

Perceived Stress and Cognitive Decline in Different Cognitive Domains in a Cohort of Older African Americans

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Background: Research indicates that stress is linked to cognitive dysfunction. However, few community-based studies have explored the relationship between perceived stress and cognitive decline, and fewer still have utilized cognitive domains rather than a global measure of cognition. **Objective:** We examined the relation between perceived stress and the rate of decline in different cognitive domains. **Methods:** Participants were older African Americans without dementia from the Minority Aging Research Study (MARS; $N = 467$, mean age: 73 years, $SD = 6.1$ years). A battery of 19 cognitive tests was administered at baseline and at annual intervals for up to 9 years (mean follow-up: 4 years), from which composite measures of global cognitive function and five specific cognitive domains were derived. The four-item Cohen's Perceived Stress Scale (PSS) was also administered at baseline. **Results:** In linear mixed-effects models adjusted for age, sex, education, and vascular risk factors, higher perceived stress was related to faster declines in global cognition ($\beta = -0.019$; $SE: 0.008$; $t_{(1951)} = -2.46$), episodic memory ($\beta = -0.022$; $SE: 0.011$; $t_{(1954)} = -1.99$), and visuospatial ability ($\beta = -0.021$; $SE: 0.009$; $t_{(1939)} = -2.38$) all $p < 0.05$. Findings were similar in subsequent models adjusted for demographics, vascular diseases, and depressive symptoms. **Conclusions:** Results indicate that older African Americans with higher levels of perceived stress have more rapid declines in global cognition than those with lower levels, most notably for episodic memory and visuospatial ability. (*Am J Geriatr Psychiatry* 2017; 25:25–34)

Key Words: African Americans, cognition, cognitive domains, cognitive decline, perceived stress

It has been well documented that stress, defined as a consequence of environmental events or demands (stressors) that exceed an individual's perceived ability to cope,¹ can affect a person's physical and psychological health. Research has described the detrimental

effects of chronic stress on psychological well-being and cognitive functioning, with an emphasis on the relationship between stress and memory.² Much of the evidence regarding the relation between stress and cognition, however, comes from clinical observations and

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basic neuroscience studies involving biological measures of the physiological stress response.³ Few community-based studies have explored the relationship between the perception of stress, which precedes the physiological response, and cognition, and fewer still have examined the full range of cognition rather than memory alone. The focus on memory in stress and cognition research stems from the fact that both animal and human studies show that psychosocial stress can lead to a spectrum of cellular changes in the hippocampus, a part of the limbic system that is important for declarative memory processes.⁴ The cellular changes seen in the hippocampus occur, at least in part, because of a high number of glucocorticoid/cortisol (also known as the stress hormone) receptors in this area.⁵⁻⁷ Glucocorticoid/cortisol receptors also exist in the prefrontal cortex, however, suggesting the possibility that psychosocial stress could lead to deficits in executive functioning and attention as well.^{8,9}

Research also suggests that chronic stress is associated with inflammatory and hormonal indicators of accelerated aging,¹⁰ with reports of greater perceived stress levels increasing the possibility of brain infarcts, reduced brain volume,¹¹ and elevated risk of stroke.^{12,13} Consequently, these same physiological markers of accelerated aging are also associated with rates of decline in cognition. Taken together, these different lines of research suggest that perceived stress may be related to cognitive decline by causing cellular changes within the hippocampus or via an association with inflammatory and hormonal markers of brain aging. We are aware of only one population-based study that examined perceived stress and change in cognition.¹⁴ Although that study confirms a relationship between perceived stress and cognitive decline, they used only a brief global measure of cognitive function consisting of four tests. Thus, the potential relationship between perceived stress and *specific* declines in memory and attention, as suggested by previous literature, is still an unanswered question.

Previous research has suggested that African Americans experience a disproportionate burden of stressful life experiences linked to poverty, racism, and residential segregation, due, in part, to their relative low social status in U.S. society.¹⁵⁻¹⁸ For example, African Americans are more likely to experience stressful life conditions such as unfair treatment, environmental stressors such as impoverished neighborhoods, and limited job opportunities.^{19,20} Yet most research on

psychosocial stress and health outcomes has been conducted in the majority white population. In addition, several studies have documented high rates of cognitive impairment in older African Americans.²¹ Examination of the link between perceived stress and cognition in a population characterized by societal inequalities and high rates of cognitive impairment^{16,18,21} would represent an important step in delineating whether psychosocial stress may be a modifiable risk factor for cognitive decline. Therefore, we examined the relation between perceived stress and cognitive decline in a sample of community-dwelling older African American adults. We hypothesized that higher levels of perceived stress would be related to faster rates of cognitive decline, particularly in the well documented area of hippocampus-mediated tasks such as memory (as measured by episodic memory specifically) and the projected areas of prefrontal cortex-mediated tasks such as executive function and attention (as measured by perceptual speed specifically).

METHODS

Participants

All participants were enrolled in the Minority Aging Research Study (MARS) and had signed an informed consent form in which they agreed to annual clinical evaluations that included an assessment of lifestyle and psychosocial factors (e.g., depressive symptoms and perceived stress) and cognitive testing, as previously described.²² MARS is a longitudinal epidemiological cohort study of risk factors for cognitive decline and Alzheimer disease in African Americans, approved by the Rush University Medical Center institutional review board. The participants were older community-dwelling adults, without dementia, recruited from churches, community-based organizations, senior-subsidized housing facilities in the Chicagoland area, and through the Clinical Core of the Rush Alzheimer's Disease Center. Community presentations were held throughout the city on aging and Alzheimer disease in African Americans, during which a description of the study and eligibility were discussed. Interested persons were asked to complete a form describing their level of interest in the study, and were contacted later to have questions answered and obtain further information on the study. At the time of the analysis, 602 older adults

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