Memory Restructuring as a Cognitive Mechanism of Insight

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Introduction

The cognitive restructuring processes supporting insight problem solving, and their temporal dynamics remain unclear

This study examines how semantic memory structure, captured through semantic memory network metrics, changes during visual (magic trick) insight problem solving

Methods

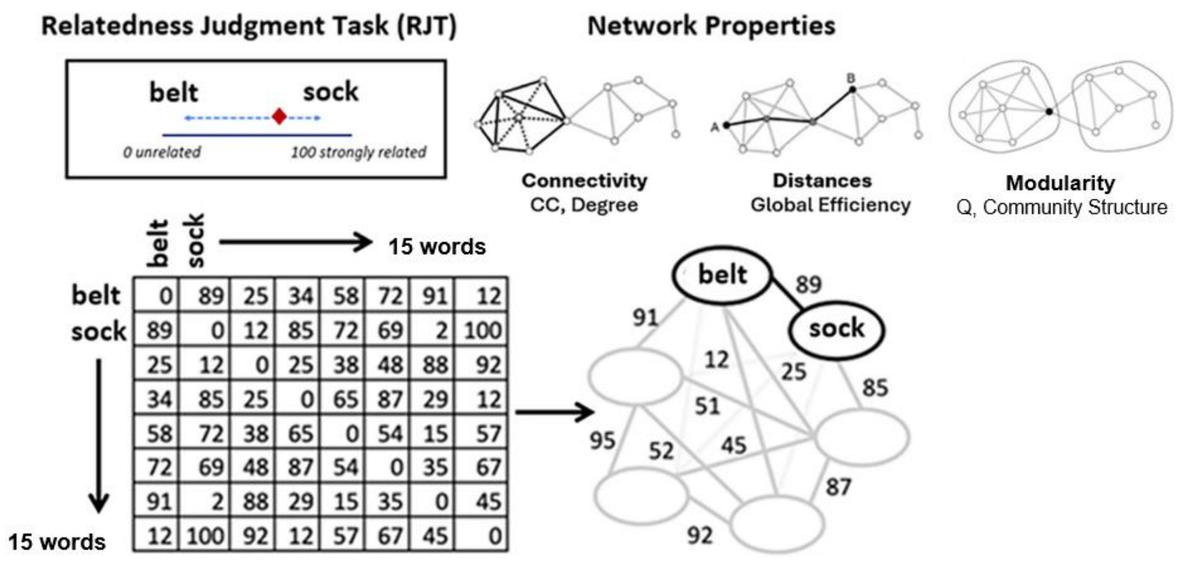
Participants

The sample consisted of 138 participants recruited via Prolific and comprised of 76 **non-solvers** (54.2% female) with a mean age of 39.97 years (SD = 12.00 years); 19 **solvers** (38.9% female) with a mean age of 42.37 years (SD = 12.22 years); and 43 **solution-given** participants (52.9% female) with a mean age of 40.22 years (SD = 11.16 years).

Magic trick

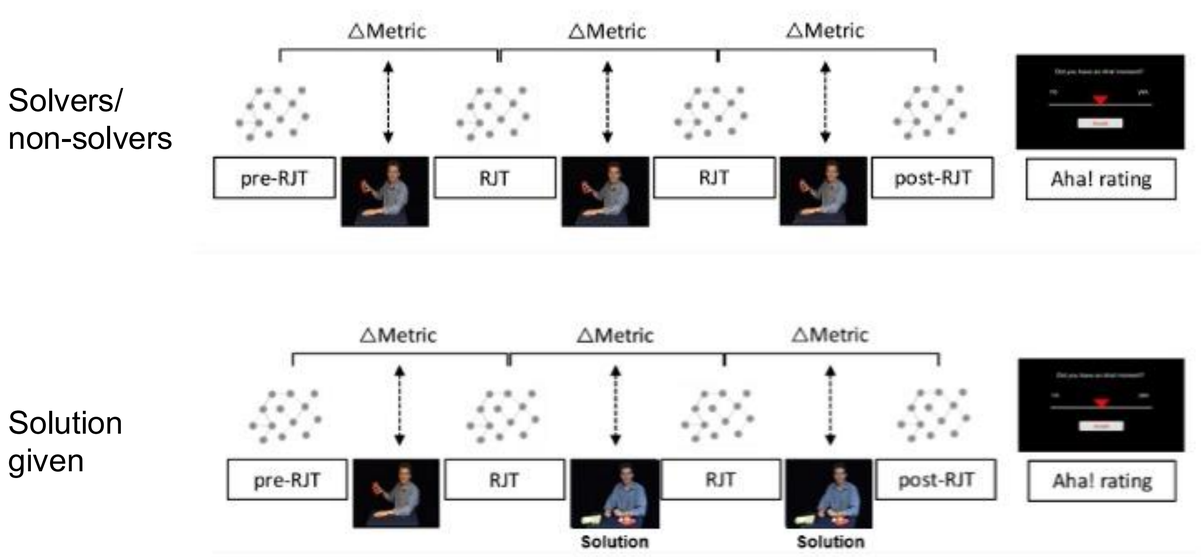
Semantic Memory Network Estimation

Relatedness Judgment Task (RJT) was used to construct individual-based weighted semantic memory networks. The task Included 105-word pairs, from a list of 15 words, either solution-related or solution non-related words

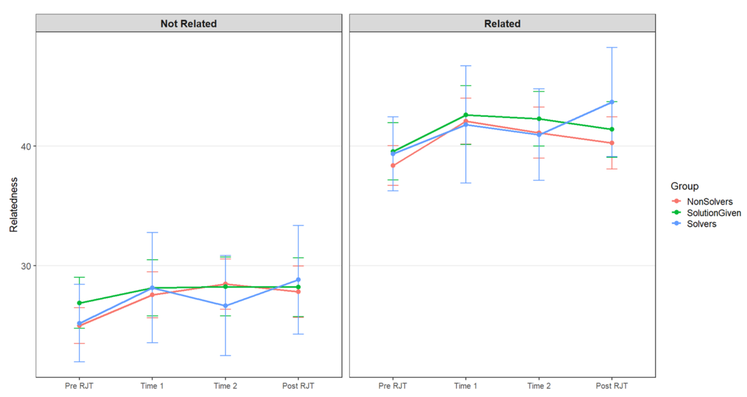


Schematic representation of the Relatedness Judgment Task (RJT) and its application to network analysis

Study design



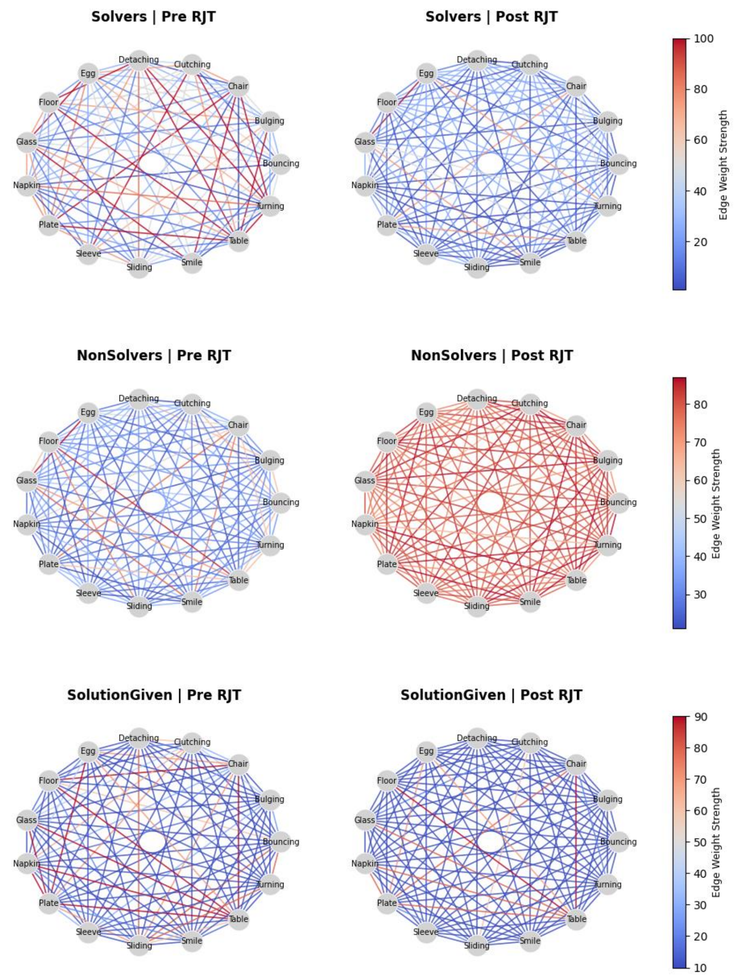
Relatedness Scores of Non-/Related Word-Pairs



Overall, all groups differentiated the relatedness of Non-related (left) compared to Related(right) Word Pairs.

*No Group or Group*Type effects found on relatedness judgments*

Results



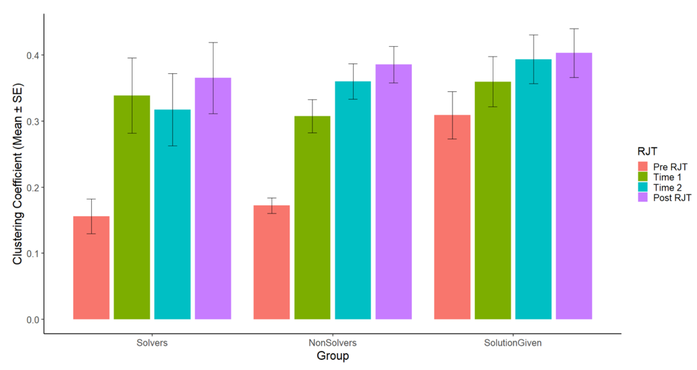
Semantic memory networks from one individual in each of the groups from their pre-RJT and post-RJT timepoints

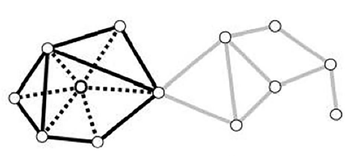
Nodes represent the 15 words

Edges represent the subjective relatedness judgment given by participant

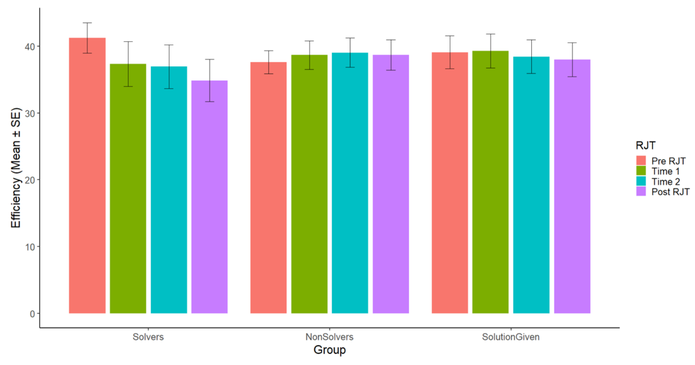
Edge color represents the strength of the relatedness score

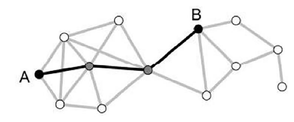
Semantic Memory Network Restructuring



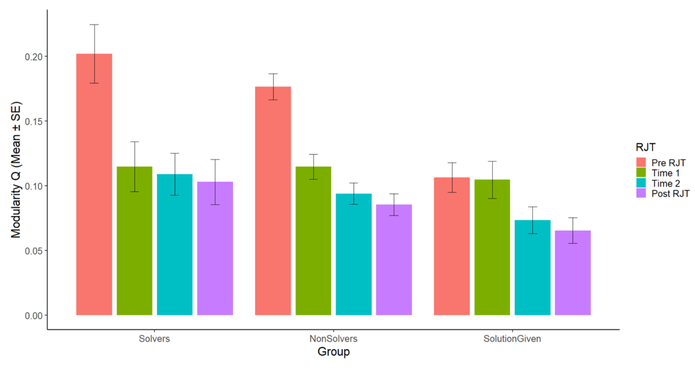


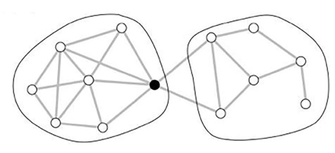
Connectivity





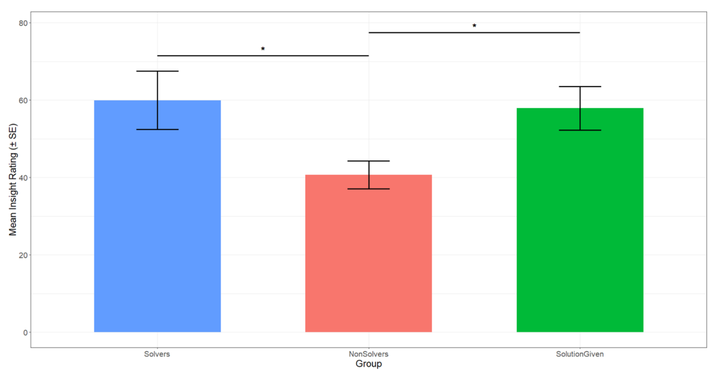
Distances





Communities

Subjective Report of Insight



Non-solvers reported significantly less subjective report of insight compared to solvers and solution-given groups.

No significant differences in subjective report of insight between Solvers and Solution-given groups.

A significant interaction effect was found between Efficiency and group on subjective report of insight – change in Efficiency from Time2 to Post-RJT in the solvers group was a significant predictor

Conclusion

Semantic memory structure changed across all groups, but unique restructuring in the solvers group (reduced efficiency) was related to subjective report of insight

Our findings shed further light on the role of semantic memory restructuring as a cognitive mechanism of insight, and its temporal dynamics

Poster

Contact

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