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Exploration mechanisms intrinsic to semantic networks and the nuanced appraisal of lexical repetition occurrences

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The use of cognitive assessments aids in identifying notable impairments, especially within cases involving the frontal lobe, as well as instances of neurodegenerative disorders like Alzheimer's, Parkinson's, and semantic dementia, among other pathologies.

This study concentrates on semantic memory, a crucial facet of cognitive storage responsible for integrating language and concepts acquired through everyday experiences. The conceptualization initiates by presenting memory as a complex semantic network, fostering various investigative processes. These processes' extent varies, based on the global or localized exploration nature and the strategic direction. Employing a stochastic model known as the 'switching random walker model,' it becomes feasible to emulate lexical searches within semantic networks. This model induces a diffusive process, characterized by Markov chains, within the network. Evaluating the efficiency and performance of these networks is accomplished through the utilization of rate entropy and the initial mean passage time.

Additionally, a unique approach introduces a fluency test model aimed at probing the correlation between short-term memory and the predisposition for lexical repetition. Instances of lexical repetition arise during tasks necessitating semantic verbal fluency, wherein individuals may inadvertently produce reiterated words. This situation encompasses contemplating a word through semantic network traversal, leading to the inability to ascertain if the word was previously uttered.

This research strives to bridge the gap between analyzing exploration mechanisms inherent to semantic networks and the intricate evaluation of lexical repetition incidents. To this end, a fusion is realized, encapsulating: i) The topological features characterizing the foundational semantic network; ii) Mechanisms of exploratory behavior rooted in switching dynamics and clustering modalities; and iii) The dimensions of short-term memory, embodied as a first-in, first-out buffer of defined proportions, proficient in retaining the most recently articulated lexical elements."

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