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Self-reported Personality Traits and Informant-Rated Cognition: A 10-Year Prospective Study

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Abstract

Personality traits, such as higher Neuroticism and lower Conscientiousness, are associated with risk of Alzheimer's disease and other dementias. A diagnosis of dementia relies, in part, on informant ratings of the individual's cognitive status. Here we examine whether self-reported personality traits are associated with four measures of informant-rated cognition up to a decade later. Participants from the Health and Retirement Study (N=2,536) completed a five-factor model measure of personality in 2006 or 2008. Informants completed the 2016 Harmonized Cognitive Assessment Protocol (HCAP), which included ratings of the participant's current cognitive functioning and change in cognitive function over the last decade assessed with the IQCODE, Blessed, 1066, and CSID. Controlling for characteristics of the participant, informant, and their relationship, higher Neuroticism and lower Conscientiousness were associated consistently with worse informant-rated cognition. The association between Openness and better informant-rated cognition was due primarily to higher baseline cognitive function. Extraversion and Agreeableness were associated with better informant-rated cognition only among participants who were cognitively intact at follow-up. The present research suggests that knowledgeable informants are able to detect cognitive deficits associated with personality.

Keywords

Five Factor Model; Informant-rated Cognition; Cognitive Decline; Dementia

When an individual is suspected of having Alzheimer's disease (AD) or a related dementia, the physician and care team rely typically on multiple sources of information to make a diagnosis, including neuropsychological tests, self-reports from individuals about their symptoms, and ratings of symptoms by a close relative or friend [1, 2]. Personality traits, defined as an individual's characteristic ways of thinking, feeling, and behaving, have been associated with an overall diagnosis of AD and these components used to make the diagnosis. The Five-Factor Model (FFM) [3] of personality operationalizes these characteristics along five broad dimensions: Neuroticism (the tendency to experience

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Conflict of Interest

None of the authors has a conflict of interest to report.

negative emotions), Extraversion (the tendency to be energetic and outgoing), Openness (the tendency to be open-minded and creative), Agreeableness (the tendency to be helpful and cooperative), and Conscientiousness (the tendency to be reliable, organized, and disciplined). Higher Neuroticism and lower Conscientiousness, in particular, are associated with higher risk of AD [4, 5], worse performance on neurocognitive tests [6, 7], more subjective cognitive complaints [8, 9], and greater cognitive decline as reported by a knowledgeable informant [10].

Informant ratings are critical to corroborate the individual's self-reported symptoms, especially because the progression of cognitive impairment may compromise the patient's ability to provide accurate information on their cognitive and functional status. As such, informants play a critical role in diagnosis and have been found to help distinguish between preclinical AD and normal aging [11]. In fact, several studies have found that informant-rated cognition is a better predictor of cognitive impairment outcomes than self-reported cognition [12–14]. Rabin and colleagues, for example, found that informant reports provided incremental predictive power beyond episodic memory for risk of AD, whereas self-reported cognition did not [12]. Gruters and colleagues likewise found that informant-rated cognitive decline, but not self-rated decline, was a predictor of incident dementia [14]. Compared to self-reports, informants may be able to better detect changes in cognition that are indicative of pathological changes. This study aims to extend the literature by investigating whether personality traits can predict clinically-relevant cognitive changes that are reported by knowledgeable observers.

Although some evidence suggests that personality is associated with informant-assessed cognition [10], less is known about this relation as compared to the relation between personality and either subjective cognition [8, 9] or neuropsychological testing [6, 7]. The one previous study on personality and informant-rated cognition included only three of the five FFM traits and was cross-sectional.[10] This prior study provides a critical foundation for the relation between personality and informant-cognition and suggests that higher Neuroticism and lower Openness and Conscientiousness are associated with greater cognitive decline, as reported by a knowledgeable informant. To build on this foundation, the next step is to test the prospective association between self-reported personality and observer-rated cognition and extend it to all five FFM traits. It is also important to replicate the associations across different measures of informant cognition to evaluate their robustness. If personality traits are associated with informant-rated cognition, it suggests that personality is associated with changes in cognition observed by others that is predictive of subsequent cognitive impairment. If personality is unrelated to informant ratings of cognition, however, it would suggest that the relation between personality and self-reported cognition is more a reflection of the association with normal cognitive aging. An association would also support the literature that shows higher Neuroticism and lower Conscientiousness predict who is at risk to develop impairment.

In addition to overall scores on informant measures, it is useful to examine the association between personality and individual symptoms. Early symptoms of cognitive impairment are varied, and it is likely that individuals will experience some symptoms but not all symptoms [15], and each personality trait could have different associations with each symptom. For

example, individuals who score higher in Openness might develop deficits in episodic memory but maintain appropriate language use. As such, testing personality as a prospective predictor of specific symptoms will help inform surveillance of cognitive decline. That is, if there are differential associations between the traits and symptoms, knowing an individual's personality and what symptoms are most likely to be exhibited can inform monitoring of cognitive status and help with early detection of cognitive deficits.

To that end, the present study tests whether self-reported personality traits are associated with informant-rated cognition approximately 10 years later and with specific symptoms indicative of poor cognitive health (e.g., forgetting things, forgetting names, misusing language, etc.). Consistent with the literature on self-reported personality and both objective and subjective cognition, we hypothesize that higher Neuroticism and lower Conscientiousness will be associated with informant-rated worse cognitive health. Finally, we test whether these associations are moderated by age, gender, baseline cognitive function, or impairment status at follow-up.

Method

Participants and Procedure

Participants were drawn from the 2016 Harmonized Cognitive Assessment Protocol (HCAP) [16], a substudy of the Health and Retirement Study (HRS). The HRS is a study of the health and well-being of adults living in the United States over the age of 50 and their spouses.[17] HRS participants complete extensive assessments every two years. In addition to these regular assessments, participants are sometimes asked to participate in ancillary studies, such as the HCAP. For HCAP, participants who completed the regular 2016 HRS assessment and who were aged 65 or older were randomly selected to participate in a comprehensive assessment of cognitive function. From the 5,500 HRS participants who were asked to complete the assessment, a total of 3,496 participants completed at least some part of it. As a participant in the HCAP assessment, individuals were asked to nominate a close other to complete informant ratings of their cognition. Specifically, participants nominated someone close to them who could report on their current cognitive function and change in cognition over the last decade. We used this informant-rated cognition as the outcome. In HRS, participants regularly complete self-report personality measures as part of the Leave-Behind Questionnaire. The first personality assessment in the Leave-Behind Questionnaire was in 2006 for a random half of the HRS sample; the other half completed the personality measure in 2008. These two assessments were combined as the baseline personality assessment. We used this self-reported personality 8–10 years before the informant ratings as the predictors.

To be included in the analytic sample, participants (i.e., focal HRS participants) had to have personality data available from the 2006/2008 Leave-Behind Questionnaire, had to have at least one measure of informant-reported cognition available, and information available on the covariates (see below). A total of 2,536 participants met these criteria.

Measures

Personality.—Personality traits were measured with Midlife Development Inventory (MIDI) [18]. The MIDI uses 26 adjectives to assess FFM traits: Neuroticism (e.g., moody), Extraversion (e.g., talkative), Openness (e.g., creative), Agreeableness (e.g., helpful), and Conscientiousness (e.g., organized). Reliability and predictive validity of the MIDI in HRS is well established [19]. Items were rated on a scale from 1 (a lot) to 4 (not at all), reverse scored in the direction of the trait label, the mean taken across items for each trait, and standardized to a mean of zero and standard deviation of one.

Informant cognition.—Informants completed four measures of the participant's cognitive function. Detailed information about the measures used in HCAP can be found in Weir and colleagues [16].

IQCODE.—Informants completed the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) [20]. Informants were asked to compare participants' current functioning to their functioning 10 years ago and rate whether it had improved, declined, or stayed the same over this interval (e.g., "Compared with 10 years ago, how is [the target] at remembering things about family and friends, such as occupations, birthdays, and addresses? Has this improved, not much changed, or gotten worse?"). If the informant responded improved or gotten worse, a follow-up question was asked as to the degree of change (a bit improved/worse and much improved/worse). These responses were combined on a scale that ranged from 1 (*much improved*) to 5 (*much worse*) with a score of 3 indicating not much changed. The IQCODE score is the mean of 16 items, with higher scores indicating greater decline over 10 years.

Blessed Part 1.—Informants completed Part 1 of the Blessed Dementia Rating Scale [21]. This scale has eight items that asked about loss of ability to do everyday activities (e.g., "remembering a short list of items such as a shopping list"). Responses were coded as 1 (Some loss or Severe loss) or 0 (No loss) and the sum taken across the eight items, with higher scores indicating greater loss in function.¹

1066.—The 1066 [22] had items that measured perceived changes in daily activities that included a cognitive component. For example, informants were asked, "Has there been a change in his/her ability to handle money? (Would you say he/she has no difficulty, some difficulty, or cannot handle money?)" Responses were coded as 1 (Some difficulty or Cannot do) or 0 (No difficulty) and the sum taken across items. Higher scores indicated worse function.

CSID.—Community Screening Instrument for Dementia (CSID) [23] included 14 items about the participant's current function and one item about decline in function. For example, informants were asked, "Does (he/she) forget where (he/she) has put things? (Would you say Yes, No, or Sometimes?)" Responses were coded as 1 (Yes and Sometimes) or 0 (No) and

¹The informant HCAP also included the Blessed Part 2, which measured deficits in activities of daily living (e.g., ability to feed self). We did not include it here because this scale did not specifically measure deficits in cognitive function.

the sum taken across the items. Higher scores indicated worse function. In addition to the total score, we also examined whether personality was associated with each of the fourteen current symptoms. We focus on the individual items for this scale to examine the prospective association between personality traits and current symptomatology.

For some analyses, we aggregated the four scales by standardizing each one and then taking the mean across the four. We also dichotomized the aggregated score at one standard deviation above the mean (i.e., rated worse cognition) compared to all others for a threshold for poor informant-rated cognition. A one standard deviation difference is a standard cut point to test threshold effects, but it is relatively arbitrary and not based on a clinical cut-off.

Covariates.—Covariates were participant-reported age in years at the baseline personality assessment, year of personality assessment (2008=1, 2006=0), gender (female=1, male=0), race (African American=1 [dummy variable 1], other/unknown=1 [dummy variable 2] both compared to white=0), and education in years. Informant covariates were informant-reported age in years at the HCAP assessment, informant gender (female=1, male=0), informant education in years, length of time informant knew participant in years, and relationship with participant (spouse=1, other=0). Participant sociodemographic covariates were included because of known associations with personality and/or cognitive function. Informant covariates were included because these characteristics were hypothesized to potentially be associated with how informants made their ratings of participants (e.g., spouses may have more information than other informants, such as friends or adult children).

In addition, some analyses used participants' 2006/2008 baseline cognitive function or cognitive status concurrent (2016) with the HCAP assessment. Participants were administered the modified Telephone Interview for Cognitive Status (TICS_m) at the same assessment as baseline personality in 2006–2008.[24] The total TICS_m score was the sum of three subscales: immediate and delayed recall (20 points), serial-7s subtraction (5 points), and backward counting (2 points). The 2016 HCAP assessment measured cognitive status with the Mini-Mental State Examination (MMSE),[25] which was administered during the HCAP. MMSE measures overall function with tasks that tap into orientation, language, registration, memory, spelling, and construction. Cognitive status was defined as intact (MMSE ≥ 25) versus impaired (MMSE < 25) cognition (out of a total of 30 possible points).

Analytic Strategy

Linear regression was used to test the association between each personality trait and the informant measures of cognition, controlling for the participant (baseline age, year of baseline personality assessment, gender, race, education), informant (age at HCAP, gender, education), and relationship (years known each other, spousal status) covariates. The study data met the assumptions for linear regression. We then did a number of sensitivity analyses to ensure the robustness of the findings. First, we reran the analyses including all five traits simultaneously in the model. Second, we reran the analyses with the 2006/2008 baseline cognition as a covariate ($n=2,508$ due to missing data on baseline cognition). Third, we reran the analyses excluding participants who were not cognitively intact at the 2016 HCAP assessment ($n=2,145$ due to missing data on the MMSE). Fourth, we reran the analyses on

the sample that had full data on all four of the informant measures ($n=2,443$ due to missing data on one or more informant measures). We further tested whether the association between personality and informant cognition was moderated by participant age, gender, baseline cognitive function, concurrent cognitive status, and spousal informant (i.e., to compare whether the associations were similar across spouses who were the knowledgeable informant compared to other knowledgeable informants). Across the four scales, we focused on interactions that replicated for at least two of the measures. We also tested the relation between personality and the aggregate score, both as a continuous variable using linear regression and as a threshold using logistic regression, both controlling for the same covariates. Finally, logistic regression was also used to test the association between the traits and the individual symptoms on the CSID measure, controlling for the same covariates.

Results

Informants had known the participant for an average of 30 years and approximately 45% of the informants were participants' spouses. Table 1 reports descriptive statistics for all study variables. Supplemental Table S1 shows the correlations among all study variables.

The associations between personality and informant-reported cognition are shown in Table 2. Consistent associations emerged across the four measures of informant-rated cognition. Specifically, self-reported higher Neuroticism at baseline was associated with greater informant-rated decline in cognition over the past decade and with worse current cognitive function. A similar pattern, in the opposite direction, emerged for Conscientiousness: Higher scores on this trait were associated with maintaining cognitive function over the last decade and higher informant-rated current cognition. The associations between both Neuroticism and Conscientiousness and informant-rated cognition remained significant with the inclusion of all five traits simultaneously (Table 2), when baseline cognitive function was included as a covariate (Table 2), when the sample was limited to participants with intact cognition in 2016 (Table S2), and when the sample was limited to complete data on all measures (Table S3). Higher Openness was also associated with better cognition, although the association with IQCODE and the CSID was non-significant when the 2006/2008 baseline cognitive function was included as a covariate, and the association with Openness and the Blessed and the CSID was non-significant when all traits were entered simultaneously (Table 2). When the sample was limited to participants with intact cognition at the concurrent 2016 assessment, higher Extraversion was associated with better informant-rated cognition on the IQCODE, the Blessed, and the 1066. The aggregate analysis likewise indicated that Neuroticism and Conscientiousness were the strongest trait correlates of informant cognition, and the threshold analysis indicated that every standard deviation difference in these two traits was associated with a greater than 30% increased risk of worse ratings on cognition by a knowledgeable informant.

The strongest evidence for moderation was baseline 2006/2008 cognitive function and Neuroticism and concurrent 2016 cognitive status and Agreeableness. Specifically, the association between self-reported Neuroticism at baseline and informant-rated cognition at follow-up was stronger for participants who scored relatively lower on cognitive function in 2006/2008. This interaction was apparent for the Blessed ($\beta_{\text{interaction}} = -.05$, $p = .014$), the

CSID ($\beta_{\text{interaction}} = -.07, p < .001$), the 1066 ($\beta_{\text{interaction}} = -.04, p = .049$), and it approached significance for the IQCODE ($\beta_{\text{interaction}} = -.03, p = .092$).² The association between Agreeableness and informant-rated cognition was moderated by concurrent mental status. Specifically, Agreeableness was associated with better informant-rated cognition among participants who had intact cognition at the 2016 assessment but was unrelated among participants with evidence of impairment (IQCODE: $\beta_{\text{interaction}} = .09, p < .001$; Blessed: $\beta_{\text{interaction}} = .04, p < .05$; CSID: $\beta_{\text{interaction}} = .06, p < .05$).³ There was only one interaction for age that replicated across two measures: The association between Conscientiousness and informant-rated cognition was stronger among relatively younger participants than relatively older participants for the IQCODE ($\beta_{\text{interaction}} = .04, p = .018$) and the CSID ($\beta_{\text{interaction}} = .05, p < .01$) but not the Blessed [$\beta_{\text{interaction}} = .01, p = .64$] or 1066 [$\beta_{\text{interaction}} = .02, p = .44$].⁴ The one interaction with spousal informant did not replicate (Neuroticism on IQCODE: $\beta_{\text{interaction}} = .05, p < .05$), and none one of the associations was moderated by gender.

Personality traits were also associated with specific cognitive symptoms reported on the CSID. In particular, Neuroticism was associated with greater risk on nearly every item: For participants higher in Neuroticism informants reported that they had difficulty with memory, following a conversation, using words correctly, and getting lost. Participants higher in Conscientiousness were less likely to have these cognitive problems. Extraversion, Openness and Agreeableness were generally unrelated to specific symptoms, except that higher Agreeableness was associated with being less likely to forget friends' names and higher Openness was associated with being less likely to have difficulty finding words or using the wrong words.

Discussion

The present research indicated that self-reported personality was associated with informant-rated cognitive function up to 10 years after the personality assessment. Specifically, participants who reported themselves as higher in Neuroticism and lower in Conscientiousness at baseline had informants who rated greater cognitive declines over this period and worse current cognitive function. Of note, these associations were similar across the four informant measures and were independent of baseline cognitive function, sociodemographic characteristics of both the participant and informant, and characteristics of the relationship between the participant and informant. Openness was also associated with informant-rated cognitive function, but the associations were weaker and more dependent on measured baseline cognitive function than the associations for Neuroticism and Conscientiousness. Finally, these associations were similar across age and gender of the participant but there were some differences by baseline cognitive function and concurrent cognitive status.

²There were two other interactions between personality and baseline cognitive function on the Blessed that did not replicate across the other measures (Agreeableness: $\beta_{\text{interaction}} = .04, p = .042$ and Conscientiousness: $\beta_{\text{interaction}} = .05, p = .017$).

³There were other interactions between personality and concurrent cognitive status that did not replicate across multiple measures for the IQCODE (Extraversion: $\beta_{\text{interaction}} = .06, p < .01$, Openness: $\beta_{\text{interaction}} = .06, p < .01$, and Conscientiousness: $\beta_{\text{interaction}} = .07, p < .01$) and CSID (Neuroticism: $\beta_{\text{interaction}} = .06, p < .01$).

⁴There were three other interactions with age on one scale that did not replicate on any of the other three scales (Agreeableness on IQCODE [$\beta_{\text{interaction}} = .04, p = .031$] and Neuroticism [$\beta_{\text{interaction}} = .04, p = .035$] and Openness [$\beta_{\text{interaction}} = -.04, p = .033$] on the Blessed).

Neuroticism and Conscientiousness are associated consistently with cognition across the three sources of information typically used to make a diagnosis of dementia: subjective evaluations, task performance, and informant ratings. Starting at least as early as middle adulthood, individuals higher in Neuroticism and lower in Conscientiousness tend to report more subjective cognitive complaints [9]. These complaints are supported by performance on objective measures of cognition: Higher Neuroticism and lower Conscientiousness are associated with greater declines in cognition over time [6]. Of note, previous research has found that the association between these traits and subjective cognition is stronger than objective performance. This pattern suggests that processes associated with the traits contribute to how cognition is evaluated, in addition to objective cognitive functioning. Standard cognitive tests, however, do not consider broader cognitive ability and function within social and other real-life contexts. Personality might capture these broader evaluations that are missed by performance on standardized tests.

The present findings add that there are equally robust associations between traits and informant-rated cognition. A previous study had implicated Neuroticism and Conscientiousness, plus Openness, in informant-rated cognition using the IQCODE [10]. The present study replicates these associations and shows that the relation is not limited to one measure, but is consistent across four measures that assess different aspects of informant-rated cognition. The present study also extends this association by separating the assessment of self-reported personality and informant-ratings of cognition in time by up to a decade. Such a prospective design is important because of changes in personality that can occur with dementia. That is, there are significant trait changes after a diagnosis of dementia [26] that may confound the association with informant cognition (although there tend not to be changes in personality prior to the onset of cognitive impairment [27]).

In contrast to Neuroticism and Conscientiousness, Extraversion has more domain-specific relations with cognitive function. Extraversion tends to be related to better performance on language tasks [28] but is unrelated to tasks that measure memory [29]. Interestingly, individuals higher in Extraversion tend to report better subjective cognition: They see themselves as having better memory than average [6]. This divergence across subjective and performance measures suggests that psychological processes (e.g., extroverts tend to be overly optimistic of their own abilities), rather than measurable ability, drive the associations between this trait and subjective cognition. Of note, the association between Extraversion and informant-rated cognitive function was only apparent among individuals who were cognitively intact. This pattern suggests that extroverts are perceived as having better cognitive capacity, but only among those with intact cognitive status. Among those with cognitive scores in the impairment range (MMSE<25), there seems to be no protective effect of Extraversion.

Interestingly, there was fairly consistent evidence for moderation by baseline cognitive status for Neuroticism. That is, the association between Neuroticism and informant-rated cognition was stronger when the participant had relatively lower cognitive function at the baseline assessment. This pattern suggests that these two risk factors for poor cognitive outcomes may amplify cognitive deficits and make them more noticeable by close others. In contrast, moderation by concurrent cognitive status was only apparent for Agreeableness:

Agreeableness was associated with better informant-rated cognition when the participant was cognitively intact but was unrelated to informant-rated cognition when impaired. Similar to Extraversion, there does not seem to be a protective association for Agreeableness among individuals who developed some cognitive impairment.

As discussed above, when measured with performance-based tasks, Neuroticism and Conscientiousness are both related to change in cognitive function over time [6, 29]. The present results are consistent with this literature and suggest that knowledgeable informants are able to detect these changes that occur over time for individuals higher in Neuroticism and lower in Conscientiousness. An alternative explanation, however, is that lapses in memory and difficulty with everyday activities are one consequence of the processes associated with these traits. That is, individuals higher in Neuroticism may simply be forgetful [30] and this tendency may be mistaken for cognitive deficits when the individual reaches the age when such deficits are more noticeable and expected. Similarly, individuals lower in Conscientiousness, who as a general tendency struggle with organization and following through on commitments [31], may be more likely to be evaluated as having cognitive deficits than individuals who are more organized and responsible. Likewise, for individuals higher in Conscientiousness, their organization and responsibility may overshadow emerging deficits. Individuals with borderline cognitive deficits may thus be more likely to be diagnosed in part based on their general tendencies.

The item-level analysis of the CSID further supports the idea that judgements about cognitive function may be shaped in part by processes associated with the traits. Neuroticism and Conscientiousness were associated with nearly every symptom measured. The association between Neuroticism and nearly every symptom is particularly noteworthy. Neuroticism is a strong risk factor for major depression [2], as well as more moderate symptoms of depression [32], and anxiety [33], and anxiety and depression are early clinical symptoms of dementia [34]. The other three traits did not have widespread associations with the symptoms, but those that did emerge were consistent with processes associated with the traits. For example, individuals high in Openness have greater verbal abilities, with associations that emerge at least as early as adolescence [35]. And, of the symptoms, higher Openness was associated with lower risk of not being able to find words or using the wrong words. In addition, the strongest association for Agreeableness was lower risk of forgetting friends' names. This association is consistent with the prosocial characteristics of this trait that tend to facilitate and prioritize friendships [36], tendencies that again emerge at least as early as adolescence [37].

This research has clinical relevance. It helps to identify who is most at risk for cognitive decline in older adulthood. That is, personality traits were associated with informant ratings of cognition 8–10 years after the personality assessment. This finding suggests who is most at risk for cognitive decline and who would benefit from monitoring and early detection. In addition, the findings indicate that the associations with cognitive performance are not due entirely to processes associated with the traits. Higher Neuroticism, for example, is associated consistently with worse performance on cognitive tasks in older adulthood [38]. This association could be due, in part, to anxiety during testing that interferes with performance [39]. The present research suggests, however, that Neuroticism is associated

with declines in cognition that are detectable by close others in more naturalistic environments than standardized testing. As such, Neuroticism may be a risk factor for cognitive decline rather than simply interference with performance.

The present study had several strengths, including a relatively large sample, informant-ratings on four measures, and a prospective assessment of informant-rated cognition up to 10 years after the self-reported personality assessment. There are also some limitations to consider. The prospective design, for example, was limited to personality. That is, we did not have informant ratings of participant cognition concurrent with the baseline personality assessment. As such, informant-rated declines in cognition were limited to retrospective reports by the informant and not modeled from multiple informant assessments over time. In addition, we do not have prospective cognitive outcomes on participants either. That is, we do not yet have information on who goes on to develop dementia among the HCAP participants after the HCAP assessment. Such information would be needed to test informant-rated cognition in a model from self-reported personality to dementia risk.

In sum, the present research indicates robust associations between personality, particularly Neuroticism and Conscientiousness, and cognitive decline, as rated by a knowledgeable informant. These findings are consistent with the broader literature on personality and cognition that shows that higher Neuroticism and lower Conscientiousness are associated with worse cognitive outcomes. The present research adds that close others can detect the changes in cognition associated with these traits. Such information may be useful for early intervention, detection, and/or monitoring of cognitive changes across older adulthood.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Descriptive Statistics for all Study Variables

Study Variables	Mean (SD) or % (n)
Participant characteristics	
Age at baseline (years)	67.66 (7.44)
Gender (female)	61% (1539)
Race (African American)	12% (305)
Race (other/unknown)	2% (62)
Education (years)	12.83 (3.08)
Year of personality assessment (2008)	52% (1323)
2006/2008 TICSm (n=2508)	16.06 (3.99)
MMSE<25 (n=2145)	8% (208)
Informant Characteristics	
Age at HCAP (years)	65.21 (13.86)
Gender (female)	67% (1695)
Education (years)	13.59 (2.57)
Relationship (spouse vs other)	45%
Time known (years)	30.08 (21.50)
Personality ^J	
Neuroticism	2.02 (.60)
Extraversion	3.23 (.54)
Openness	2.96 (.53)
Agreeableness	3.55 (.45)
Conscientiousness	3.40 (.44)
Informant-Rated Cognition	
IQCODE ² (n=2535)	3.20 (.54)
Blessed Part 1 ³ (n=2486)	1.17 (1.63)
CSID ⁴ (n=2536)	3.46 (3.09)
1066 ⁵ (n=2493)	1.14 (1.46)

Note. N=2536 for all variables, unless otherwise specified. TICSm=Modified Telephone Interview for Cognitive Status. MMSE=Mini-Mental State Examination. HCAP= Harmonized Cognitive Assessment Protocol. IQCODE= Informant Questionnaire on Cognitive Decline in the Elderly. Blessed Part 1= Blessed Dementia Rating Part 1. CSID= Community Screening Instrument for Dementia.

¹ Personality is measured on a scale from 1 (not at all) to 4 (a lot). The raw means were standardized to a mean of 0 and standard deviation of 1 for analysis.

² IQCODE is measured on a scale from 1 (much improved) to 5 (much worse).

³ Blessed is the sum of 8 yes/no items.

⁴ CSID is the sum of 14 yes/no items.

⁵ 1066 is the sum of 5 yes/no items.

Table 2

Association between Self-reported Personality and Informant-rated Cognition

Trait	IQCODE	Blessed Part 1	1066	CSID	Total	Threshold
Neuroticism	.09**	.12**	.12**	.11**	.12**	1.36 (1.21–1.53)**
Extraversion	-.01	-.02	-.03	-.01	-.02	.98 (.87–1.10)
Openness	-.04*a, b	-.06**a	-.04	-.04*a, b	-.05*b	.92 (.81–1.04)
Agreeableness	.00	-.02	-.02	-.04	-.02	.94 (.83–1.06)
Conscientiousness	-.06**	-.09**	-.10**	-.12**	-.10**	.80 (.71–.90)**
<i>n</i>	2535	2486	2493	2536	2535	2535

Note. Coefficients are standardized beta coefficients from linear regression controlling for participant age at the baseline personality assessment, year of baseline personality assessment, gender, race, and education, informant age at the HCAP assessment, gender, and education, length of time informant and participant knew each other, and spousal relationship. IQCODE= Informant Questionnaire on Cognitive Decline in the Elderly. Blessed Part 1= Blessed Dementia Rating Part 1. CSID= Community Screening Instrument for Dementia. Total refers to the combined score across the four informant-rated cognitive measures. Threshold reports the odds ratio of scoring 1 standard deviation below the mean of Total.

^aNon-significant when all five traits are entered simultaneously.

^bNon-significant when baseline cognitive function is included.

* p<.05.

** p<.01.

Table 3
Association Between Self-reported Personality and Informant-rated Symptoms on the CSID

Trait	Symptom	
	Difficulty remembering	Forget where put things
Neuroticism	1.28 (1.15–1.43) **	1.18 (1.08–1.30) **
Extraversion	.96 (.86–1.07)	.96 (.88–1.05)
Openness	.96 (.86–1.07)	.96 (.88–1.05)
Agreeableness	.96 (.86–1.07)	.98 (.89–1.07)
Conscientiousness	.84 (.76–.94) **	.77 (.70–.85) **
	Forget where things kept	Forget friends' names
Neuroticism	1.21 (1.10–1.32) **	1.10 (1.01–1.20) *
Extraversion	1.03 (.95–1.13)	1.00 (.92–1.10)
Openness	.98 (.90–1.08)	.95 (.87–1.05)
Agreeableness	.97 (.89–1.06)	.87 (.80–.96) **
Conscientiousness	.80 (.73–.87) **	.89 (.82–.98) *
	Forget family's names	Forget thoughts in conversation
Neuroticism	1.26 (1.11–1.42) **	1.19 (1.09–1.29) **
Extraversion	1.05 (.92–1.19)	.98 (.90–1.06)
Openness	1.02 (.90–1.16)	.93 (.86–1.01)
Agreeableness	.89 (.79–1.01)	1.02 (.94–1.11)
Conscientiousness	.81 (.72–.91) **	.87 (.80–.95) **
	Hard to find words	Uses wrong words
Neuroticism	1.14 (1.04–1.24) **	1.12 (1.01–1.24) *
Extraversion	.92 (.84–1.00)	1.01 (.92–1.12)
Openness	.87 (.79–.95) **	.88 (.80–.98) *
Agreeableness	.89 (.82–.98) *	.93 (.84–1.03)
Conscientiousness	.81 (.74–.88) **	.83 (.75–.92) **
	Talks about past rather than present	Forget last time saw informant
Neuroticism	1.08 (.99–1.18)	1.36 (1.16–1.59) **

Trait	Symptom	
Extraversion	1.03 (.95–1.12)	.92 (.79–1.08)
Openness	.98 (.90–1.07)	.94 (.80–1.10)
Agreeableness	.99 (.91–1.08)	.85 (.72–1.00)
Conscientiousness	.86 (.80–.94)**	.78 (.67–.91)**
	<u>Forget what happened yesterday</u>	<u>Forgets where is</u>
Neuroticism	1.22 (1.11–1.34)**	1.25 (1.06–1.48)**
Extraversion	.94 (.86–1.03)	1.13 (.95–1.35)
Openness	.90 (.82–.99)*	.98 (.82–1.17)
Agreeableness	.96 (.87–1.06)	.98 (.82–1.16)
Conscientiousness	.82 (.75–.90)**	.87 (.74–1.02)
	<u>Gets lost in community</u>	<u>Gets lost at home</u>
Neuroticism	1.37 (1.20–1.57)**	1.30 (.99–1.70)
Extraversion	1.02 (.89–1.16)	1.10 (.82–1.45)
Openness	.90 (.78–1.03)	.84 (.64–1.12)
Agreeableness	.95 (.83–1.09)	.99 (.74–1.31)
Conscientiousness	.92 (.80–1.05)	.93 (.71–1.22)

Note. Coefficients are odds ratios (95% Confidence Intervals) from logistic regression controlling for participant age at the baseline personality assessment, year of personality assessment, gender, race, and education, informant age at the assessment, gender, and education, length of time informant and participant knew each other, and spousal relationship. CSID= Community Screening Instrument for Dementia.

* $p < .05$.

** $p < .01$.