

Exploring the Psychosocial Brain: A Retrospective Analysis of Personality, Social Networks, and Dementia Outcomes

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Abstract : Psychosocial factors such as personality traits and social networks influence cognitive aging and dementia outcomes both positively and negatively. The inherent complexity of these factors makes defining the underlying mechanisms of their influence difficult; however, exploring their interactions affords promise in the field of cognitive aging. The objective of this study was to elucidate some of these interactions by determining the relationship between social network size and dementia outcomes and by determining whether personality traits mediate this relationship. The longitudinal Alzheimer's Disease (AD) database provided by Rush University's Religious Orders Study/Memory and Aging Project was utilized to perform retrospective regression and mediation analyses on 3,591 participants. Participants who were cognitively impaired at baseline were excluded, and analyses were adjusted for age, sex, common chronic diseases, and vascular risk factors. Dementia outcome measures included cognitive trajectory, clinical dementia diagnosis, and postmortem beta-amyloid plaque (AB), and neurofibrillary tangle (NT) accumulation. Personality traits included agreeableness (A), conscientiousness (C), extraversion (E), neuroticism (N), and openness (O). The results show a positive correlation between social network size and cognitive trajectory (p -value = 0.004) and a negative relationship between social network size and odds of dementia diagnosis (p = 0.024/ Odds Ratio (OR) = 0.974). Only neuroticism mediates the positive relationship between social network size and cognitive trajectory (p < $2e-16$). Agreeableness, extraversion, and neuroticism all mediate the negative relationship between social network size and dementia diagnosis (p =0.098, p =0.054, and p < $2e-16$, respectively). All personality traits are independently associated with dementia diagnosis (A: p = 0.016/ OR = 0.959; C: p = 0.000007/ OR = 0.945; E: p = 0.028/ OR = 0.961; N: p = 0.000019/ OR = 1.036; O: p = 0.027/ OR = 0.972). Only conscientiousness and neuroticism are associated with postmortem AD pathologies; specifically, conscientiousness is negatively associated (AB: p = 0.001, NT: p = 0.025) and neuroticism is positively associated with pathologies (AB: p = 0.002, NT: p = 0.002). These results support the study's objectives, demonstrating that social network size and personality traits are strongly associated with dementia outcomes, particularly the odds of receiving a clinical diagnosis of dementia. Personality traits interact significantly and beneficially with social network size to influence the cognitive trajectory and future dementia diagnosis. These results reinforce previous literature linking social network size to dementia risk and provide novel insight into the differential roles of individual personality traits in cognitive protection.

Keywords : Alzheimer's disease, cognitive trajectory, personality traits, social network size

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