Personality and Cognitive Decline in the Baltimore Epidemiologic Catchment Area Follow-up Study

Rebecca S. Hock, B.A., Hochang Benjamin Lee, M.D., O. Joseph Bienvenu, M.D., Ph.D., Gerald Nestadt, M.D., M.P.H., Jack F. Samuels, Ph.D., Jeanine M. Parisi, Ph.D., Paul T. Costa, Jr., Ph.D., Adam P. Spira, Ph.D.

Objective: *To determine the association between personality domains and 11-year cognitive decline in a sample from a population-based study.* **Method:** *Data from Waves 3 (1993−1996) and 4 (2003−2004) of the Baltimore cohort of the Epidemiologic Catchment Area (ECA) study were used for analyses. The sample included 561 adults (mean age ± SD: 45.2 ± 10.78 years) who completed the NEO Personality Inventory-Revised prior to Wave 4. Participants also completed the Mini-Mental State Examination (MMSE) and immediate and delayed word recall tests at Wave 3, and at Wave 4, 10.9 ± 0.6 years later.* **Results:** *In models adjusted for baseline cognitive performance, demographic characteristics, medical conditions, depressive symptoms, and psychotropic medication use, each 10-point increase in Neuroticism T-scores was associated with a 0.15-point decrease in MMSE scores (B = −0.15, 95% confidence interval [CI]: −0.30, −0.01), whereas each 10-point increase in Conscientiousness T-scores was associated with a 0.18-point increase on the MMSE (B = 0.18, 95% CI: 0.04, 0.32) and a 0.21-point increase in immediate recall (B = 0.21, 95% CI: 0.003, 0.41) between baseline and follow-up.* **Conclusion:** *Findings suggest that greater Neuroticism is associated with decline, and greater Conscientiousness is associated with improvement in performance on measures of general cognitive function and memory in adults. Further studies are needed to determine the extent to which personality traits in midlife are associated with clinically significant cognitive outcomes in older adults, such as mild cognitive impairment and dementia, and to identify potential mediators of the association between personality and cognitive trajectories.* (Am J Geriatr Psychiatry 2013; ■:■−■)

Key Words: Personality, neuroticism, conscientiousness, cognition, dementia, depression

Received May 7, 2012; revised December 11, 2012; accepted December 14, 2012. From the Johns Hopkins Bloomberg School of Public Health, Department of Mental Health (RSH, OJB, GN, JFS, JMP, PTC, APS), Baltimore, MD; Yale University School of Medicine, Department of Psychiatry (HBL), New Haven, CT; and the Johns Hopkins University School of Medicine, Department of Psychiatry and Behavioral Sciences (OJB, GN, JFS, PTC), Baltimore, MD. Send correspondence and reprint requests to Adam P. Spira, Ph.D., Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, 624 North Broadway, Hampton House, Room 794, Baltimore, MD 21205. e-mail: aspira@jhsph.edu

http://dx.doi.org/10.1016/j.jagp.2012.12.217

Cognitive decline is associated with great disability and a profound burden on caregivers and the healthcare system.[1,2] The U.S. population of adults aged 65 and older is projected to double between 2010 and 2030, reaching approximately 72 million by 2030 and representing almost 20 percent of the population.[3] In parallel, both the incidence and prevalence of dementia are expected to rise dramatically over the next several decades.[4] Identifying individuals at elevated risk for cognitive decline is critical to understanding the etiology of neurodegenerative diseases and to developing prevention efforts.[5]

Personality domains have been linked to variables with relevance to cognitive outcomes. For example, greater Neuroticism, characterized by stress reactivity and negative affect, has been identified as a risk factor for inflammation[6] and reduced brain volume.[7] Also, Extraversion, characterized by a proclivity for social engagement and stimulation, has been inversely linked to major depressive disorder.[8]

Several studies have reported associations between personality and cognition.[9–13] For example, higher Neuroticism has been linked to cognitive impairment or decline,[11,14] whereas higher Openness and Conscientiousness may be protective against decline.[10,11] Studies have reported similar findings in terms of these personality domains and risk of Alzheimer disease.[9,12,13] The relationships between Extraversion, Agreeableness, and cognition are less clear with one study reporting a protective role of moderate Extraversion,[14] one study reporting an association between increased Extraversion and worse cognitive functioning,[11] and no studies reporting significant findings for Agreeableness and cognition.[9–13]

Studies of personality and cognition have had methodological limitations, however. Some have used retrospective[9] or case-control[14] designs, or primarily Caucasian[9,12] or highly selected populations (e.g., nuns, priests).[13] Others have excluded participants based on medical status,[12] limiting generalizability to less-healthy populations. Further, studies have generally been restricted to older adults.[9,12] Studying personality as a predictor of cognitive decline in older adults can be problematic, because neurodegenerative diseases are prevalent in this population and can produce both personality change and cognitive decline.[15] Thus, it can be difficult to demonstrate compelling causal links between "pre-morbid" personality and cognitive change in older populations.[12]

We determined the association between personality domains and 11-year cognitive decline in the Baltimore Epidemiologic Catchment Area (ECA) study, a population-based cohort of adults from a broad range of age groups and diverse racial/ethnic backgrounds.[16] Personality assessment was measured using the NEO Personality Inventory-Revised (NEO PI-R), a comprehensive five-factor model that yields the following personality domains: Neuroticism (reactivity to stress and tendency to experience negative affect); Extraversion (loquaciousness, proclivity for people, large groups, activity, excitement, and overall stimulation); Openness to Experience (inclination for intellectual curiosity, variety, imagination, aesthetic sensitivity, and attention to inner feelings); Agreeableness (ability to trust, sympathize with, and cooperate with others); and Conscientiousness (high degree of self control, active planning, and carrying out tasks in an organized fashion).[17] We hypothesized that higher levels of Neuroticism would be associated with greater cognitive decline, and that higher levels of Extraversion, Openness, Agreeableness, and Conscientiousness would be associated with greater stability of cognitive performance.

METHODS

Participants

Baltimore is one of five sites of the ECA Study, an NIMH-sponsored population-based study of psychopathology over the adult life course.[16] A probability sample of 3,481 East Baltimore residents was enrolled in 1981 (Wave 1) with follow-ups in 1982 (Wave 2), 1993–1996 (Wave 3), and 2003–2004 (Wave 4). Of the original sample, 2,768 were retained at Wave 2, 1,920 at Wave 3, and 1,071 at Wave 4. At each wave, participants completed multiple cognitive and psychosocial measures. Psychopathology was assessed using the NIMH Diagnostic Interview Scale (DIS).[18] Participants were included in the present analysis if they completed the NEO PI-R assessment at or after Wave 3 but before Wave 4 (N = 824) and at least one of three cognitive tests (see the following description) at both Waves 3 and 4 (N = 561). Here, we refer to Wave 3 as "baseline," and to Wave 4 as "follow-up."