

## BRIEF REPORT

# Personality–Cognition Relations Across Adulthood

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Although an increasing number of studies have investigated relations between dimensions of personality and level of cognitive functioning, the research results have been somewhat inconsistent. Furthermore, relatively little is known about whether the personality–cognition relations vary as a function of age in adulthood. The current project examined these issues with data from a sample of 2,317 adults between 18 and 96 years of age who each completed a personality inventory and performed a broad battery of cognitive tests. The results revealed strong relations of the personality trait of Openness with several distinct cognitive abilities and smaller relations of other personality traits with specific cognitive abilities. Comparisons across different age groups indicated that the personality–cognition relations were both qualitatively and quantitatively similar across the adult years.

*Keywords:* Big Five, cognition, age, structural invariance

There has been considerable research on the relations of age to personality (e.g., McCrae, Martin, & Costa, 2005; Roberts & Mroczek, 2008; Srivastava, John, Gosling, & Potter, 2003; Terracciano, McCrae, Brant, & Costa, 2005), on the relations of age to cognition (e.g., Salthouse, 2004; Salthouse & Ferrer-Caja, 2003; see Craik & Salthouse, 2008, for a review), and some research on the relations of personality to cognition (e.g., Ackerman & Heggestad, 1997; Moutafi, Furnham, & Crump, 2006; Schaie, Willis, & Caskie, 2004). However, results of studies investigating personality–cognition relations have not always been consistent. For example, reported correlations between both Extraversion and Conscientiousness have sometimes been positive and sometimes negative (for contradictory results on Extraversion, see, e.g., Ackerman & Heggestad, 1997; Austin et al., 2002; Meier, Perrig-Chiello, & Perrig, 2002; Moutafi, Furnham, & Paltiel, 2005; Moutafi et al., 2006; see also Wolf & Ackerman, 2005; for contradictory results on Conscientiousness, see, e.g., Allik & Realo, 1997; Booth, Schinka, Brown, Mortimer, & Borenstein, 2006; Furnham & Chamorro-Premuzic, 2006; Moutafi et al., 2006; Moutafi, Furnham, & Crump, 2003; Moutafi, Furnham, & Paltiel, 2004). In addition, although the relations of Neuroticism to cognitive measures tend to be negative in nature (e.g., Crowe, Andel, Pedersen, Fratiglioni, & Gatz, 2006; Judge, Higgins, Thoresen, & Barrick, 1999;

Wilson et al., 2007), they have not always been significant (e.g., Arbuckle, Gold, Andres, Schartzman, & Chaikelson, 1992; Hulstsch, Hertzog, Small, & Dixon, 1999; Jelacic et al., 2003; Schaie et al., 2004; Whetherell, Reynolds, Gatz, & Petersen, 2002). The most consistent finding regarding the relations between personality and cognition may be that higher levels of Openness are associated with better performance on several cognitive tasks (e.g., Ackerman & Heggestad, 1997; DeYoung, Peterson, & Higgins, 2005; Judge et al., 1999; for relations between creativity and typical measures of intelligence, see DeYoung, Flanders, & Peterson, 2008).

One potential reason for the inconsistent results is that relatively little research has examined the possibility that personality–cognition relations might vary as a function of age (but see Hulstsch et al., 1999). This omission is unfortunate because in addition to determining whether the relations generalize to other segments of the population, examination of age relations could be informative about the nature of age differences in both personality and cognition. For example, an increase in the strength of the personality–cognition relation with increased age might suggest that the two aspects are becoming more closely integrated, or less differentiated, with increased age. Alternatively, a nearly constant relation between aspects of personality and aspects of cognition across the adult years would be consistent with the preservation of the distinction between the two dimensions of functioning across the adult years.

There were two major goals of the current project. The first was to determine which dimensions of personality are related to which aspects of cognitive functioning. The second goal was to investigate whether the personality–cognition relations differ across adulthood. Among the desirable conditions for providing meaningful answers to these questions are a moderately large sample of participants across a wide age range, reliable assessment of major dimensions of personality, broad and sensitive coverage of cognition, and evidence that the relevant aspects of both personality and cognition are measured in a similar fashion at different ages.

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The current project attempted to incorporate these characteristics by examining data from a sample of 2,317 adults between 18 and 96 years of age who each completed the International Personality Item Pool personality questionnaire (IPIP; Goldberg, 1999) assessing the Big Five personality traits and also performed a broad variety of cognitive tests. The cognitive tests were selected to represent the four cognitive abilities indicated in Figure 1, and prior research (e.g., Salthouse, 2004; Salthouse & Ferrer-Caja, 2003; Salthouse, Pink, & Tucker-Drob, 2008) has established that all of the variables have good reliability (i.e., coefficient alphas greater than .7) and validity (i.e., factor loadings greater than .7).

There were four major phases to our analyses. Because we were interested in age relations, we first divided our sample into three age groups that approximately corresponded to the periods of young adulthood (18–39), middle adulthood (40–59), and older adulthood (60–96). Confirmatory factor analyses were then conducted to investigate the structure of the cognitive abilities and the personality traits and determine whether it is reasonable to assume that they are invariant across age groups. Next we converted the composite scores for the cognitive abilities and the scores for the personality traits into  $z$  scores and examined the age trends in the four cognitive ability variables and the five personality traits. Finally, we used the model shown in Figure 1 to investigate the relations between the personality traits and the cognitive abilities in each age group. It is important to emphasize that although Figure 1 portrays the personality–cognition relations as though personality were a cause of cognition, we are interested in the associations between the two domains, and we do not assume that either personality or cognition is necessarily more primitive or fundamental in the relationship between the two. The relations were examined in terms of regression coefficients rather than of covariances because we were interested in identifying unique relations among the variables. However, it is worth noting that nearly identical patterns, with congruence coefficients greater than .99, were found when the analyses were repeated with the personality–cognition relations represented by covariances instead of regressions.<sup>1</sup>

## Method

### Participants

Participants were recruited through newspaper advertisements, flyers, and referrals from other participants over a period of several years. Descriptive characteristics of the sample are provided in Table 1. All of the participants had Mini Mental Status Exam (Folstein, Folstein, & McHugh, 1975) scores of 27 or greater and thus were unlikely to be demented. The mean age of the participants was 50.5 ( $SD = 18.6$ ), and 64.5% of them were women. The self-identified ethnicity of the participants was primarily White (81%) with about 10% Black and the remainder split among different groups including mixed ethnicity. Most of the participants were highly educated, with a mean of nearly 16 years of formal education, and healthy, with a mean of about 2 on a self-report health scale ranging from 1 (*excellent*) to 5 (*poor*). As a means of evaluating the representativeness of the sample, age-adjusted scaled scores are provided (see Table 1) for four tests from the Wechsler Adult Intelligence Scale III (Wechsler, 1997a) and the Wechsler Memory Scale III (Wechsler, 1997b). These

age-adjusted scores have means of 10 and standard deviations of 3 in the nationally representative normative samples, and therefore it can be inferred that the current sample was functioning about 2/3 to 1 standard deviation above the national norms. Importantly for the age comparisons, however, is that there were relatively small relations of age to the number of years of education or to the age-adjusted scaled scores for the four cognitive variables.

### Materials and Procedure

A total of 16 cognitive tests were performed in the laboratory, and a series of questionnaires, including the IPIP (Goldberg, 1999), were completed at home.

**Cognitive tests.** The cognitive tests were designed to assess fluid intelligence (Gf) with tests of reasoning and spatial visualization, crystallized intelligence (Gc) with tests of vocabulary, episodic memory with verbal memory tests, and perceptual speed with substitution and comparison tests. Descriptions of the tests and their sources are contained in Salthouse (2004) and Salthouse et al. (2008).

**Personality.** Personality was evaluated with the 50-item version of the IPIP questionnaire (Goldberg, 1999). The five factors identified from this questionnaire are Neuroticism (reverse coded from emotional stability), Extraversion, Openness, Agreeableness, and Conscientiousness.

### Results

The initial analyses examined factor invariance for the cognitive abilities and personality traits across the three age groups with multigroup analyses and nested comparisons with different sets of constraints. Neither constraining the factor loadings to be equal across the three age groups ( $\chi^2_{diff} = 12.3$ ,  $df_{diff} = 24$ ), nor constraining the factor correlations to be equal across the three age groups ( $\chi^2_{diff} = 5.8$ ,  $df_{diff} = 12$ ), nor constraining the variances to be equal across the three age groups ( $\chi^2_{diff} = 7.7$ ,  $df_{diff} = 32$ ) resulted in a significant change in fit for the cognitive ability structure. Similar analyses with the personality data also revealed no significant loss of fit when the factor loadings were constrained ( $\chi^2_{diff} = 1.6$ ,  $df_{diff} = 90$ ), when the factor correlations were constrained ( $\chi^2_{diff} = 1.6$ ,  $df_{diff} = 20$ ), and when the variances were constrained to be equal across the three age groups ( $\chi^2_{diff} = 2.7$ ,  $df_{diff} = 110$ ). These results indicate that there was no evidence that the structure of either the cognitive abilities or the personality traits differed as a function of age.

Results were also similar when the 60–96-year-old age group was divided into two groups ages 60–69 ( $n = 388$ ) and ages 70–96 ( $n = 396$ ), and thus this wide age range was considered justified. Neither constraining the factor loadings to be equal across the four age groups ( $\chi^2_{diff} = 7.7$ ,  $df_{diff} = 36$ ), nor constraining the factor correlations to be equal across the four age groups ( $\chi^2_{diff} = 3.1$ ,  $df_{diff} = 18$ ), nor constraining the variances to be equal across the four age groups ( $\chi^2_{diff} = 11.8$ ,  $df_{diff} = 40$ ) resulted in a significant change in fit for the cognitive ability structure. Analyses with the personality data revealed no significant loss of fit

<sup>1</sup> Congruence coefficients reflect the correspondence between factor configurations (see Jensen, 1998, p. 99).

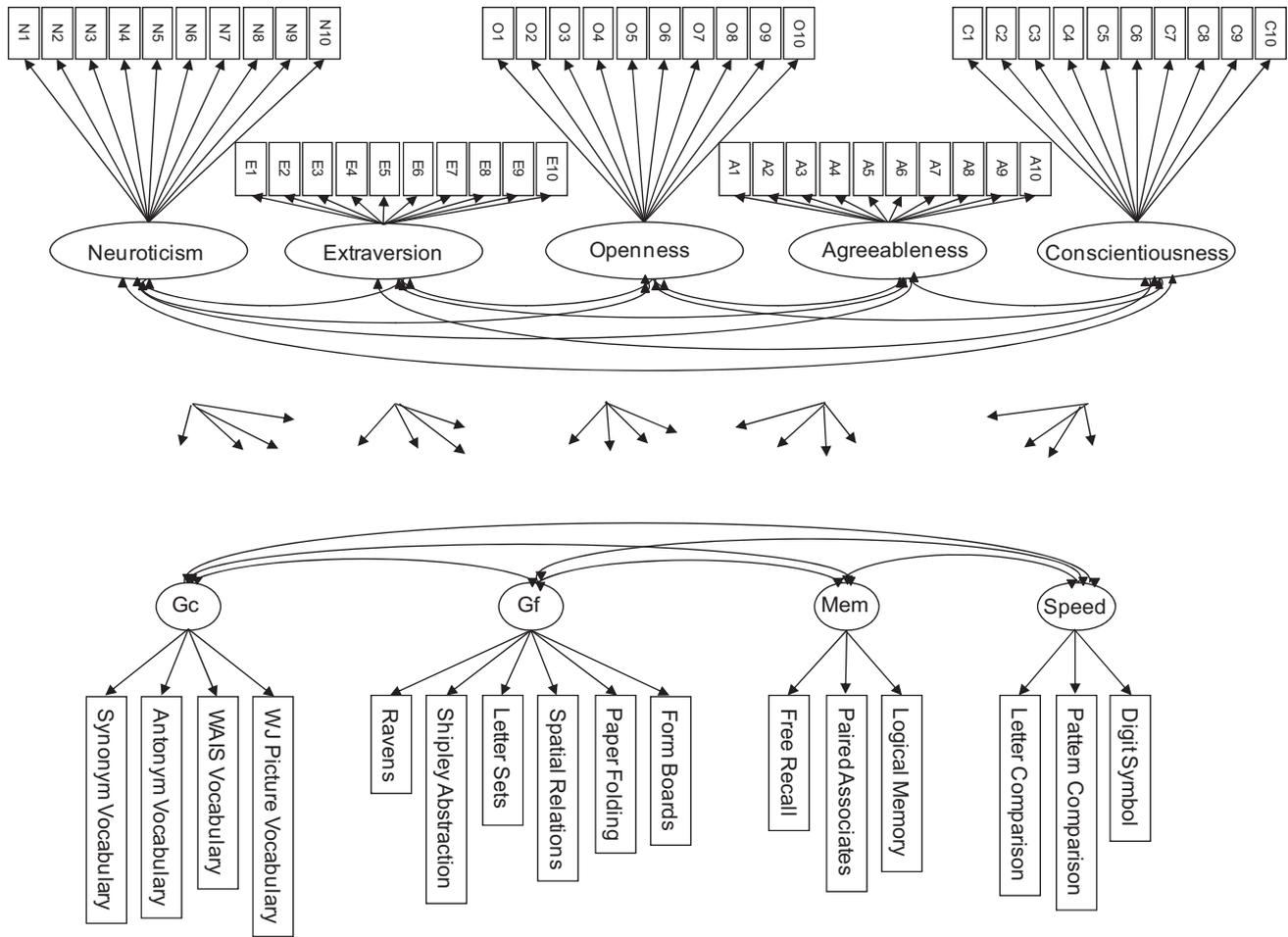


Figure 1. Schematic illustration of the possible relations of the Big Five personality traits on four latent constructs representing different cognitive abilities.

when the factor loadings were constrained ( $\chi^2_{diff} = 1.7, df_{diff} = 90$ ), when the factor correlations were constrained ( $\chi^2_{diff} = 2.3, df_{diff} = 20$ ), or when the variances were constrained to be equal across the three age groups ( $\chi^2_{diff} = 2.3, df_{diff} = 110$ ).

The cognitive variables and the personality scales were next converted into  $z$  scores based on the complete sample. Composite cognitive scores were created by averaging  $z$  scores of cognitive variables assumed to measure the same ability. The left panel of Figure 2 contains the means and standard errors of the four cognitive composites in the three age groups, and the right panel contains the corresponding information for the Big Five personality dimensions. The simple age correlations were .31 for Gc, -.51 for Gf, -.43 for memory, -.63 for perceptual speed, -.19 for Neuroticism, .00 for Extraversion, -.06 for Openness, .13 for Agreeableness, and .22 for Conscientiousness. Quadratic and cubic relations of age to both cognitive abilities and personality traits were also examined. Very few of them were significantly different from zero, and because they were all associated with less than 1% of the variance, these nonlinear age trends were not retained in subsequent analyses. Although all of the age relations except that with Extraversion were significantly different from zero ( $p < .01$ ),

it can be seen that the age relations were much larger for the cognitive variables than for the personality variables.

Finally, the structural equation model portrayed in Figure 1 was applied to the data in each age group. In order to remove potentially spurious influences associated with stronger relations of age to the cognitive variables at older ages, the influence of age was statistically controlled in the analysis within each age group. This had the effect of comparing the personality–cognition relations at the average age in each group, and therefore it allowed the groups to be compared without distortion of the relations by differential age relations within groups. The standardized coefficients representing the relations of the personality scales to each cognitive ability are portrayed in Figure 3 for the three age groups. Coefficients with absolute values greater than .12 were significantly different from 0 at  $p < .01$ . The unstandardized coefficients along with standard errors and confidence intervals of these estimates are reported in Table 2. Also in Table 2 are the unique relations of each personality trait to cognitive abilities expressed in  $R^2$  changes by regressing cognitive abilities on each personality trait after controlling for the four other personality traits.

Table 1  
Descriptive Characteristics of the Sample by Age Range

Item	18–39 years	40–59 years	60–96 years	Age correlation
Number	663	870	784	NA
Age	26.3 (6.0)	50.8 (5.5)	70.5 (7.6)	NA
Proportion female	.60	.71	.61	.01
Self-rated health <sup>a</sup>	2.0 (0.9)	2.2 (0.9)	2.3 (0.9)	.13*
Years of education	15.1 (2.3)	15.8 (2.6)	16.3 (2.9)	.22*
Age-adjusted scaled scores <sup>b</sup>				
Vocabulary	13.2 (3.1)	12.3 (2.8)	13.4 (2.5)	
Digit symbol	11.2 (2.7)	11.2 (2.9)	11.7 (2.7)	
Logical memory	11.8 (2.7)	11.8 (2.7)	12.6 (2.7)	
Word recall	12.2 (3.1)	12.2 (3.3)	12.6 (3.3)	

Note. Standard deviations are in parentheses.

<sup>a</sup> 5-point scale ranging from 1 (*excellent*) to 5 (*poor*). <sup>b</sup> Based on the nationally representative normative samples from the *Wechsler Adult Intelligence Scale—Third Edition* (Wechsler, 1997a) and the *Wechsler Memory Scale—Third Edition* (Wechsler, 1997b) in which the means are 10 and the standard deviations are 3.

\*  $p < .01$ .

The first point to note in Figure 3 is that the results are quite similar in each age group. The possibility that the personality–cognition relations varied as a function of age was investigated with tests of interactions of age and the personality trait in the prediction of the latent cognitive ability construct. These analyses revealed that only the relation between Conscientiousness and the memory construct differed significantly as a function of age. However, the lower right panel of Figure 3 reveals that the pattern was unsystematic and therefore could be attributable to chance fluctuation. Furthermore, when the age group differences in the personality–cognition relations were expressed in  $d$  units, all of the absolute values were less than .12, with a median of .04, which suggests that the personality–cognition relations were quite similar in the three age groups.

The strongest personality–cognition relations were apparent for the personality dimension of Openness as higher levels of Openness were associated with higher levels on all four cognitive ability factors. Moreover, all of the relations were in the moderate-to-strong range as the standardized regression coefficients were be-

tween .2 and .6. There were also consistent relations involving Extraversion as higher levels of Extraversion were associated with lower levels on the Gc and Gf.

The relations between the three other personality traits and cognitive abilities were smaller and were less systematic across age groups. People with higher levels of Agreeableness tended to have lower levels on Gf, and people with higher levels of Conscientiousness tended to have slightly higher levels on the perceptual speed factor. The relations with Neuroticism were limited to a slight negative association with Gf.

Because there is considerable evidence for the hierarchical structure of cognitive abilities, with cognitive variables organized in terms of first-order abilities, which are in turn related to one another through a higher order factor (e.g., Carroll, 1993; Salthouse, 2004; Salthouse & Ferrer-Caja, 2003), the analyses were repeated with the personality variables allowed to be related to different levels within the hierarchical structure. All of the personality traits except Conscientiousness were significantly ( $p < .01$ ) related to the second-order factor representing the variance shared

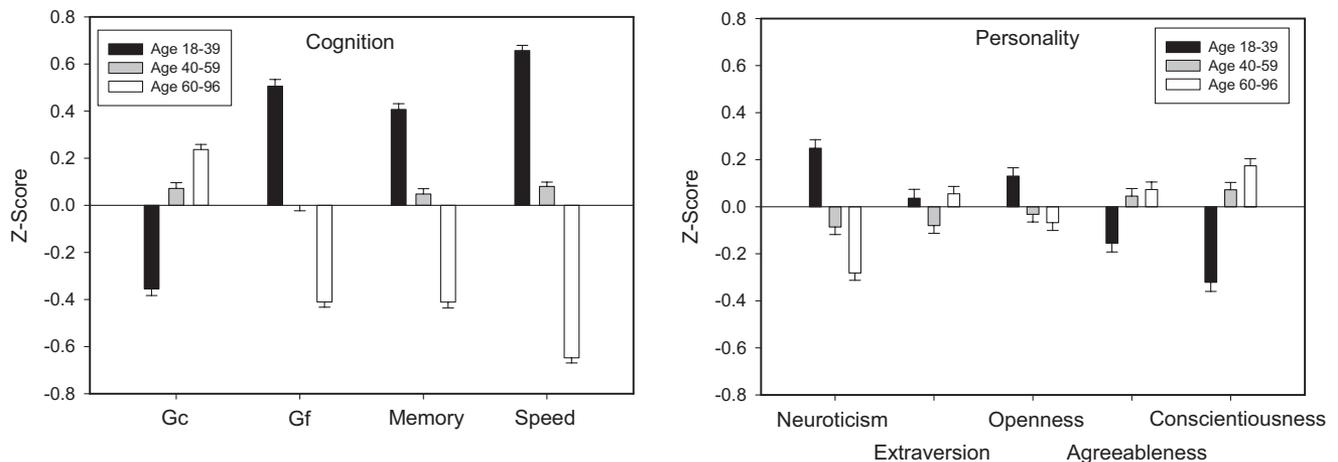


Figure 2. Means (and standard errors) of cognitive composite scores (left panel) and personality traits (right panel) in  $z$  score units of the entire sample for adults in three age groups.

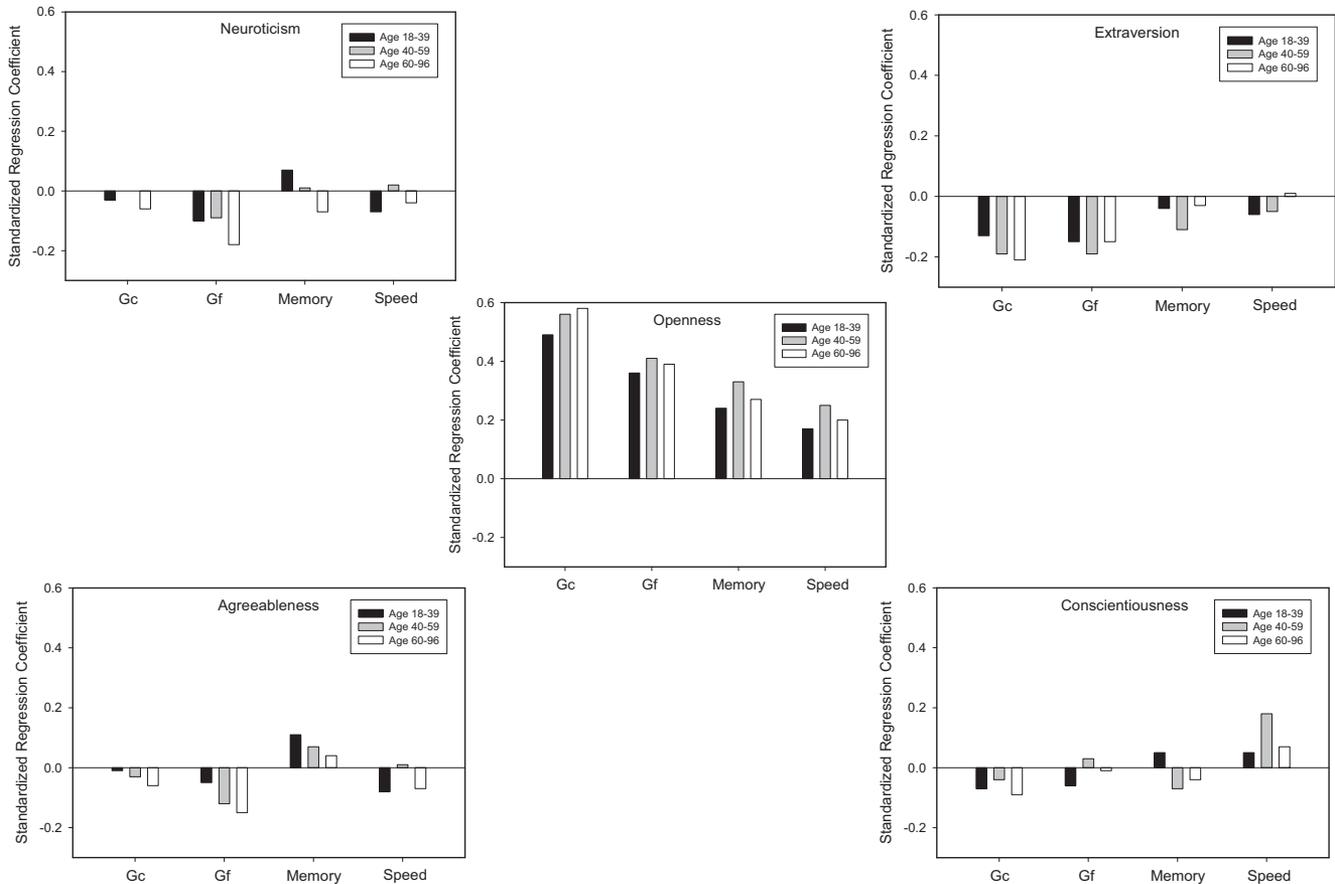


Figure 3. Standardized regression coefficients for the relations of personality traits on four cognitive abilities in three age groups.

by all first-order cognitive abilities. In addition, after controlling for the influence on the second-order factor, there were also moderate relations of Openness on Gc and of Agreeableness on memory, and a smaller relation of Conscientiousness on perceptual speed.

### Discussion

The current project capitalized on the availability of extensive cognitive assessment in a moderately large sample of adults across a wide age range to investigate personality–cognition relations across adulthood. A unique feature of the project was that cognition was examined not at the level of individual cognitive variables, which include test-specific influences and measurement error, but at the latent factor level, which represents what different variables have in common. Moreover, the availability of four latent cognitive ability constructs provides a relatively comprehensive assessment of cognitive functioning.

Although there were early speculations that cognitive abilities become more differentiated, and less strongly correlated with one another with increased age (e.g., Balinsky, 1941), the recent literature has failed to support the dedifferentiation hypothesis of cognitive abilities (e.g., Facon, 2008; Juan-Espinosa et al., 2002; Salthouse, 2010; Salthouse & Saklofske, in press; Tucker-Drob &

Salthouse, 2008; Zelinski & Lewis, 2003). The analyses conducted in the current study also found that the cognitive ability structure is similar at different periods in adulthood. In addition, the structure of the personality traits is also invariant across age.

The relations between age and the personality factors were similar to those reported in the literature as increased age was associated with lower levels of Neuroticism (McCrae et al., 2005; Roberts & Mroczek, 2008; Schaie et al., 2004) and Openness (McCrae et al., 2005; Terracciano et al., 2005), and with somewhat higher levels of Agreeableness (McCrae et al., 2005; Roberts & Mroczek, 2008; Terracciano et al., 2005) and Conscientiousness (McCrae et al., 2005; Roberts & Mroczek, 2008; Terracciano et al., 2005). One exception was for the personality trait of Extraversion. Indeed, while there have been previous reports of age variations in this personality trait (e.g., McCrae et al., 2000; Roberts & Mroczek, 2008), there were no significant age differences in the level of Extraversion in the current study. However, previous reports used the NEO Personality Inventory scales (e.g., Costa & McCrae, 1992), which contain two distinguishable dimensions of Extraversion: social dominance and social vitality. It is possible that we did not find significant age-related variation in Extraversion because these two dimensions are not adequately represented in the IPIP scale (Goldberg, 1999), which was used in this project.

Table 2  
*Relations of Personality Factors to Cognitive Factors*

Personality factor	Cognitive factor	Age 18–39 years				Age 40–59 years				Age 60–96 years				$d_1$	$d_2$	$d_3$
		Est.	SE	95% CI	$R^2$	Est.	SE	95% CI	$R^2$	Est.	SE	95% CI	$R^2$			
N	Gf	-.12	.05	[-.25, .00]	.01	-.06	.03	[-.14, .03]	.01	-.15	.03	[-.24, -.06]	.02*	-.06	.03	.10
	Gc	-.06	.06	[-.20, .09]	.00	.00	.04	[-.11, .11]	.00	-.07	.04	[-.17, .02]	.00	-.04	.01	.06
	Memory	.06	.05	[-.06, .18]	.00	.00	.04	[-.11, .11]	.00	-.06	.04	[-.16, .03]	.00	.05	.12	.06
E	Speed	-.04	.04	[-.15, .06]	.01	.04	.03	[-.05, .12]	.00	-.02	.03	[-.11, .06]	.00	-.08	-.02	.06
	Gf	-.24	.06	[-.40, -.09]	.01	-.28	.05	[-.42, -.14]	.02*	-.28	.05	[-.42, -.15]	.02*	.02	.03	.00
	Gc	-.20	.05	[-.33, -.07]	.02*	-.20	.04	[-.32, -.09]	.03*	-.17	.05	[-.29, -.05]	.04*	.00	-.02	-.03
O	Memory	-.05	.05	[-.18, .08]	.00	-.14	.05	[-.28, -.01]	.01	-.05	.05	[-.17, .08]	.00	.07	.00	-.07
	Speed	-.05	.04	[-.16, .07]	.00	-.04	.04	[-.14, .07]	.00	.01	.05	[-.10, .13]	.00	-.01	-.05	-.04
	Gf	.55	.07	[.36, .73]	.10*	.54	.06	[.39, .70]	.12*	.53	.07	[.35, .71]	.09*	.00	.01	.01
A	Gc	.95	.10	[.70, 1.20]	.21*	.95	.08	[.73, 1.16]	.23*	.92	.10	[.67, 1.16]	.23*	.00	.01	.01
	Memory	.28	.07	[.10, .45]	.04*	.43	.07	[.26, .60]	.06*	.33	.07	[.16, .50]	.05*	-.08	-.03	.05
	Speed	.17	.06	[.02, .32]	.02*	.27	.05	[.14, .40]	.04*	.22	.06	[.07, .37]	.02*	-.07	-.04	.03
C	Gf	-.08	.07	[-.27, .11]	.01	-.20	.06	[-.36, -.03]	.02*	-.23	.06	[-.38, -.07]	.00	.06	.08	.02
	Gc	-.01	.09	[-.23, .21]	.00	-.10	.08	[-.30, .10]	.00	-.16	.07	[-.33, -.07]	.01	.04	.08	.03
	Memory	.15	.07	[-.04, .33]	.00	.10	.07	[-.10, .29]	.00	.07	.06	[-.09, .23]	.00	.02	.04	.01
C	Speed	-.08	.06	[-.24, .09]	.01	-.02	.06	[-.17, .13]	.00	-.10	.06	[-.25, .05]	.00	-.03	.01	.05
	Gf	-.15	.08	[-.37, .06]	.01	.08	.07	[-.11, .27]	.00	-.01	.08	[-.22, .21]	.00	-.11	-.07	.04
	Gc	-.22	.10	[-.47, .04]	.00	-.09	.09	[-.33, .16]	.00	-.18	.09	[-.42, .01]	.05	-.05	-.01	.04
C	Memory	.08	.08	[-.13, .29]	.00	-.18	.09	[-.42, .05]	.00	-.09	.09	[-.32, .13]	.00	.11	.08	-.03
	Speed	.09	.07	[-.10, .27]	.00	.32	.08	[.12, .52]	.03*	.17	.08	[-.05, .38]	.01	-.11	-.04	.06

Note. Indicators of fit were  $\chi^2/df = 2.9$ , comparative fit index (CFI) = .79, and root mean square error of approximation (RMSEA) = .05 for the age group 18–39;  $\chi^2/df = 3.3$ , CFI = .80, and RMSEA = .05 for the age group 40–59; and  $\chi^2/df = 2.8$ , CFI = .79, and RMSEA = .05 for the age group 60–96.  $R^2$  values represent  $R^2$  changes explained by each personality trait after controlling for variance associated with the four other personality traits in cognitive abilities.  $d$  values are for contrasts between groups.  $d_1$  column displays  $d$  values for the differences between the age group 18–39 years and the age group 40–59 years;  $d_2$  column displays  $d$  values for the differences between the age group 18–39 years and the age group 60–96 years;  $d_3$  column displays  $d$  values for the differences between the age group 40–59 years and the age group 60–96 years. N = Neuroticism; E = Extraversion; O = Openness; A = Agreeableness; C = Conscientiousness; Est. = unstandardized estimate; SE = standard estimate; CI = confidence interval; Gf = fluid intelligence; Gc = crystallized intelligence; speed = perceptual speed.

\*  $p < .01$ .

The structure of cognitive abilities was also replicated, with four factors corresponding to four domains of crystallized intelligence (Gc), fluid intelligence (Gf), memory, and perceptual speed (e.g., Salthouse, 2004; Salthouse & Ferrer-Caja, 2003).

One of the major findings of the project was that the personality–cognition relations were very similar among young, middle-aged, and older adults. The distinction between aspects of typical functioning reflected in personality assessments and aspects of maximal functioning reflected in cognitive assessments (Cronbach, 1949) therefore appears to be maintained, both qualitatively and quantitatively, across the adult years.

The strongest relations between personality and cognition were found for the personality dimension of Openness. This relation is not surprising because the Openness trait is sometimes considered to represent “intellect” (e.g., Goldberg, 1993). However, it is noteworthy that there was an independent influence of Openness on Gc even after controlling for influence on what all first-order abilities have in common. These results suggest that Openness may have two distinct relations with cognition—one on the effectiveness of processing different types of information, as evident in the second-order common factor and the relations with all first order constructs, and another on the tendency to acquire information, as reflected in the unique relations on Gc.

The negative relations between Extraversion and Gf and Gc may reflect a tendency for people who are more introverted (or, conversely, lower in Extraversion) to be more oriented toward

abstract intellectual endeavors and less oriented toward social and emotional dimensions of life. It is noteworthy that the negative relations between Extraversion and these aspects of cognitive functioning are consistent with recent reports but contrary to older reports. Furthermore, in their meta-analysis, Wolf and Ackerman (2005) provided evidence for changes over time in both magnitude and direction of the correlation between Extraversion and cognition.

The relations between the other personality dimensions and the cognitive factors were generally small, although they were consistent across the three independent groups of participants. It is possible that the influences of Neuroticism may be related to either impulsiveness or anxiety and that influences of Agreeableness may be related to a complaisant and possibly unanalytical style, but we are not aware of any evidence relevant to these speculations.

To summarize, the current project had two major goals. The first was to determine which dimensions of personality are related to which aspects of cognitive functioning. Our results confirm and extend earlier results in terms of strong relations of Openness to several distinct cognitive abilities and smaller relations of other personality traits with specific cognitive abilities. The second goal was to examine whether personality–cognition relations differ across adulthood. The patterns apparent in Figure 3, together with the general lack of significant interactions of age and personality in the prediction of the cognitive composites, indicate that the associations between personality and cognition are both qualitatively

and quantitatively similar in healthy adults between at least 20 and 90 years of age.

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### **Call for Papers: Special Section on Theory and Data in Categorization: Integrating Computational, Behavioral, and Cognitive Neuroscience Approaches**

*The Journal of Experimental Psychology: Learning, Memory, and Cognition (JEP:LMC)* invites manuscripts for a special section on approaches to categorization, to be compiled by guest editors Stephan Lewandowsky and Thomas Palmeri working together with journal Associate Editor Michael Waldmann.

The goal of the special section is to showcase high-quality research that brings together behavioral, computational, mathematical, neuropsychological, and neuroimaging approaches to understanding the processes underlying category learning. There has been some divergence between approaches recently, with computational-mathematical models emphasizing the unity of category-learning processes while neuropsychological models emphasize the distinction between multiple underlying memory systems. We are seeking articles that integrate cognitive neuroscience findings in designing models or interpreting results, and behavioral studies and modeling results that constrain neuroscientific theories of categorization. In addition to empirical papers, focused review articles that highlight the significance of cognitive neuroscience approaches to cognitive theory—and/or the importance of behavioral data and computational models on constraining neuroscience approaches—are also appropriate.

The submission deadline is **June 1st, 2011**. The main text of each manuscript, exclusive of figures, tables, references, or appendixes, should not exceed 35 double-spaced pages (approximately 7,500 words). Initial inquiries regarding the special section may be sent to Stephan Lewandowsky (stephan.lewandowsky@uwa.edu.au), Tom Palmeri (thomas.j.palmeri@Vanderbilt.Edu), or Michael Waldmann (michael.waldmann@bio.uni-goettingen.de).

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