

# Evaluation of Effects of Gradual Increase Length and Complexity of Utterance (GILCU) Treatment Method on the Reduction of Dysfluency in School-Aged Children with Stuttering



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**Citation:** Basi M, Farazi M, Bakhshi E. Evaluation of effects of gradual increase length and complexity of utterance (GILCU) treatment method on the reduction of dysfluency in school-aged children with stuttering. Iranian Rehabilitation Journal. 2016; 14(1):59-62. <http://dx.crossref.org/10.15412/J.IRJ.08140109>

**doi:** <http://dx.crossref.org/10.15412/J.IRJ.08140109>

## Article info:

**Received:** 05 Oct. 2015

**Accepted:** 13 Jan. 2016

## Keywords:

Gradual increase in length and complexity of utterance (GILCU), Dysfluency, SSI-3, School-aged children

## ABSTRACT

**Objectives:** The Gradual Increase Length and Complexity of Utterance (GILCU) therapy method is a form of operant conditioning. This is a precise and controlled treatment that is done in 54 steps in 3 speech situations consisting of monologue, reading, and conversation. This study aimed at examining the effects of GILCU treatment method on the reduction of speech dysfluency of school-aged children with stuttering.

**Methods:** In this quasi-experimental study, 32 children with stuttering (6-11 years old) who were referred to speech therapy clinics were selected using convenience sampling. Then, they were assigned into two groups. The first group was treated by GILCU therapy method by the researcher, and the second group was treated by traditional methods by another speech therapist. Both groups had fourteen 45-minute sessions that were conducted one to two times per week. Pre-test and post-test of both groups were assessed using the SSI-3 scores. The obtained data were analyzed using the Kolmogorov-Smirnov, t-test, and covariance test.

**Results:** Both groups had statistically significant difference ( $P < 0.005$ ) in the stuttered syllables frequency. The average of moments of stuttering from the maximum moments of stuttering and the physical activity were examined according to the speech situations such as reading and conversation. The first group (GILCU therapy method) did not show any statistically significant improvement ( $P > 0.005$ ) with respect to parameters of SSI-3 scores.

**Discussion:** These results suggest that a non-programming treatment for stuttering may be effective with school-aged children who stutter.

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## 1. Introduction

Stuttering is a common childhood disorder that poses a serious challenge to a majority of pediatric speech therapists. Statistics show that out of every hundred children who go to school, a child is stuttering [1].

Studies have reported that children can be effectively treated for stuttering than the adults. Therefore, it is suggested that stuttering should be treated at a young age and they can record fluent speech in a short period of time. The treatment for preschool children who stutter will be a relatively quick process that is affected by the composition of environment and change in speech patterns. Older children require an intensive therapy program and need to work directly on their speech production. The intensive therapy program structure involves techniques of strengthening the fluency of speech [4].

The behavioral approach can be used for treating stuttering because the techniques used are directly rooted in the principles of human behavior. Moreover, laboratory and field experiments and evidence have supported the results of the behavioral approach and found them to be more accurate [6]. One of the treatment methods that is built on this approach is the Gradual Increasing Length and Complexity of Utterance (GILCU) method. The GILCU therapy method is a form of operant conditioning and is very precise and controlled in 54 steps in 3 speech situations that consist of monolog, reading, and conversation according to three phases such as establishment, transfer, and maintenance [5]. To the best of our knowledge, there is a lack of study on the effect of GILCU treatment method on increased fluency in school-age children who stutter in the Iranian society.

Kalashi studied the effect of syntactic complexity and length of utterance on speech fluency of children with stuttering and normal children aged 6-12 years in the Tehran city [3]. She reported a positive correlation between increasing length and complexity of utterance with increasing speech disfluency and found it to be applicable for treating stuttering [3]. Analyzed the speech samples of 19 subjects with stuttering (10 males and 9 females) and 38 non-stuttering subjects (20 males, 18 females) aged 20-25 years in Shiraz. She showed that increasing the length of the part of speech of the stutterers and non-stutterers subjects increased dysfluency and stuttering [7].

Hares Abadi et al. reported that in both groups of stuttering and non-stuttering children, there were significant differences in the rate of dysfluency between simple and complex sentences ( $P < 0.05$ ) [2]. In addition, chil-

dren with stuttering showed more dysfluency due to the increasing syntactic complexity compared to children without stuttering. The study aimed to analyze the effect of GILCU program on children with stuttering.

## 2. Methods

In this quasi-experimental study, the participants were selected using a convenience sampling method. Children with stuttering who were referred to the Mehrafarin speech therapy clinic and were diagnosed by a speech therapist were selected for inclusion in this study. The criteria for inclusion were as follows: all subjects should be of school age (6-11 years old), received at least 8 score of the SSI-3 scale, should be normal in terms of IQ and adaptive behavior based on academic performance and the views of the teacher, the stuttering should not be under other groups of dysfluency, should have no history of neurological disorders, and other speech and language disorders.

A total of 32 children were finally included in the study and then divided into two groups of 16 children each. Informed written consent was obtained from the parents of all the included children. The experimental group, the children were treated with GILCU therapy method by the researcher, and in the control group, the children were treated by other therapists using traditional methods. The instruments used in this study included questionnaires, mp3-player Samsung model YP-P2E, data sheet, and the book "the story My Dad and I" Volume I and II (Publications Fatemi). The basic information of the participants was collected from the demographic questionnaire that included demographic data, severity of stuttering based on SSI-3, and a history of neurological disorders. The researcher interviewed the parents to gather information from the questionnaire so as to identify the eligible children for participation.

In this study, an mp3 player (Samsung model YP-P2E) was used for recording the voice of children in three situations (i.e. monolog, reading, and conversation) before and after the treatment. The instructions for executing GILCU therapeutic method were prepared and translated into Persian. The translated instructions were then investigated by experts, and their views were considered. In this study, each child participated in 14 sessions with 45-minute time that were conducted one to two times per week. In the first session before the start of treatment, the stuttering of children was assessed by the investigator. A 10-minute speech sample was taken from the children in monolog, reading, and conversational situations to calculate the SSI-3 scores in which the stuttered syllables frequency, the average of moments of stuttering from

maximum moments of stuttering, and physical activity were examined based on 5 scores.

For reading, three texts of mentioned stories were used. The children were required to read the story on each page based on the serial images. For evaluating stuttering in conversational speech, the children were asked to describe some events like parties, going to the park, etc. At each stage, the children’s voice was recorded. Later, 16 children were treated with the GILCU therapy method in experimental group during the 54 stages of the development of fluency. In the first step of creating fluency of speech, the children were required to produce words a dozen times fluently so as to enter the next step.

The second step required the children to successfully read two words fluently. In the third to sixth steps, the children were required to read three words fluently and so on up to the sixth step. In the seventh step, the children were required to read a sentence fluently. In the eighth to the eleventh steps, the children were required to read two sentences fluently and so on till the eleventh step, where the children were required to read fluently up to 30 seconds. In the eighteenth step, the children were required to read fluently up to five minutes. In the nineteen to fifty-fourth steps, the children were required to repeat the first eighteen steps in monolog and conversational situations.

During this period, the responses of children were for three modes of reading, monolog, and conversation. The responses along with stuttering were negatively reinforced. For example, if a child spoke non-fluently, then

the words “stop, fluent now” was said to the child before continuing to talk and repeat in the fluent form. Fluent speech was encouraged by saying “OK” or by giving a token that eventually leads to an objective reward. A child should have stuttering for less than a moment in every two minutes in all the three modes [8].

The control group was treated using traditional methods (prolongation and other fluency shaping technique without consideration of language levels and positive and negative reinforcement) by another speech therapist. Data was analyzed using SPSS program version 19. To assess the normal distribution of data, the Kolmogorov-Smirnov test was used. After evaluating the situation, the t-test and paired t-test were used. To neutralize the effect of confounding variables, the analysis of covariance was used. In all tests, a P-value of 0.005 was considered as the significance level.

3. Results

The results from the comparison between the two groups with respect to the mentioned background and dependent variables are presented in Table 1, which indicates similar conditions of both groups before the intervention. No significant difference was observed between the two groups, and they were statistically in the same conditions.

However, after the intervention, both groups showed that the method is effective for improving fluency. Better improvement was observed in the stuttered syllables frequency, the average of moments of stuttering from maximum moments of stuttering, and physical activity in both

Table 1. Pre and post intervention scores and their difference.

Variable	Group	Step	Mean	SD
SSI-3 inmonolog	Control	Pre-test	16.12	3.79
		Post-test	11.06	2.64
	Test	Pre-test	15.81	4.19
		Post-test	7.93	2.04
SSI-3 in conversational	Control	Pre-test	21.18	4.84
		Post-test	16.81	2.92
	Test	Pre-test	23.18	5.65
		Post-test	14.37	2.47
SSI-3 in reading	Control	Pre-test	7.09	7.70
		Post-test	2.60	4.69
	Test	Pre-test	14.81	3.89
		Post-test	7.71	2.79

groups. Results of the paired t-test are presented in Table 1, which showed that the improvement rate is statistically significant ( $P < 0.005$ ) in both groups. The comparison of both methods did not show any statistically significant improvement ( $P > 0.005$ ) in the subjects (of first group) with respect to the parameters of SSI-3 scores.

#### 4. Discussion

The results of this study indicate that improvement was observed in the stuttered syllables frequency, the average of moments of stuttering from maximum moments of stuttering and physical activity in the GILCU therapy method than in the traditional therapy method. However, the differences between both therapy methods (GILCU and traditional) are not significant. These results suggest that a non-programming treatment for stuttering may be effective with school-aged children who stutter. This result is in agreement with the results of Conture and Guitart (2000), who reported that GILCU is more effective than other methods in a review article on stuttering therapy programs for school children. According to Ryan (2005), both the DAF and GILCU methods are effective in improving fluency up to 96%, and the only difference between the two procedures was that the GILCU therapy method was found to be more successful when generalized to other environments. Thus, we suggest future studies should follow up the GILCU therapy method to three months after therapy so as to evaluate differences obtained in the generalization time.

#### 5. Conclusion

The study results indicated that Gradual Increase Length and complexity of utterance (GILCU) for treatment method is effective method for reduction of dysfluency of school-aged children. But this does not mean that this method can be the best treatment is to reduce the disfluency of school-aged children. And here we can conclude that the skills and expertise of the therapist even more effective is the treatment of choice.

#### Acknowledgments

This study was a part of Ms. Masume Basi's Master of Sciences thesis that was done in association with the University of Social Welfare and Rehabilitation Sciences, Tehran, Iran and Branch of Tehran, Iran Welfare Organization, Tehran, Iran during 2012- 2014. We acknowledge the parents and children who participated in this study. We are also thankful to our colleague Ms. Nafise Hoseinian, who did the treatment of the control group.

#### Conflict of Interests

The authors declared no conflict of interests.

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