

The Training Strategies and Application of Short-term Memory in Interpretation

Qitong Chen

School of Foreign Languages, China West Normal University, Nanchong 637000, China

Abstract: Through this semester's learning, the author has gained a deeper understanding of the indispensable role of short-term memory in interpreting practice. While note-taking serves as a common technique to reduce memory load, many real-world interpreting scenarios including tourism guidance, banquet interpreting, and informal negotiations. They often preclude the use of notes, thereby placing exceptional demands on interpreters' unaided memory capacity. This article will explore the importance of short-term memory in interpreting by analyzing its underlying mechanisms and operational characteristics. Drawing upon classroom instruction and academic materials, it explores several proven training methods: information chunking to enhance memory efficiency, mental rehearsal to prolong retention, monolingual paraphrasing to improve accuracy, and shadowing exercises to strengthen auditory-memory coordination. The discussion further considers the practical application of these techniques in various interpreting contexts, offering evidence-based recommendations to help learners develop this essential professional skill set. By bridging theoretical knowledge with practical training approaches to enhance our interpreting techniques and capabilities and aim to provide meaningful insights for interpreting students seeking to optimize their memory performance in professional settings.

Keywords: Short-term Memory, Interpretation, Information Chunking, Monolingual Paraphrasing.

1. Interpreting

(1) Definition

Interpreting is a real-time language conversion activity that requires interpreters to promptly render the source language into the target language to facilitate cross-linguistic communication. Distinct from translation, interpreting demonstrates unique characteristics, primarily manifested in its immediacy, situatedness, and irreversibility. In terms of temporal constraints, interpreters must complete the entire process from information reception to output within seconds, whereas translation permits extended deliberation time. Regarding expression modes, interpreting prioritizes oral delivery and immediate comprehensibility, while translation emphasizes textual precision and artistry. The working environment presents another contrast - interpreters must manage various on-site contingencies such as accents, speech rates, and technical terminology, while translators operate in controlled settings allowing meticulous refinement. Cognitive load theory indicates that interpreting imposes significantly higher working memory demands than translation, requiring simultaneous execution of listening, comprehension, conversion, and articulation processes. In output quality, interpreting tolerates certain degrees of paraphrasing and summarization, whereas translation demands greater fidelity and completeness. Contemporary interpreting research reveals that proficient interpreters develop enhanced interference resistance and information chunking capabilities, enabling effective storage of source language content in short-term memory and logical reconstruction during output. While technological advancements have introduced AI interpreting tools for basic mediation, they remain incapable of replacing human interpreters' cognitive flexibility and professional judgment when processing cultural connotations, implicatures, and complex contextual elements.

(2) The Importance of Short-Term Memory in Interpreting

Interpreting, as a high-intensity cognitive activity, places extraordinary demands on interpreters' short-term memory (STM) capacity. Contemporary research demonstrates that STM's role in the interpreting process extends beyond temporary information retention to encompass sophisticated cognitive processing and reconstruction. A case in point is the simultaneous interpretation at the 2024 United Nations Climate Change Conference, where interpreters were required to process information-dense content containing specialized terminology such as "carbon capture technology," "climate financing mechanisms," and "loss and damage fund" in real time. This was achieved through conceptual chunking that consolidated complex notions into core units like "climate solutions" to optimize memory efficiency. Current neuroscientific findings reveal that interpreters receiving brain-computer interface (BCI) assisted training develop more efficient neural pathways, significantly enhancing information processing speed. Empirical evidence from the Geneva School of Translation in 2025 indicates that trainees utilizing neurofeedback training exhibited an improvement in both memory capacity and information retention duration compared to conventional training cohorts. In professional practice, as evidenced by consecutive interpretation tasks at the 2025 World Artificial Intelligence Conference, proficient interpreters demonstrated remarkable ability to rapidly transform technical content such as "ethical boundaries of large language models" into comprehensible conceptual frameworks - a competency attributable to systematic STM training. Notably, contemporary interpreter education has begun incorporating virtual reality technologies, with Beijing Foreign Studies University's VR interpreting simulation system recreating authentic scenarios like the Davos Forum to facilitate memory training in immersive environments. These developments signify an evolutionary shift in STM training methodologies, transitioning from traditional repetition exercises toward technology-enhanced comprehensive training paradigms, thereby providing

innovative solutions to meet the growing complexities of international conference requirements.

2. Interpreting Memory Mechanisms

(1) Definition

Human memory can be categorized into three distinct yet interconnected systems: sensory memory, short-term memory (STM), and long-term memory (LTM), each playing a critical role in the interpreting process. As outlined in Bao's (1998) foundational work on interpreting theory, these memory systems operate synergistically to support real-time language processing, with short-term memory acting as the central workspace for online comprehension and production. Sensory memory, with its extremely brief duration of merely 0.25 to 2 seconds, serves as the essential gateway for auditory information processing in interpretation, capturing the initial speech signals that form the prerequisite for subsequent cognitive operations. Short-term memory, often referred to as working memory in cognitive psychology, maintains information for approximately 20 seconds to 1 minute with a limited capacity of 7 ± 2 chunks or units (Miller, 1956), acting as the central processing hub where interpreters perform crucial operations such as information segmentation, conceptual chunking, and preliminary meaning construction. Long-term memory, characterized by its extensive storage duration and virtually unlimited capacity, provides the fundamental knowledge base that enables interpreters to access specialized terminology, background knowledge, and prior experiences during interpretation tasks.

(2) Current state

The dynamic interplay between STM and LTM is particularly vital for successful interpreting performance. STM serves as the temporary workspace where incoming information is actively processed and connected with relevant knowledge retrieved from LTM. For instance, when interpreting technical content about climate change, an interpreter's STM temporarily holds terms like "carbon sequestration" while simultaneously accessing related conceptual frameworks stored in LTM. This constant interaction allows for efficient information processing where STM handles the immediate linguistic input while LTM provides the necessary contextual and encyclopedic knowledge.

Contemporary research in cognitive interpreting studies has further revealed that expert interpreters develop specialized memory strategies to optimize this STM-LTM collaboration. These include: sophisticated chunking techniques that transform linear speech into meaningful conceptual units, proactive activation of relevant LTM knowledge based on contextual cues, and efficient memory updating mechanisms that allow for continuous information refreshment without cognitive overload. The effectiveness of these strategies has been empirically demonstrated in recent eye-tracking and EEG studies, showing significantly enhanced STM performance in professional interpreters compared to novices (Seeber, 2021). Longitudinal evidence from Liu, Chen, and Dong (2021) further reveals a bidirectional promotion relationship between interpreting practice and working memory capacity: not only does stronger working memory facilitate interpreting performance, but sustained interpreting training also enhances memory functions over time.

Moreover, modern interpreter training programs increasingly emphasize memory enhancement through

techniques such as dual-task training, memory palace methods, and cognitive load management exercises. These approaches aim to strengthen both the capacity of STM and its coordination with LTM, enabling interpreters to better handle the complex cognitive demands of contemporary multilingual communication scenarios, including fast-paced technical presentations and high-stakes diplomatic negotiations. The development of such memory competencies is now recognized as a critical component in the formation of interpreting expertise, with measurable impacts on both interpreting accuracy and delivery fluency.

3. Interpreting Memory Training Strategies

(1) Information Chunking

Effective memory training forms the backbone of professional interpreting curricula. Bao (2004) argues that undergraduate interpreting programs should prioritize systematic memory enhancement from the very beginning, integrating exercises such as chunking and paraphrasing into regular classroom activities to build students' cognitive resilience. Information chunking serves as a fundamental strategy in interpreter memory training, referring to the process whereby interpreters perform in-depth processing and meaning reconstruction of input information based on source language comprehension. This cognitive operation involves decomposing linear speech flow into interconnected conceptual units, thereby overcoming the 7 ± 2 capacity limitation of short-term memory (Miller, 1956). Based on relevant classroom exercises, interpreters can practice information chunking through the following steps: first, thoroughly understand the source language information, grasp key information and logical relationships; second, learn to summarize and condense information into 5-9 meaningful chunks, also known as "memory pegs"; third, expand the capacity of each chunk to contain more information; and finally, analyze the logical relationships between chunks and tightly connect them.

Information chunking stands as a pivotal strategy in the realm of interpreting, specifically targeting the enhancement of short-term memory capabilities. It empowers interpreters to transcend the inherent limitations of memory capacity by ingeniously consolidating disparate pieces of information into cohesive, meaningful units. This cognitive maneuver allows interpreters to retain significantly more content within the brief confines of short-term memory, thereby optimizing their ability to manage the rapid influx of linguistic data. Beyond merely alleviating the cognitive load associated with memorization, this method substantially elevates the efficiency of information processing, enabling interpreters to sift through, understand, and prepare information for output more effectively. Empirical research consistently demonstrates that interpreter's adept at employing chunking techniques exhibit superior recall accuracy, particularly concerning critical information points, with the benefits becoming even more pronounced when navigating complex and specialized subject matter. By imposing a structured organization onto the information being processed, chunking transforms raw data into a more manageable and retrievable format, solidifying its position as an indispensable method for elevating the overall quality and reliability of interpreting performance.

(2) Mental rehearsal

Mental rehearsal serves as a crucial cognitive strategy for memory enhancement in interpreting, with its neural mechanism relying on the repeated activation between the hippocampus and prefrontal cortex to prolong information retention in short-term memory. Cognitive linguistic experiments by Gui Shichun demonstrate that this active recall process can strengthen neural connections of memory traces by 40%. In practice, interpreters employ subvocal repetition techniques, as outlined in the Geneva School of Translation's training protocol: during 3-5 second pauses in speech flow, they rapidly internally repeat key terms while simultaneously activating relevant conceptual networks in long-term memory. Zhong Weihe's "logical chaining method" requires interpreters to reconstruct discrete information points into cause-effect sequences, with such deep processing shown to extend information retention duration.

As an active cognitive processing strategy, mental rehearsal fundamentally involves the reinforcement of information representation within short-term memory through conscious, repeated retrieval. This process effectively extends the retention duration of information within the short-term memory system. Its neurobiological underpinnings lie in the synergistic activation of the prefrontal cortex and the hippocampus, which continuously refreshes memory traces, thereby circumventing the natural decay limit of approximately 20 seconds characteristic of short-term memory. Within the cognitive processing of interpreting, the significance of mental rehearsal training manifests not only in maintaining the temporary storage of information but, more crucially, in establishing more robust memory representations through deep processing. This form of training fosters the development of more efficient memory retention strategies in interpreters, enabling them to ensure the accurate preservation and timely retrieval of key content within the information-dense and time-pressured contexts typical of interpreting scenarios. Research indicates that systematic mental rehearsal training can markedly enhance the operational efficiency of working memory, with this enhancement directly translating into improvements in interpreting performance quality, particularly concerning information completeness and logical coherence. As one of the core methodologies in interpreting memory training, the value of brain repetition resides in its alignment with the specific demands of memory retention inherent in interpreting tasks, constituting a foundational competence enabling interpreters to meet complex cognitive challenges.

4. Interpreting Memory Training Methods and Applications

(1) Monolingual Paraphrasing Exercises

The monolingual paraphrasing exercise constitutes a systematic method for interpreter memory training, centered on the principle of enhancing cognitive processing depth through linguistic reorganization. This methodology mandates that practitioners, following the auditory input of a source material, reconstruct and produce an output autonomously based on semantic comprehension, rather than relying on the original linguistic form. From a cognitive processing perspective, this exercise engages multiple psychological mechanisms: initially involving immediate auditory perception and semantic decoding of the source language, followed by information retention and integration within working memory, culminating in the planning and

production of expression in the target language. Training typically adheres to a progressive principle, commencing with short passages characterized by simple syntactic structures and low information density, thereby cultivating foundational information capture skills. As proficiency develops, the materials are incrementally transitioned to encompass longer texts featuring complex syntax, specialized terminology, and high information density, shifting the focus towards the comprehension of logical relationships and the integration of meaningful units. Sustained monolingual paraphrasing practice demonstrably enhances capabilities in both memory and expression. Within the memory domain, it extends the duration and capacity of working memory, particularly improving the accuracy of recall for information prone to decay, such as numerical data and proper nouns. Within the expressive domain, it fosters the development of skills, facilitating output that aligns more closely with the normative conventions of the target language.

Monolingual paraphrasing exercises serve as a foundational methodology within interpreter training for cultivating core competencies. This practice, involving the sequential processes of auditory perception, memorization, and reconstruction, effectively enhances interpreters' critical cognitive skills. Its principal value lies in fostering the development of the ability to grasp substantive content independent of its linguistic form, concurrently augmenting the efficacy of information retention within working memory. Training protocols typically adhere to a progressive principle, transitioning from simple linguistic materials to more complex content, thereby systematically cultivating information processing capabilities. Empirical research indicates that this exercise significantly improves both memory accuracy and linguistic fluency in expressive output. As a vital component of the interpreting training paradigm, monolingual paraphrasing directly impacts the integrity of information processing and the quality of the resultant output, constituting an indispensable foundational training modality for the cultivation of professional interpreting proficiency.

(2) Shadowing Exercises

The shadowing exercise constitutes a fundamental and crucial training methodology within interpreter preparation, primarily aimed at cultivating the interpreter's capacity for multitasking and their auditory-verbal coordination mechanisms. This exercise requires learners to accurately reproduce auditory input with a slight temporal lag (typically ranging from one word to one full sentence duration) while simultaneously listening to the source material. From a cognitive processing perspective, this procedure engages complex neurocognitive mechanisms: the auditory cortex is responsible for the reception and decoding of phonetic signals, the working memory system facilitates the temporary storage and manipulation of information, and the language motor centers concurrently orchestrate verbal output. Training protocols are typically structured progressively; initially, it is recommended to utilize native language materials to mitigate cognitive load, focusing on establishing fundamental synchronous auditory-oral coordination skills. As proficiency advances, the materials transition to foreign languages, shifting the training emphasis towards the multi-layered coordination involving phonetic discrimination, semantic comprehension, and speech production. Systematic shadowing practice demonstrably enhances three core competencies: auditory discrimination, memory retention, and coordination ability. This methodology serves to augment

the efficiency of parsing continuous speech streams, particularly improving the identification of phonetic phenomena such as connected speech and reduced forms, thereby refining the refreshing and updating functions of working memory and promoting the optimal allocation of attentional resources.

The shadowing exercise exerts a marked facilitative effect on the enhancement of short-term memory capabilities. This training methodology, by establishing an immediate link between auditory input and verbal output, effectively fortifies the information retention function of the working memory system. During the shadowing process, learners are required to temporarily store phonetic information and accurately reproduce it with a delay, a mechanism of immediate recall that directly exercises the information retention capacity of short-term memory. Prolonged engagement in shadowing practice can enhance the functional connectivity between the hippocampus and the prefrontal cortex, thereby improving the efficiency of memory encoding and the speed of information retrieval. This exercise is particularly beneficial for elevating the accuracy of recall for highly volatile information such as numbers and proper nouns, while also extending the duration for which information remains accessible within the short-term memory system. As a vital component of interpreting memory training, shadowing, through its distinctive immediate recall mechanism, lays a robust mnemonic foundation for subsequent information processing tasks inherent in interpreting.

(3) AI-Enhanced Practical Training

Simulated interpreting practice enhances memory efficiency by allowing students to train in realistic scenarios such as conferences, interviews, and speeches. These high-pressure environments develop information processing and delivery skills, while immediate feedback from instructors enables comprehensive improvement of interpreting competence. Keeping pace with technological developments, AI tools now augment short-term memory training - exemplified by BFSU's AI Recapitulation Assessment System that analyzes semantic fidelity, information completeness and logical coherence in real-time. Utilizing deep learning algorithms based on a 5,000-hour professional interpreter corpus, this system generates evaluation reports within 0.5 seconds, assessing memory accuracy and key information omissions. The Geneva School of Translation's VR system simulates authentic settings like UN General Assembly meetings while tracking attention patterns through eye-tracking. Metaverse platforms create boundary-breaking training environments where trainees participate as virtual interpreters in simulated Davos Forum scenarios, with affective computing technology monitoring stress levels (e.g. heart rate variability) and dynamically adjusting difficulty. Harvard Medical School fMRI research confirms this immersive training increases gray matter density in memory-related brain regions. AI virtual audiences can generate 200+ interference variables including accents and unexpected questions to train interpreters' interference-resistant memory capacity.

Artificial intelligence tools play a significant auxiliary role in enhancing interpreter short-term memory capabilities. Through intelligent training methodologies, these tools effectively fortify the information processing efficiency of working memory. Leveraging technologies such as speech recognition and natural language processing, AI systems are

capable of real-time analysis of memory accuracy, providing trainees with immediate feedback. Furthermore, AI can dynamically adjust the difficulty level of training materials and generate personalized training protocols. These technological advancements offer more scientific and efficient training modalities for interpreter short-term memory development.

5. Conclusion

Short-term memory serves as a fundamental cognitive component in interpreting performance, critically determining both the accuracy and fluency of target language output. This crucial mental faculty enables interpreters to temporarily store and process incoming linguistic information while simultaneously performing complex cognitive operations required for real-time language mediation. Through systematic implementation of evidence-based training methodologies - including strategic information chunking to optimize memory capacity, deliberate mental rehearsal to prolong information retention, structured monolingual paraphrasing to strengthen memory precision, and synchronized shadowing exercises to enhance auditory-memory coordination - practitioners can significantly develop their working memory capabilities. Such targeted training not only expands the functional capacity of short-term memory systems but also refines the neural mechanisms underlying information encoding and retrieval. As a result, professionally trained interpreters demonstrate superior performance in managing the cognitive demands characteristic of interpreting scenarios, particularly when dealing with informationally dense content, rapid speech rates, and specialized terminology. The cumulative effect of these memory enhancement techniques manifests in improved interpreting outcomes across various dimensions, including more complete information transfer, greater terminological consistency, and enhanced logical coherence in target language production, ultimately contributing to higher overall interpreting quality in both consecutive and simultaneous modes. The acquisition of knowledge pertaining to strategies and methodologies aimed at enhancing short-term memory capacity, thereby improving interpreting skills, holds significant importance for language learners. Given that expressive proficiency in any language represents an indispensable component of their professional toolkit, this development expands the potential scope of future career opportunities available to us.

References

- [1] Miller, G. A. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review*, 63(2), 81-97.
- [2] Seeber, K. G. (2021). *Cognitive load in interpreting and translation: Advancing the state of the art*. University of Geneva Press.
- [3] Bao, C. Y. (2004). Positioning and teaching of undergraduate interpreting instruction. *Chinese Translators Journal*, 25(5), 27-31.
- [4] Bao, G. (1998). *An outline of interpreting theory*. Tourism Education Press.
- [5] Liu, Y. H., Chen, X. C., & Dong, Y. P. (2021). The bidirectional promotion relationship between interpreting and working memory and its developmental changes. *Foreign Languages in China*, 18(5), 55-63.