

ORIGINAL RESEARCH

The Effectiveness of Storytelling on Improving Cognitive Skills, Visual Perception, and Academic Progress in Students with Dyslexia.

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Abstract

Objective: Introduction: Dyslexia is one of the most common types of learning disabilities, defined as a specific learning disability in reading. Dyslexia-related issues are significant and acute educational problems that can be the primary cause of academic failure, leading to serious educational consequences. The present study aims to determine the effectiveness of storytelling on improving cognitive skills, visual perception, and academic progress in elementary school students with dyslexia.

Materials and Methods: The statistical population of this study includes female elementary school students in Tehran during the academic year 1402, with 30 participants selected voluntarily. They were then randomly assigned to two groups of 15: an experimental group and a control group. The experimental group was tested before and after the storytelling intervention, while the control group was assessed at the end of the intervention using equivalent tools. Data collection involved the use of questionnaires, including the Dyslexia Symptoms Questionnaire, Najati's Cognitive Abilities Assessment, Benton's Visual Retention Test, and an Academic Progress Questionnaire. The experimental group underwent treatment using a designed therapeutic protocol over 10 sessions, totaling 10 hours (one hour per session).

Results: The empirical data obtained from the research were analyzed using the ANCOVA statistical method in SPSS version 24. The results of this study align with previous research, indicating that storytelling therapy has a positive and significant effect on improving cognitive skills, visual perception, and academic progress in students with dyslexia, with an effect size of (0.67) and statistical significance within the range of (0.00).

Conclusion: The effectiveness of storytelling therapy on cognitive skills, visual perception, and academic progress paves a clear path for therapists, educators, and educational specialists to improve outcomes for students with dyslexia.

Keywords: Storytelling, Cognitive skills, Visual perception, Academic progress, Dyslexia

Introduction

Dyslexia is considered one of the most common types of learning disabilities, defined as a specific learning disability in reading. Dyslexia-related issues represent a significant and acute educational problem that can be the primary cause of academic failure, leading to serious educational consequences. Strong, as an expert in education, views reading difficulties as a major factor in school failure (1). According to the Diagnostic and Statistical Manual of Mental Disorders, the main criteria for dyslexia include the following factors:

a) Problems with Reading Accuracy: Children with dyslexia may experience difficulties in reading accuracy. This issue can lead to confusion and frustration in understanding textual material.

b) Problems with Fluency: Individuals with dyslexia may struggle with reading smoothly and continuously. Their reading speed may be below average, and comprehension of the text may not be accurate or complete.

c) Incompatibility with Age and Educational Curriculum: Reading difficulties typically do not align with the individual's age and educational level, meaning their reading performance is not commensurate with their age and educational stage.

d) Interference with Academic Progress and Daily Activities: Dyslexia can interfere with academic progress and everyday activities. For example, an individual with dyslexia may face challenges in studying lessons, completing assignments, and understanding daily instructions. Information on the prevalence of specific learning disorders in adults is limited. However, various estimates suggest that its prevalence in adults is around 4% (2).

Stories and narratives, in addition to their literary nature, have the ability to convey educational, developmental, and therapeutic messages to the reader or listener. These types of literary texts utilize psychological methods to help readers become familiar with their subconscious, understand their psychological issues, and foster personal growth. Stories are particularly effective for children due to their comprehensible and meaningful nature. By presenting lessons and morals in narrative form, stories encourage children to recall and generalize these teachings to similar situations in their lives. Narratives can assist children in

improving their understanding of emotions, social skills, and problem-solving strategies.

Story therapy is a therapeutic approach that utilizes stories as a tool for externalizing a child's thoughts and feelings. This process helps children share their emotions and experiences with others, enhancing their awareness and understanding while fostering more effective communication. Story therapy is one of the methods used in psychotherapy, assisting children in confronting issues such as loss, fear, and anxiety. This approach generates hope, energy, and change in children through an indirect and engaging method (3). Research on story therapy indicates that it helps children address their psychological issues indirectly and non-invasively, facilitating their journey toward change and growth. Therefore, stories serve as a powerful tool in psychotherapy, education, and child development, enhancing their quality of life and communication while providing them with greater hope and motivation. The role of stories in human behavior and functioning can be justified from the perspective of mirror neurons. Mirror neurons are present in the human brain and activate when an action is performed by others. According to studies, stories can also impact the reader and listener both mentally and physically (4). The book "Life is a Continuous Storytelling" notes that one of the key actions of storytelling is that the listener or reader becomes immersed in the problem-solving process presented in the story. This active experience helps enhance the individual's ability to confront real-life issues and challenges (4). Storytelling can serve as a tool for achieving goals or even as a first step in establishing effective communication. It must engage the listener and immerse them in the narrative; if it fails to achieve this goal, it may not be effective in reaching its intended purpose (5). When children listen to a story, they imagine themselves in the role of the story's hero, joining in the adventurous and thrilling experiences depicted within it. This approach helps audiences learn from past failures and setbacks, preparing them to create a meaningful and productive future for themselves (6). Research evidence indicates that children with specific learning disorders may experience deficiencies and challenges in various areas of their development. Some of these areas include: cognitive, educational, psychological and

social, and emotional domains (7). Studies conducted by Biranvand and colleagues indicate that children with specific learning disorders experience deficiencies and challenges in cognitive skills, which include problem-solving skills, optimal or goal states, understanding activities, and recognizing limitations for problem-solving (8).

Visual-spatial relationships refer to an individual's ability to perceive and understand the overall state of an object in space. The ability to process visual-spatial information is highly complex due to multiple factors. Factors such as visual-spatial processing speed, attention, and working memory significantly influence this skill (9). Additionally, factors such as 1) creating mental images of objects in the environment; 2) the child's ability to recognize differences between objects; 3) identifying various directions; and 4) recognizing bilateral coordination and lateral dominance are crucial. These abilities enable children to accurately judge the positions of objects in their visual space in relation to other objects and their own bodies (10). Another issue that students face is procrastination and delay in completing their academic tasks and assignments. Dyslexia is a common learning disorder that can significantly impact students' academic performance, especially in elementary school. Children with specific learning disorders, such as reading disorders, written expression disorders, and mathematical disorders, may progress academically at a level below general expectation. Specific learning disorders are generally classified as neurodevelopmental disorders in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (11). Dyslexia is a type of learning disorder that affects the ability to read and spell words accurately. It is also considered a neurological disorder (12). According to the DSM-5, reading is defined as a process involving the visual recognition of letters and identifying them as meaningful units (i.e., words), followed by recalling their meanings from memory and connecting them with other words; ultimately, it involves understanding the concepts in various environmental contexts (13). Dyslexia is often resistant to conventional teaching methods; however, with the use of specific and appropriate therapeutic

approaches, its effects can be mitigated. Children with advanced dyslexia, despite having average non-verbal intelligence and suitable learning environments, and in the absence of neurological disorders, are unable to achieve an appropriate reading level. Nevertheless, dyslexia can be defined as a reading disorder. According to researchers, language and speech deficits also significantly impact reading success (14). Furthermore, studies have shown that metalinguistic skills are influenced by language development and that metalinguistic skills correlate with the reading abilities of elementary school children (14). Research indicates that remedial education and instructional interventions can be effective in treating and addressing learning disorders in reading. Some specialists in this field believe that the best time to begin remedial education is before the age of ten. A study by Fashami and colleagues found that early initiation of remedial education can be more effective (15). The method of storytelling enables teachers to present educational concepts and materials in an engaging and lively manner to students. This approach, using stories and fictional characters, helps students understand the connections between concepts and gain a deeper understanding of educational content. Additionally, storytelling can enhance language, reading, and writing skills; therefore, developing cognitive abilities in educators and utilizing storytelling as an educational tool can improve the learning process and facilitate comprehension for students with specific learning disorders. As a conceptual and engaging educational method, storytelling can stimulate students' attention and focus. When an exciting and captivating story is narrated, students naturally have a greater inclination to listen and comprehend the material. Stories can create mental images in students' minds and encourage them to absorb and understand educational concepts. Ultimately, we seek to answer the main question: Does storytelling affect the improvement of cognitive skills, visual perception, and academic progress of elementary school students with dyslexia?

Materials and Methods

The present study is a clinical trial with a single-blind design. The statistical population consists

of elementary school students aged 8 to 10 years with dyslexia in schools and learning disorder centers in Tehran. After obtaining ethical approval (code IR.IAU.TNB.REC.142.16) from the university, 50 students with dyslexia referred to the Iranian Association of Special Learning Disorders by school counselors were initially subjected to a structured clinical interview. Following diagnostic confirmation, students were selected based on inclusion criteria. Informed consent was obtained from both participants and their parents, who were made aware of the research objectives and the confidentiality of their information. After consent, 30 students were randomly assigned to two groups: 15 in the treatment group and 15 in the control group. Members of the experimental group received storytelling intervention once a week for 10 sessions of 60 minutes each. Inclusion criteria included a diagnosis of dyslexia, consent from the participant and parent, age between 8 to 10 years, no neurological developmental disorders or co-occurring psychological disorders, no use of psychiatric medications, and no psychotherapy received in the past year. Exclusion criteria included absence from more than two treatment sessions. Pre-tests and post-tests were conducted to evaluate the treatment outcomes using the Dyslexia Symptoms Questionnaire by Bazarghan-Moghadam, the Cognitive Abilities Questionnaire, the Benton Visual Retention Test, and the Academic Progress Questionnaire by Fam and Taylor. The data were then entered into SPSS-24, and ANCOVA analysis was performed. The educational intervention consists of 10 sessions (each 60 minutes) specifically designed for the experimental group. Additionally, 10 stories suitable for the age group, titled (16), were approved by the Center for the Intellectual Development of Children and Young Adults. The storytelling guidelines authored by Mostafa Rahmandoust (17) were also utilized.

Table (3-2): Storytelling Training Protocol

Session Number	Session Topic	Objective	Method	Session Evaluation
Pre-test	Pre-test administration	Assessing the level of perception (intelligence), visual perception, dyslexia symptoms, and academic achievement	Questionnaires and research tests	Conducting pre-test in the first stage
Beginning Session	Creating therapeutic rapport and introducing the participants	Familiarizing students with how the sessions will be held, exam boundaries, gaining individual confidence and encouraging participation		
Session 1	Practice and repetition of the story (Roozbeh Falls Asleep)	Familiarizing students with rhythm, order, and organization of speech (attention vs. inattention)	Repetition	Asking questions
Session 2	Practice and repetition of the story (Little Bear is Scared)	Familiarizing students with the topic of the story and relating to it	Participation and role-playing by students	Asking questions about the story
Session 3	Presenting and repeating the story (Older Brother, Younger Brother)	Making better decisions, reducing impulsive behaviors	Q&A	Reviewing classroom behavior and giving feedback
Session 4	Presenting and repeating the story (Wise Old Man)	Understanding one's perspective and correcting classroom tasks	Asking about completing classwork	Their behavior in relation to the session topic
Session 5	Presenting and repeating the story (The Clever Rabbit and the Mirror)	Preparing students to express themselves and prepare for discussions	Q&A	Behavior in relation to others' actions and speech
Session 6	Presenting and repeating the story (I Don't Make Fun of Others Anymore)	Gaining confidence and social integration at school	Q&A	Their reactions about others' speech and behavior
Session 7	Presenting and repeating the story (Sara Goes to School)	Building interest in school and interacting with classmates	Asking questions	Behavior on the story topic and speech with others
Session 8	Presenting and repeating the story (Roozbeh and the Balloon)	Trying to achieve goals and teamwork	Q&A and modeling by students	Taking steps on weak points
Session 9	Presenting and repeating the story (Reading suitable)	Improving imagery and memorizing words in poetic texts		
	poems with the group)		Practical work	Group work
Session 10	Presenting and repeating the story (Wise Old Man)	Guiding students to solve problems and correct misconceptions	Q&A	Observation of outcomes
Post-test	Post-test administration	Assessing the level of perception (intelligence), visual perception, dyslexia symptoms, and academic achievement	Questionnaires and research tests	Completion and result review

Instruments

Dyslexia Symptoms Questionnaire by Bazarghan-Moghadam (1996)

This questionnaire contains 15 questions regarding students' reading abilities. When students read the word reading ability assessment form (reading test), the examiner marks each question with a "yes" or "no." If more than 5 questions are marked "yes" for a student, that student is considered suspicious for dyslexia and referred for further evaluation. In the study conducted by Pakdaman and Savaji in 2000, the reliability of the questionnaire was approximately 92%. It was also found that individuals showing no signs of reading

difficulties in 90% of the cases were recognized as having normal reading abilities. In this research, reliability was calculated using Cronbach's alpha, yielding a value of 79%, which is considered acceptable. In the present study, a Cronbach's alpha of 0.74 was obtained (18).

Cognitive Abilities Questionnaire

This questionnaire was designed and standardized by Nejati in 2013. It includes 30 items and 7 components. The components of this questionnaire are: Memory (items 1 to 6), Skill Control and Selective Attention (items 7 to 12), Decision-Making (items 13 to 17), Planning (items 18 to 20), Sustained Attention (items 21 to 23), Social Cognition (items 24 to 26), and Cognitive Flexibility (items 27 to 30). Scoring for this questionnaire is based on a five-point Likert scale, ranging from 1 (almost never) to 5 (almost always). Some questions, such as items 24, 25, and 26, are scored in reverse, meaning that a higher score indicates a lower index of cognitive ability, while a lower score indicates a higher index of cognitive ability. In the study conducted by Pirani in 2016, the Cronbach's alpha coefficient for the overall scale of the questionnaire was found to be 0.82. In the present study, a Cronbach's alpha of 0.79 was obtained (19).

Benton Visual Retention Test (1974)

This is a research and clinical tool designed to assess visual perception, visual memory, and fundamental visual abilities. There are three different types of tests, including forms (E.D.C). Each form contains 10 designs, and each design consists of one or more shapes. The time allocated for each form is 5 minutes. The various methods of administering the test are as follows:

Administration A: In this method, each design is displayed for 10 seconds, and then the subject immediately reconstructs the memory.

Administration B: In this method, each design is displayed for 5 seconds, followed immediately by memory reconstruction by the subject. The subject first views a design and must memorize it within a limited time. After 5 seconds, the design is removed, and the individual must accurately reconstruct it.

Administration C: Each design is copied by the subject while the design remains visible.

Administration D: Each design is shown for 10 seconds and is followed by memory reconstruction by the subject after a delay of 15 seconds.

Note: Each of the three forms may be used in any style of administration.

The reliability of this tool was measured using Cronbach's alpha, with a reported coefficient of ($r = 0.9$). Another correlation based on the classification of errors was reported by Wahler (1956) as ranging from ($r = 0.75$ to 0.98). In the present study, Cronbach's alpha was obtained as 0.88 for Administration A and 0.83 for Section B (20).

Academic Progress Questionnaire by Fam and Taylor (1994)

The research conducted by Fam and Taylor (1990) in the field of academic progress led to the development of a questionnaire standardized for the Iranian population. This questionnaire consists of 48 items and is assessed using a Likert scale. Each question has 5 response options, with scores assigned based on the categories of "not at all" (score 1), "a little" (score 2), "somewhat" (score 3), "a lot" (score 4), and "very much" (score 5). Additionally, for the 11 negatively worded questions, reverse scoring is applied. The maximum possible score from this questionnaire is 240, while the minimum score is 48. The reliability of this questionnaire in the Iranian population, measured using Cronbach's alpha, was calculated by Moradian (2013) to be 0.82. In the present study, a Cronbach's alpha of 0.78 was obtained (21).

Results

Demographic Information

Table (1) Demographic Characteristics of the Sample

Education Level	Control Group Frequency	Control Group Percentage	Experimental Group Frequency	Experimental Group Percentage
First Grade	6	40%	7	46.6%
Second Grade	5	33.4%	4	26.6%
Third Grade	4	26.6%	4	26.6%
First Child	8	53.3%	7	46.6%
Second Child	5	33.3%	4	26.6%
Third Child or more	2	13.3%	4	26.6%
Less than Diploma & Diploma	4	26.6%	3	20%
Associate & Bachelor's Degree	7	46.6%	9	60%
Master's Degree or higher	4	26.6%	3	20%

In the demographic characteristics of the sample, it is observed that the highest frequency is in the first grade, first child, and caregivers with an associate or bachelor's degree

Table (2) Skewness and Kurtosis of Research Variables

Dyslexia	Cognitive Skills	Visual Perception (Benton Form 1)	Visual Perception (Benton Form 2)	Academic Progress	Statistical Measure
-0.8	-1.47	-0.27	-0.30	-0.20	Skewness
-1.18	-2.48	-0.62	-0.93	-1.34	Kurtosis

The values of skewness and kurtosis obtained in Table (2), which are all less than 1 for all variables, indicate that the condition for normality of the data distribution is met, and therefore, analysis of covariance can be used to test the research hypotheses.

Other default tests, such as the correlation between variables, were all below 0.8, which confirms that the assumption of no multicollinearity among variables holds true. Considering the F-value (0.69) from Levene's test and the reported significance level ($p > 0.50$), which is greater than (0.05) we can conclude that the assumption of homogeneity of variances is also satisfied in the dataset obtained from the research.

Table (3): ANCOVA Analysis Results

The effect of therapeutic storytelling on cognitive skills, academic progress, and visual perception in students with dyslexia.

Dependent Variable	Sum of Squares	df	F	Significance Level	Eta Squared
Cognitive Skills	0.918	1	0.252	0.019	0.007
Visual Perception – Benton Form 1	3.75	1	1.03	0.00	0.026
Visual Perception – Benton Form 2	0.27	1	0.008	0.00	0.001
Academic Progress	2.98	1	0.82	0.00	0.021
Group	286.405	2	39.320	0.00	0.67
Error	138.395	38	3.642		
Total	13980.000	45			

Table (3) presents the results of a one-way ANCOVA analyzing the effectiveness of story therapy on cognitive skills, academic achievement, and visual perception in students with dyslexia. In the group variable row, the F-statistic value (39.320) is significant at the level of $p < 0.00$, indicating a statistically significant difference in dyslexia levels between the control and experimental groups. The obtained beta coefficient (0.67) suggests that 67% of the variance in dyslexia can be explained by story therapy. For other variables, all F-values are significant at ($p < 0.00$). Therefore, the results demonstrate that story therapy is effective in improving dyslexia, cognitive skills, academic achievement, and visual perception.

Discussion

The results of the present study indicate that storytelling therapy has been effective in improving cognitive skills, academic progress, and visual perception in individuals with dyslexia. The results obtained from the analysis of covariance confirm the effectiveness of storytelling on enhancing the cognitive skills of elementary school students with dyslexia at a significance level of ($p < 0.01$). In line with these results, Ojinejad, Moayed, and Dehghaniyan (22) showed that storytelling and storytelling therapy techniques positively influence a wide range of children's skills, including cognitive skills. Similarly, Hatami (23) in a study examining the effectiveness of storytelling therapy on brain functions, memory, and speech development in dyslexic students stated that storytelling affects and enhances cognitive skills by developing memory and language capacity. Additionally, Yousofi Louyeh and Azar (2007) demonstrated

that storytelling therapy is an effective and efficient method for addressing psychological problems and enhancing cognitive skills in children with learning disabilities (24).

By further examining previous research consistent with the results of the present study, Pichou, Mohammadi, and Abdollah (25) stated that storytelling therapy creates significant improvements in the learning and cognitive processes of children. Additionally, Siu and Mingua (2018) demonstrated in a study on children with attention deficits that storytelling therapy and narrative-based methods help enhance children's cognitive skills and acquire positive, socially approved patterns (26). Natalie-Boud and Morsh (2016) also confirmed the effectiveness of storytelling therapy in developing various social, emotional, and cognitive skills in children (27).

Furthermore, the results of the analysis of covariance confirm the effectiveness of storytelling in improving the academic progress of elementary school students with dyslexia at a significance level of ($p < 0.001$). In line with the results obtained in this study, it is observed that Ojinejad, Moayed, and Dehghaniyan previously examined the effectiveness of storytelling on academic performance, and the results indicated an improvement in academic performance due to storytelling therapy in students (22). Additionally, Moghadam, Noorabadi, Hashemi Benab, and Jafari Kalibar conducted a study on the role of narrative literature with a storytelling therapy approach on students' learning, showing that the use of storytelling techniques and narratives positively and incrementally affects student learning and plays an enhancing role (28).

Adimura (2023) demonstrated that storytelling therapy, through changes in the attitudes of students with reading dyslexia, subsequently improves reading-related skills and the reading process, thereby enhancing academic progress and individual academic standing, as well as school experiences (29). Narsi, Laurich, Deni, and Zhou studied the role and importance of storytelling as a catalyst for early education, particularly in formal school settings during childhood. This research indicated that using storytelling therapy as a stimulating tool for learning and fostering better understanding in

children is highly effective in increasing academic progress (30).

The results of the analysis of covariance also indicated that storytelling significantly improves the visual perception of elementary school students with dyslexia at a significance level of ($p < 0.00$). A review of the literature on visual perception in relation to dyslexia or specific learning disabilities did not report significant findings. Tahmasbi and Ahmadi demonstrated that storytelling therapy positively affects creativity in children, and since visual perception is an important factor in creativity, the impact of storytelling therapy on visual perception can also be considered part of this effectiveness (31). Additionally, given that visual perception is fundamental to achieving and enhancing learning, it can be argued, in line with the results of Moghadam, Noorabadi, Hashemi Benab, and Jafari Kalibar, that storytelling leads to increased learning in students through the improvement of visual perception (28).

In a systematic review, Ekinici and Tokash reported that storytelling therapy plays a role in improving psychological disorders, anxiety symptoms, and various skill and perception domains, including visual perception. Visual perception is one of the sub-factors that significantly affects learning and, consequently, learning disabilities and dyslexia. The results of this research suggest the potential impact of storytelling therapy on visual perception as an innovative finding. These results may motivate other researchers to investigate the relationship between visual perception and dyslexia or other categories of specific learning disabilities (32). The results obtained in this study align with previous research in this field, as referenced in the discussion of hypotheses one, two, and three. The body of prior research has confirmed the effectiveness of storytelling therapy in improving academic performance (22) and the impact of storytelling on learning and related processes, including cognitive skills and visual perception (28). As the results of this study indicate, other research has also shown that storytelling affects the development of working memory and related processes, as well as cognitive and language skills (23). Additionally, verbal intelligence, creativity,

and expressive literature and vocabulary are positively enhanced through storytelling therapy as foundational elements related to academic progress and visual perception (31). Furthermore, Ali Moradi, Qurban Shiroudi, Khallatbari, and Rahmani demonstrated that storytelling therapy is effective in improving social competence and emotional dysregulation as foundational elements of academic progress in girls with specific learning disabilities (33). The results obtained from this study and the examination of other related research indicate that storytelling therapy improves psychological disorders, reduces anxiety symptoms, and enhances communication skills as factors influencing cognitive abilities and foundational elements of learning and academic progress (32). Additionally, Adimora (29) demonstrated that storytelling therapy is an effective tool for improving reading in individuals with dyslexia. Kanok (2020) also showed that storytelling therapy can aid academic progress in students with specific learning disabilities by fostering positive attitudes and cognitive skills (34). In related studies, Pijo, Abdollah, and Mohammadi stated that storytelling brings significant improvements to the learning process of students (25). Furthermore, the supportive and stimulating role of storytelling in learning and fostering better understanding in children during the early years of formal education has been confirmed in research by Narsi, Lavrich, Deni, and Zhou (30). Matos, Rocha, Cabral, and Bessa also demonstrated that storytelling and narrative methods are effective in enhancing focus and the foundational elements required for learning, as well as addressing learning difficulties (35). The cumulative results of

studies related to the present research, along with the findings of this study, indicate that dyslexia, as one of the most common categories of specific learning disabilities, can be improved through a variety of therapeutic and educational methods, including storytelling therapy. Furthermore, it appears that in order to achieve this improvement, the underlying sub-factors affecting dyslexia, such as cognitive skills and visual perception, which contribute to academic progress, must also be enhanced.

The effectiveness of storytelling therapy on cognitive skills, visual perception, and academic progress paves a clear path for therapists, educators, and specialists in educational sciences to improve students with dyslexia. This achievement, alongside other educational, therapeutic, psychological, and pedagogical outcomes, underscores the importance of employing diverse and qualitative methods for treating dyslexia and achieving academic progress in these students. Efforts to reduce dyslexia and the significance of its treatment, considering its critical role in mental health, psychological well-being, future career prospects, and the social and familial contexts influencing it, can enhance the prognosis for treatment based on the results of this research.

Limitations of the study include the use of self-reporting tools, which necessitates caution in generalizing the results. Additionally, the inability to conduct follow-up testing due to time, location, and sample access constraints represents another limitation of the research.

Conflict of Interest

Author declares no conflict of interest.

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