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Research Article

Story Retelling as a Narrative-Based Linguistic Intervention to Improve Working Memory in Adults with Cognitive Impairment

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ABSTRACT

Cognitive impairment characterized by a reduced ability to process, store, and manipulate linguistic information, particularly verbal working memory, which is essential for discourse comprehension and language production. From an applied linguistics perspective, story retelling is a narrative-based activity involving discourse processing, verbal repetition, and memory updating. However, empirical evidence on its cognitive-linguistic effects in Indonesian individuals with cognitive impairment is still limited. Utilizing quantitative one-group pretest-posttest modes, research investigated how recounting stories affected verbal working memory in Surakarta residents with cognitive impairment. A total of twelve individuals took part in 10 organized story recounting sessions, with an emphasis on understanding and recreating stories orally. The Cognitive-Linguistic Evaluation Form (Form 14-2) was used to test verbal working memory. The Wilcoxon Signed Rank Test was used for statistical analysis due to the data's irregular distribution. The study's findings demonstrated that repeating stories is a successful language-based cognitive intervention for verbal working memory, as the average score increased from 4.33 to 7.17 ($p < 0.05$).

Keywords: *Cognitive Impairment, Narrative, Speech Therapy, Story Retelling, Working Memory*

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INTRODUCTION

Cognitive impairment is widely observed in older populations worldwide and represents a significant public health issue, as it negatively impacts memory function, information processing efficiency, and overall functional performance (Bai et al., 2022; Pais et al., 2020). There was a wide range of reported prevalence rates of cognitive impairment in a systematic evaluation of community-dwelling persons aged 50 and over, with a median prevalence of around 19% and a range of from 5.1% to 41% (Bai et al., 2022). Similarly, among persons aged 50 and above, a meta-analysis research estimates a prevalence of 15.56% for MCI, a stage among standard cognitive aging also dementia (Pais et al., 2020). In the Indonesian context, cognitive impairment has also been identified as an emerging concern, with empirical studies demonstrating significant associations with metabolic and sociodemographic determinants among middle-aged and elderly populations (Ardiansyah et al., 2022).

Given the growing burden of cognitive impairment, identifying linguistically grounded interventions becomes increasingly important. From an applied linguistics perspective, story retelling involves discourse-level processing and verbal repetition, thus establishing a direct link between linguistic tasks and cognitive improvement. This study examines its effects on verbal working memory in Surakarta, aiming to address the existing gap in empirical evidence in Indonesian populations. In spite of the extensive use of narrative-based interventions in aphasia rehabilitation and language acquisition, there is a lack of data on how retelling affects working memory in people with non-aphasic cognitive impairments, especially in settings with limited resources like Indonesia (Lê et al., 2023; Livingston et al., 2020). Addressing this gap, this study contributes to applied linguistics by conceptualizing retelling as a targeted cognitive-linguistic intervention and using a quantitative pretest-posttest design to generate empirical evidence of cognitive change, as well as context-specific implications for speech therapy practices in nations with poor or medium incomes.

"Learning is a lifelong process, and sharing knowledge is the highest form of learning."

Research is grounded at Baddeley's multicomponent working memory model, which posits that story retelling engages the phonological loop through verbal repetition, activates the episodic buffer to support narrative integration, and engages the central executive in attentional control and information management. Explicitly informed by applied linguistic constructs such as narrative coherence, this approach suggests that story retelling facilitates cognitive modifications that go beyond purely linguistic performance (Baddeley, 1992; Gray et al., 2017).

This study investigates how retelling stories influences the working memory of individuals with cognitive impairments in Surakarta, aiming to understand potential cognitive benefits and develop effective intervention strategies to support their memory functions:

(1) What is the level of working memory function in individuals with cognitive impairment in Surakarta before implementing story retelling?

(2) What is the level of working memory function in individuals with cognitive impairment in Surakarta after implementing story retelling?
(3) What is the effect of story retelling on working memory performance in individuals with cognitive impairment in Surakarta?

LITERATURE REVIEW

Story Retelling as a Narrative-Based Intervention

Retelling is recognized as a cognitively oriented instructional approach that engages individuals in the process of encoding, organizing, and verbally reproducing narrative content. Thus, this contributes to an improvement in narrative comprehension and verbal working memory capacity (Vretudaki, 2022). From a cognitive perspective, retelling is understood as a linguistic activity that demands the working memory system, particularly in relation to temporary retention and active processing of verbal information necessary for accurate narrative recall and coherent structural organization (Baddeley, 2000; Paris & Paris, 2003). Empirical findings further indicate that the effectiveness of retelling is closely related to verbal working memory capacity, as individuals are required to retain narrative components while simultaneously organizing them into a coherent and meaningful discourse (Gillam et al., 2018).

Despite accumulating evidence highlighting the cognitive benefits of retelling, research examining its application among individuals with broader cognitive impairments remains relatively limited. Limitations in the existing literature informed this study, which conceptualizes retelling as a narrative-based linguistic intervention designed to enhance working memory performance through the retention and manipulation of discourse-level information. Furthermore, current practice in language and cognitive therapy increasingly utilizes structured retelling support, including story grammar-based frameworks, to enhance auditory memory, narrative organization, and verbal expression in clinical settings (Petersen et al., 2010).

Relevance and Significance of Cognitive Impairment and Working Memory

This study highlights the role of narrative-based tasks in advancing applied linguistics by integrating linguistic practice with cognitive processing mechanisms, particularly in resource-limited contexts. Working memory, as a fundamental component of cognitive function, is crucial for activities such as learning, problem-solving, and narrative comprehension. The importance of this topic is underscored by the increasing rate of mental decline linked to demographic longevity neurodegenerative disorders, which are projected to affect millions of individuals worldwide by 2050 (Livingston et al., 2020). In the context of speech therapy, Improving the standard of life and functioning independently requires therapies target working memory. Research synthesises existing literature to highlight the interaction between cognitive impairment, working memory, and narrative-based interventions such as retelling stories, with an emphasis on their significance in rehabilitation science.

Definition and Conceptual Framework of Cognitive Impairment

Defined as a decline in cognitive function that affects multiple domains, including orientation, attention, language, and memory, and is influenced by various demographic and lifestyle factors, such as age and education level (Han et al., 2022; Salari et al., 2025). Although a substantial body research has offered descriptive insights into cognitive impairment, longitudinal evidence evaluating the long-term effectiveness of non-pharmacological interventions remains limited (Cepeda-Pineda et al., 2025; Chang et al., 2021).

Empirical findings showing that cognitive impairment occurs often among the elderly. Research conducted by Khan and Suwarti (2023) and Madani and Biromo (2022) reported that the majority of older adults scored below 24 on the MMSE, a widely used screening instrument to assess global cognitive function, indicating significant cognitive decline (Khan & Suwarti, 2023; Madani & Biromo, 2022). In the scientific literature, cognitive impairment is typically classified into several domains, with memory, particularly verbal working memory, identified as one of the most vulnerable components. Among these domains, memory, particularly verbal working memory, has been identified as a particularly vulnerable domain owing to its pivotal role in language processing and daily functioning.

Although prevalence rates and cognitive profiles have been extensively documented, much of the existing literature remains descriptive in nature and provides limited insight into the causal mechanisms underlying cognitive decline or the sustained effectiveness of intervention strategies. The scarcity of longitudinal, intervention-oriented research represents a significant the existing literature, thereby underscoring the necessity for targeted, theoretically grounded cognitive interventions, particularly those rooted in language processing. In this regard, narrative-based approaches such as retelling are increasingly recognized as linguistically relevant and cognitively engaging interventions consistent with contemporary perspectives in applied linguistics and cognitive rehabilitation (Pragholapati et al., 2021).

Working Memory: Theories also Models

In order to carry out higher-level cognitive operations including thinking, learning, and understanding, the brain uses a system known as working memory (Angelopoulou & Drigas, 2021; Baddeley, 1992). Based on research by Gray et al. (2017), there are four interconnected subsystems at multicomponent design working memories. These subsystems are as follows: central executive, which controls attention also task coordination; visuospatial sketchpad, which processes visual also spatial informations; phonological loop, which processing auditory verbal material; also, episodic buffer, which integrates information across these subsystems. There has been extensive use of this theoretical paradigm in both academic and medical settings (Sinurat et al., 2022).

Recent developments in the literature indicate a conceptual shift from static representations of memory capacity towards dynamic, process-based models. One notable example is the Time-Based Resource Allocation Theory (TBRA), which

highlights the critical role of attention resource allocation in working memory function (Barrouillet et al., 2007). However, empirical research in this field continues to face methodological challenges, particularly inconsistencies in the measurement of working memory across different populations. Some studies rely on limited sample sizes or non-standardized assessment tools, thereby limiting the generalizability of their findings. Although substantial empirical evidence supports the central role of phonological and executive components, existing models remain limited by inadequate representation of cultural and contextual factors, particularly in non-Western populations. Overall, this theoretical framework offers a robust conceptual basis for understanding working memory deficits associated with cognitive impairment.

Storytelling vs. Story Retelling: Conceptual Differences and Therapeutic Implications

Storytelling and retelling are often used interchangeably in practice, but they represent distinct processes with distinct cognitive and therapeutic implications. In educational literature, storytelling is understood as a portmanteau of the words narrative and telling, referring to the act of conveying a story or narrative to an audience for the purpose of learning, conveying ideas, or understanding experiences in a coherent and meaningful way (Hardebeck et al., 2025). In contrast, retelling a story requires the listener to reconstruct and reproduce a previously heard narrative, involving auditory memory retention, sequencing, and verbal recall (Veraksa et al., 2020).

From a cognitive perspective, storytelling relies primarily on generative language production, whereas story retelling demands memory-related abilities, including storage, updating, and retrieval. This distinction positions story retelling as an activity more closely aligned with working memory stimulation, thus supporting its relevance to the research questions of this study. Previous research has confirmed that story retelling tasks correlate more strongly with memory measures than story-telling tasks, particularly in populations with cognitive or language deficits (Yoo & McNeil, 2019).

METHOD

Research Design and Context

This research employed a quantitative single-group pretest-posttest modes for investigating effects retelling intervention to working memory among person along cognitive impairment. Selections this design was motivated by its practicality and efficacy in detecting intervention related changes within a single group, thereby enabling the assessment of disparities between pre-intervention and post-intervention outcomes (Shadish & Cook, 2009).This study was conducted at Griya PMI Surakarta, a social welfare institution established in 2021 that provides services for elderly people experiencing cognitive and psychosocial difficulties. The research environment, characterized by limited resources and a humanitarian care framework for marginalized populations, informed the implementation of a simple narrative- based intervention. This approach was considered suitable for both group and individual administration, as it did not require sophisticated technological support.

Participants

Participants were recruited from the elderly population living at Griya PMI Surakarta, which houses a total of 108 residents, 12 of whom have been identified as having cognitive impairment. A purposive sampling approach was applied to recruit participants who satisfied pre-established inclusion indicators, specifically: person aged 15 - 70 years along MMSE count 24 or <, adequate functional verbal communication skills, and the absence of severe sensory impairment. Individuals with diagnosed psychiatric conditions or a recent history of trauma were excluded from the study. Although the inclusion criteria specified an age range of 15–70 years, all correspondents who included indicators also completed intervention aged 51 years or older.

A total of twelve correspondents help this research, including eight males also four females, ages ranging from 51 to 70 years. Given the limited sample size, uneven age distribution, descriptive age statistics were limited to range and frequency. This study obtained ethical clearance from the appropriate institutional review boards, and Everyone who participated were asked to provide their informed permission before they were included in research. Throughout the research process, strict confidentiality measures were maintained to protect participant privacy and ensure ethical standards were upheld shows in Table 1.

Table 1
Pretest Score Distributions

Baseline Characteristic	Frequency (n=12)	Percentage (%)
Gender		
Male	8	66.7
Female	4	33.3
Age Group		
51-60	3	25.0
61-70	9	75.0
MMSE Score		
8-17	3	25.0
18-24	9	75.0

Data Collection

Working memory was assessed using Form 14-2 of the Cognitive Linguistic Assessment developed by Shipley and McAfee (2021), which measures immediate memory and recent memory through structured tasks such as number span, word list recall, and sentence repetition (Shipley & McAfee, 2021). This evaluation was conducted orally in a controlled, distraction-free environment, with each item scored dichotomously (0–1), resulting in a maximum possible score of 8, based on the subtest administered in this study.

The story retelling intervention was conducted over ten sessions, once a day, using a narrative developed by the researchers entitled 'Helen's Morning Activities.' The narrative

was designed to incorporate verbal stimuli aimed at enhancing memory processing. Each session lasted approximately 30–45 minutes. Baseline measurements (pretest) were obtained before the first intervention session, while outcome measurements (posttest) were collected after completion of the final session. Data were recorded manually throughout the study. No instrument trial issues were identified; however, participant fatigue was occasionally observed and appropriately addressed by providing rest breaks during sessions.

Data Analysis

A version of SPSS 21.0 was used for the data analysis. To begin, we checked whether data distribution was normal utilizing Shapiro-Wilk test. We used appropriate non-parametric statistical techniques as the findings did not follow a normal distribution. Therefore, in order to reliably compare the pre- and post-intervention measures, the signed rank test Wilcoxon was employed. Approach ensured a robust analysis of the differences, accommodating the non-normality and providing reliable insights into the effects observed. Analytical accuracy was maintained through careful verification of data entries and comparison of quantitative results with session documentation to ensure consistency. This procedure supported the alignment of the analytical approach with the quantitative research objectives of this study.

FINDINGS

RQ1: Working Memory Performance Before the Story Retelling Intervention

A total of twelve participants were involved in the pre-intervention assessment. Pre-intervention assessment indicated that participants generally exhibited low to moderate levels of working memory performance. This baseline score indicates limitations in verbal working memory, characterized by impaired discourse processing, thus establishing a reference point for evaluating intervention effects. The mean pre-test score was 4.33 (SD= 2.995), with observed scores ranging from 0 to 7.

As shown in Figure 1 and summarized in Table 2, the distribution of pre-test scores exhibited substantial inter-individual variability. One-quarter of participants (25%) scored 0, reflecting very limited working memory function before the intervention. Furthermore, 16.7% of participants achieved a score of 3, while 8.3% scored 5 or 6. The largest proportion of participants (41.7%) scored 7, indicating that although some individuals maintained moderate working memory abilities, overall pre-intervention performance was uneven and inconsistent.

The median pre-test score was 5, indicating that at least half of the participants performed below the midpoint of the working memory scale. The wide range of scores (0–7), combined with the relatively high standard deviation, indicates considerable dispersion in baseline working memory performance. Further examination of individual scores revealed clustering at the lower end of the scale, highlighting the presence of a subgroup with significantly reduced working memory capacity before the intervention.

Categorical classification of pre-test scores (Table 3) indicates that three participants (25%) were categorized as having low working memory performance, while nine participants (75%) were categorized as having moderate working memory performance. No participants were classified as having high working memory performance at baseline, confirming the absence of optimal working memory function before the intervention.

Figure 1
Pretest Score Distributions

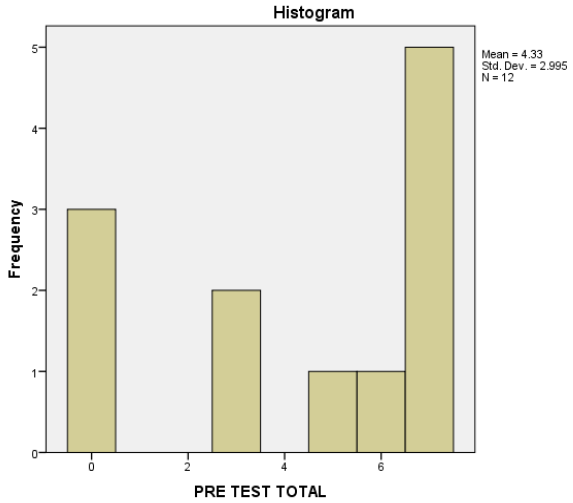


Table 2
Descriptive Statistic of Pretest Working Memory Scores

Statistic	Value
Mean	4.33
Standard Deviation	2.995
Median	5
Minimum	0
Maximum	7
Range	0-7

Note: Table 2 shows substantial spread in baseline working memory scores, supporting the heterogeneity observed among participants before the intervention.

Table 3
Distribution of Pretest Working Memory Performance Categories

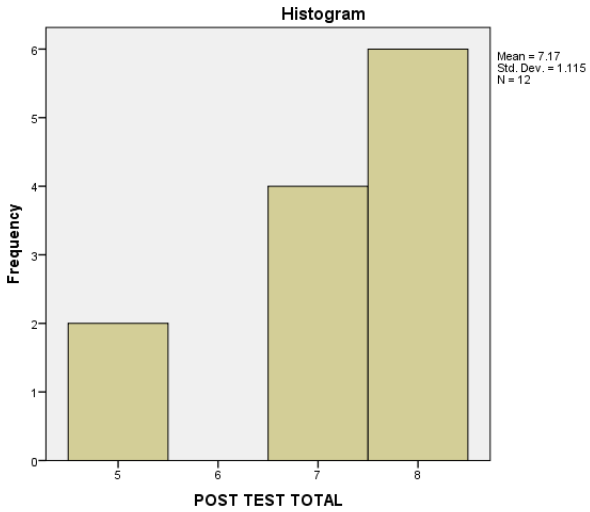
Category	Score Range	n	(%)
Low	0-2	3	25
Moderate	3-7	9	75
High	≥ 8	0	0
Total		12	100

Note: The categorical distribution confirms that no participant demonstrated high working memory performance at baseline, indicating uniformly compromised cognitive capacity prior to the intervention.

RQ2: Working Memory Performance After Following the Story Retelling Intervention

After completing ten sessions of the story retelling intervention, participants demonstrated significant improvements in working memory performance. The mean post-test score increased to 7.17 (SD = 1.115), with scores ranging from 5 to 8.

Figure 2
Posttest Score Distributions



We can see from above also Table 4, posttest score distributions demonstrated a pronounced shift toward higher performance levels. Six participants (50%) achieved the highest observed score of 8, four participants (33.3%) scored 7, and two participants (16.7%) obtained a score of 5. Importantly, no participants scored below 5 following the intervention.

Further analysis indicated that the median posttest score increased to 7, reflecting a clear upward shift in central tendency relative to pre-intervention performance. In addition, the narrower score range and reduced standard deviation suggest decreased variability across participants. Posttest scores were predominantly concentrated at the upper end of the scale, indicating convergence toward higher levels of working memory performance following the intervention.

Categorical analysis of post-test scores (Table 4) showed that none of the participants remained in the low working memory category. Six participants (50%) were categorized as having medium working memory, while the remaining six participants (50%) were classified as having high working memory. This categorical redistribution reflects a complete transition away from low working memory classification after the intervention.

Table 4
Descriptive Statistic of Posttest Working Memory Scores

Statistic	Value
Mean	7.17
Standard Deviation	1.115
Median	7

Minimum	5
Maximum	8
Range	5-8

Note. Compared with pretest values, posttest statistics demonstrate higher central tendency and reduced variability, indicating improved and more stable working memory performance following the intervention.

Table 5
Distribution of Posttest Working Memory Performance Categories

Category	Score Range	n	(%)
Low	0-2	0	0
Moderate	3-6	6	50
High	≥ 7	6	50
Total		12	100

Note. The categorical shift from low and moderate classifications to predominantly moderate and high levels reflect a marked improvement in working memory performance after the intervention.

RQ3: Impact of Story Retelling on Working Memory

In order to assess how the retelling intervention impacted working memory performance, Wilcoxon Signed Ranking Test was used for comparing pre- also post-test score. This was done since the data did not follow normal distribution. According Table 6, there was difference statistical significance across working memory scores before and after the intervention ($Z = -2.934$, $p = 0.003$).

Individual score changes (Table 7) revealed that all participants showed an increase or maintenance in their working memory scores after the intervention, with no declines. The average improvement score was 2.84 points, with individual increases ranging from 1 to 6 points. Participants who initially demonstrated low working memory performance showed the greatest relative improvement, while those with moderate baseline scores showed consistent, incremental improvement. The uniform direction of change across all participants suggests a consistent pattern of working memory improvement associated with the retelling intervention.

Table 6
Wilcoxon Signed-Rank Test Result

Test Statistic	Value
Z	-2.934
Asymp. Sig. (2-tailed)	0.0003

Table 7
Individual Gain Scores in Working Memory Performance

Indicator	Value
Mean Gain Score	2.84
Minimum Gain	1
Maximum Gain	6
Participants Improved	12
Participants Declined	0

Note: All participants demonstrated improvement or score maintenance, indicating a consistent positive effect of the story retelling intervention across individuals.

DISCUSSION

Findings addressing RQ1 indicate that individuals with cognitive impairment exhibit considerable variability in working memory capacity, with a significant proportion experiencing marked difficulties in short-term information retention and recall. This variability is reflected in a wide range of pre-intervention scores, suggesting uneven cognitive functioning across participants. This heterogeneity theoretically aligns Baddeley's multicomponent design of working memory, which conceptualizes works memories as a The working recall paradigm proposed by Baddeley dynamic system composed of interacting subsystems rather than a single construct (Baddeley, 1992). In individuals with cognitive impairment, deficits may differentially affect verbal memory system, regulatory control mechanism, and integrative storage unit, resulting in diverse working memory profiles (Angelopoulou & Drigas, 2021). Consistent with this view, empirical research has documented non-uniform patterns of working memory decline, particularly among older and populations along cognitive impairment, where verbal working memory is one of the most vulnerable yet highly variable domains (Khan & Suwarti, 2023; Madani & Biromo, 2022). Although some longitudinal investigations have reported more uniform declines in advanced neurodegenerative conditions, the current findings suggest that in cases of non-aphasic cognitive impairment, working memory limitations are not homogeneous but are shaped by individual cognitive-linguistic differences, thus supporting a spectrum-based conceptualization of cognitive decline (Raimo et al., 2024).

Regarding RQ2, post-intervention results demonstrated clear improvements and increased stabilization of working memory performance following the retelling intervention. The overall improvement in scores, accompanied by reduced variability, suggests that repeated engagement in narrative-based activities promotes more efficient and consistent working memory function. From a theoretical perspective, retelling requires sustained verbal repetition, narrative integration, and sequential reconstruction processes that heavily engage the verbal processing and integrative memory governed by executive control regulation (Baddeley, 1992; Gray et al., 2017). The observed improvements are also consistent with cognitive load theory, which posits that well-structured linguistic input can minimize unnecessary cognitive load and optimize the use of limited processing resources, thereby facilitating improved memory performance (Netto et al., 2010). Previous studies have reported comparable benefits from narrative-based interventions, showing that repeated retelling tasks improve verbal working memory through repetition and semantic organization in both clinical and non-clinical populations (Gabig, 2008; Veraksa et al., 2020). These findings suggest that narrative retelling not only strengthens memory capacity but also contributes to greater cognitive stability in individuals with cognitive impairment.

Findings related to RQ3 further confirmed that story retelling had a statistically significant positive effect on working memory performance, providing empirical support for its effectiveness as a language-based cognitive intervention. The significant improvement observed between pre- and post-intervention assessments suggests that working memory as malleable cognitive capacity which could enhanced through targeted cognitive-linguistic engagement. From a cognitive-linguistic perspective, retelling differs

from storytelling in that it places greater demands on memory maintenance, updating, and retrieval processes, making it particularly suitable for stimulating working memory (Yoo & McNeil, 2019). These outcomes as prior research demonstrating narrative repetition improves verbal working memory and discourse processing through repeated activation of executive control and memory integration mechanisms (Lê et al., 2023). Although some research suggests that the benefits of linguistic interventions may be task-specific, the current findings demonstrate a more general improvement in working memory capacity that extends beyond immediate task familiarity, thus supporting a neuroplasticity-based perspective emphasizing the role of repeated cognitive activation in functional memory enhancement.

Notwithstanding these contributions, several limitations warrant consideration. The outcomes cannot be generalized due to a small number of samples and the lack of a control group, which both limit the inference of causality. Furthermore, the brief duration of the intervention prevents conclusions from being drawn regarding the long-term sustainability of improvements in working memory. Nonetheless, this study offers important implications for linguistics. Retelling emerges as a low-cost, culturally adaptable, and linguistically meaningful intervention that can be effectively integrated into speech therapy and cognitive rehabilitation programs, particularly in resource-constrained settings. Future research is encouraged to use controlled longitudinal designs, incorporate more detailed assessments of working memory subsystems, and conduct cross-linguistic investigations to further strengthen the theoretical and empirical foundations of narrative-based cognitive-linguistic interventions.

CONCLUSION

Outcomes of nowadays research suggest implementation of a story retelling intervention resulted in a statistically significant improvement in working memory performance among individuals with cognitive impairment, as reflected by an increase in mean scores from 4.33 to 7.17 (p = 0.003). These results contribute to the field of applied linguistics by empirically validating story retelling as a language-based cognitive intervention, thereby extending psycholinguistic frameworks in rehabilitation research. Moreover, the findings help address existing gaps in the literature on narrative-based interventions and provide meaningful insights for the advancement of language-based cognitive rehabilitation and speech-language therapy practices. Despite these contributions, Be careful when interpreting the findings because of the tiny sample size and the absence of a comparison group. Accordingly, future studies are recommended to employ larger, controlled, and longitudinal experimental designs, as well as to examine culturally adapted narrative materials within Baddeley's working memory framework, in order to further strengthen the integration of applied linguistics and cognitive therapy across diverse populations.

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