Personality and Individual Differences 59 (2014) 89–95

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Personality traits, facets and cognitive performance: Age differences in their relations

Eileen K. Graham *, Margie E. Lachman

Brandeis University, Waltham MA, United States
Northwestern University, Evanston IL, United States

ARTICLE INFO

Article history:
Received 26 July 2013
Received in revised form 13 November 2013
Accepted 18 November 2013
Available online 8 December 2013

Keywords:
Personality
Facets
Cognitive aging

ABSTRACT

Personality traits and cognitive performance are related, but little work has examined how these associations vary by personality facet or age. 154 adults aged 22–84 completed the Brief Test of Adult Cognition by Telephone (BTACT) and the NEO Five Factor Personality Inventory. Hierarchical multiple regression analyses showed negative emotional aspects of personality (neuroticism, depression) were associated with lower reasoning, and social aspects of personality (assertiveness) were associated with faster reaction time, yet lower reasoning. The association between neuroticism and performance was found primarily among younger adults. In older adulthood, better performance was associated with positive emotional aspects of personality. We discuss how personality may have different associations with performance across age and the implications for possible interventions.

1. Introduction

Research has shown links between personality and cognition, although results have been somewhat inconsistent. Neuroticism is negatively related to cognition, while openness is positively linked to cognition (Chamorro-Premuzic, Furnham, & Petrides, 2006; Costa, Fozard, McCrae, & Bosse, 1976; Graham & Lachman, 2012; McCrae, 1987; Moutafi, Furnham, & Crump, 2003; Moutafi, Furnham, & Paltiel, 2005; Schaie, Willis, & Caskie, 2004). Extraversion is associated with better speed and long-term memory, but worse reasoning and verbal ability (Chamorro-Premuzic & Furnham, 2006; Chamorro-Premuzic et al., 2006; Graham & Lachman, 2012; McCrae, 1987; Moutafi et al., 2005). Conscientiousness shows positive and negative associations to cognition (Graham & Lachman, 2012; McCrae, 1987; Moutafi et al., 2003, 2005; Schaie et al., 2004). Agreeableness is associated with poor reasoning, spatial orientation and general cognition (Schaie et al., 2004; Willis & Boron, 2008). Variations across studies could be due to the focus on traits not facets, and the range of cognitive variables used. For example, inconsistencies in extraversion could be explained by whether studies use tasks requiring effortful or automatic processing (Evans, 2008). Some argue that personality and cognition represent overlapping constructs (Ackerman & Heggestad, 1997). However, others more recently argue that intelligence/ability and performance are distinct from personality (Chamorro-Premuzic & Furnham, 2006).

The personality/cognition relationship also varies by age. Whereas personality typically stabilizes by middle adulthood (Roberts, Walton, & Viechtbauer, 2006), cognitive performance shows declines on fluid tasks in later adulthood (Salthouse & Ferrer-Caja, 2003). Some studies examined how relationships between personality and performance vary by age although not typically at the facet level. Booth, Schinka, Brown, Mortimer, and Borenstein (2006) explored traits among older adults (60–85), finding that openness and neuroticism are the strongest predictors of performance. Baker and Bichsel (2006) broadened this by comparing younger and older adults, finding that across age, extraversion and openness were positively associated with most aspects of performance. They also examined cognitively superior older adults, a group with better performance than average older adults in the sample, finding that high conscientiousness and low agreeableness were associated with better performance. This suggests that individuals who maintain their abilities beyond the average older adult have a particular constellation of personality characteristics (Baker & Bichsel, 2006), and provides a foundation for our study by showing the importance of understanding how personality influences performance differently for older and younger adults. Soubelet and Salthouse (2011) examined a wide age range (18–96) and found the pattern and direction was consistently positive for openness across age, and negative for extraversion. We extend this by examining personality facets and traits in relation to performance as a function of age.

Few studies included facets in their analyses, and with age homogeneous samples. Chamorro-Premuzic and Furnham (2003)

* Corresponding author. Address: Northwestern University, Psychology Department, 2029 Sheridan Road, Evanston, IL 60208, United States. Tel.: +1 (913) 530 6580.
E-mail address: eileen.graham@northwestern.edu (E.K. Graham).

0191-8869/$ - see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.paid.2013.11.011

found that facets related to academic performance were dutifulness (C), anxiety (N), and activity (E), concluding that inclusion of facets is necessary to determine the precise characteristics predicting performance. Other studies used a wider age-range but did not analyze as a function of age. Moutafi, Furnham, and Crump (2006) found, among 24–66 year-olds, actions and ideas (openness) were positively correlated, while order, self-discipline and deliberation (conscientiousness) were negatively correlated with fluid intelligence. Aiken-Morgan et al. (2012) explored traits and facets among older adults in relation to memory and verbal learning, revealing facet-level predictors, including positive emotions, deliberation (negative) and straightforwardness (positive). These studies provide guidance for the current study, and we expand this work to include younger and older adults to analyze how these associations differ across age. There is a need for a systematic analysis of personality facets that may underlie trait level associations, and the differential effects that personality may have on cognition in younger versus older adults.

The current study's objective was to extend the literature by examining (a) links between personality and cognition at the trait and facet levels in a sample including younger and older adults, to explore which traits/facets are related, and whether relationships vary by cognitive domain, and (b) how links between personality and cognition differ in older and younger adults. Personality may be a risk or protective factor for cognitive performance or aging-related changes in cognition.

For hypothesis one, we were interested in whether results would be found when younger and older adults were both included, as earlier work focused primarily on either college students or older adults. We expected neuroticism to be negatively related, and openness to be positively related to performance across cognitive domains. Based on prior work (e.g. Costa et al., 1976; Wolf & Ackerman, 2005), we expected extraversion to be positively related to speed but negatively related to domains requiring effortful processing (e.g. reasoning, verbal fluency). We expected conscientiousness to be negatively related to speed, verbal fluency and reasoning.

The goal of hypothesis two was to uncover specific facets of each trait most closely related to cognition (e.g. Chamorro-Premuzic & Furnham, 2003; Moutafi et al., 2006). We expected competence to be positively related, and dutifulness to be negatively related to all cognitive domains. The extraversion facets of assertiveness and activity would be negatively related to reasoning and positively to speed. We expected all facets of openness to be associated with cognition, the most strongly being ideas and actions (Moutafi et al., 2006). We expected depression and anxiety (neuroticism) to have a negative relation to all domains.

The goal of hypothesis three was to examine how personality-cognition varies across age (Aiken-Morgan et al., 2012; Soubelet & Salthouse, 2011). We expected the relation between personality (traits and facets) and cognition to vary for younger and older adults. Given the limited literature with age comparisons, we did not make specific predictions for all facets. Nevertheless we expected to find positive emotions, deliberation, and aesthetics, feeling and ideas to play a unique role in older adulthood (Aiken-Morgan et al., 2012). We focused on fluid measures of cognition, as these are known to decline with age yet show wide individual differences.

2. Methods

2.1. Participants

Participants were from a probability sample within 10 miles of a university in suburban Boston, provided by a sampling firm. Trained lab members mailed letters to potential participants, called to follow up, and recruited them, resulting in a total sample of $N = 154$. The average age was 57.23 (SD = 15.68, range 22–84). The sample was comprised of 51.3% over the age of 60%, 52.6% were male, and 82.7% of the sample had a college education or higher.

2.2. Measures

2.2.1. Personality

Personality was measured using the 240-item NEO-FFI (Costa & McCrae, 1992), which included the 30-facet, and five trait scales. Participants rated themselves on a 5-point scale ranging from "strongly disagree" to "strongly agree," with respect to how well each statement described them. Each facet score consisted of a mean of 8 items from the overall scale. Each trait score was computed by taking the mean of that trait's corresponding facet scores. The range of coefficient alpha reliabilities was from .60 to .85. One facet, tender-mindedness, was below .6, therefore we do not report results for this facet.

2.2.2. Cognition

Cognitive performance was measured using the Brief Test of Adult Cognition-Telephone (BTACT) (Lachman & Tun, 2008). The cognitive domains measured were processing speed, reaction time, verbal fluency, inductive reasoning, working and episodic memory. Phone testing is useful, especially for older adults who do not typically use the internet frequently, and may have difficulty due to vision problems. Hearing issues for phone batteries has been addressed, and shown not to be a factor (Lachman, Agrigoroaei, Tun, & Weaver, in press).

2.2.2.1. Verbal fluency. It was measured using the category fluency task (Kozora & Cullum, 1995; Lezak, 1995). Participants were given one minute to generate as many words within the category "animal" as they can. Repeated words and intrusion errors were subtracted from the total score.

2.2.2.2. Inductive reasoning. Participants were asked to generate the next logical number in a progression of numbers (such as "3 6 9 12 15"). They received 5 series, increasing in difficulty. Scores were the number of sets correctly completed, for a highest possible score of 5.

2.2.2.3. Processing speed. Participants were given 30 s to count backwards from 100 as quickly and accurately as possible. The score is the total number of correct numbers reported, after subtracting skipped and incorrect numbers.

2.2.2.4. Reaction time. It was measured using the Stop and Go Switch task. Participants completed two single task trials with 20 blocks each, first with a congruent response (to RED, say "STOP", to GREEN, say "GO"), then with an incongruent response (to RED, say "GO", to GREEN, say "STOP). In the mixed-switch trials, they were given a cue to switch between congruent and non-congruent responses. The task sequence was randomized, so switch cues were given at random intervals in order to increase sensitivity to age effects (Tun & Lachman, 2008). Reaction time scores are coded such that higher latency scores indicate slower speed and are reported in milliseconds. The mean of reaction times for the mixed-task (switch and non-switch trials) was analyzed.

2.2.2.5. Episodic memory. It was assessed using the Rey Auditory-Verbal Learning Test (Lezak, 1995; Rey, 1964; Taylor, 1959), which includes 15 items for free recall with a possible scores of 0–15.