeh *et al* and have been conducted on 25000 Iranian students and have high validity and reliability. In expressive word test is communicated with child firstly then was asked to retell story and memoir. Then it was wanted them that

stated about pictures around 3 minutes. Their sounds is recorded and the speech sample was transcribed and analyzed. In perceptive vocabulary test we show pictures at first. The five colors (red, yellow, blue, green, violet) was educated for first class and for second class to fifth class 2-10 was educated. After the primer instruction of test, we administered practice page for participants. Each question was stated 3 times for first class and 2 times for second to fifth class. Maximum time for asking was intended 1 second for first class and for higher classes was 4 seconds. Information about perceptive word test recorded and analyzed and too, in 100-word text (text related to educational grade) participants' sounds was recorded when reading on text and his sample speech was analyzed and we gave dysfluency level with calculation of proportion of stuttered words to all words. For assessment of relationship between dysfluency and core vocabulary frequency used of correlation statistic test. It is necessary to know that data analyse by SPSS statistic software. Resentment offered to parents.

RESULTS

Participant characteristics such as number of participants, Age range and TOLD-P results are summarized in Table 1.

The correlation was performed between stuttering severity and frequency of expressive vocabulary in the categories of nouns, verbs, adjectives. The results showed that there is a significant negative correlation between stuttering severity and frequency of expressive vocabulary in the categories of nouns, verbs, adjectives (Table 1).

The correlation was performed between stuttering severity and frequency of perceptive vocabulary in the categories of nouns, verbs, adjectives. The results showed that there is a significant negative correlation between stuttering severity and frequency of expressive vocabulary in categories of nouns, verbs, adjectives. (Table 2).

Table 1: Participant characteristics

CWS	Number	Age Range (Year)	TOLD-P	
			Mean	S.D
	50	7-12	98.0	10.1

Table 1: The relationship between stuttering severity and frequency of expressive vocabulary in noun, verb and adjective

Adjective	Verb	Noun	r	Number	Variable type
-0.705	-0.573	-0.628			
0.00	0.00	0.00	p	50	severity

Table 2: The relationship between stuttering severity and frequency of perceptive vocabulary in noun, verb and adjective

Adjective	Verb	Noun		Number	Variable type
-0.339	-0.225	-0.211	r		
0.016	0.074	0.142	p	50	severity

DISCUSSION

The aim of this study was to investigate the relationship between the frequency of expressive and receptive vocabulary and stuttering severity in children who stutter in primary school. The main hypothesis of this study was that the severity of stuttering has negative relationship with the frequency of expressive and receptive vocabulary in noun, verb and adjective category. That can result from this research is that whatever the frequency of expressive and receptive vocabulary in noun, verb and adjective category be lesser, stuttering severity is the more. In relation with the comparison of this study with Previous studies, it has been studied the directed researches in core vocabulary in children who stutter and its relationship with severity of stuttering. But there is related researchers that paid in the study of linguistic features and its relationship with severity of stutter. Mayers and Freeman (1981) observed significant correlation between the Peabody Picture Vocabulary test (Dun and Dun, 1981) and the frequency of overall speech nonfluency with only 24 participants that in line with the present finding [44]. Wolk *et al* (1993) not reported statistically significant difference in frequency and severity of stuttering in children who stutter with or without phonological disorders [8] that isn't consistent with a present study. The study of Yaruss and Conture (1996) included children 3-6 years old with a history of stuttering to 3 years old and the average 2 years old. One group showed stuttering and normal phonological abilities while control group showed stuttering and disordered phonological abilities using the criteria specified in Wolk *et al* (1993). There were no significant difference between the groups in the frequency or duration of dysfluency that occur in conversation [7] that is not in line with current research. Subjects in this study were the primary school, whereas samples in the Yaruss and Conture's study were younger. Gregg and Yairi (2007) investigated bilateral relations between the phonological problems and stuttering severity in 28 preschooler close to the beginning of stutter. Children were 20 boys and 8 girls whose age ranged from 25 to 38 months (mean age 2.32). Phonological skills 2 groups compared with different degrees of severity of stuttering. Similarly, the severity of stuttering 2 groups of patients compared with different

levels of phonological skills. It wasn't observed significantly different to the relationship between phonological disorders and severity of stuttering [13] that is not in line with current research. Gregg and Yairi study differences in the light of the sample size and age of the subjects and tests used with present study. Thronberg, Yairi and Paden (1994) investigated The relationship between phonological problem of words and the point at which stutter occur -like nonfluency in children speech (number 24) with stutter. Children is classified based on the severity of stuttering and phonological ability to sub-groups. The Speech sample approximately 1000 words obtained of each child. Phonological problem of every word is classified in that there is a stutter-like dysfluency and every fluent word that follow a dysfluency. The proportion of words in the speech sample of the each child was determined. Results showed that phonological problem of non-fluent word and fluent word after that hasn't role in dissociation of fluency of speech despite the severity of stuttering or phonological ability [14]. It is inconsistent with present study. This study was different in the light of the number of samples and tests used in this study. Watkins and Yairi (1997) investigated production capacity of 32 children who stutter in different groups in stuttering including consistent, relatively mild stuttering and improved stutter. Three area of language production (mean length utterance, the number of different words and the number of total words) obtained of spontaneous speech sample. The study of three groups showed high diversity and abnormal developmental patterns in language production skills in children with persistent stutter. These results suggest that although the language production disorders is not large in children who stuttering, doing the assessment of individual performance features have central role in identifying the developmental relationship between language proficiency and production of fluent speech [15] which is in line with current research. Hubbard and Prinz (1994) reported that adaptation of stuttering and phrases linguistic features leading to assumptions that consider main cause for stuttering events in incomplete set of speech. In their study is evaluated the effects of word frequency and syllable-stress patterns in the frequency of stuttering on 10 stutterers and non-stutterers 10. Results showed significant differences in the frequency of stuttering in

sentence with low frequency and high frequency words with regular and irregular syllable-stress patterns on which is in line with present study. They stated that word familiarity is major factor in the word word frequency effect. Problems accessing the word and phonological encoding could be a major factor in the occurrence of stuttering events [18] on which is in line with present study. Yeung and Howell (1998) evaluated stuttering in function words on 51 pws. Children, According to previous studies up to age 9 stutter more on function words, while adults tend to stutter more in content words. The stutter in function words before the content words in young people is as a delay strategy when the content word is not ready for production [18]. Dayalu, Kalinovsky, Stuart and Halbert (2002) evaluated the frequency of stuttering as a function of the grammatical type of word (content or function) on 10 children who stutter. Resultsshowed that adult who have frequency of more stutter when words are presented separately [42]. Anderson (2007) studied the effects of frequency of word and phonological neighborhood variables in prone to words to stuttering and whether this variables effect on the type of stutter-like dysfluency. Given the words of children include part-word repetitions and sound prolongation had low frequency than words produced fluently but this frequency variables have not effect on productions of one-syllable word. This study evaluate first attempt to assess the effect of word frequency in stutter-like dysfluency the preschool children who stutter stuttering. The results showed that preschool children who stuttering are susceptible to stutter in low-frequency words than words with high frequencies. [25, 33, 34, 35, 43], which is consistent with present research. Anderson (2007) assessed role of frequency variables in st-like dysfluencyin preschool children who stutter (n = 15) to see whether these variables affect the type of stutter-like dysfluency. The results showed frequency variables not only influence on fluency of produced words but also effect on the type of stutter-like dysfluency. This is consistent with present study [43]. Conture (2000) assessed the hypothesis that children who stutter have the larger difference between the general index of linguistic abilities and receptive words than children who do not stutter and that these differences correlated with speech dysfluency index (greater differences in related to greater frequency of stuttering). There is an imbalance between the parts of language-speech system. That if the difference be large enough, natural speech production temporarily interrupted, leading to interruption of flow in progress the production in

speech and language (stuttering). However, the results do not support the assumption that these differences significantly correlated with the total frequency of dysfluency and frequency of stuttering. The results showed that the vocabulary skills of children who stutter are less developed than morphosyntactic abilities. When young children begin to experience of dysfluency in their speech that the lexical and grammatical systems are during the period of rapid acquisition. The study is not in line with present study [45]. This study was conducted on preschool children while the present study was in the range of school age children. As well it were different in the light of number of samples and used tests within this study. Conture and Anderson (2000) in study of linguistic competence the children who stutterassessed differences between children who stutter and children who do not stutter in standard tests of receptive vocabulary and expressive and receptive language. Children were 16 male and 4 female stutterers (mean age 46 months) and 16 male and 4 female non-stutterers (mean age 47 months). The voice of each child was recorded during a conversation 30 minutes with the parent. This conversation interaction examined to provide data on the frequency and the type of child' dysfluency. After completing child-parent conversational interaction, each child carried out standard tests of developmental and lexical, semantic and syntactic capabilities. The results showed that the difference between the indices of receptive/expressive language and perceptive words was significantly higher in cws than cwns. However, the difference between receptive/expressive language and perceptive words significantly was not correlated with total frequency of stuttering [44]. Which is not in line with current research. Anderson and Conture's study was assessed the linguistic levels while the present study investigated frequency of expressive and receptive vocabulary in category of nouns, verbs and adjectives, as well as the age and number of the subjects in this study was different. It appears to be a discrepancy between syntactic and phonological abilities children who stutter, such a disparity role play in abundant hesitation and prolongations or repetitions. People who stutter show an imbalance between the components of the language system that if it is large enough thatlead to the interruption of the normal flow of speech. However, the results of this study motivates the future research in the field of syntactic and lexical processing skills in children who stutter [44]. Lees, Anderson and Martin (1999) stated that relationship between speech fluency and grammatical complexity is unknown [45] which is in line with current

research. Newman and Ratner (2007) stated the stutter affected by word frequency and not another factor [47]. Imbalance between lexical and syntactic abilities may play a role in childhood stuttering it is estimated that children who stutter have more significant differences between the total characteristics of the language and perceptive words than children who do not stutter. If this is true, it is assumed that these differences significantly correlated with baseline characteristics in frequency of stuttering (general dysfluency and within words) and the most common type of stuttering dysfluency (larger differences associated with greater frequency of stuttering) that in line with present study. Speech errors, the tip of the tongue in children and adults, often occurs in low-frequency words than words with high frequency. [20, 27, 48-50]. The lower frequency words are more vulnerable to dissociation because they have less familiarity for speaker or have less prominent in that they are willing to provide important or new information [52]. Thus, because the high-frequency words occurs more abundant in language access stronger in words. This would enable them to be processed with less effort and attention. Consequently, these words more resistant to fluency dissociation and other speech errors. In other words, low frequency words have ways with lower strength. Because commonly don't used in the language and are required to have the energy and time to process. These words are more vulnerable than stutter-like dysfluency and speech errors because they is needed more effort to retrieve the correctly and fluently. Frequency of word in addition to effect on production facility effect on determining the phonological representation. This way because the processing routes in high frequencies words go through with more frequency course, the sub-lexical representations of words be strong [54, 55].

CONCLUSION

According to reports Vitevitch (1997), Vitevitch and Sommers (2003) Low-frequency words receives less activation of within phonology lexicon, this increases the likelihood that they will be less retrieved. This can vulnerable them not only to speech errors but to dissociation in speech fluency in the form of numerous repetitions or pauses or prolongations. Conversely, high-frequency words more resistant to dissociation in speech fluency because they receive more activation. Based on the theory EXPLAN [62, 61] if a word has high

complexity and low frequency, then more time is needed for planning and increases the likelihood of failure in fluency.

Future Research: According to the results obtained of research and the investigation of different sources in related to subject, it is recommended: same research with more samples investigate the relationship between stuttering severity and frequency of core vocabulary in people who stutter- frequency of core vocabulary examined with other assignments and different age groups- the type of core vocabulary in children who stutter investigated in relation to the severity of stuttering- Since the population studied in the present study is the boy who stuttering similar studies in female group seemly is necessary- the relationship between severity of stuttering and socio-economic levels and quality of life people who stutter investigated.

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