Self-Discipline and Self-Consciousness Predict Subjective Memory in Older Adults

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Research has shown the personality variables of conscientiousness and neuroticism to be related to subjective memory in older adults. This study was designed to determine the specific facets of these traits involved in the relation between personality and memory complaints. Subjective memory evaluations were examined in 85 community-dwelling people aged 56 to 94 years. Regression analysis revealed that one facet of conscientiousness (self-discipline) and two facets of neuroticism (self-consciousness and anxiety) explained almost one third of the variance in subjective memory complaints. Anxiety acted as a suppressor variable to enhance the contribution of self-consciousness. Objective measures of episodic and prospective memory were not related to subjective memory. Effective treatments of memory complaints in healthy older adults may have to focus on enhancing self-discipline and self-concept.

As the population of the United States ages, the incidence of and concerns regarding memory impairment increase. People with negative memory self-evaluations often report their concerns to primary care physicians, memory clinics, and neurologists. Some researchers have found that subjective memory complaints by middle-aged and older adults are unrelated to objective memory performance (e.g., Kahn, Zarit, Hilbert, & Niederehe, 1975; Zelinski, Burnight, & Lane, 2001), even in longitudinal studies (e.g., Poirenaud, Malbezín, & Guez, 1989). Others have found that subjective memory is correlated with objective memory performance in middle-aged and older people (e.g., Levy-Cushman & Abeles, 1998; Ponds & Jolles, 1996), but the effect size is usually small. Derouesné, Lacomblez, Thibault, & LePoncin (1999) concluded that negative subjective memory in older adults may represent more of a psychological symptom than an expression of age-related memory decline. In addition to reflecting significant worry among the patients, these complaints also represent serious costs and challenges to the health care industry. Thus, a major challenge for geropsychologists is the development of interventions for the unwarranted negative evaluations of their memory reported by some older adults. Most treatments have focused instead on objective, not subjective, memory (Floyd & Scogin, 1997).

A component of the challenge is the identification of the variables, other than objective memory ability, that are related to memory complaints. In his review chapter, Niederehe (1998) recommended a clinically differentiated model to explain memory complaint in older adults. He suggested that trait, state, contextual, and health variables may also be involved. Past research has found depression to be a correlate of memory self-ratings (e.g., Kahn et al., 1975), although recent research, such as that by Pearman (2003), found that depression was related only to perceived memory ability and not to perceived frequency of memory problems. Pearman hypothesized that self-esteem was a driving force in memory complaints rather than depression, particularly in nondepressed older people. That is, the evaluation of one’s memory as poor is a component of negative global self-evaluation. Thus, as reported in Pearman and Storandt (2004), we focused on the trait variables, including self-esteem, associated with subjective memory complaints by older people. Specifically, in order of entry into a stepwise regression analysis and with the associated increment in the $R^2$ shown in parentheses, we found that conscientiousness (.21), self-esteem (.08), episodic memory (.04), and neuroticism (.03) explained 36% of the variance in memory complaint. Depression was not a significant predictor of memory complaint in the relatively healthy sample studied.

Conscientiousness and neuroticism are broad constructs, essentially second-order factors. Costa and McCrae (1995) have suggested that, within each personality dimension, there are facets (essentially first-order factors) that combine to form the entire construct. They described six facets for each domain. The names for each facet are derived from the items that contribute to it. The conscientiousness facets are competence, order, dutifulness, achievement-striving, self-discipline, and deliberation. Competence is described as the sense that one feels capable and effective; order is described as the ability to get organized; dutifulness is described as the sense that one is bound to one’s principles and obligations; achievement-striving is described as ambitiousness and motivation; self-discipline is the ability to both begin tasks and carry them through to completion; and deliberation is described as the tendency to think before acting. Within neuroticism, anxiety is the tendency to be apprehensive and nervous; angry-hostility is the tendency to experience anger and frustration; depression is the tendency to experience depressive affect; self-consciousness is the tendency to experience shame and embarrassment; impulsive is the tendency to be unable to control urges; and vulnerability represents vulnerability to stress.

Our major goal in the current study was to determine which facets of conscientiousness and neuroticism are involved in the relation between personality and subjective memory. Our previous study did not include measures of the personality facets. Therefore, in this study we provide clearer understanding of memory complaints and help guide future intervention development. For example, a different intervention approach would be used if the facet of order were the predictor of
subjective memory than if competence were the predictor. One would represent a possible relation between organizational ability and subjective memory; the other would represent a relation between self-efficacy and subjective memory. Somewhat different treatment strategies would be used to enhance organizational ability than would be used to enhance self-efficacy.

We also include an objective measure of prospective memory. Most studies of the relation between subjective and objective memory have used episodic measures of objective memory. We reasoned that it was worth assessing this additional domain, because perhaps older people’s memory complaints reflect problems with forgetting to do things rather than forgetting what they have already done or experienced.

**METHODS**

**Participants**

We solicited 85 community-dwelling older adults through the Washington University Aging and Development research volunteer pool after approval by the human subjects committee. Interviewers screened the participants by telephone to determine eligibility and to collect basic demographic information. Following verbal consent, participants took the short Blessed test (Katzman et al., 1983) as a way for us to screen for cognitive dysfunction. We excluded people with a weighted score greater than 6. We mailed eligible participants a packet of questionnaires, a written informed consent form to sign and return, a small stipend ($5), and a self-addressed stamped return envelope. The mean age of the sample was 73.2 (SD = 7.84) years, with a range from 56 to 94. The mean education was 14.20 (SD = 2.78) years. Most participants reported good health; the mean rating on an 11-point scale (Botwinick & Storandt, 1974) ranging from 0 (poor) to 10 (excellent) was 7.55 (SD = 1.82).

**Measures and Procedure**

We used the Memory Assessment Clinics Self-Rating Scale (Winterling, Crook, Salama, & Gobert, 1986; also see Crook, & Larrabee, 1992) to measure subjective memory. This 45-item, 5-point Likert scale has high test–retest reliability and concurrent validity (Crook & Larrabee). It measures two specific factors, namely memory ability and frequency of memory problems. The ability factor indicates people’s ratings of their memory ability in various situations. The frequency factor indicates ratings of the frequency of occurrence of certain memory problems. Because the ability and frequency scores were highly correlated (.81), we standardized the scales and averaged them to form a composite that served as the dependent variable. High scores on the composite indicate good subjective memory, and low scores indicate poor subjective memory.

We also obtained several measures of objective memory. As in our previous study, we again administered the Logical Memory subtest from the Wechsler Memory Scale III (Wechsler, 1997) by telephone after the cognitive screening assessment. Examiners asked the participant to listen while the examiner read a short story. Immediately after hearing the story, the participant retold it from memory. There are two different short stories, but the second story is presented twice. Responses were tape recorded, with the participant’s permission, and later scored according to the test manual. Scores can range from 0 to 75, with a high score indicating good memory. Because this test was administered by telephone, we assessed only immediate recall.

During the telephone conversation, examiners also asked participants to do two prospective memory tasks. First, they were asked to call the laboratory as soon as they received the packet of materials in the mail; we recorded who did and who did not call (scored as 1 or 0). Second, they were asked to write down as much of the second Logical Memory story as they could remember on the blank last page of the booklet they received in the packet. No written reminder appeared in the booklet. We recorded who did and who did not write some part of the story (scored as 1 or 0). Because so few people completed both prospective tasks (n = 12), we formed a single prospective memory score; participants received a 1 if they completed either task or a 0 if they completed neither task. As a separate measure of delayed episodic recall, we scored written recall for participants who completed the written prospective task according to the manual when they returned the packet.

We used a single-item self-esteem scale (Robins, Hendin, & Trzesniewski, 2001) as the measure of self-esteem. This item has shown good convergent validity with the Rosenberg Self-Esteem Scale (Robins et al.) and is a more practical alternative to the longer Rosenberg scale. Scores on this item ranged from 1 to 5, with higher values indicating greater self-esteem.

We obtained the facets of neuroticism and conscientiousness from the Revised NEO Personality Inventory (NEO PI-R; Costa & McCrae, 1992). The conscientiousness facets are competence, order, dutifulness, achievement-striving, self-discipline, and deliberation; the neuroticism facets are anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability. Scores on each facet range from 0 to 32. Higher scores indicate higher levels of the particular facet. We also calculated total scores for conscientiousness and neuroticism by summing the six facets for each factor.

**RESULTS**

The zero-order correlations of the four predictors of subjective memory found in the previous study as well as the range, means, and standard deviations of those measures in this sample are shown in Table 1. As an aside, age was not correlated with subjective memory evaluations (r = -.02). Similar results have been obtained in previous studies that included an expanded age range including both young and older adults (e.g., Derouesné et al., 1999; Pearman, 2003).

We conducted the first set of analyses to determine which facets of conscientiousness and neuroticism were predictive of subjective memory by using a hierarchical regression analysis (SPSS, Version 11.0). We entered the independent variables in the order determined in the previous study: conscientiousness, self-esteem, logical memory, and neuroticism. Rather than using the summary scores for conscientiousness and neuroticism, however, we allowed the six facet scores for those two personality dimensions to enter in a stepwise fashion within the step. The total predicted variance was $R^2 = .33$ (adjusted $R^2 = .29$). The associated increment in the squared multiple correlation was $R^2 = .16$ for the step including the conscientiousness facets, $R^2 = .05$ for self-esteem, $R^2 = .01$ for logical memory, and $R^2 = .11$ for the step including the neuroticism facets. Only the self-discipline facet of conscientiousness was
Table 1. Correlations Among Study Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>1a</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>4a</th>
<th>4b</th>
<th>5</th>
<th>6</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
</tr>
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<tbody>
<tr>
<td>1. Conscientiousness</td>
<td>.84</td>
<td>.38</td>
<td>-.08</td>
<td>-.51</td>
<td>-.45</td>
<td>-.28</td>
<td>.40</td>
<td>.20</td>
<td>129.96</td>
<td>17.97</td>
<td>91–169</td>
<td></td>
</tr>
<tr>
<td>a. Self-discipline facet</td>
<td>.38</td>
<td>.32</td>
<td>-.51</td>
<td>-.43</td>
<td>-.35</td>
<td>.40</td>
<td>.11</td>
<td>22.34</td>
<td>4.36</td>
<td>12–32</td>
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<tr>
<td>2. Self-esteem</td>
<td>-.01</td>
<td>-.56</td>
<td>-.52</td>
<td>-.34</td>
<td>.35</td>
<td>.07</td>
<td>4.00</td>
<td>0.74</td>
<td>1–5</td>
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<tr>
<td>3. Logical memory</td>
<td>.05</td>
<td>.16</td>
<td>-.01</td>
<td>.09</td>
<td>.21</td>
<td>.39</td>
<td>18.38</td>
<td>8.74</td>
<td>14–56</td>
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<tr>
<td>4. Neuroticism</td>
<td>.78</td>
<td>.79</td>
<td>-.36</td>
<td>-.08</td>
<td>65.41</td>
<td>19.29</td>
<td>14–122</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>a. Self-consciousness facet</td>
<td>.55</td>
<td>.45</td>
<td>-.08</td>
<td>11.32</td>
<td>4.51</td>
<td>0–22</td>
<td></td>
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<tr>
<td>b. Anxiety facet</td>
<td>-.13</td>
<td>.01</td>
<td>11.19</td>
<td>4.97</td>
<td>0–25</td>
<td></td>
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<tr>
<td>5. Subjective memory evaluation</td>
<td>.12</td>
<td>.00</td>
<td>0.95</td>
<td>2.10</td>
<td>1.91</td>
<td></td>
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<td>6. Prospective memory</td>
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uniquely related to subjective memory at Step 1, $F(1, 83) = 15.98$, $p < .001$. The 5% increment attributed to self-esteem in Step 2 was also significant, $F(1, 82) = 4.99$, $p < .03$, but the 1% contributed by Logical Memory at Step 3 was not, $F(1, 81) = 1.03$, $p = .31$.

We included two of the neuroticism facets at Step 4. Self-consciousness entered first, explaining an additional 7% of the variance in subjective memory, $F(1, 80) = 7.65$, $p < .01$. As shown in Table 1, the zero-order correlation of the self-consciousness facet was substantially correlated with self-esteem ($r = -.52$). When we added self-consciousness in Step 4, the standardized regression coefficient for self-esteem, which we entered at Step 2, dropped from .24 to .10 and became nonsignificant, $t(30) = 0.88$, $p > .38$. Thus, the variance in memory complaint explained by self-esteem appears to overlap with the variance in memory complaint explained by the self-consciousness facet of neuroticism.

Finally, the anxiety facet of neuroticism accounted for an additional 4% of the variance in memory complaints, $F(1, 79) = 4.87$, $p = .03$. Although its zero-order correlation with subjective memory was $-13$, its beta value was $\beta = .25$. In addition, the beta for self-consciousness increased from $-33$ to $-45$ when we added anxiety to the equation. This suggests that anxiety serves as a suppressor variable; including it in the model enhances the contribution of the self-consciousness facet.

The standardized regression coefficients from a simultaneous regression equation including the three significant predictors from the stepwise hierarchical regression analysis were .28 for self-discipline, -.45 for self-consciousness, and .22 for anxiety, $R^2 = .29$, $F(3, 81) = 11.01$, $p < .0001$. The unstandardized regression equation (with standard errors shown in parentheses) was .06 (.02) for self-discipline, -.10 (.02) for self-consciousness, and .04 (.02) for anxiety -.78. The means, standard deviations, and range for these three facets of the NEO are shown in Table 1, along with their zero-order correlations with the other variables in the study.

Next we examined the objective measures of prospective memory. Sixty-four people completed one or both of the prospective memory tasks, and 21 people did not complete either. These two groups did not differ in age (72.42 vs 75.43 years), $t(83) = 1.54$, $p > .05$; education (14.31 vs 13.86 years), $t(83) = -.65$, $p > .05$; or gender (14 vs 23 men), $\chi^2 (1, N = 85) = .79$, $p > .05$. Using group membership as a dichotomous measure of prospective memory, we found that it was modestly correlated with Logical Memory scores (point biserial $r = .21$), although it was not significant ($p > .05$); it also was not significantly correlated with subjective memory ($r = .12$). The only significant correlations between this dichotomous measure of prospective memory and the personality measures were with the competence (point biserial $r = .35$) and order (point biserial $r = .29$) facets of conscientiousness. Those who remembered to do one or both of the prospective memory tasks had higher mean scores on both facets (competence, $M = 32.88$ vs 30.00; order, $M = 27.30$ vs 24.52).

Sixty people remembered to write the Logical Memory story when they received the packet in the mail. The mean score on this part of the task was 12.75 ($SD = 4.21$), ranging from 2 to 24. Excluding the people who did not do this task, we found that the only variable that was significantly related to the written Logical Memory delayed recall was the score at immediate recall ($r = .50$, $p < .001$). In summary, there was little evidence that difficulty with objective memory, either immediate or prospective, was related to older people’s subjective memory evaluations.

**Discussion**

In the main, the results of the present study replicate and extend those reported by Pearman and Storandt (2004), who concluded that memory complaints by nondemented older people are related to personality rather than actual memory deficits. The specific aspects of personality identified in this study were self-discipline and self-consciousness, which, after we controlled for anxiety, accounted for almost one third of the variance in the subjective memory measure.

Self-discipline is the ability to begin tasks and carry them through to completion. It describes a productive person. The greater the self-discipline, the better one rates one’s memory. As shown in Table 1, the correlations between self-discipline and the other measures are essentially identical to the correlations between the higher-order factor of conscientiousness and the other study variables. The self-discipline facet was also highly correlated with the other conscientiousness facets ($r = .36–.61$), and these facets were also moderately correlated with subjective memory ($r = .19–.34$). Self-discipline, however, was the only facet to have a unique relation with subjective memory.

The mechanism, however, is unclear. Initially one might think that greater self-discipline leads to better objective memory and therefore fewer complaints about memory. As shown in Table 1, however, self-discipline was not correlated with either of the objective measures of memory, which, in
turn, were uncorrelated with memory complaint. Therefore a path between self-discipline and subjective memory complaints through better memory performance is not supported.

An alternative explanation for why a personality characteristic described as the ability to both begin tasks and carry them through to completion should be related to the judgment that one’s memory is good is not immediately apparent. Perhaps it would be better to examine this relation from the opposite end of each scale. Why do people who describe themselves as unproductive and undisciplined also complain about their memory? More detailed investigation of this relation would be useful in planning successful interventions for memory complaints. Self-discipline is rarely addressed in the psychological treatment literature, although it is discussed sometimes in connection with the treatment of addictive behaviors. It is not clear if the term means the same thing in that context as it means as a personality characteristic (e.g., productivity). Geropsychologists may need to develop novel approaches to intervene with older individuals who describe themselves as lacking in self-discipline.

The self-consciousness facet of neuroticism measures embarrassment and inferiority; the anxiety facet measures fear and worry. As shown in Table 1, anxiety was not significantly related to subjective memory at the zero-order correlation level \( r = -0.13 \), although anxiety was related to the self-consciousness facet \( r = 0.55 \) to about the same extent that it was to most of the other facets of neuroticism. Eliminating the portion of the self-consciousness facet that is related to anxiety enhanced the correlation between the self-consciousness facet and memory complaint. Thus, the relation between neuroticism and memory complaints appears to occur primarily through that portion of the facet of self-consciousness that is unrelated to anxiety. This, plus the elimination of the single-item measure of self-esteem when the self-consciousness facet was added to the model, suggests that the essential element that the self-consciousness facet brings to the prediction of memory complaints is that of a negative self-concept (i.e., poor self-esteem, inferiority). Enhancement of self-concept and self-esteem is part of many of the treatment approaches used by clinical psychologists; these techniques can probably be adapted for older adults who are concerned about their memory.

That personality traits are related to subjective memory ratings has important implications for the treatment and study of memory complaints by older people. There are, however, limitations in the present study that deserve comment. One potential limitation was in the measurement of objective memory. Although the Logical Memory subtest is both reliable and valid, it does not capture the full range of potential memory impairments that may lead people to voice concerns about their memory. We added the prospective memory tasks to try to capture another type of the day-to-day memory problems that people may experience, but they also were unrelated to subjective memory. Future research might include objective measures of other types of memory, although the evidence is mounting that subjective and objective memory are uncorrelated in nondemented older people. It may also be important to explore what memory ratings mean to people. Older adults may report memory failures when they are actually referring to attentional problems. Another limitation is the cross-sectional nature of this study. Two longitudinal studies have reported no relation between changes in subjective and objective memory (McDonald-Miszczak, Hertzog, & Hultsch, 1995; Poirenaud et al., 1989), but a longitudinal study would be useful in verifying the assumption that personality trait variables exhibited earlier in adulthood predict memory complaints in later life. In addition to research on interventions for memory complaints, other predictors from Niederehe’s model should be included in future studies. When we added the simple self-rating of health that we had to the model, it did not make a significant contribution. Our sample, however, was generally physically and emotionally healthy and therefore not a good one in which to test the contribution of health and emotional problems to complaints about memory.

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