

Psychometric Network Analysis: A Novel Framework for Sex-Sensitive Cognitive Aging Research

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- Introduces psychometric network analysis as a new framework for studying cognitive aging
- Reveals sex differences in cognitive organization, not just performance
- Demonstrates the value of network approaches for precision aging research

INTRODUCTION	METHODS	RESULTS	CONCLUSIONS	REFERENCES
• Traditional research focuses on mean sex differences in cognition, with limited insights • Cognitive function is better understood as a dynamic system of interacting processes • Psychometric network analysis enables: • Mapping relationships between cognitive domains • Identifying core (central) processes • Aim: Apply a network-based framework to examine sex-sensitive patterns in late-life cognition	• Sample: N = 2,802 older adults (≥65 years) from the ACTIVE study • Measure: Mini-Mental State Examination (MMSE); 20 dichotomized cognitive items • Approach: Cognitive items modeled as nodes; Associations modeled as edges (positive/negative) • Analyses: Psychometric network analysis; Separate networks for males and females; Age-stratified comparisons (<73 vs ≥73) • Key metrics: Network structure; Connectivity patterns; Centrality	• Network Structure: Both sexes show a unified cognitive system • Connectivity Patterns: Sex differences emerged in how cognitive processes interact. Males had more negative connections, while females had more positive but weaker connections • Central Processes: Language naming was the most central node across sexes • Sex differences varied with age: At younger ages (<73), females had more negative connections while males had none. In older participants (≥73), males showed more negative connections	• Psychometric networks provide a novel lens for studying cognitive aging • Sex differences are structural (network-based), not just performance-based • Findings suggest distinct male vs female aging trajectories: Negative connections may reflect compensatory mechanisms. Males may compensate more, and females may compensate earlier, presenting earlier adaptive changes • Implication: Potential for sex-sensitive interventions and precision diagnostics (e.g., language naming may be a key target for assessment and intervention)	Rotstein, A. (2025). Sex differences in late-life cognition: A psychometric network analysis of well-functioning older adults. <i>The American Journal of Geriatric Psychiatry</i>, 33(7), 78-792. Jobe, J. B., Smith, D. M., Ball, K., Tennstedt, S. L., Marsiske, M., Willis, S. L., Rebok, G. W., Morris, J. N., Helmers, K. F., Leveck, M. D., & Kleinman, K. (2001). ACTIVE: A cognitive intervention trial to promote independence in older adults. <i>Controlled Clinical Trials</i>, 22(4), 453–479. Epskamp, S., Cramer, A. O. J., Waldorp, L. J., Schmittmann, V. D., & Borsboom, D. (2012). qgraph: Network visualizations of relationships in psychometric data. <i>Journal of Statistical Software</i>, 48(4), 1–18. CONTACT arotstein@univ.haifa.ac.il ALZHEIMER'S ASSOCIATION AAIC>26