

Scottish International Conference on Multidisciplinary Research and Innovation – SICMRI 2025

COGNITIVE OPERATIONS IN SIMULTANEOUS INTERPRETATION: PERCEPTION AND COMPREHENSION IN FOCUS.

Ismatova Zarina Ahrorovna

Graduate master student of UzSWLU

zarinaismatova407@gmail.com

+998970072765

Abstract: Simultaneous interpretation (SI) represents one of the most complex cognitive tasks in human communication. It requires interpreters to listen, comprehend, and reproduce speech almost instantaneously in another language. This paper focuses on two key cognitive operations, perception and comprehension, as core components of the interpreting process. Drawing from psycholinguistic and cognitive frameworks, it investigates how interpreters manage auditory input, process linguistic information, and maintain accuracy and coherence under severe time constraints. The study highlights strategies used by interpreters to optimize perception and comprehension and discusses implications for interpreter training and cognitive research.

Keywords: Simultaneous interpretation, cognitive operations, perception, comprehension, attention, memory, psycholinguistics, speech production, short-term memory, verification model, cohort model.

Simultaneous interpretation (SI) is one of the most cognitively demanding forms of human communication. It requires the interpreter to listen to the source language, understand its meaning, and reproduce it almost instantly in the target language - all at the same time. This complex activity involves several mental operations working in parallel, such as perception, comprehension, memory, and speech production. Among these, **perception** and **comprehension** are the most fundamental stages. Perception allows interpreters to identify and process the incoming auditory input accurately, while comprehension enables them to extract and organize meaning from that input. Together, they form the foundation on which all other interpreting processes depend. If an interpreter fails to perceive or understand correctly, even excellent language skills cannot guarantee an accurate translation.

The perception–comprehension mechanism is the first cognitive system activated during simultaneous interpretation and forms the basis for its success. Perception and comprehension are distinct yet interrelated processes. Perception refers to the psychological act of reflecting external reality through language. It is subjective and influenced by the interpreter's goals, emotions, and motivations, leading to the creation of mental representations of incoming information. Comprehension, in contrast, involves extracting meaning from speech and encoding it into another mental form at the word, sentence, and discourse levels. It depends largely on the interpreter's language competence and ability to grasp the logical and semantic structure of the message.

D. Massaro's *Information Processing and a Computational Approach to the Study of Simultaneous Interpretation* introduced a perception model emphasizing the integration of multiple linguistic sources: phonemic, lexical, syntactic, and semantic during processing. This model advanced the debate on **bottom-up** (data-driven) and **top-down** (knowledge-driven) information processing. Bottom-up mechanisms are triggered by sensory input, while top-down processes reflect conscious control and prior knowledge. Over time, repeated controlled processes may become automatic, though still guided by top-down regulation. D. Massaro explored how bottom-up and top-down information processing interact in speech perception. His **Fuzzy Logical Model of Perception (FLMP)** suggests that language understanding remains stable through the integration of multiple information sources. Each source is processed independently, evaluated for how well it fits possible interpretations, and then combined to determine the most likely perceptual outcome.

Scottish International Conference on Multidisciplinary Research and Innovation – SICMRI 2025

W. F. Ganong's experiments further supported this idea by showing how lexical context influences phonetic perception. When participants heard ambiguous speech sounds, they identified them according to familiar word patterns, for example, perceiving more [d] sounds in "ask" than in "ash" contexts. The FLMP explains this effect through the combination of bottom-up input from speech sounds and top-down influence from lexical knowledge, both evaluated on a scale of fuzzy truth values (0–1).

For interpreters, the final step in understanding the speaker's intent occurs at the discourse level, where meaning is constructed beyond words and sentences. Interpreters use various strategies, including inductive and deductive reasoning to build hierarchical mental representations of the discourse. During comprehension, they constantly make inferences to clarify meaning and fill informational gaps. A crucial aspect of comprehension is syntactic analysis, which determines how words are grouped into meaningful structures. Scholars disagree on whether syntactic processing begins immediately after the first word is heard or only after a pause when enough lexical information has accumulated. The first view risks early misinterpretation, while the second increases memory load. Given these constraints, W. Frauenfelder (cited in psycholinguistic research) concluded that interpreters typically begin semantic and syntactic processing as soon as the first words are perceived, balancing accuracy with efficiency.

We partly disagree with the view that syntactic analysis proceeds uniformly, as it depends on multiple factors such as word function and contextual cues. We support G. V. Chernov's perspective, which emphasizes that analyzing earlier semantic-syntactic structures helps interpreters accumulate contextual information and linguistic redundancy. This allows them to predict and identify the semantic and syntactic roles of lexical units earlier during speech perception and comprehension. At the lexical level, scholars debate whether comprehension follows a discrete or cascading process. The discrete approach assumes that lexical identification occurs first, followed by access to meaning and syntax. The cascading approach, reflected in the "verification" and "cohort" models, argues that semantic information from several lexical candidates becomes available before full word identification. Psycholinguists explain this rapid recognition through deductive information processing, in which both auditory and contextual (lexical, syntactic, semantic, pragmatic) cues interact. This debate aligns with two major psycholinguistic models: autonomous, where context does not affect lower-level processing, and interactive, where higher-level information shapes lower-level analysis.

Studies of perception and comprehension in simultaneous interpreting show that these processes occur at several interconnected levels. Information is processed in a cascading, integrative manner that accelerates understanding. However, interpreters face difficulties related to pronunciation, speech rate, and unfamiliar accents. For example, nonstandard pronunciations such as Australian [maɪk] for *make* or ['ɒpə'reɪʃ(ə)n] for *operation* require extra cognitive effort. Mispronunciations or unknown words can cause confusion, while unfamiliar abbreviations (e.g., CoC-Code of Conduct in ASEAN meetings) may result in omissions. To strengthen this cognitive mechanism, interpreters should train to recognize various English pronunciation patterns, learn specialized terminology, and familiarize themselves with common abbreviations used by international speakers. Regular exposure to diverse speech varieties enhances perceptual flexibility and supports accurate comprehension.

REFERENCES

1. Балаганов Д.В. Психологические механизмы синхронного перевода. – Москва: Российский государственный гуманитарный университет, 2002. – 45 с.
2. Boland, J., Cutler, A. Interaction with autonomy: Multiple output models and the inadequacy of the Great Divide // *Cognition*. – Amsterdam: Elsevier, 1996. – Vol. 58. – P. 309.

Scottish International Conference on Multidisciplinary Research and Innovation – SICMRI 2025

3. Chernov, G.V. Theory and Practice of Simultaneous Interpretation. – Moscow: Nauka, 1987. – 158 p.
4. Frauenfelder, U. H., & Schriefers, H. A psycholinguistic perspective on simultaneous interpretation // Interpreting. – Philadelphia: John Benjamins Publishing Company, 1997. – P. 63.
5. Massaro, D.W., Shlesinger, M. Information Processing and a Computational Approach to the Study of Simultaneous Interpretation // Journal of Psycholinguistic Research. – New York: Springer, 1997. – No. 26(3). – P. 217.
6. McClelland, J.L., Elman, J.L. The TRACE model of speech perception // Cognitive Psychology. – New York: Academic Press, 1986. – Vol. 18. – P. 13.
7. Morton, J. Interaction of information in word recognition // Psychological Review. – New York: American Psychological Association, 1969. – P. 166.
8. Pechenkova, E.V., Falkman, M.V. Solving a Perceptual Task as an Interaction Between Bottom-Up and Top-Down Processes of Visual Information Processing // Theoretical and Experimental Psychology. – Moscow: Institute of Psychology RAS, 2010. – Vol. 3. – No. 3. – P. 52.
9. Tanenhaus, M., Lucas, M. Context effects in lexical processing // Cognition. – Amsterdam: Elsevier, 1987. – Vol. 25. – P. 213.