NEUROCOGNITIVE STUDIES OF TRANSLATION: ILLUSTRATED BY A DYNAMIC VIEW OF THE NEUROCOGNITION AS A TRANSLATION PROCESS

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Abstract: *The field of neurocognitive research provides valuable insights into how the human brain processes complex linguistic tasks, such as those encountered by translators. This article examines the neurocognitive mechanisms that underlie translation, highlighting the cognitive load, brain regions activated, and neural pathways engaged during bilingual processing. Using advanced neuroimaging techniques, such as functional Magnetic Resonance Imaging (fMRI) and Electroencephalography (EEG), researchers have identified critical areas, including the prefrontal cortex, angular gyrus, and Broca’s area, that play pivotal roles in translation tasks. The findings emphasize the interplay between working memory, executive control, and language comprehension, offering implications for translator training and cognitive enhancement strategies. The necessity of this research lies in improving translation pedagogy and fostering a deeper understanding of the cognitive demands faced by translators.*

Key words*: Neurocognitive studies, translation, bilingual processing, cognitive load, fMRI, EEG, brain response, linguistic tasks, working memory, executive control.*

Necessity: The necessity of this research is underscored by the growing need to understand the cognitive processes underlying translation to improve the training and performance of professional translators. Given the increasing demand for high-quality translations in our globalized world, a deeper understanding of the brain's response to translation tasks can lead to more effective teaching methods and cognitive training programs. Additionally, this research has the potential to inform strategies for cognitive enhancement, reduce cognitive load, and prevent translator fatigue.

Object: The object of this research is the neurocognitive mechanisms that are activated during the translation process, focusing on brain regions and neural pathways engaged when translators perform complex linguistic tasks.

Subject: The subject of this research is the cognitive and neural processes involved in bilingual language comprehension and production during translation. This includes the activation of brain areas such as the prefrontal cortex, which is associated with executive functions, and Broca's area, involved in language production.

Aim: The aim of this article is to explore the neurocognitive aspects of translation, focusing on how the brain processes complex linguistic tasks and what this reveals about bilingual language comprehension and production. By examining recent neuroimaging studies, the article seeks to highlight the neural mechanisms that support the high-level cognitive functions required for translation.

Translation is a cognitively demanding task that requires the integration of multiple linguistic and cognitive skills. Recent advancements in neurocognitive studies have paved the way for a deeper understanding of how the brain responds to complex linguistic tasks during translation. Translators must continuously engage in a dynamic process of language switching, meaning reconstruction, and context adaptation, which activates various neural networks.

Neuroimaging studies have identified several brain regions that are activated during translation tasks. The prefrontal cortex is crucial for executive functions such as attention, working memory, and decision-making, which are heavily involved in translation. Research by Hervais-Adelman et al. (2015) using fMRI has shown that the dorsolateral prefrontal cortex (DLPFC) is particularly active when translators engage in language switching and semantic processing.

The angular gyrus and supramarginal gyrus are involved in language comprehension and semantic integration. These areas help translators retrieve the meanings of words and phrases from long-term memory and integrate them into the target language context. Additionally, Broca’s area in the left hemisphere, known for its role in language production, is engaged during the formulation of sentences in the target language.

Working memory is a central component in translation, allowing translators to hold and manipulate information from both the source and target languages. According to Baddeley (2000), the working memory model is essential for understanding the cognitive load translators experience. The phonological loop and visuospatial sketchpad work together to store linguistic and contextual information, while the central executive manages attention and cognitive control.

Neurocognitive research, such as that by Christoffels et al. (2006), has shown that high cognitive load can lead to increased activation in the prefrontal cortex, reflecting the effort required to manage multiple linguistic tasks simultaneously. Translators often face challenges in balancing accuracy and fluency, which further adds to their cognitive burden.

The insights gained from neurocognitive studies have significant implications for translator training. Understanding how the brain processes complex linguistic tasks can inform the development of cognitive training programs aimed at enhancing working memory, attention control, and stress management. Techniques such as cognitive load reduction and mindfulness training may help translators improve their performance and reduce fatigue. Furthermore, incorporating neurocognitive principles into translation pedagogy can lead to more effective teaching methods that address the cognitive demands of translation.

Conclusion. Neurocognitive research has shed light on the intricate processes involved in translation, revealing the significant brain activity and cognitive load required for bilingual language processing. By understanding the neural mechanisms that support translation tasks, researchers and educators can develop strategies to enhance translator performance and well-being. Future research should continue to explore the relationship between cognitive functions and translation, using advanced neuroimaging techniques to provide deeper insights into this complex linguistic task.

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