

Paper8

by

FILE	PAPER-8.DOCX (33.36K)		
TIME SUBMITTED	22-NOV-2016 11:16AM	WORD COUNT	2540
SUBMISSION ID	741369471	CHARACTER COUNT	14949

PHONOLOGICAL WORKING MEMORY IN CHILDREN WITH NORMAL NON-FLUENCY

Abstract

Clinically, it is very important to predict the development of stuttering at an early age of life because stuttering has an impact on academic, social, emotional and vocational achievements in life. Many studies have reported that children with stuttering show poorer in their phonological working memory. It has been proven to be an important predicting factor for the development of stuttering. There is dearth of studies in Indian scenario regarding the relationship between phonological short term memory and NNF. Identifying its relationship may help speech language pathologist for the identification of development of stuttering in its early stage. Hence the purpose of the study was to explore the possible relationship between phonological short term memory and NNF by comparing the performance on non-word repetition task between children with more NNF and less NNF. A total of 16 subjects in the age range of 2.5 to 3.5 years were taken up for the study. Based on percentage of disfluency the subject were grouped into two i.e. Group 1 consisted subjects with percentage of disfluency more than 5 and Group 2 will consisted subjects with percentage of disfluency less than 5. Non word repetition task was used to assess the phonological short term memory. The result indicated that children in Group 1 performed significantly poorer than that of children in Group 2.

Keywords: Normal Non-Fluency, Stuttering, Phonological Working Memory

Background

Linguistic issues are reported as one of the most important factors in the etiology of stuttering in the past few decades (Vahab, Zandiyan , Falahi & Howell, 2013) . ⁴ Recently working memory has been implicated in the development of stuttering (Aboul , Hossam , Dessouky, Shohdi & Aisha,2010). ⁴ Working memory is universally recognized as neurocognitive system that provides temporary storage and processing of incoming information. Working memory ¹ is considered critical to phonological encoding (Gathercole & Baddley, 1990) ¹ Many researchers (Smith, 1999; Van Riper,1992) have proposed that the factors that contribute to the onset and development of stuttering vary across individuals, and thus, a given language skill maybe a strong factor in one child's etiological history. Recently, a language -related area that has claimed attention from researches of stuttering is ²⁵ phonological working memory.

Many studies have reported that children with stuttering show poorer in their phonological working memory. ¹ Earlier, it has been reported that children who stutter have a higher rate of phonological disorders relative to the general population (Paden, Yairi & Ambrose, 1999; Yarus, Lasalle & Conture, 1998) suggesting an existence of relation between phonological skills and stuttering. ¹² Anderson and Wagovich (2010) reported that children with stuttering performed significantly poorer than children without stuttering on non- word repetition and focused attention skill.

Few researchers like Bakhtiyar , Soleymani and Mahmoud (2006) in Persian language ¹¹ examined phonological encoding in twelve children who stutter and 12 children who do not stutter through non word repetition task. Their results indicated that children with stuttering showed slightly poorer performance than non stuttering children but the difference was not significant. Anderson, Wagovich and Hall (2006) compared ⁴ non word repetition in children who do and do not stutter and found that children with stuttering produced fewer two, three syllable word repetition and made significantly more phonemic errors compared to that of

24 children who do not stutter. Spencer and Fox (2014) reported that phonological and articulation abilities in preschool children are important predictors for the development of chronic stuttering.

Phonological short term memory in Normal Non-Fluency (NNF) is one of the aspects of cognition. It has been proven to be an important predicting factor for the development of stuttering. Phonological working memory can be assessed using various tasks. One such task is non-word repetition task. Non-word repetition tasks have been widely used to estimate phonological working memory skills in children (e.g., Dollaghan, Biber, & Campbell, 1993, 1995; Dollaghan & Campbell, 1998). These tasks essentially rely on retrieval and output as the response that provides information about storage and rehearsal capabilities. That is, a participant who is able to retrieve a non-word stimulus and produce it accurately is presumed to have relied upon adequate rehearsal and storage abilities to reach that point. However, there has been considerable discussion about whether non-word repetition tasks are appropriate measures of phonological working memory (e.g., Van der Lely & Howard, 1993), especially given the range of other skills required to repeat non-words accurately. At present, non-word repetition represents the standard for measuring phonological working memory in individuals with typical and atypical speech-language production. Thus, a non-word repetition task would appear to be an appropriate assessment tool for initial exploration of the phonological working memory abilities of children with stuttering (Anderson, Wagovich & Hall, 2006). Magimairaj and O'Malley (2008) have utilized non word repetition task to check phonological short term memory and reported it to be a useful measure to assess phonological short term memory in typically developing children. It is hypothesized that non word repetition tasks uniquely assess phonological working memory by requiring the listener to store the phonemes heard, retrieve them from memory, and produce the nonsense word (Gathercole & Baddeley, 1990). Not only does non-word repetition enlist phonological

memory skills, but it also recruits auditory processing phonological representation and analysis and speech motor planning and execution (Gathercole,2006; Rispen& Bakers,2012.) This task required repetition of non-words with varying syllable length.

8 Clinically, it is very important to predict the development of stuttering at an early age of life because stuttering has an impact on academic, social, emotional and vocational achievements in life. 1 It is not financially or practically feasible to treat every child who begins to stutter, yet early intervention has consistently been demonstrated to benefit the child, both by improving fluency strategies and providing emotional support (Subramanian, Yairi, & Amir ,2003). 3 Normal non fluency of speech typically occurs in children between ages two and seven, with a heightened occurrence between 2.5-4 years. 3 In young children, typical non fluent speech is initially episodic, and then becomes cyclical in nature, coming and going without apparent cause or pattern. According to Guitar (2007), the characteristics of normal -nonfluencies are less than ten disfluencies per hundred words; most repetitions are only 1 or 2 repetition in length and are easy, loose and relaxed with no apparent sign of tension or struggle. The most common normal disfluencies are interjections (um, uh), revisions and whole word repetitions. As children mature past three, they will show a decline in part-word (sound or syllable) repetitions. When the disfluencies occur the child's body is in motion and they will appear relaxed. Most of the times they will appear as if they are unaware of the disfluencies and will continue talking without interruptions that is secondary behaviours will be absent in them. 3

18 Identifying the relationship between phonological short term memory and NNF may help speech language pathologist for the identification of development of stuttering in its early stage. It is clear from the literature that many researchers have attempted to find the relationship between 23 phonological working memory and stuttering. However studies focusing on phonological working memory in children with NNF are scanty. Hence 17 the present study

was aimed to explore the possible relationship between phonological short term memory and NNF by comparing the performance on non word repetition task between children with more NNF and less NNF.

Method

A total of 16 subjects in the age range of 2.5 to 3.5 years were taken up for the study. All the subjects were native speaker of Kannada language. None of the subjects had any history of speech, language, hearing and other medical related problems. Speech samples were taken from each of the subject by using general conversation and story narration. Speech sample consisted of minimum of 250 syllables. None of the subjects exhibited stuttering like dysfluencies. Percentage of disfluency was calculated from each of the subject. Based on percentage of disfluency the subjects were further grouped into two. Group 1 consisted of 8 subjects (M=6, F=2) with percentage of disfluency more than 5 and group two consisted of 8 subjects (M=5, F=3) with percentage of disfluency less than 5.

Stimuli used

The stimuli consisted of 15 non-words with varying syllable length from two syllables to four syllables. The non-words had various combinations of consonants and vowels like CVCV, CVCCV, and CVCVCCV that followed the Kannada phonotactic rules.

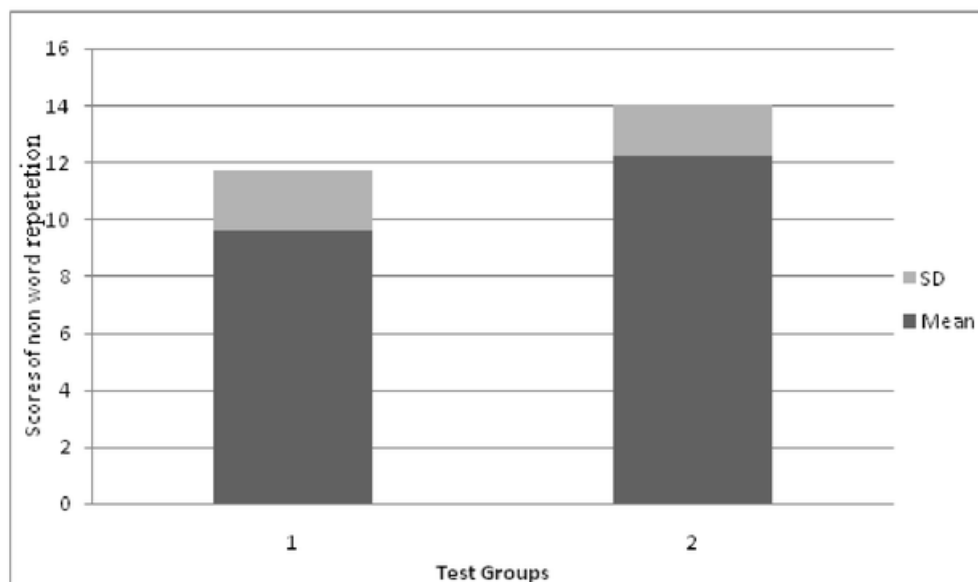
Procedure

Each subject was seated comfortably on a chair facing the investigator across the table in a quiet and distraction free room. In order to get the co-operation from the subject for testing, rapport was built by talking about the daily activities of the child and games played by the child etc. After that the subject was instructed as follows “now i will read out to you certain meaningless words. You will have to immediately repeat each one as you hear it”.

10 The non-words were presented in a random order, and the subject had to repeat the non-words. Online scoring was adopted. For every correct answer a score of 1 was awarded.

Results

The scores obtained by children in group one and group two on non word repetition task were subjected to statistical analysis using SPSS version 17 software. The mean scores obtained by children in group one was 9.63 (SD=2.13) and for children in group 2 was 12.25 (SD=1.83). The Figure 1 represents the mean scores obtained by children with more and less normal non fluency.



9 Figure 1: Mean scores obtained by children in Group one and two

The mean scores obtained by children in group 1 and 2 were compared using independent sample t test and results revealed 21 significant differences between the groups [p<0.05] i.e. children who were more fluent performed significantly better than that of children who were less fluent.

Discussions

7
Studies have reported that children having delay in the development of phonological working memory can have stuttering in their later period of life (Vehab, Shojaei, Ahmadi & Nasiri; 2014). Anderson and Wagovich (2010) explored the 5 possible relationships between measures of linguistic processing speed and two aspects of cognition: phonological working memory and attention in children who stutter. The results indicated the children with stuttering 13 were less proficient in consonant production and repetition of novel phonological sequences. They also concluded that the 1 phonological and speech articulation abilities in the pre-school years should be considered with other predictive factors as a part of comprehensive risk assessment for the development of chronic stuttering.

4
Kolk, Conture, E., Postmark, and Louk (1991) assumes that stuttering arises because of inefficient or slow phonological encoding which may be leading to an increase in covert repairs to the phonological plan, especially when the individual is intending to speak at a faster rate which may be exceeding the compliance of the phonological encoding mechanism. 4
By comparing phonological working memory using 5 non word repetition task between children with stuttering and typically developing school age children, Krishnan, Alcock, Mercure,, Leech, Barker, and Smith, (2013) suggested that the promoter 1 control for novel,

sequential non linguistic movements predicted a significant portion of variance (24%) in performance of a standard non word repetition task for children with stuttering.

In the present study children with more number of disfluencies performed poorer in non word repetition task which may be because of the developmental delay in phonological working memory. The findings of the present study is similar to the findings of Vehab, Shojaei, Ahmadi & Nasiri (2014) who compared phonological working memory in 4-8 Year-Old Persian Children with stuttering and found that, mean percentage of error was higher in children who stutter than normal children, but the difference was not statistically significant. They also support the view that children with stuttering may have some degree of delay and slow in phonological working memory abilities when compared to normal children. Spencer and Fox (2014) reported that children with stuttering who performed better in non word repetition had recovered eventually better than that of children who had a poorer performance.

Conclusion

Studies have proven that children from mild to severe stuttering also exhibit poorer performance on non word repetition task. Hence it can be concluded that probability of occurrence of stuttering is high in children who performed poorer on phonological short term memory task compared to that of children who performed better. The non-word repetition task can be used with children who have mild and severe NNF to trace the involvement of developmental stuttering in them.

References:

- Aboul Oyoum H, Hossam E, Dessouky E, Shohdi S, Aisha Fawzy (2010). Assessment of working memory in normal children and children who stutter. *Journal of American Science*.:562-69.
- Anderson, JD., Wagovich, SA., and Hall, N., E (2006). Nonwords repetition skills in young children who do and do not stutter. *Journal of Fluency Disorders*; 31:177-99.
- Anderson, JD., Wagovich, SA (2010). Relationships among linguistic processing speed, phonological working memory and attention in children who stutter. *Journal of Fluency Disorders*; sep: 35(3): 216-34.
- Bakhtiyar M , Soleymani Z , Mahmoud Bakhtiyari B (2006). Non word repetition ability of children who do and do not stutter and convert repair hypothesis. *Journal of Rehabilitation*;7 (4).
- Barry Guitar (2007). cited in *Stuttering An Integrated approach to its Nature and Treatment* . Third edition. Printed in United States of America.
- Caroline Spencer, Christine Weber-Fox (2014) Preschool speech articulation and non word repetition abilities may help predict eventual recovery or persistence of stuttering. *Journal of Fluency Disorders* 41 32-46.
- Dollaghan, C., & Campbell, T. F. (1998). Non-word repetition and child language impairment. *Journal of Speech, Language, and Hearing Research*, 41, 1136-1146.
- Dollaghan CA, Bibber ME & Campbell TF (1993). Constituent syllable effects in a nonsense-word repetition task. *Journal of Speech and Hearing Research*.;36:1051-1054.

- Dollaghan CA, Bibber ME & Campbell TF(1995).Lexical influences on nonwordrepetition.*Applied Psycholinguistics*; 16:211-222.
- Gathercole, S.(2006).Non-word repetition and word learning :The nature of the relationship. *Applied Psycholinguistics*, 27,513-543;
- . Krishnan, S., Alcock, K.J., Mercure, E., Leech, R., Barker, E., Karmiloff-Smith, A., et al. (2013). Articulating novel words: Children's oromotor skills predict non-word repetitor abilities. *Journal of speech, Language and Hearing Sciences*, 56.1800-1822.
- Kolk, H., Conture, E., Postmark, A., and Louko, L., 1991. The covert -repair hypothesis and childhood stuttering. Paper presented at the annual conference of the American SpeechLanguage-Hearing Association, Atlanta, GA.
- Magimairaj and O'Malley(2008). Role of working memory in typically developing children's complex sentence comprehension. *Journal of Psycholinguistic Reasearch*. Vol 37 (5), pp 331-354.
- Mahwah,Nj:Erlbaum.VanRiper,C.G.(1992).*The nature of stuttering*.EnglewoodCliffs,Nj: Prentice-Hall.
- Maryam Vehab, KarimShojaei, AlirezaAhmadi, Mohammad Nasiri(2014); Phonological Working Memory in 4-8 year- Old Persian Children who stutter. *Journal of Rehabilitation Science and Research* 192-96.
- Paden,E.P.,Yair, E.,& Ambrose, N.G. (1999).Early childhood stuttering II:initial status of phonological abilities. *Journal of speech, language & hearing research*, 42,1113-1124.

Rispens J., & Bakers, A. (2012). Non-word repetition :The relative contributions of phonological short term memory and phonological representations in children with language and reading impairment. *Journal of Speech Language and Hearing Research*, 55, 683-694.

Smith, A. (1999). Stuttering :A unified approach to a multifactorial, dynamic disorder .In N. Bernstein Ratner, & E.C. Healey (Eds.), *Stuttering research and practice: Bridging the gap* (pp.27-44).

Subramanian, A., Yairi, E., & Amir, O. (2003). Second formant transitions in fluent speech of persistent and recovered preschool children who stutter. *Journal of Communication Disorder*, 36, 59-75.

Vahab M, Zandiyan A, Falahi MH, Howell P-Lexical category influences in Persian children who stutter .*Clinical Linguistics & Phonetics*, December 2013;27(12):862-873

Van der Lely HK, Howard D (1993). Children with Specific Language impairment: Linguistic impairment or Short term memory deficit? *Journal of speech and hearing Research*. Dec 36(6) pp 1193-207.

Yaruss, Lasalle, & Contur (1998).. Evaluating stuttering in young children: Diagnostic data. *American journal of speech-language Pathology*, 7, 62-76.

Paper8

ORIGINALITY REPORT

% **40**

SIMILARITY INDEX

% **28**

INTERNET SOURCES

% **31**

PUBLICATIONS

% **9**

STUDENT PAPERS

PRIMARY SOURCES

- 1** Spencer, Caroline, and Christine Weber-Fox. "Preschool speech articulation and nonword repetition abilities may help predict eventual recovery or persistence of stuttering", *Journal of Fluency Disorders*, 2014. % **10**
Publication
- 2** www.pubmedcentral.nih.gov % **7**
Internet Source
- 3** www.coloradostutteringtherapy.com % **6**
Internet Source
- 4** www.jofamericanscience.org % **4**
Internet Source
- 5** www.science.gov % **1**
Internet Source
- 6** etheses.dur.ac.uk % **1**
Internet Source
- 7** Anderson, J.D.. "Relationships among linguistic processing speed, phonological working memory, and attention in children who stutter", *Journal of Fluency Disorders*, 201009 % **1**

-
- | | | |
|---|---|-----|
| 8 | www.psykosyntesforum.se
Internet Source | % 1 |
|---|---|-----|
-
- | | | |
|---|---|-----|
| 9 | Submitted to University of KwaZulu-Natal
Student Paper | % 1 |
|---|---|-----|
-
- | | | |
|----|---|-----|
| 10 | Nation, Kate, Margaret J. Snowling, and Paula Clarke. "Dissecting the relationship between language skills and learning to read: Semantic and phonological contributions to new vocabulary learning in children with poor reading comprehension", <i>Advances in Speech Language Pathology</i> , 2007.
Publication | % 1 |
|----|---|-----|
-
- | | | |
|----|---|-----|
| 11 | Submitted to Murray State University
Student Paper | % 1 |
|----|---|-----|
-
- | | | |
|----|---|-----|
| 12 | Submitted to Kingston University
Student Paper | % 1 |
|----|---|-----|
-
- | | | |
|----|---|-----|
| 13 | Submitted to University of Melbourne
Student Paper | % 1 |
|----|---|-----|
-
- | | | |
|----|---|-----|
| 14 | Byrd, C.T.. "Nonword repetition and phoneme elision in adults who do and do not stutter", <i>Journal of Fluency Disorders</i> , 201209
Publication | % 1 |
|----|---|-----|
-
- | | | |
|----|---|-----|
| 15 | moody.utexas.edu
Internet Source | % 1 |
|----|---|-----|
-
- | | | |
|----|---|-----|
| 16 | journal.frontiersin.org
Internet Source | % 1 |
|----|---|-----|
-

17 Archibald, Lisa M. D., Marc F. Joanisse, and Benjamin Munson. "Motor Control and Nonword Repetition in Specific Working Memory Impairment and SLI :", Topics in Language Disorders, 2013.

Publication

<% 1

18 discovery.ucl.ac.uk

Internet Source

<% 1

19 kn.open.ac.uk

Internet Source

<% 1

20 Ursula Willstedt-Svensson. "Is age at implant the only factor that counts? The influence of working memory on lexical and grammatical development in children with cochlear implants", International Journal of Audiology, 10/1/2004

Publication

<% 1

21 openaccess.city.ac.uk

Internet Source

<% 1

22 home.medewerker.uva.nl

Internet Source

<% 1

23 www.hanspub.org

Internet Source

<% 1

24 Pelczarski, Kristin M., and J. Scott Yaruss. "Phonological memory in young children who stutter", Journal of Communication Disorders, 2016.

Publication

<% 1

25

slhs.sdsu.edu

Internet Source

<% 1

26

www.health.utah.edu

Internet Source

<% 1

27

eprints.maynoothuniversity.ie

Internet Source

<% 1

EXCLUDE QUOTES ON

EXCLUDE MATCHES < 7 WORDS

EXCLUDE
BIBLIOGRAPHY ON