

**Title.** A neural network account of creativity-related differences in memory search: empirical evidence from an association chain task

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**Abstract.** Recent research on creative thinking reconciles previously opposed approaches either putting emphasis on structural or processual individual difference variables. Structural equation models e.g. show that small-world properties of the mental lexicon – gauged through graph-theoretical analyses of association data – and executive control processes – tapped by cognitive tasks, such as n-back – contribute jointly to explaining variance in divergent thinking (DT) tasks. Similarly, neuropsychological studies that apply temporal network analyses of fMRI data imply a dynamic interplay between associative memory structures and functions of an internal attention control to co-vary with high performance scores in a DT task. However, the methods applied have yet not allowed for specifying and examining the exact mechanisms, which realize such interplay and would thus help explain individual differences in mechanistic terms. To enter this gap, the present work proposes and validates a corresponding measurement model that can be fitted against individual data points of a simple-to-administer association chain task. Derived from a neural network approach towards memory search, the model parameters represent recursive sub-mechanisms of a structure-process interplay, e.g. internal attention updates or synaptic modulation. An empirical study with 21 high and 21 low creative participants lends evidence to the model's validity by demonstrating a high goodness-of-fit and uncovering systematic and hypothesized group differences in the parameters. The results contribute to our understanding of the cognitive mechanisms that underlie creativity-dependent differences in memory search. Additionally, our proposed approach goes beyond traditional techniques of network analyses already applied in the field of creative cognition research and allows addressing new questions on the dynamic coupling of associative structure and executive processes during creative ideation.