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STANDARDISATION AND VALIDATION OF FORMULATED TONGUE TWISTER FOR COGNITIVE RESEARCH WITH PHONOLOGICAL SPEECH ERRORS

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ABSTRACT

Present research aims to standardize and validate the formulated tongue twister with the already established MIT tongue twister" The top cop saw a cop top". The purpose of standardisation and validation is to use the formulated tongue twister for research purpose. This tongue twister was utilised by Dr Stefanie from MIT to establish the most difficult tongue twister in the world which is "pad kid poured curd pulled cod". For data collection WASP software was used to record and calculate the number of repetitions and errors in tongue twister during a fixed time interval of 30 sec. The result reveals that the formulated tongue twister is more difficult than the established tongue twister used by MIT. t value on the mean of the errors in tongue twister for a period of 30 secs, is found to be significant (t=4.25, p>.01) whereas the t value of the repetitions of tongue twister in 30 seconds is insignificant (t=0.4279 p< .05). Thus, the results provide evidence that the formulated tongue twister may be more difficult than the established tongue twister of MIT.

KEYWORDS: *Tongue twister, WASP software, MIT tongue twister, formulated tongue twister*

INTRODUCTION

Tongue twister has always been an item for fun and learning. It is a non sensible giggle inducing phrase. But now a day's, it has been used in a number of research modalities and disciplines because of its sensory motor connection. According to **Stefanie Shattuck-Hufnagel** (2013), an MIT psychologist, it is opening the door to brain deformities and problems. She explained it by comparing two types of tongue twisters in 166 meeting of Acoustical society of America San Francisco (2013). According to Dr Stefanie Shattuck-Hufnagel(2013) each error, points to a particular area of the brain.The tongue twister used by Dr Stefanie Shattuck was "the top cop saw a cop top" in which people tend to make errors such as cop, tah kop, t kop. The most common error was tkop error. Stefanie Shattuck (2013) presented a paper on comparison of speech errors elicited by sentences and alternating repetitive tongue twisters San Francisco. Her work is still continuing to the next stage with Haskins laboratories, Ludwig-Maximilians university in Munich and USC.

Matthew. Golrick(2014) studied cascading on activation from phonological planning to articulatory processes- evidences from tongue twister. It revealed that acoustic analyses of various parameter of obstruent's voicing in TT

production show that errors induced in TT leave acoustic traces of the intended target for example k – g error VOT is longer than correctly produced g—g tokens reflecting a trace of voiceless k target.

There are other studies also on the articulation of syllables by **Frisch**. **Stefan (2002).** This paper brings an insight into the psychological reality of the phonological segments and words as unit in speech production. It has explained the process of using z sound in place of s. There are few researches on the effect of bilingualism or multilingualism on the tongue twisting.

Gollan H.Tamar (2012) conducted a study on bilingualism and tongue twist. It revealed the fact that bilingual disadvantages extend beyond the lexical level to affect the processing of sub lexical representations. Hence tongue twisting is all together at a different paradigm as far as the researches are concerned. It has been now dealt with, by neurophysiologist to find any abnormality in different areas of brain.

Sanskrit is a computational language, established by NASA. It has been accepted, as the most scientific and complete language. Hence Sanskrit mantras are given importance in Indian scriptures. Emphasis has been laid on the correct pronunciation of the mantras as per Vedic and Buddhist scriptures, which is now proved by many scientists. **Briggs Rick's (2015)** study reveals that Sanskrit is a language for artificial intelligence and has tongue twisting affect.

Tongue twister is a phrase in which a consonant is replaced by a different but similar sounding consonant and a vowel is replaced by a different vowel, therefore it is difficult for the brain to register it fast. This is why one tends to make mistake. Researches on Sanskrit syllables have already established that the consonants and vowels were made in such a way to give pressure to particular part of the brain, some are spoken from the tip of the tongue others from the palate or nasal. Therefore the language has been placed to a different level.

The science behind the tongue twister has appeased many areas of the research like linguistics, phonetics, physiology, neurophysiology and psychology etc. Here in this article the researcher is using tongue twister used by Dr Stefenie Sttatuck MIT to standardize the formulated tongue twister with a comparative analysis of errors and repetition.

OBJECTIVE

To standardize and validate the formulated tongue twister (chick chucked and chopped chat) with established tongue twister used by MIT.

HYPOTHESIS

There will be significant difference in the errors committed while speaking in both the tongue twisters, by the subjects in fixed duration.

METHODS

Sample

The sample was taken from the students of North Point Children's Academy, Garhi Cantt Dehradun, Uttarakhand, India. The audio of both the tongue twisters were recorded on WASP software to analyse the errors.

Inclusion Criteria:

1. Age group between 8-13 years
2. Both genders are considered.

Exclusion Criteria:

1. Children below 8 and above 13 are not considered.

Sample size: 30 students are taken for the study

Location: Garhi Cantt Dehradun,Uttrakhand, India

Tool Used: WASP (WAVE FORM ANNOTATIONS SPECTROGRAMS AND PITCH) software was used for recording and analyzing the repetitions and errors. WASP is a free program for recording, displaying and analysis of speech. One can record, replay, save the speech signals for assessment. The audio file is saved in SFS and Wave format. It was developed by Mark Huckvale, University College London. It has been used in a number of researches related to speech in UCL.

PROCEDURE

Students of North Point Children's Academy were approached. 30 students were taken for the audio recording of the tongue twisters on WASP software. Each subject recorded two tongue twisters "The top cop saw a cop top" (used by MIT) and the newly formulated tongue twister (chick chucked and chopped chat) for a fixed time interval of 30 seconds. The data was assessed and analysed through the recorded wave files on WASP for number of repetitions and errors committed in limited duration.

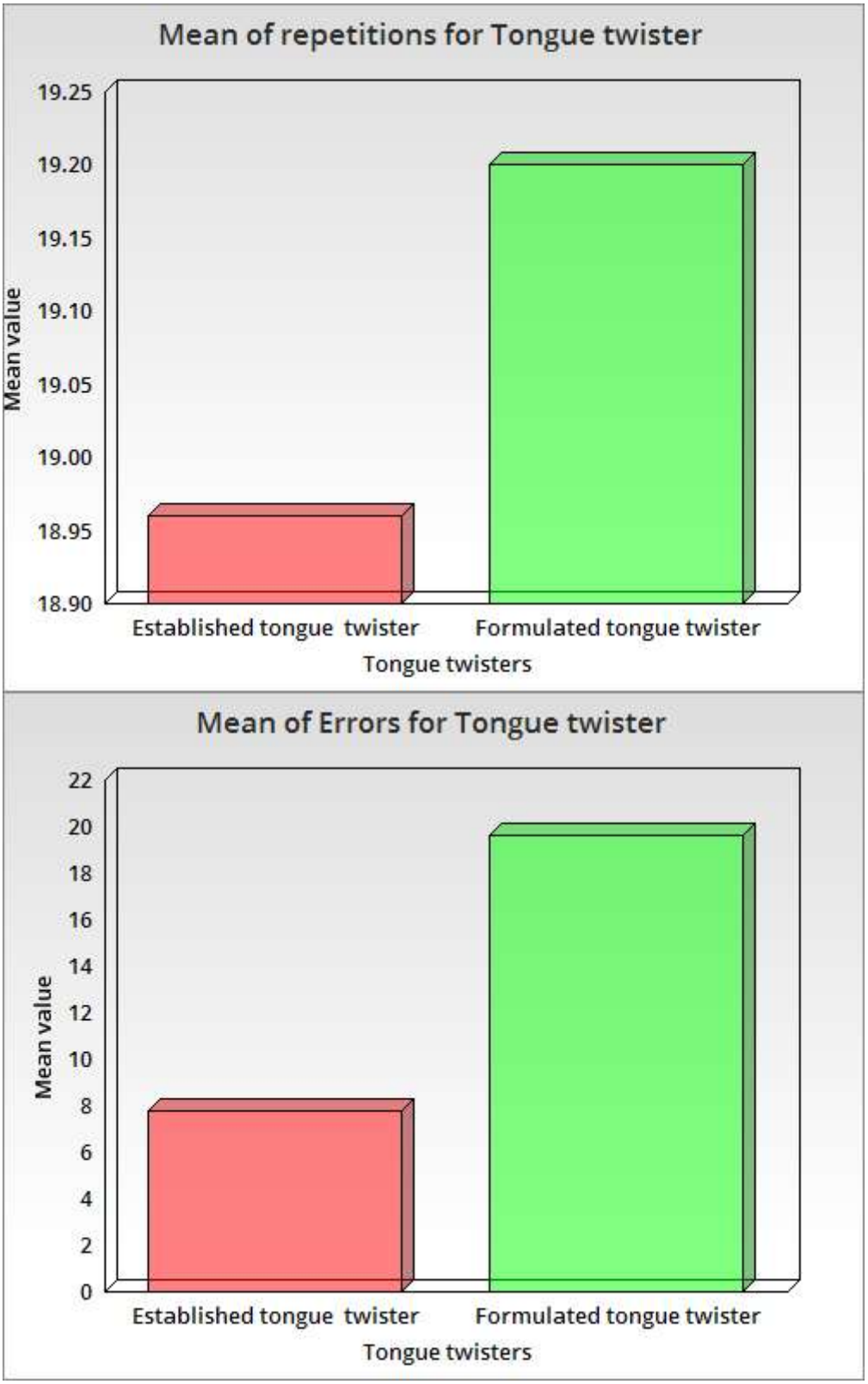
RESULTS

Table 1 Table of results
Table showing Mean, SD, SEM, and t value of Errors and The Repetition of Established And New Formulated Tongue Twister

	Mean	SD	SEM	't'test	P value
Repetition of Established tongue twister	18.96	4.76	0.87	0.4279	<.05 **insignificant**
Repetition of Formulated tongue twister	19.26	4.27	0.78		
Errors in Established tongue twister	7.76	5.14	0.94	4.25	>0.01 **significant**
Errors in Formulated tongue twister	19.60	14.35	2.76		

In the present research, data was obtained for the repetitions of tongue twister and errors. Data collected on WASP has been analysed by using 't' test. The number of repetitions and errors committed while repetitions are calculated manually and confirmed through WASP graph and WASP audio recording. Results of analyses are given in Table-1. 't' test analysis was performed, to explore the difference between the mean of number of repetitions for both the tongue twisters. In established tongue twister, mean for number of repetitions is M=18.26 where as for formulated tongue twister, M=19.26. 't' value for number of repetitions in both the tongue twister is t= 0.4279, hence there is an insignificant relationship (p<.05) between the mean values of repetitions for both the tongue twisters. The result reveals approximately similar number of repetition in fixed duration i.e. 30 seconds.

The results are summarised in table -1. Table 1 shows that the mean of repetitions of established tongue twister is M=18.96 and for formulated tongue twister is 19.26. Therefore calculated't' value=0.4279, which is statistically non significant (p<.05). The mean of errors committed in established and formulated tongue twister are 7.76 and 19.60 respectively. The calculated't' =4.25, which is statistically significant (p>.01). Hence on the basis of result analysis formulated tongue twister is more difficult than the established tongue twister.


Mean of repetitions for Tongue twister
19.25
19.20
19.15
19.10
19.05
19.00
18.95
18.90
Mean value
Established tongue twister
Formulated tongue twister
Tongue twisters
Mean of Errors for Tongue twister
22
20
18
16
14
12
10
8
6
4
2
0
Mean value
Established tongue twister
Formulated tongue twister
Tongue twisters

DISCUSSION

Tongue twister has been the topic of research in many disciplines like linguistics, physiology, speech therapy, neuro physiology, psychology etc. **Dr. Stefanie Shattuck-Hufnagel** (2013), an MIT psychologist has presented her work in ASA on speech errors as a way of understanding the normal brain functions. In this research tongue twister of MIT is taken as standard tongue twister to validate the formulated tongue twister. The formulated tongue twister is "chick chucked and chopped chat". Since it is a nonsensical tongue twister and does not make any sense, so it is hard for the brain to mug it up fast. Errors of the recording for both tongue twisters are assessed on wasp software and analysed along with the confirmation of the graph. The duration is kept fixed, so that the number of errors and repetitions can be analysed without any bias.

Statistical analysis of the data collected on WASP revealed that the mean value of errors committed by the subjects while speaking the formulated tongue twister is M=19.60 and the mean value of the number of errors committed in established tongue twister is M =7.76. The 't' value for the errors committed by the subjects is t= 4.25, p>.01. Hence there is a significant difference in the mean of errors for both the tongue twsiters. It has been noticed that the mean value of repetition for established tongue twister is M=18.96 whereas, for the formulated tongue twister M= 19.26, hence't' value is t=0.4279, p<.05. Therefore there is an insignificant relationship between the mean of repetitions, for both the tongue twisters. It shows that the difficulty level of the formulated tongue twister is more than the established tongue twister. The errors were chuckled in place of chucked, kich in place of chick, chokes in place of chopped, cop in place of chopped. Chicked many a time has been spoken as chikkkad and the pauses in between the phonemes are for long duration. Kop sound is replaced by Chop sound.

Subjects mistook top as cop and they made mistakes in saying cop -top as cop -cop or top top. So the T sound was replaced by C. The subjects were Asians and basically Indians in which the script of all the languages is Devnagri and the root language is Sanskrit which is at a different paradigm. It has been studied by **Briggs Rick(2015)** in his study of Sanskrit as artificial intelligence.

Gollan H.Tamar (2012) has proved that bilingualism is a problem in speaking tongue twister but in the current research, subjects are multilingual, speaking Hindi, English and Nepali. Hindi has its roots in Sanskrit, therefore the tongue twister has been quite easy for them although the age group was 8-13 years. Personal details of the subjects reveal that the subjects who have committed very less errors with high number of repetitions were from spiritual background and following chanting as bis in day routine. Those student who chant Sanskrit mantras daily in their routine, committed very less number of errors in the tongue twister and are above average academically. It has been confirmed from the class teachers and founder of the school. Hence the roots in Sanskrit language, multilingualism can also affect the grasping of the tongue twister phonemes fast. Subjects who were speaking one language at home and are not in any kind of meditative activity committed more errors in tongue twister. Since the number of errors committed in formulated tongue twitter is higher than the established tongue twister during the fixed time interval therefore it standardizes and validates the formulated tongue twister.

CONCLUSION

The study is conducted to achieve following objectives

1. To standardize and validate the formulated tongue twister (chick chucked and chopped chat) with established tongue twister used by MIT.

It has been concluded that the formulated tongue twister "chick chucked and chopped chat" is standardized and validated through a standard tongue twister being used in MIT by Dr **Stefanie Shattuck-Hufnagel (2013)**, "The top cop saw a cop top". The standardization has been confirmed by the errors committed in the repetition of the tongue twister. There were approximately same number of repititions in a fixed time interval but errors committed are three times more in formulated tongue twister. The current research has a different finding with multilingualism. Subjects who were multilinguals managed to commit less number of errors and have less obstructions. Hence the current study standardizes and validates the tongue twister.

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