Gerontology & Geriatric Medicine
Volume 9: 1–11
© The Author(s) 2023
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/23337214221146663
journals.sagepub.com/home/ggm
SAGE

Discrepancies in Objective and Subjective Cognition in Middle-Aged and Older Adults: Does Personality Matter?

Amy N. Costa, MA[1], Lauren M. Nowakowski, BS[1], Christina S. McCrae, PhD[2], Nelson Cowan, PhD[1], and Ashley F. Curtis, PhD[1,2]

Abstract

Associations between subjective cognition and current objective functioning are inconclusive. Given known associations between personality and cognition, this study tested whether personality moderates associations between subjective memory and objective cognition in middle-aged and older adults. Participants ($N = 62$, $M_{age} = 63.8$, $SD = 7.7$, 33 men) completed assessments of personality (Big Five Inventory-10), subjective memory (Cognitive Failures Questionnaire [CFQ-memory]), and objective cognition (processing speed, attention, inhibition [Stroop], working memory [Sternberg], set-shifting [Wisconsin Card Sorting Task]). Multiple regressions and simple slopes analyses examined whether personality moderates associations between subjective memory and objective cognition, controlling for age, number of medical conditions, and household income. Extraversion moderated associations between processing speed and CFQ-memory. Agreeableness moderated associations between set-shifting and CFQ-memory. Among individuals with higher extraversion and lower agreeableness, objectively worse cognition was associated with the fewest memory complaints. Findings suggest personality may impact the discrepancies between subjective memory and objective cognition in mid-to-late life.

Keywords

personality, cognitive performance, subjective memory, middle-aged adults, older adults

Manuscript received: October 20, 2022; **final revision received:** November 21, 2022; **accepted:** December 4, 2022.

What this Paper Adds

- High extraversion and low agreeableness moderate the discrepant association between subjective and objective cognition in aging adults.
- Personality should be considered when evaluating how well subjective reports of everyday cognition reflect current objective cognitive functioning.

Applications of Study Findings

- Clinicians should consider examining personality when evaluating how subjective reports of cognitive complaints reflect current objective cognition in mid-to-late life.
- Aging adults with high extraversion and low agreeableness may be at higher risk for missed cognitive impairment diagnoses, as their evaluation of subjective cognition may not reflect objective functioning.
- Detection of who may be at risk (i.e., those with specific personality profiles) for missed cognitive impairment diagnoses could inform preventative or therapeutic interventions.

[1]University of Missouri, Columbia, USA
[2]University of South Florida, Tampa, USA

Corresponding Author:
Ashley F. Curtis, College of Nursing, University of South Florida, 12901 Bruce B. Downs Blvd, MDC Box 22, Tampa, FL, 33612, USA.
Email: ashleycurtis@usf.edu

Introduction

Associations between subjective memory and objective cognition aging adults are inconclusive (Mitchell, 2008). Some studies have shown subjective memory complaints are not related to current objective cognition (Reid & MacLullich, 2006), while other work has found they are associated (Burmester et al., 2016). Previous work in our lab (Costa et al., 2022) suggests sleep plays a role in the discrepant relationship between objective cognition and subjective memory, but little work has examined other contributing factors (e.g., personality).

In older adults, personality is associated with worse objective cognition (high neuroticism, high extraversion, lower openness; Aschwanden et al., 2021) and subjective memory complaints (higher neuroticism, lower conscientiousness, lower agreeableness; Sutin et al., 2020). Additionally, higher extraversion, conscientiousness, and openness correlate with individuals viewing their memory favorably even if they score poorly on objective memory measures (Buratti et al., 2013; Hülür et al., 2015). Little research, however, has examined how personality moderates associations between subjective memory and objective cognition. A lack of awareness in objective cognitive functioning could contribute to missed diagnoses of cognitive impairment and missed opportunities for early intervention (Lenehan et al., 2012). Understanding contributing factors may help clinicians determine under which circumstances (e.g., those with specific personality traits) the relationship between subjective and objective cognition diverges.

This study examined whether personality moderated associations between specific objective cognition domains and subjective memory in middle-aged and older adults. We hypothesized in the presence of specific personality traits (high neuroticism, high extraversion, low conscientiousness, low openness, low agreeableness), the association between objective cognition and subjective memory would be strongest, and discrepant (worse objective cognition associated with better subjective memory evaluation).

Methods

Participants

Middle-aged and older adults were recruited via Qualtrics panels. Qualtrics panels provides users with access to market research panels and uses digital fingerprinting technology and IP addresses to ensure data validity and reliability. Participants who met inclusion criteria completed a documentation of consent. Inclusion criteria were: (i) 50+ years of age, (ii) residing in the United States, (iii) report no cognitive impairment or major neurological disorder (mild cognitive impairment [MCI], dementia, Parkinson's disease, epilepsy, etc.), and (iv) normal/corrected-to-normal vision and/or hearing. Exclusion criteria included receiving treatment for cognition, substance use, fatigue, mood, or participation in non-pharmacological sleep treatment. Participants were compensated $6.50 and $10 following survey and cognitive task completion, respectively. The University of Missouri Institutional Review Board approved all procedures.

Measures

Personality. The Big Five Inventory-10 (BFI-10; Rammstedt & John, 2007) assesses personality traits of extraversion, agreeableness, conscientiousness, neuroticism, and openness. Participants answer questions regarding how they agree with statements ("1" [disagree strongly] to "5" [agree strongly]) regarding personality traits (e.g., "I see myself as someone who is relaxed, handles stress well"). The BFI-10 consists of two items per personality trait/subscale, with total personality trait scores computed (possible values from "2" to "10"). Higher scores represent greater endorsement of a specific personality trait.

Objective cognition. All cognitive tasks were completed via Inquisit web (Inquisit Web, 2020).

Stroop task (inhibition, attention, processing speed). Trials (84 randomized; see Supplemental Figure S1) measure processing speed (control trials consisting of colored rectangle targets), processing speed and attention (congruent trials with word targets matching on color and name), and inhibition (incongruent trials with word targets not matching on color and name [Stroop, 1935]). Participants indicate the color of the target. Mean reaction time (RT) on correct trials is computed within the different trial types (control, congruent, incongruent). Lower RTs indicate better performance.

Posner cueing task (attentional orienting). Trials (200 randomized; see Supplemental Figure S2) measures orienting attention (Posner, 1980). A target appears in the left or right box and participants press the spacebar key upon target detection. For 80% of trials, a valid cue is presented predicting the target location. For 20% of trials, an invalid cue is presented predicting the opposite location. Half of the cues are exogeneous (highlighted right/left box), and half are endogenous (central arrow above fixation pointing left/right). Mean RTs on correct trials were computed. Invalid trials RT minus valid trials RT within each block were computed, representing exogenous and endogenous orienting of attention indices (Lundwall et al., 2018). Lower scores indicate better performance.

Sternberg (working memory). Trials (18 randomized trials; see Supplemental Figure S3) measures working memory (Sternberg, 1966). A sequence of numbers (from 2 to 7) is presented one by one. A probe digit is shown, and participants indicate if it was previously

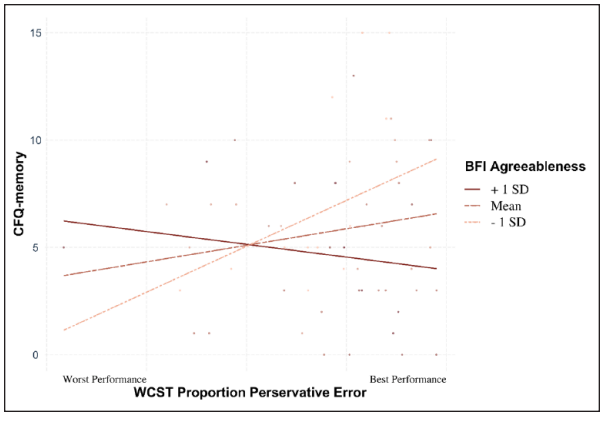

Figure 1. Association between WCST percent perseverative error and CFQ-memory moderated by agreeableness in middle-aged and older adults. Higher CFQ-memory scores reflect more reported memory failures.

presented or not. Feedback was provided before starting the next trial. Given working memory capacity limits during aging (Cowan et al., 2008), proportion of correct answers for trials of sequence sizes four to seven was calculated. Higher values indicate better working memory.

Wisconsin Card Sorting Test. The test (WCST) measures set-shifting (Berg, 1948). Participants match a fifth card from the sequentially presented response cards to one of the four key cards, without any categorization strategy instructions (see Supplemental Figure S4). Participants ideally learn the correct classification rule, according to the trial feedback. The classification rule changes after 10 correct responses. The test ends after participants complete six categories. Percent perseverative error (when participant did not change response upon rule change) was recorded. Lower scores indicate better set-shifting.

Subjective memory. The Cognitive Failures Questionnaire (CFQ; Broadbent et al., 1982) assessed subjective memory. Participants rate from 0 (never) to 4 (always) the degree to which they experience failures in 25 everyday cognitive tasks over the past 6 months. Component scores are calculated from the individual questions (Wallace et al., 2002), with the memory component (CFQ-memory) measuring general memory failures across eight questions (e.g., "Do you find you forget appointments?"). Possible scores range from 0 to 32. Higher scores indicate worse subjective memory.

Statistical Analysis

Multiple linear regressions were conducted in SPSS (Version 28; PROCESS macro [Hayes, 2017] V.4.0). The dependent variable was CFQ-memory. Independent variables were objective cognitive scores, personality, and the objective cognitive score × personality interaction term, covarying for age, socioeconomic status (household income), and number of medical conditions.

Significant interactions were clarified via simple slopes of objective and subjective cognition associations at sample-estimated moderator values: endorsing fewest personality traits (1 *SD* below personality mean), endorsing average amount of personality traits (mean value of personality trait), and endorsing the most personality traits (1 *SD* above mean of personality trait). Following statistical recommendations (Bender & Lange, 2001), false-positive risk was accepted with no familywise error correction, given limited research on interactive relationships between subjective memory, personality, and specific objective cognitive domains. Results were evaluated at an alpha level of $p < .05$.

Results

Participant Characteristics

Sixty-two participants ($M_{age} = 63.58$, $SD = 7.79$, 33 men) completed all measures and were included in analyses (see Table 1).

Regression Results

Agreeableness and objective cognition: Associations with CFQ-memory. The interaction between WCST percent perseverative error (set shifting) and agreeableness was associated with CFQ-memory (R^2-change = .07, see Table 2). As shown in Figure 1, worse cognitive flexibility was associated with fewer memory complaints at the lowest agreeableness ($\beta = -.84$, $p = .049$), but not average ($p = .35$) or most agreeableness ($p = .27$).

Conscientiousness and Objective Cognition: Associations with CFQ-memory. Stroop RT-control trials (processing speed) and Stroop RT-congruent trials (attention and processing speed) were associated with CFQ-memory (see Table 2), indicating better attention and processing speed are associated with more memory complaints. Additionally, conscientiousness was associated with CFQ-memory in all regression models (see Table 2) indicating less conscientiousness was associated with fewer memory complaints regardless of objective cognitive performance.

Extraversion and objective cognition: Associations with CFQ-memory. The interaction between Stroop RT-control trials (processing speed) and extraversion was associated with CFQ-memory (R^2-change = .06, see Table 2). As shown in Figure 2, worse processing speed was associated with fewer memory complaints at the most extraversion ($\beta = -1.81$, $p = .003$), but not at average ($p = .14$) or least extraversion ($p = .78$).

Table 1. Participant Characteristics.

Variable	Total ($N = 62$) Mean (*SD*)	Range	Construct measured
Age	63.6 (7.8)	50 to 79	
Sex (F:M)	29:33		
Income (*n*, %)			
Below $19,999	4 (6.5)	—	
$20,000–$39,999	11 (17.7)	—	
$40,000–$59,999	18 (29.0)	—	
$60,000–$79,999	13 (21.0)	—	
$80,000–$99,999	8 (12.9)	—	
Above $100,000	8 (12.9)	—	
# of medical conditions (*n*, %)	1.63 (1.83)	0 to 8	
BFI-agreeableness	7.66 (1.57)	3 to 10	Agreeableness traits
BFI-conscientiousness	8.45 (1.48)	4 to 10	Conscientiousness traits
BFI-extraversion	5.81 (2.23)	2 to 10	Extraversion traits
BFI-neuroticism	4.63 (1.87)	2 to 8	Neuroticism traits
BFI-openness	8.61 (1.79)	4 to 10	Openness traits
CFQ-total	25.90 (11.82)	5 to 54	Errors in cognitive performance
CFQ-memory	5.55 (3.71)	0 to 15	Errors in memory
Stroop task—RT (ms)			
Control trials	1,449.38 (526.51)	746.71 to 3,768.74	Processing speed
Congruent trials	1,542.38 (633.06)	790.21 to 4,330.93	Processing speed and attention
Incongruent trials[a]	1,853.18 (591.04)	971.96 to 3,688.52	Inhibition
Posner task—RT (ms)			
Exogenous orienting index	39.02 (34.91)	−56.39 to 140.71	Exogenous orienting attention
Endogenous orienting index	38.90 (35.08)	−40.61 to 130.87	Endogenous orienting attention
Sternberg task—proportion correct 4–7 number series[b]	0.77 (0.20)	0.33 to 1.00	Working memory
Wisconsin Card Sorting Task—percent perseverative error	28.43 (20.22)	2.5 to 95.74	Set-shifting

Note. BFI = Big Five Inventory; CFQ = Cognitive Failures Questionnaire.
[a]Two participants obtained an accuracy of 0% on incongruent trials, therefore no RT could be calculated (for correct trials). Therefore, this subsample is based on 60 participants.
[b]One participant did not complete the Sternberg task. Therefore, this subsample is based on 61 participants.

Neuroticism and objective cognition: Associations with CFQ-memory. There was a main association between Stroop RT-control trials and CFQ-memory, indicating slower processing speed is associated with fewer memory complaints (see Table 3). Additionally, neuroticism was associated with CFQ-memory regression models including Stroop RT-control trials, Stroop RT-congruent, Stroop RT-incongruent trials, Posner RT-exogenous, Posner RT-endogenous, and Sternberg proportion correct (see Table 3), indicating less neuroticism is associated with fewer memory complaints regardless of actual cognitive performance.

Openness and objective cognition: Associations with CFQ-memory. As shown in Table 3, Stroop RT-control trials (processing speed) was associated with CFQ-memory, indicating faster processing speed is associated with fewer memory complaints.

Discussion

This study examined whether personality moderated associations between objective cognition and subjective memory in aging adults. Results revealed agreeableness (via BFI-10 scores, e.g., generally trusting, does not tend to find faults with others) moderated the association between cognitive flexibility and subjective memory. Extraversion (via BFI-10 scores, e.g., not reserved, outgoing, social, sensation seeking) moderated the association between processing speed and subjective memory. Consistently, objectively worse cognition was associated with the fewest subjective memory complaints only in those with lowest agreeableness and highest extraversion.

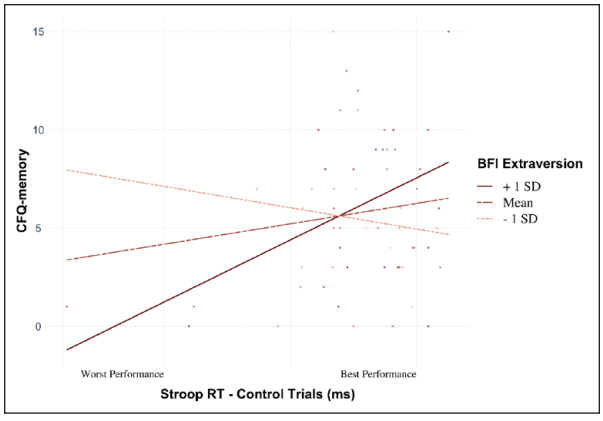

Figure 2. Association between Stroop RT-Control trials and CFQ-memory moderated by extraversion in middle-aged and older adults. Higher CFQ-memory scores reflect more reported memory failures.

We offer several potential explanations for our findings, which partially support our hypothesis that personality would moderate objective cognition/subjective memory associations. Lower agreeableness may correlate with higher appraisal of subjective cognition and lower objective cognitive performance (Hülür et al., 2015). Individuals who score low on agreeableness may be less modest in their self-reporting of memory (Hülür et al., 2015). Some literature proposes those who score low on agreeableness may lack the cognitive capacity to control their own behavior in response to societal rules (Williams et al., 2010). This difficulty of inhibiting impulses can be associated with lower objective cognition (Williams et al., 2010). Therefore, the combination of lower modesty being associated with higher subjective memory scores and lower objective cognition scores, may lead to an overestimation of one's own cognition.

Regarding findings for extraversion, individuals scoring higher in extraversion have been shown to struggle to shift their engagement (Pearman, 2021), are highly activated by external stimuli compared to their lower extraversion counterparts (Luchetti et al., 2016), and tend to view their own health in a more positive (Luchetti et al., 2016). Thus, extraverts might feel they are competent in general, resulting in them showing high confidence regardless of their actual performance (Buratti et al., 2013), which may be indicated by overestimating their cognitive abilities.

Interestingly, main associations revealed low conscientiousness and high neuroticism were associated with worse subjective memory, regardless of objective cognitive performance. This is consistent with previous work in the field, where individuals scoring higher on neuroticism report more cognitive complaints (Pearman & Storandt, 2004) and individuals low on conscientiousness report worse subjective memory (Hülür et al., 2015). This may be due to the similar traits experienced by individuals with higher neuroticism and lower conscientious traits, such as reporting more negative emotions (Pearman & Storandt, 2004). Thus, these individuals may report more cognitive failures, regardless of their actual cognitive ability.

Clinical Implications

Given memory complaints are frequently used as a diagnostic criterion for MCI, despite low sensitivity (Mitchell, 2008), it is important to understand factors that contribute to the discrepancy between subjective memory complaints and objective cognitive functioning. This may help identify those at risk for missed early detection of cognitive impairment. For instance, those who are low on agreeableness and/or high on extraversion may not appraise their objective cognitive functioning properly and may need to be given early and more frequent comprehensive neuropsychological evaluations.

Limitations

The present study has several limitations. First, surveys and cognitive tasks were completed online anonymously, posing potential concerns for reliability and generalizability. However, recommended steps were implemented (pre-screening questions, only one response per same IP address; Chang & Vowles, 2013), mitigating concern. Additionally, past work has found these online cognitive tasks (Inquisit) are valid and reliable when compared to in person tasks (McGraw et al., 2000). Second, the sample size was relatively small. However, we followed precedent for regression models to examine 1 independent variable for every 10 cases (Peduzzi et al., 1996). Third, no multiple comparison adjustments were made, therefore, the results, while consistent, should be replicated in larger samples with multiple comparison adjustments. Finally, the study sample lacked racial and ethnic diversity (90% white/Caucasian).

Conclusions

Present findings suggest personality (agreeableness and extraversion) may be associated with discrepancies in subjective memory and objective cognition in mid-to-late life. Our sample had a mean CFQ score of 25.9, which is below the cutoff other studies have found to indicate subjective cognitive impairment (Papaliagkas et al., 2017; Postma et al., 2014). However, given cognitively impaired populations experience a large discrepancy between subjective and objective cognition (Jessen et al., 2010), future work should explore this relationship in a cognitively impaired population and in prospective studies. Similarly, future research should explore the relationship between subjective/objective cognition in individuals with disorders known to impact personality, such as

Table 2. Multiple Regression Results of Agreeableness, Conscientiousness, and Extraversion Moderating Associations Between Objective Cognition and Subjective Memory in Middle-Aged and Older Adults.

	Agreeableness				Conscientiousness				Extraversion			
Cognitive task performance	β	*SE*	*t*	*p*	β	*SE*	*t*	*p*	β	*SE*	*t*	*p*
Stroop RT—control trials	Full model $R^2 = .26$			.01	Full model $R^2 = .34$			.00	Full model $R^2 = .30$			.00
Stroop RT—control	−1.17	0.50	−2.32	.02	−1.27	0.47	−2.71	.01	−.69	0.55	−1.27	.21
Personality	−.52	0.55	−0.95	.34	−1.67	0.59	−2.84	.01	−.06	0.44	−0.15	.88
Personality × Stroop RT—control	−.26	0.60	−0.44	.66	−.03	0.65	−0.05	.96	−1.03	0.51	−0.02	.05
Age	.01	0.07	0.14	.89	−.03	0.65	−0.05	.96	−.01	0.06	−0.22	.83
Number of medical conditions	.81	0.25	3.24	.00	.72	0.23	3.09	.00	−.01	0.06	−0.22	.83
Income	−.09	0.31	−0.28	.78	.15	0.30	0.50	.62	−.17	0.30	−0.54	.59
Stroop RT—congruent trials	Full model $R^2 = .22$			.03	Full model $R^2 = .31$			.00	Full model $R^2 = .25$			.01
Stroop RT—congruent	−.87	0.50	−1.73	.09	−.98	0.48	−2.06	.04	−.58	0.52	−1.11	.27
Personality	−.53	0.56	−0.94	.35	−1.71	0.60	−2.85	.01	−.20	0.46	−0.44	.66
Personality × Stroop RT	−.14	0.67	−0.20	.84	.31	0.71	0.43	.67	−1.11	0.66	−1.68	.10
Age	−.01	0.07	−0.18	.86	−.02	0.06	−0.28	.78	−.03	0.07	−0.39	.70
Number of medical conditions	.76	0.26	2.95	.00	.67	0.24	2.81	.01	.90	0.25	3.65	.00
Income	−.11	0.31	−0.36	.72	.13	0.31	0.41	.68	−.12	0.31	−0.37	.71
Stroop RT—incongruent trials	Full model $R^2 = .23$			.03	Full model $R^2 = .27$			.01	Full model $R^2 = .25$			.02
Stroop RT—incongruent	−055	0.52	−1.06	.30	−.47	0.49	−0.96	.34	−.14	0.50	−0.27	.79
Personality	−.37	0.59	−0.62	.54	−1.40	0.63	−2.21	.03	.03	0.47	0.06	.95
Personality × Stroop RT	−.44	0.41	−1.08	.29	.18	0.73	0.24	.81	−1.12	0.58	−1.94	.06
Age	−.02	0.07	−0.27	.79	−.04	0.06	−0.57	.57	−.05	0.06	−0.78	.44
Number of medical conditions	.76	0.27	2.83	.01	.75	0.25	2.99	.00	.88	0.25	3.56	.01
Income	−.18	0.32	−0.56	.58	.06	0.32	0.18	.86	−.21	0.32	−0.67	.51
Posner RT—exogenous orienting index	Full model $R^2 = .20$			.04	Full model $R^2 = .28$			.01	Full model $R^2 = .19$			.06
Posner RT—exogenous	−.30	0.48	−0.63	.53	−.39	0.47	−0.82	.41	−.34	0.50	−0.69	.49
Personality	−.50	0.55	−0.90	.37	−1.62	0.62	−2.61	.01	−.19	0.46	−0.42	.67
Personality × Posner RT	.13	0.43	0.29	.77	.50	0.62	0.81	.42	−.06	0.43	−0.13	.90
Age	−.04	0.06	−0.67	.50	−.05	0.06	−0.83	.41	−.05	0.06	−0.84	.40
Number of medical conditions	.74	0.26	2.80	.01	.56	0.26	2.14	.04	.83	0.26	3.19	.00
Income	−.07	0.32	−0.22	.83	.11	0.32	0.34	.74	−.05	0.33	−0.14	.89

(continued)

Table 2. (continued)

	Agreeableness				Conscientiousness				Extraversion			
Cognitive task performance	β	*SE*	*t*	*p*	β	*SE*	*t*	*p*	β	*SE*	*t*	*p*
Posner RT—endogenous orienting index	Full model $R^2 = .22$			.03	Full model $R^2 = .29$			.00	Full model $R^2 = .20$			.05
Posner RT—endogenous	.49	0.50	0.95	.34	.56	0.48	1.16	.25	.58	0.51	1.12	.27
Personality	−.50	0.57	−0.88	.38	−1.54	0.60	−2.58	.01	−.35	0.45	−0.77	.44
Personality × Posner RT	−.27	0.51	−0.54	.59	−.41	0.62	−0.66	.51	.20	0.51	0.38	.70
Age	−.03	0.06	−0.51	.61	−.04	0.06	−0.64	.52	−.05	0.06	−0.82	.41
Number of medical conditions	.69	0.26	2.62	.01	.56	0.26	2.20	.03	.78	0.26	3.02	.00
Income	.03	0.33	0.08	.93	.23	0.32	0.72	.47	.09	0.34	0.25	.80
Sternberg proportion correct	Full model $R^2 = .16$			.15	Full model $R^2 = .23$			.02	Full model $R^2 = .15$			.19
Sternberg	.28	0.49	0.57	.57	.09	0.50	0.17	.87	.18	0.51	0.35	.73
Personality	−.36	0.59	−0.62	.54	−1.62	0.63	−2.57	.01	.05	0.52	0.10	.92
Personality × Sternberg	.40	0.54	−0.62	.54	.13	0.71	0.19	.85	.33	0.46	0.73	.48
Age	−.06	0.06	−1.01	.32	−.07	0.06	−1.20	.23	−.08	0.06	−1.25	.22
Number of medical conditions	.66	0.26	2.49	.02	.52	0.26	2.00	.05	.75	0.27	2.78	.01
Income	−.13	0.32	−0.40	.69	.13	0.32	0.40	.69	−.13	0.33	−0.39	.70
WCST percent perseverative error	Full model $R^2 = .22$			.03	Full model $R^2 = .26$			.02	Full model $R^2 = .18$			.10
WCST	−.48	0.50	−0.95	.35	.01	0.53	0.02	.98	−.07	0.54	−0.12	.91
Personality	−1.20	0.56	−2.15	.04	−1.49	0.67	−2.23	.03	−.10	0.52	−0.18	.85
Personality × WCST	1.33	0.57	2.36	.02	−.01	0.64	−0.02	.98	.27	0.55	0.50	.62
Age	−.05	0.06	−0.82	.41	−.08	0.06	−1.35	.18	−.10	0.06	−1.51	.14
Number of medical conditions	.57	0.26	2.18	.03	.62	0.27	2.30	.03	.79	0.27	2.91	.01
Income	−.07	0.32	−0.22	.83	.05	0.34	0.15	.88	−.20	0.36	−0.55	.58

Note. Criterion variable was CFQ-memory.

Table 3. Multiple Regression Results of Neuroticism and Openness Moderating Associations Between Objective Cognition and Subjective Memory in Middle-Aged and Older Adults.

	Neuroticism				Openness			
Cognitive task performance	β	*SE*	*t*	*p*	β	*SE*	*t*	*p*
Stroop RT—control trials		Full model $R^2 = .31$		.00		Full model $R^2 = .24$		.02
Stroop RT—control	−1.21	0.48	−2.52	.01	−1.22	0.51	−2.39	.02
Personality	1.24	0.52	2.38	.02	.04	0.52	0.08	.93
Personality × Stroop RT - Control	−.10	0.56	−0.18	.86	−.18	0.65	−0.28	.78
Age	.02	0.07	0.24	.81	−.01	0.08	−0.08	.94
Number of medical conditions	.65	0.26	2.55	.81	.88	0.24	3.52	.00
Income	−.10	0.29	−0.33	.75	−.08	0.31	−0.26	.80
Stroop RT—congruent trials	Full model $R^2 = .27$			.01	Full model $R^2 = .20$			.04
Stroop RT—congruent	−.84	0.49	−1.72	.09	−.88	0.51	−1.74	.09
Personality	1.17	0.54	2.18	.03	.15	0.53	0.28	.78
Personality × Stroop RT	−.12	0.51	−0.24	.81	.08	0.57	0.14	.89
Age	−.01	0.07	−0.16	.88	−.03	0.07	−0.40	.69
Number of medical conditions	.61	0.26	2.32	.02	.83	0.25	3.37	.00
Income	−.13	0.30	−0.42	.68	−.13	0.32	−0.40	.69
Stroop RT—incongruent trials	Full model $R^2 = .29$			.01	Full model $R^2 = .21$			.05
Stroop RT—incongruent	−.54	0.48	−1.12	.27	−.43	0.51	−0.84	.40
Personality	1.28	0.53	2.40	.02	−.02	0.52	−0.03	.97
Personality × Stroop RT	.38	0.44	0.86	.40	−.50	0.57	−0.88	.38
Age	.00	0.07	0.07	.95	−.03	0.07	−0.49	.63
Number of medical conditions	.62	0.26	2.36	.02	.88	0.25	3.47	.00
Income	−.20	0.30	−0.64	.52	−.17	0.32	−0.53	.60
Posner RT—exogenous orienting index	Full model $R^2 = .28$			.00	Full model $R^2 = .19$			.06
Posner RT—exogenous	−.23	0.46	−0.49	.63	−.40	0.48	−0.82	.42
Personality	1.23	0.53	2.45	.02	.12	0.51	0.24	.81
Personality × Posner RT	−.55	0.46	−1.20	.23	.14	0.54	0.27	.79
Age	−.03	0.06	−0.56	.58	−.05	0.06	−0.76	.45
Number of medical conditions	.57	0.25	2.25	.03	.81	0.25	3.22	.00
Income	−.09	0.30	−0.30	.76	−.07	0.32	−0.23	.82
Posner RT—endogenous orienting index	Full model $R^2 = .28$			.01	Full model $R^2 = .22$			.03
Posner RT—endogenous	.47	0.48	0.98	.33	.40	0.50	0.80	.43
Personality	1.27	0.53	2.41	.02	.21	0.49	0.42	.67

(continued)

Table 3. (continued)

	Neuroticism				Openness			
Cognitive task performance	β	*SE*	*t*	*p*	β	*SE*	*t*	*p*
Personality × Posner RT	.40	0.51	0.76	.44	−.71	0.50	−1.41	.17
Age	−.03	0.06	−0.45	.66	−.05	0.06	−0.90	.37
Number of medical conditions	.51	0.26	1.95	.06	.71	0.26	2.75	.01
Income	.03	0.21	0.10	.92	.07	0.32	0.24	.81
Sternberg proportion correct	Full model R^2 = .22			.03	Full model R^2 = .16			.15
Sternberg	.33	0.48	0.70	.49	.29	0.49	0.60	.55
Personality	1.13	0.56	2.02	.05	.06	0.53	0.12	.90
Personality × Sternberg	.80	0.59	1.37	.18	−.61	0.55	−1.12	.27
Age	−.06	0.06	−1.01	.32	−.08	0.06	−1.23	.22
Number of medical conditions	.54	0.27	2.02	.05	.69	0.26	2.63	.01
Income	−.08	0.31	−0.26	.80	−.09	0.32	−0.29	.78
WCST percent perseverative error	Full model R^2 = .26			.01	Full model R^2 = .18			.10
WCST	−.30	0.50	−0.59	.56	−.05	0.55	−0.09	.93
Personality	1.07	0.56	1.91	.06	.13	0.57	0.24	.82
Personality × WCST	−.84	0.54	−1.55	.13	.35	0.66	0.53	.60
Age	−.07	0.06	−1.05	.30	−.10	0.07	−1.43	.16
Number of medical conditions	.52	0.28	1.84	.07	.80	0.28	2.83	.01
Income	−.14	0.32	−0.43	.67	−.13	0.34	−0.38	.70

Note. Criterion variable was CFQ-memory.

non-Alzheimer's disease dementias, including frontotemporal dementia (Rankin et al., 2005), that commonly present in middle-aged adults (Ratnavalli et al., 2002). Such studies that are conducted prospectively could shed light on the possibility of whether or not subjective/objective cognition discrepancy is an indicator of risk of frontotemporal dementia. Present findings may help identify those at risk for missed early detection of cognitive impairment.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Investigator contributions to this project were partially supported by internal funds from the University of Missouri (TRIUMPH Award; PI: Ashley Curtis), R01NR017168 and R01NR017168S1 (PI McCrae; Co-I Curtis), DOD W81XWH2010399 (PI McCrae; Co-I Curtis), R01AG061976 (PI McCrae; Co-I Curtis), NIH R01HD021338 (PI Cowan). Funding agencies had no role in study design; data collection, analysis, or interpretation; manuscript preparation; or the decision to submit the paper for publication.

Ethical Approval

University of Missouri IRB approval: 2023385.

ORCID iD

Amy N. Costa https://orcid.org/0000-0001-8863-3352

Supplemental Material

Supplemental material for this article is available online.

References

Aschwanden, D., Strickhouser, J. E., Luchetti, M., Stephan, Y., Sutin, A. R., & Terracciano, A. (2021). Is personality associated with dementia risk? A meta-analytic investigation. *Ageing Research Reviews*, *67*, 101269.

Bender, R., & Lange, S. (2001). Adjusting for multiple testing—when and how? *Journal of Clinical Epidemiology*, *54*(4), 343–349.

Berg, E. A. (1948). A simple objective technique for measuring flexibility in thinking. *The Journal of General Psychology*, *39*(1), 15–22.

Broadbent, D. E., Cooper, P. F., FitzGerald, P., & Parkes, K. R. (1982). The cognitive failures questionnaire (CFQ) and its correlates. *British Journal of Clinical Psychology*, *21*(1), 1–16.

Buratti, S., Allwood, C. M., & Kleitman, S. (2013). First- and second-order metacognitive judgments of semantic memory reports: The influence of personality traits and cognitive styles. *Metacognition and Learning*, *8*(1), 79–102.

Burmester, B., Leathem, J., & Merrick, P. (2016). Subjective cognitive complaints and objective cognitive function in aging: a systematic review and meta-analysis of recent cross-sectional findings. *Neuropsychology Review*, *26*(4), 376–393. https://doi.org/10.1007/s11065-016-9332-2

Chang, T.-Z. D., & Vowles, N. (2013). Strategies for improving data reliability for online surveys: A case study. *International Journal of Electronic Commerce Studies*, *4*(1), 121–130.

Costa, A. N., McCrae, C. S., Cowan, N., & Curtis, A. F. (2022). Paradoxical relationship between subjective and objective cognition: the role of sleep. *Journal of Clinical Sleep Medicine, 18*(8), 2009–2022. https://doi.org/https://doi.org/10.5664/jcsm.10070

Cowan, N., Morey, C. C., Chen, Z., Gilchrist, A. L., & Saults, J. S. (2008). Theory and measurement of working memory capacity limits. *Psychology of Learning and Motivation*, *49*, 49–104.

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Publications.

Hülür, G., Hertzog, C., Pearman, A. M., & Gerstorf, D. (2015). Correlates and moderators of change in subjective memory and memory performance: Findings from the health and retirement study. *Gerontology*, *61*(3), 232–240.

Inquisit Web. (2020). Inquisit. https://www.millisecond.com

Jessen, F., Wiese, B., Bachmann, C., Eifflaender-Gorfer, S., Haller, F., Kölsch, H., Luck, T., Mösch, E., van den Bussche, H., & Wagner, M. (2010). Prediction of dementia by subjective memory impairment: Effects of severity and temporal association with cognitive impairment. *Archives of General Psychiatry*, *67*(4), 414–422.

Lenehan, M. E., Klekociuk, S. Z., & Summers, M. J. (2012). Absence of a relationship between subjective memory complaint and objective memory impairment in mild cognitive impairment (MCI): Is it time to abandon subjective memory complaint as an MCI diagnostic criterion? *International Psychogeriatrics*, *24*(9), 1505–1514. https://doi.org/10.1017/S1041610212000695

Luchetti, M., Terracciano, A., Stephan, Y., & Sutin, A. R. (2016). Personality and cognitive decline in older adults: Data from a longitudinal sample and meta-analysis. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *71*(4), 591–601.

Lundwall, R. A., Woodruff, J., & Tolboe, S. P. (2018). RT slowing to valid cues on a reflexive attention task in children and young adults. *Frontiers in Psychology*, *9*, 1324.

McGraw, K. O., Tew, M. D., & Williams, J. E. (2000). The integrity of web-delivered experiments: can you trust the data? *Psychological Science*, *11*(6), 502–506. https://doi.org/10.1111/1467-9280.00296

Mitchell, A. J. (2008). The clinical significance of subjective memory complaints in the diagnosis of mild cognitive impairment and dementia: A meta-analysis. *International Journal of Geriatric Psychiatry*, *23*(11), 1191–1202. https://doi.org/10.1002/gps.2053

Papaliagkas, V., Papantoniou, G., Tsolaki, M., & Moraitou, D. (2017). Self-report instruments of cognitive failures as screening tools for Subjective Cognitive Impairment in older adults. *Hellenic Journal of Nuclear Medicine*, *20*(Suppl.), 58–70.

Pearman, A. (2021). The interpersonal context of memory complaints. *Journal of Applied Gerontology*, *40*(11), 1601–1610.

Pearman, A., & Storandt, M. (2004). Predictors of subjective memory in older adults. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *59*(1), P4–P6.

Peduzzi, P., Concato, J., Kemper, E., Holford, T. R., & Feinstein, A. R. (1996). A simulation study of the number of events per variable in logistic regression analysis. *Journal of Clinical Epidemiology*, *49*(12), 1373–1379.

Posner, M. I. (1980). Orienting of attention. *Quarterly Journal of Experimental Psychology*, *32*(1), 3–25.

Postma, I. R., De Groot, J. C., Aukes, A. M., Aarnoudse, J. G., & Zeeman, G. G. (2014). Cerebral white matter lesions and perceived cognitive dysfunction: The role of pregnancy. *American Journal of Obstetrics and Gynecology*, *211*(3), 257.e251–257.e255. https://doi.org/10.1016/j.ajog.2014.02.031

Rammstedt, B., & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality*, *41*(1), 203–212.

Rankin, K., Baldwin, E., Pace-Savitsky, C., Kramer, J., & Miller, B. (2005). Self awareness and personality change in dementia. *Journal of Neurology, Neurosurgery & Psychiatry*, *76*(5), 632–639.

Ratnavalli, E., Brayne, C., Dawson, K., & Hodges, J. (2002). The prevalence of frontotemporal dementia. *Neurology*, *58*(11), 1615–1621.

Reid, L. M., & MacLullich, A. M. (2006). Subjective memory complaints and cognitive impairment in older people. *Dementia and Geriatric Cognitive Disorders*, *22*(5–6), 471–485.

Sternberg, S. (1966). High-speed scanning in human memory. *Science*, *153*(3736), 652–654.

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, *18*(6), 643–662.

Sutin, A. R., Aschwanden, D., Stephan, Y., & Terracciano, A. (2020). Five Factor Model personality traits and subjective cognitive failures. *Personality and Individual Differences*, *155*, 109741.

Wallace, J. C., Kass, S. J., & Stanny, C. J. (2002). The cognitive failures questionnaire revisited: Dimensions and correlates. *The Journal of General Psychology*, *129*(3), 238–256.

Williams, P. G., Suchy, Y., & Kraybill, M. L. (2010). Five-factor model personality traits and executive functioning among older adults. *Journal of Research in Personality*, *44*(4), 485–491.