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Cognitive language processing through positron emission tomography

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Abstract

This thesis investigates the cognitive language processing of South African Sign Language (SASL) interpreters using positron emission tomography (PET). The study is pertinent concerning cognitive language processing during simultaneous interpreting and grapples with a specific question: "What happens in the plurilingual black box during interpreting from SASL to spoken language/s?" The concept of translanguaging is fundamental to this study as it elucidates the intersection of ubuntu translanguaging and interpreting praxis in plurilingual interpreting settings. Interpreting in a plurilingual context is discussed concerning cognition, drawing on the theoretical framework of Motor Resonance and Adaptive Control theories. This investigation aims to understand cognitive language processing by plurilingual interpreters using neurological examination and accessing the idiosyncrasy of interpreting from sign language (visual-gestural mode) into a spoken language/s (vocal-auditory mode). The research questions cover prominent cognitive areas of activation during simultaneous interpreting and its relevance to language and simultaneous interpreting. Twenty subjects took part in the study. They interpreted a SASL text into various South African spoken languages while PET brain imaging, baseline and activation imaging were recorded. Data were collected using a questionnaire, interpreted voice notes and PET brain imaging. A triangulation approach was used to analyse the data by thematic analysis of the questionnaire, ELAN transcription and annotations of the recorded interpretation and NeuroQ^{TM} analysis of the PET brain imaging. The findings present evidence of ubuntu translanguaging strategies during interpreting, mainly by code-blending and lexical borrowing. For the cognitive part of the experiment, significant differences were seen in brain metabolism in the right Primary Visual Cortex (rPVC), left Primary Visual Cortex (lPVC), right inferior lateral anterior Temporal Cortex (riLAT), left anterior Medial Temporal Cortex (lMAT) and the right inferior lateral posterior Temporal Cortex (riLPT) across all respondents. Significant changes in the primary visual cortices, left and right anterior medial temporal cortex and right inferior lateral posterior temporal cortex of experienced interpreters were recorded. These changes highlight the role of visual cortices for visual inputs and processing and the temporal regions in language processing during interpreting. This study pinpoints the defined anatomical part of the temporal lobe that demonstrates changes during activation. The inferior or superior and lateral or medial and anterior or posterior region of the temporal lobe is involved when respondents interpret in the directionality SASL to spoken languages.