

EVALUATION OF THE REI METHOD EFFECTIVENESS IN THE READING IMPROVEMENT OF A STUDENT WITH DYSLEXIA

VALENTINA MARTAN, Elementary school Nedelišće, Nedelišće, Trg Republike 9
valentina.martan@skole.hr

DARKO LONČARIĆ, University of Rijeka, Faculty of Teacher Education, Sveučilišna avenija 6
dloncaric@uniri.hr

This evaluation research was supported by the Learning and Instruction Laboratory established within Chair for Educational Sciences, University of Rijeka, Faculty of Teacher Education

Summary

The REI model, whose starting points are similar to other hierarchical models of neurocognitive development, has resulted in the formulation of a currently under-researched method for dyslexia treatment. In addition to one published work by the author of the method (Kenda, 2014) that is based, among other things, on an innovative form of support for analysis and synthesis processes in reading, there are just a few unpublished studies on its effectiveness. The main goal is to test the effectiveness of the REI model for improving reading skills by comparing the results of a student (8-year-old girl) diagnosed with dyslexia that participated in REI treatment with that of a control participant exposed to standard reading exercises also conducted by a speech/language therapist, and with the average scores of other students in the same grade (N = 20). Parents provided informed consent, and the REI method was conducted with the student for a period of one year, during the third grade of primary school. Development of reading skills in all participants was monitored by a One-minute reading aloud test (Furlan, 1965; forms C and B) at several time points: initial condition, condition after 3 and 12 months of treatment, and, in order to evaluate the delayed effects of the method, four months after treatment. The number of correct and misspelt words was monitored, as well as their corrected ratio in terms of the average number of correctly read words in a given unit of time. Results followed the prediction of REI model. The expected positive outcomes of the treatment are empirically supported in this study and results provided evidence of student's reading improvement with REI treatment when compared to the referent group and greater advances in reading when compared to advances made by control participant. These results indicate the potential of the REI method that needs to be verified by additional evaluation studies on a larger sample of participants.

1. Introduction:

1.1. Dyslexia therapy programs

Dyslexia is one of the specific learning disorders, with symptoms most prominent during the formal education period. Due to its neurobiological complexity, dyslexia requires the use of different approaches aimed at improving the cognitive processes that affect successful reading acquisition. Therapy programs that include grapheme-phoneme teaching activities, decoding skills, developing reading fluency, reading comprehension and language skills can have a significant impact on improving literacy skills of students with dyslexia (Galuschka et al., 2014; Report of the National Reading Panel, 2000). Complementary approaches, such as motor training, interventions targeting the auditory and visual systems, biofeedback, etc., still need to demonstrate their effectiveness (Elliot and Grigorenko, 2014). Approaches focused on analytical and synthetic processes in reading acquisition are especially important in the early stages of reading acquisition and in the languages of transparent orthography (eg. Croatian), where the grapheme-phoneme correspondence is consistent (Kelić, 2015). Effective reading interventions should lead to significant changes in neural systems organization and the normalization of left hemisphere neural network activity that is responsible for linguistic abilities, word recognition and reading (Shaywitz and Shaywitz, 2005).

1.2. REI model

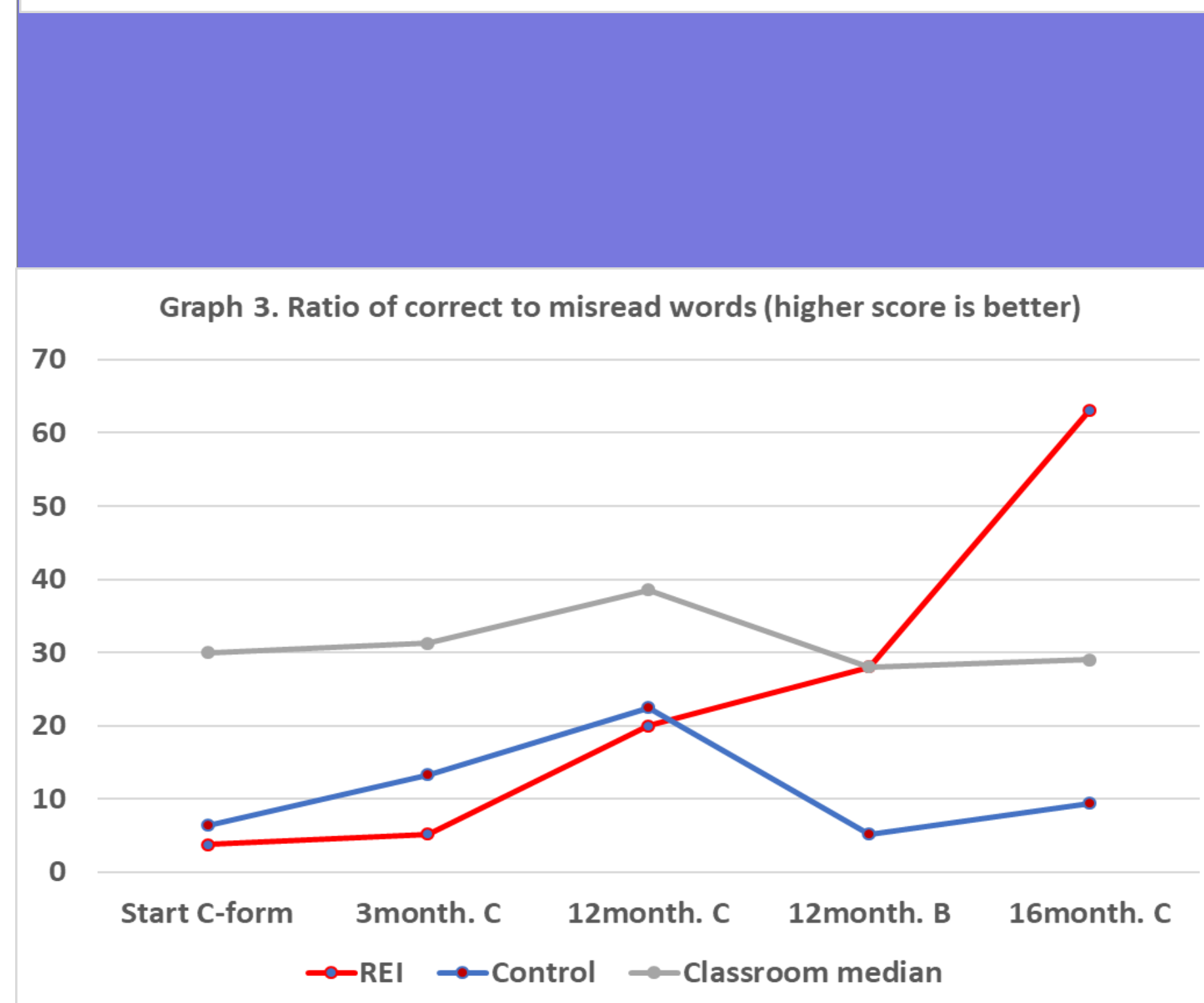
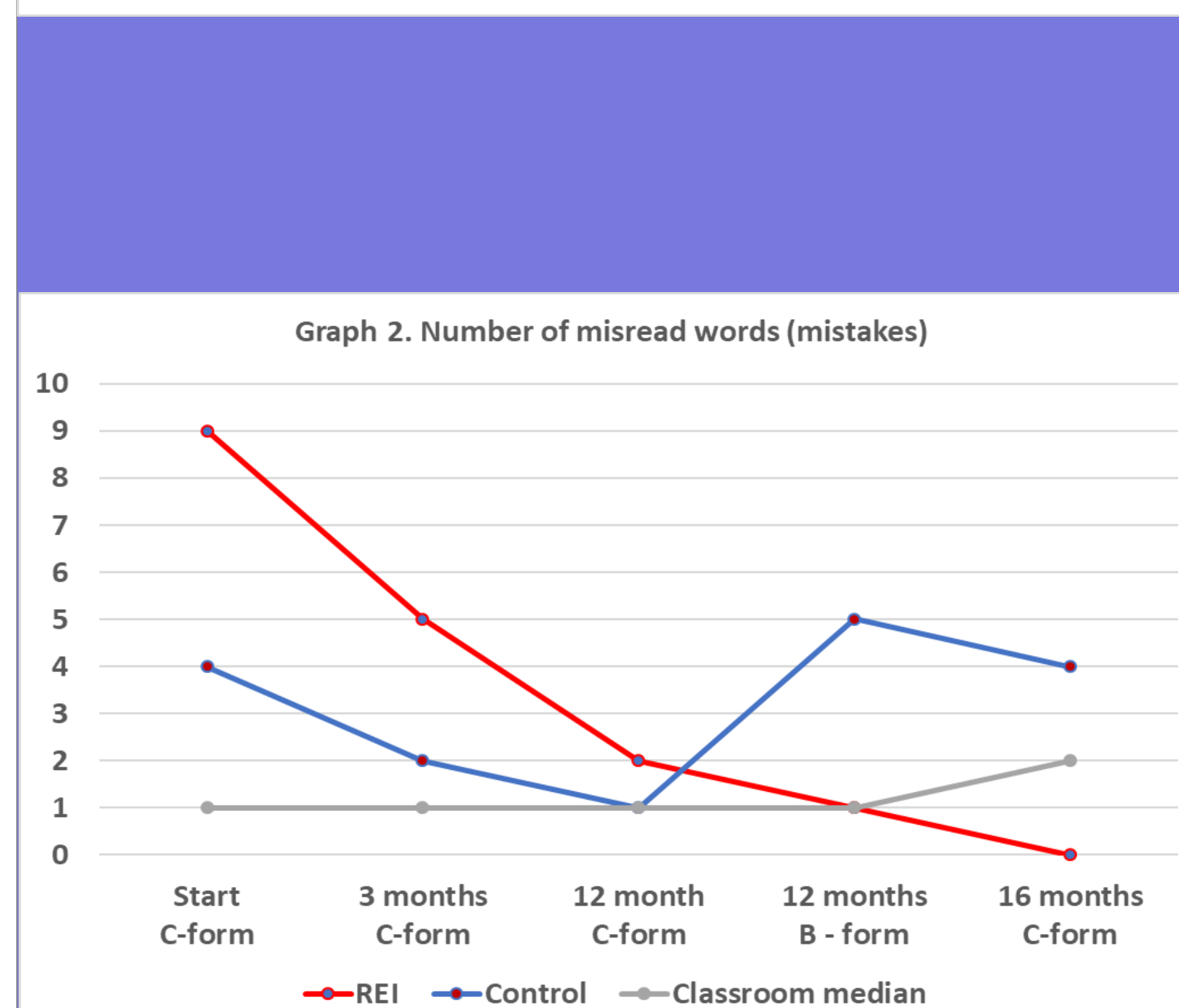
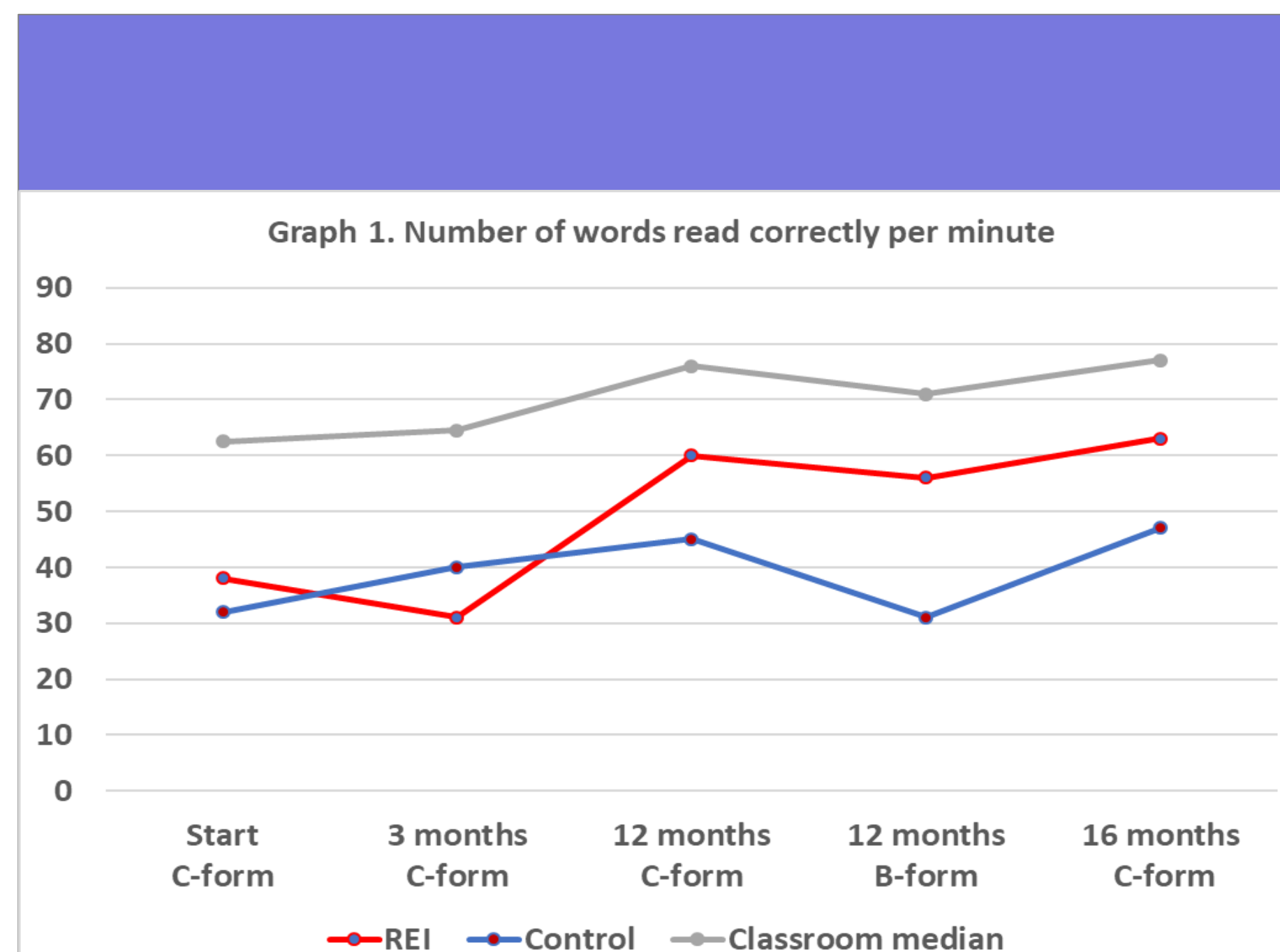
The REI model, whose starting points are similar to hierarchical models of neurocognitive development, is presented in Igor Kenda's paper "REI Method for the Elimination of Dyslexia" (2014). The model is based on the hypothesis about three interdependent neurological structures referred to as the three "minds" - Reason (R), Emotion (E) and Instinct (I), whose characteristics don't match the predominantly assumed meanings of these words. Some of Reason's traits are verbal thinking through words and numbers, concepts, abstractions, rules and definitions, linear organization, conscious actions, planning and prediction. It acts analytically with a focus on "reasonable", accurate and systematic thinking. The Emotion (from "movere" - to move, motivate) processor is responsible for thinking visually through images, colours, shapes, movement, associative and parallel relationships in space. The oldest (in terms of phylogenesis and ontogenesis) processor - Instinct thinks through emotions of fear and security. The model assumes that the Reason is the only conscious mind, while the thoughts, desires, decisions and memories of the other two minds are part of our subconscious, and their impulses Reason mediates, within its limitations, to us through thoughts. The model also assumes the existence of a different hierarchy of structures in the information processing in each individual, and the existence of 13 different but equivalent hierarchies among "minds" (similar to "types" of personality) based on a different distribution of R-E-I power pattern. Given the characteristics of the "minds" described, it is assumed that they all function in the brain with different centres: Reason in the left, Emotion in the right cerebral cortex, and Instinct in the subcortical areas - predominantly in the amygdala.

1.3. REI method for dyslexia

The REI model has resulted in the formulation of an under-researched method for dyslexia treatment (Kenda, 2014). The author of the method relates the cause of dyslexia to the dominant Emotion processor and in his work describes an approach to increase reading skills acquisition which purpose is to make a transfer from a less suitable processor (Emotion) to one that is more suitable for reading (Reason). According to the REI model, the Reason processor is most appropriate for the reading acquisition process, because of its analytical, synthetic and serial thinking. It participates in recognizing and decoding graphemes, converting them to phonemes and merging them into meaningful words. The method consists of specially designed reading exercises with the so-called "double symbols" (an appropriate number replaces each letter - e.g. A, a = 1, B, b = 2 ... Ž, ž = 30) that "strengthen" the ability to accurately decode the words when reading. The implementation of the method consists of several stages: 1) acquisition of "double symbols"; 2) reading texts written in a combination of letters and numbers (e.g. for the English alphabet: read = r5a4 or 18e1d - discouraging reliance on visual memory for words and strengthening analytical-synthetic process in decoding a word), which directs the brain to decode each symbol accurately and prevents reading by "visual cues"; 3) reading pseudowords that can not be linked to visual images; 4) reading commonly written text to automatize the acquired reading skills. Each stage of treatment lasts as long as it takes a person to complete the tasks to the level of automation. The original method assumes a complete absence of reading ordinary (non-coded) texts during the implementation of the main phase of treatment. The author states that it is best to start with the method as soon as reading problems are noticed, and its implementation requires work on a daily basis. REI model is based on the innovative form of analytical-synthetic approach to reading acquisition: phoneme-grapheme-double symbol correspondence and on detailed analysis and subsequent synthesis. Since the analytic and synthetic processes and the left-to-right analytical sequencing of letters are essential characteristics of the left cerebral hemisphere, all strategies that assist the Emotion processor should be removed when conducting the method (e.g. using colours, perceptual adjustments of text, visualization, use of tactile sensation, etc.). At the beginning of treatment, there is a possibility of increased reading difficulties due to complex dynamics of the three processors and the crisis of switching from the Emotion to the Reason processor when Emotion doesn't want to give up his primary role in reading. As a person progresses through treatment and more appropriate neural structures engage in reading, providing better results, the significant improvement in reading is expected.

1.4. Previous evaluations of the REI model

In addition to one published work by the author (Kenda, 2014), and the book chapter on the application of REI model in education (Miletić, 2019), there are currently few unpublished studies on REI method effectiveness. The first evaluation study was carried out by a psychologist in Slovenia. Treatment with two boys (9 and 12 years old), was recorded according to the original one-year REI method application (presented by Masa Blaznik and Matej Štuhec). In both cases, the results showed a decrease in dyslexia-related reading difficulties. The procedure and results were also shown in the documentary film "Dan za sanje" on Slovenian TV3 national television program.



References

- Blaznik, M. & Štuhec, M. (unpublished work). Full Recovery of Two Patients from Dyslexia with „Reason, Emotion and Instinct Method (REI method): Case Report.
- Elliott, J. G., & Grigorenko, E. L. (2014). *The dyslexia debate*. Cambridge University Press.
- Furlan, I. (1965). *Jednominutni ispit glasnog čitanja*. Zagreb: Školska knjiga.
- Galuschka, K., Ise, E., Krick, K., & Schulte-Körne, G. (2014). Effectiveness of treatment approaches for children and adolescents with reading disabilities: A meta-analysis of randomized controlled trials. *PLoS one*, 9(2): e89900
- Kelić, M. (2015). *Ovladavanje čitanjem*. Zagreb: Naklada Slap.
- Kenda, I. (2014). REI Method for Elimination of Dyslexia. *Journal of Psychology and Psychotherapy Research*, 1, 69-85.
- Miletić, E. (2019). REI School: A school to fit any child. In J.W. Moravec (Ed.) *Emerging education futures: Experiences and visions from the field* (p.p. 237-253). Minneapolis: Education Futures.
- Report of the National Reading Panel: Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction.(2000). <https://www.nichd.nih.gov/sites/default/files/publications/pubs/nrp/Documents/report.pdf>
- Shaywitz, S. E., & Shaywitz, B. A. (2005). Dyslexia (specific reading disability). *Biological psychiatry*, 57(11), 1301-1309.

Poster presented at the 2nd International Scientific Conference "Brain and Mind: Promoting the Individual and Community Well-Being", Department of Psychology Catholic University of Croatia, 12 – 14 December 2019, Zagreb, Croatia

2. The main goal of the study

The main goal of this study is to test the effectiveness of the REI model in improving reading skills by comparing the results on One-minute reading aloud test of a girl diagnosed with dyslexia that participated in REI treatment with that of a control participant with dyslexia and with the average scores of other students in the same grade.

3. Method

For the purpose of this study, the original REI method was slightly modified for children and adapted to the possibilities and needs of the particular student (REI+ method). In order to make "double symbols" more comfortable to read, in the initial phases of treatment the reading materials were perceptually adapted (spacing and font size), and other techniques were used such as fingerprinting, spelling, spatial orientation exercises, accurate number decoding and computational operations exercises. All reading materials were adjusted to the maturity and interest of the child. During the implementation of the main treatment phase, class-books and books for reading (in reduced form) were transformed into "double symbols". Reading of commonly written texts in the school could not be avoided.

3.1 Participants

This evaluation study involved a girl diagnosed with dyslexia who finished 2nd grade of primary school at the beginning of treatment (Age= 8 years, eight months), a control participant from the same class – boy with diagnosed dyslexia (Age = 8 years, nine months), and other students in the same class (n = 20; 50% male; Average age = 8 years; 10 months; SD = 0.48). During the evaluation study period, two female students stopped attending that class and were not included as control group participants. A school speech/language therapist diagnosed the experimental and control student with dyslexia and clinical psychologist's assessment excluded the existence of other developmental difficulties. Parents provided informed consent and consent from the Ethics Committee of the Faculty of Humanities and Social Sciences in Rijeka for research was also obtained.

3.2. Measures

The initial condition of reading level and the progress during the stages of treatment and after treatment were evaluated with a One-Minute Reading Aloud Test (Furlan, 1965, forms C and B). The test consists of a 120-word list, five in one row with a gradual increase in length (number of syllables) and semantic complexity, and a gradual decrease in font size. The result of the participant is calculated as the number of correctly read aloud words during one minute, with a possible range of results from 0 to 120.

3.3 Procedure

REI+ treatment method was conducted during a one-year period, with a few short breaks due to student's fatigue. The first phase of treatment (acquisition of the so-called double symbols) was conducted during the summer school break in individual work with speech/language therapist and with parents at home with prepared materials. Learning to read texts with double symbols took place during 3rd grade, three times a week with a speech/ language therapist and two times a week reading with parents. Passages from textbooks and reading books prepared and coded in advance were used. In the final stages of treatment, the student read pseudowords and gradually transferred to reading the commonly written text. The girl was also taught reading comprehension strategies, writing and language skills. During the same academic year, treatment for improving literacy skills (mastering reading and reading comprehension, improving writing and language skills) was conducted with a boy from the same class that was also diagnosed with dyslexia. The treatment of both students was done by the school speech/language therapist at the school the students attend. For the purpose of this study (with parental consent) the data were collected in the speech therapist's office. One-minute reading aloud test for all students was conducted at several time points: pre-treatment, after 3 and 12 months of treatment and after 16 months (evaluation of delayed effects of the treatment). The number of words that students read correctly or inaccurately were monitored, as well as their corrected ratio (average number of words read correctly continuously in the given unit of time).

4. Results

When comparing the student's achievement with those of the control participant and with the group of students from the same class, as the REI model predicted, there was a relative decrease in reading ability in the first three months and a subsequent increase until the 12th month. At that time the number of errors the student made while reading was equal to the average of the group, and on the alternative test with new words she had significantly fewer mistakes and a better ratio of correct to misread words, when compared to the average of the group. Also, at the end of treatment, her result exceeded the achievement of the control participant on all observed parameters. She maintained such relative achievement even after four months when she was better than the control subject on all indicators, reduced the lag when compared to the group average in absolute word count and had a significantly better score on the relative ratio of correct to misread words when compared with the average result of other students in her class.

5. Discussion

Results collected at the end of the treatment indicated a reduction in the number of errors for the student that participated in REI treatment who also made significantly fewer mistakes and achieved a better ratio of correct to misread words on the alternative reading test. These results suggest that student's reading progress is independent of whether she is presented with already known or new words. On the other hand, part of the improvement effect of the control subject and the classroom group can be attributed to the test-retest effect on the already used list of words. As the results show, intensive training aimed at enhancing the activity of the neural structures responsible for analytical and synthetic processes in reading acquisition (in REI model described as the Reason structure and processes) has led to the improvement of reading skills in a student with dyslexia. A particular contribution of this treatment is in the reduction of reading errors, suggesting that the method has proven to be effective in improving decoding skills and reading accuracy.

6. Conclusion

The results of the evaluation study indicate the potential of the REI method and offer new possibilities in the education and treatment of students with dyslexia. In further research, the method needs to be adjusted for children as much as possible (in terms of time and content). In the further evaluation of the method, special consideration should be placed on child ability to decode numbers, as well as letters. Some children with dyslexia may also have problems with decoding numbers, which can make the method more difficult to apply at an early age and lower grades of elementary school. The REI method needs to be verified by additional evaluation studies on a larger sample of participants of different ages. Also, it is necessary to elaborate on the diagnostic and differential criteria for dyslexia caused by the dominant Emotion processor and the requirements for evaluation of REI method for dyslexia effectiveness.