MEMORY COMPLAINTS IN ELDERLY PEOPLE: THE ROLE OF MEMORY ABILITIES, METAMEMORY, DEPRESSION, AND PERSONALITY

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This study examined the relation between memory complaints, memory performance, and metamemory variables by comparing a group of elderly participants (n = 50) with memory complaints with a group of participants without memory complaints (n = 52). The groups were matched for age, sex, and education; mean age was 65 years. Data were also collected for personality variables (anxiety, neuroticism) and affective state. Metamemory was measured with the Metamemory in Adulthood (MIA) questionnaire. The memory tests used were the Auditory Verbal Learning Test, the Rivermead Behavioral Memory Test, and two category fluency tasks. Significant group differences were found on all subscales of the MIA (except Locus) and for verbal fluency and depression. Logistic regression analysis with depression, memory performance, and the MIA as independent variables showed that only the memory self-efficacy factor of the MIA (Capacity, Change, and Anxiety subscales) could discriminate between the groups. Furthermore, those in the memory complaints group had higher scores for neuroticism than those in the no-complaints group, whereas no differences were found with respect to trait anxiety. The findings suggest that concerns and complaints about memory in old age reflect memory self-efficacy beliefs rather than declining memory abilities.

Memory complaints are very common among middle-aged and older adults. A study involving almost 15,000 participants age 55 and older indicated that more than 15% reported having had frequent trouble remembering things in the past year, and almost 40% indicated that they sometimes had trouble remembering things (Cutler & Grams, 1988). It is generally assumed that these complaints reflect an age-related decline in memory abilities, as many studies have shown that older adults show a decrease in performance on memory tests compared with younger adults, especially when the acquisition of new information is required (Craik & Jennings, 1992). If memory com-

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plaints are primarily determined by memory abilities, there should be a close relation between memory complaints and memory performance. Elderly persons with memory complaints should have greater deficits in memory performance than elderly persons without memory complaints. Scogin, Storandt, and Lott (1985) compared a group of elderly participants with memory complaints (who had subscribed for memory training) with a group of participants without complaints by using three memory recall tasks and two clinical memory tests (Digit Span forward of the Wechsler Adult Intelligence Scale—Revised and the Benton Visual Retention Test [BVRT]). The only difference between the two groups, as assessed with 11 memory measures, was on the BVRT. Scogin et al.'s conclusion that self-evaluation of memory is not systematically related to objective measures of memory performance is supported by the general finding that correlations between complaints, as measured by memory questionnaires, and performance on memory tests are mostly lacking or only modest (Gilewski & Zelinski, 1986).

It is often argued that this absence of clear correlations may be due to shortcomings of the psychometric tests used. For example, the ecological validity of most memory tests is low. Traditional memory tests are, in terms of everyday memory, highly artificial. The material that has to be memorized as well as the way in which the material is presented to the participant shows little or no resemblance to everyday memory tasks, whereas memory questionnaires explicitly focus on problems in everyday memory situations (Kausler, 1989). Furthermore, many people, and especially those who are forgetful, have difficulty in objectively assessing their own daily memory failures.

Although these measurement problems contribute to the lack of a straightforward relation between memory complaints and memory performance, it is now increasingly recognized that memory complaints and memory performance in elderly people are not solely determined by actual memory abilities or skills, but are also related to personality variables such as introversion or neuroticism (Gold & Arbuckle, 1990), depressive mood (Bolla, Lindgren, Bonaccorsy, & Bleecker, 1991), level of social and intellectual daily activities (Arbuckle, Gold, & Andres, 1986), and knowledge and perceptions about one's own memory. These self-perceptions may be labeled as metamemory (Hultsch, Hertzog, Dixon, & Davidson, 1988).

An important aspect of metamemory is memory self-efficacy, an individual's belief in his or her memory abilities, strengths, and weaknesses. Although these efficacy beliefs are not necessarily veridical estimates of actual memory abilities, they may have a strong influence on the way people use their memory in everyday situations (Bandura, 1989; Lovelace, 1990). If these beliefs are strongly negative, they may
easily lead to a self-fulfilling prophecy. For example, negative self-efficacy beliefs may create a strong attentional bias toward everyday forgetfulness. As the result of low expectations about successful memory performance, participants may decide not to engage in memory-demanding situations or decrease the effort expended on everyday memory tasks. This in turn may lead to an increased awareness of memory failure and strengthen the negative memory self-efficacy beliefs.

In this study, we examined the relation between memory complaints, memory performance, and metamemory variables by contrasting a group of elderly participants with explicit memory complaints with a control group of elderly participants without memory complaints. Elderly people with memory complaints were selected from a pool of participants who had registered for a memory training program. In addition to memory assessment, data were collected about personality traits (trait anxiety, neuroticism), mood, and background variables related to daily intellectual and social activities (e.g., reading books). It was expected that group differences would be found on most measures, with the memory-complaint group having lower memory self-efficacy beliefs, higher scores for anxiety and neuroticism, more depressive symptoms, and a lifestyle that could be viewed as less cognitively challenging than the control group. No group differences were expected with respect to memory performance. The participants from the group with memory complaints are referred to as the high-complaint group, and the control group is referred to as the low-complaint group.

METHOD

Subjects

Seventy-four participants who had responded to a newspaper advertisement recruiting older adults with memory complaints for a memory training program were invited to participate in the study. Fifty-six training participants were willing to participate. They were matched for age, sex, and educational level with 56 control participants who were recruited from an existing pool of healthy volunteers. The Mini-Mental State Examination (MMSE) was used to exclude those who were possibly in an early stage of dementia, using a cutoff score of less than or equal to 23 (Folstein, Folstein, & McHugh, 1975). Three training participants scored below this cutoff score and were excluded from the study (MMSE scores of 23, 23, and 21, respectively). Furthermore, 4 control participants and 3 training participants were excluded because too many data were missing on the metamemory questionnaire (see Measures section).
The remaining group of 50 training participants had a mean age of 63.1 years (SD = 8.7 years) and included 35 women and 15 men. Educational level was measured by a Dutch scoring system developed by Verhage (1964), which consists of a 7-point scale ranging from unfinished primary education (Level 1) to university education (Level 7). The mean educational level of the training group was 4.4 (SD = 1.2). The control group of 52 participants (37 women and 15 men) had a mean age of 63.5 years (SD = 10.2 years) and a mean educational level of 4.4 (SD = 1.3).

All participants were paid for their participation.

**Measures**

**Memory Self-Assessment**

Three memory questionnaires were used: the Metamemory in Adulthood (MIA) Questionnaire (Dixon, Hultsch, & Hertzog, 1988), the Memory Assessment Clinics Self-Rating Scale (MAC-S), and the Memory Assessment Clinics Rating Scale for Family Members and Others (MAC-F) (Winterling, Crook, Salama, & Gobert, 1986).

The MIA is one of the most widely used metamemory questionnaires. Participants are asked to rate on a 5-point Likert scale 108 statements describing their own memory functioning and their general knowledge of memory processes. The MIA consists of seven subscales: Strategy (use of memory strategies to improve memory performance), Task (knowledge of basic memory processes), Capacity (beliefs about personal memory capacity), Change (perceived change in memory functioning), Anxiety (feelings of stress and anxiety related to memory performance), Achievement (personal motivation to perform well in memory situations), and Locus (perceived sense of control over memory abilities). Hertzog, Hultsch and Dixon (1989) found evidence for a higher order factor called Memory Self-Efficacy (MSE) consisting of the subscales Capacity, Change, and Anxiety. The MSE factor is thought to reflect beliefs about personal competence in various memory situations. Participants who had not filled in 5% or more of the MIA questions (six or more questions) were excluded from the study. Remaining missing values on MIA questions were replaced by participants' mean subscale item score.

In this study, only the Frequency of Occurrence subscales of the MAC questionnaires were used. The Frequency subscales consist of 24 items. On the MAC-S Frequency subscale, participants indicated on a 5-point Likert scale how often specific memory problems occurred (e.g., "fail to recognize people who recognize you"). Responses ranged from
very often (1) to very rarely (5). On the MAC-F Frequency subscale, a
close relative of the participant was asked to rate the occurrence of the
same specific memory problems for that participant. Missing values (if
fewer than 2) were replaced by participants' mean item score. Both
questionnaires also included four global items. In these items, participants
(or a close relative in the case of the MAC-F) were asked, using
a 5-point Likert scale, to describe their memory compared with others'
(ranging from very poor to very good), to describe their memory as
compared with the best it had ever been (ranging from much worse to
much better), to describe the speed of remembering as compared with
the best it had ever been (ranging from much slower to much faster),
and finally to describe their concern about their memory (ranging from
very seriously concerned to not concerned).

Memory Performance

Three memory tests were used to assess memory performance: a modi-
ified version of the Auditory Verbal Learning Test (AVLT; Lezak,
1983), which measures encoding and retrieval of verbal information;
the Rivermead Behavioral Memory Test (RBMT; Wilson, Cockburn, &
Baddeley, 1985), which measures everyday memory; and two verbal
category fluency tasks, which measure retrieval from semantic mem-
ory (Lezak, 1983).

The AVLT consists of 15 monosyllabic meaningful words that are
presented to the participant five times. After each presentation, the
participant is requested to recall as many words as possible, with no
restriction concerning the order of recall (immediate recall). Twenty
minutes after the fifth presentation, the participant is again requested
to recall as many words as he or she can remember (delayed recall).
The variables of interest were the total number of correctly remem-
bered words over Trials 1–5 (immediate recall, maximum score 75) and
the number of words remembered on delayed recall (maximum score
15).

The RBMT was developed to bridge the gap between strictly ex-
perimental and more naturalistic measures of memory and is considered
to have more ecological validity than standard memory tests. The test
consists of several items that are comparable with everyday memory
tasks (e.g., remembering an appointment, a route, a newspaper story,
a name, or where an personal object is laid aside). The variable of
interest was the standard profile score (maximum score 24).

Two verbal category fluency tasks were used. In the animal fluency
task, the participants were asked to name as many different animals
as possible in 1 minute. In the profession fluency task, they were asked
to name different professions. Variables of interest were the number of correctly named animals and professions.

**Personality and Mood Variables**

Depressive complaints were assessed with the Zung Self-Rating Depression Scale (Zung, 1965). The Zung consists of 20 items that reflect psychological and physiological correlates or symptoms of depression. The presence of the symptoms could be rated by the participant on a 4-point scale ranging from ‘little–none of the time’ (1) to ‘most of the time’ (4). Higher scores on this scale indicate the presence of more depressive symptoms.

A Dutch version of the Trait scale of Spielberger's State–Trait Anxiety Inventory (Van der Ploeg, Defares, & Spielberger, 1981) was used to assess the general susceptibility to feelings of anxiety and stress. The Trait scale consists of 20 items that can be scored on a 4-point scale. Higher scores indicate greater trait anxiety.

Neuroticism was assessed with a Dutch neuroticism questionnaire (Amsterdamse Biografische Vragenlijst [ABV]; de Wilde, 1970). The ABV Neuroticism scale consists of 30 items, on which the participant indicates the absence of (“no”), presence of (“yes”), or undecidedness about (“?”) feelings of stress and worry (e.g., “Do you often feel guilty about something?” “Do you often worry about the past?”). Higher scores indicate a higher level of neuroticism.

**Other Variables of Interest**

Data about background variables such as hours spent watching television, reading books, or main social activities outside the house were collected during a semistructured interview. This was done because Salthouse, Kausler, and Sauls (1988) suggested that there may be an interaction between the effects of age and these background variables on cognitive competence. During the same interview, the elderly participants from the high-complaint or training group were asked what they thought was the main cause of their forgetfulness.

**Procedure**

The training participants who were willing to participate in the study received the memory questionnaires during an introductory meeting that took place 2 weeks before the memory training started. The memory questionnaires were filled in at home and returned at the first memory training meeting. In the next 2 weeks, all training participants were visited and assessed at home. The control participants were also assessed at home. They received the questionnaires a few weeks
before they were visited and returned the questionnaires at the start of the home visit.

The training participants were recruited from two successive memory training programs. The neuroticism and anxiety questionnaires were added to the study at a later stage and were only given to the participants recruited from the second memory training and their controls (28 training participants and 29 controls).

During the home visit, a short semistructured interview took place and the three memory tests, the MMSE, and the remaining questionnaires were administered in the following order: MMSE, RBMT, ABV, AVLT Trials 1–5, interview, AVLT delayed recall, Zung, ZBV, and fluency.

RESULTS

We conducted multivariate and additional univariate analyses of variance separately for the memory questionnaires and the memory tests. Means, standard deviations, and the p values of the univariate F tests of the major variables of the study are presented in Table 1.

Memory Self-Assessment

The data for the MAC-S questionnaire showed an overall difference between the groups, F(5, 96) = 7.89, p < .001. As expected, the high-complaint group reported significantly more everyday memory failures than did the low-complaint group. There were also clear differences on the four global items of the MAC-S. The high-complaint group described their memories as being worse than those of others and that their memories had declined considerably from the best they had ever been. They were more concerned about this decline, and they also reported a significantly greater decrease in speed of remembering. The same pattern of results was found for the MAC-F questionnaire, F(5, 83) = 6.70, p < .001, although the mean scores for both the high- and low-complaint groups were higher than those for the MAC-S questionnaire. The high-complaint group's mean scores for Frequency and speed of remembering were significantly higher on the MAC-F questionnaire than on the MAC-S questionnaire. The low-complaint group's mean scores on the MAC-F were all, with the exception of concern about memory, significantly higher than the scores on the MAC-S (p < .05).

A significant overall effect was found on the MIA, F(7, 94) = 7.42, p < .001. Univariate tests revealed that these differences appeared on
TABLE 1  Means and Standard Deviations of the Main Variables

<table>
<thead>
<tr>
<th>Measures</th>
<th>High-complaint group (n = 50)</th>
<th>Low-complaint group (n = 52)</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Memory questionnaires</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory Assessment Clinics Self-Rating Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>3.17</td>
<td>0.60</td>
<td>3.75</td>
</tr>
<tr>
<td>Comparison with others</td>
<td>2.84</td>
<td>0.71</td>
<td>3.42</td>
</tr>
<tr>
<td>Comparison with optimum</td>
<td>1.76</td>
<td>0.63</td>
<td>2.35</td>
</tr>
<tr>
<td>Speed of remembering</td>
<td>1.94</td>
<td>0.79</td>
<td>2.35</td>
</tr>
<tr>
<td>Concern about memory</td>
<td>2.90</td>
<td>1.09</td>
<td>3.75</td>
</tr>
<tr>
<td>Memory Assessment Clinics Rating Scale for Family Members and Others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>3.48</td>
<td>0.56</td>
<td>3.90</td>
</tr>
<tr>
<td>Comparison with others</td>
<td>3.07</td>
<td>0.82</td>
<td>3.84</td>
</tr>
<tr>
<td>Comparison with optimum</td>
<td>2.07</td>
<td>0.76</td>
<td>2.71</td>
</tr>
<tr>
<td>Speed of remembering</td>
<td>2.07</td>
<td>0.76</td>
<td>2.69</td>
</tr>
<tr>
<td>Concern about memory</td>
<td>3.18</td>
<td>1.38</td>
<td>4.18</td>
</tr>
<tr>
<td>Metamemory in Adulthood</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategy</td>
<td>3.78</td>
<td>0.44</td>
<td>3.42</td>
</tr>
<tr>
<td>Task</td>
<td>4.05</td>
<td>0.39</td>
<td>3.78</td>
</tr>
<tr>
<td>Capacity</td>
<td>2.56</td>
<td>0.61</td>
<td>3.11</td>
</tr>
<tr>
<td>Change</td>
<td>2.13</td>
<td>0.54</td>
<td>2.84</td>
</tr>
<tr>
<td>Anxiety</td>
<td>3.55</td>
<td>0.69</td>
<td>2.90</td>
</tr>
<tr>
<td>Achievement</td>
<td>4.14</td>
<td>0.45</td>
<td>3.75</td>
</tr>
<tr>
<td>Locus</td>
<td>3.17</td>
<td>0.44</td>
<td>3.13</td>
</tr>
<tr>
<td>Auditory Verbal Learning Test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immediate recall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trials 1–5</td>
<td>43.5</td>
<td>10.7</td>
<td>45.9</td>
</tr>
<tr>
<td>Delayed recall</td>
<td>8.8</td>
<td>3.1</td>
<td>9.4</td>
</tr>
<tr>
<td>Rivermead Behavioral Memory Test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard profile</td>
<td>20.3</td>
<td>2.8</td>
<td>20.9</td>
</tr>
<tr>
<td>Fluency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animals</td>
<td>19.8</td>
<td>4.2</td>
<td>23.9</td>
</tr>
<tr>
<td>Professions</td>
<td>14.9</td>
<td>4.3</td>
<td>17.0</td>
</tr>
<tr>
<td>Mood and personality questionnaires</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zung depression</td>
<td>38.0</td>
<td>8.6</td>
<td>34.2</td>
</tr>
<tr>
<td>Trait Anxiety</td>
<td>40.0</td>
<td>10.4</td>
<td>38.0</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>61.7</td>
<td>25.9</td>
<td>48.6</td>
</tr>
</tbody>
</table>

*aUnivariate F test.  bA low score on this scale means more complaints.  cHigh-complaint group, n = 44; low-complaint group, n = 45.  dHigh-complaint group, n = 28; low-complaint group, n = 29.
all subscales, except for the Locus subscale. The high-complaint group had a poorer perception of their memory capacities (Capacity), reported a greater decline of memory over the years (Change), reported more feelings of stress and anxiety related to memory performance in daily life (Anxiety), and had significantly higher levels of motivation to achieve well in everyday memory tasks (Achievement). The high-complaint group also had significantly more knowledge of basic memory processes (Task) and used memory strategies more frequently (Strategy) than did the low-complaint group.

Memory Performance

There was a significant overall effect on memory performance, $F(5, 96) = 3.63, p = .004$, which could be ascribed to the high-complaint group's significantly lower scores on both fluency tasks. No group differences were found on the RBMT and AVLT.

Depression, Anxiety, and Neuroticism

As only the Zung list was filled in by all the participants, only univariate $F$ tests could be used for the analysis. The high-complaint group had a significantly higher score on the Zung depression scale than did the low-complaint group. The mean Zung scores for both groups were, however, within the normal range and were not indicative of depression (Zung, 1965). The high-complaint group had a far higher mean score on the Neuroticism scale than did the low-complaint group ($p = .054$). Compared with the neuroticism score of a normal population, the mean neuroticism score of the high-complaint group corresponded to the seventh decile for norms for women and eighth decile for norms for men. The mean score of the low-complaint group corresponded to the fifth decile for women and sixth decile for men (de Wilde, 1970). No group difference was found on the trait anxiety questionnaire; the mean scores for both groups were within the normal range (fifth to sixth decile; Van der Ploeg et al., 1981).

Background Variables

Table 2 shows the participants' main activities outside the house. The participants could report more than one activity. Duration of these activities in terms of hours per week or months is not taken into account. No differences were found between the groups, $\chi^2(4, N = 220) = 2.05, p = .725$. 
### TABLE 2 Background Variables of the High- and Low-Complaint Groups

<table>
<thead>
<tr>
<th>Background variables</th>
<th>High-complaint group $(N = 50)$</th>
<th>Low-complaint group $(N = 52)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main activities out of the house</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participating in clubs or other types of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>organizations</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Visiting family and friends</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>Walking or sport</td>
<td>37</td>
<td>38</td>
</tr>
<tr>
<td>Courses (no formal education)</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>Volunteer work</td>
<td>13</td>
<td>18</td>
</tr>
<tr>
<td>Watching TV and reading</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hours watching TV (daily)</td>
<td>1.91</td>
<td>2.25</td>
</tr>
<tr>
<td>Hours reading (daily; newspapers, books,</td>
<td>1.29</td>
<td>1.41</td>
</tr>
<tr>
<td>magazines)</td>
<td>0.86</td>
<td>0.94</td>
</tr>
</tbody>
</table>

The low-complaint group spent more time watching TV daily and reading than did the high-complaint group. These differences, however, were not statistically significant: TV, $t(100) = 1.82, p = .071$; reading, $t(100) = 0.66, p = .509$.

### Attribution of the Memory Problem

Table 3 shows the main causes of forgetfulness given by the participants in the high-complaint group. Aging was mentioned by 12 participants as the main cause of their everyday forgetfulness. Twelve participants thought that their forgetfulness was due to emotional problems (tension, stress). If indifference or lack of interest is taken together with lack of concentration, 12 participants ascribed their memory complaints mainly to problems of attention. Six participants related their memory complaints to physical health problems.

### Additional Analysis

The high- and low-complaint groups clearly differed from each other with respect to memory beliefs and behavior, as measured by the MIA. These differences were less clear with respect to memory performance, where significant differences were found only on the fluency tasks. There was a significant but only small difference on the Zung depres-
TABLE 3  Main Possible Causes of Forgetfulness Mentioned by the High-Complaint Group (N = 50)

<table>
<thead>
<tr>
<th>Cause</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aging</td>
<td>12</td>
</tr>
<tr>
<td>Tensions and stress</td>
<td>12</td>
</tr>
<tr>
<td>Indifference and lack of interest</td>
<td>6</td>
</tr>
<tr>
<td>Lack of concentration</td>
<td>6</td>
</tr>
<tr>
<td>Physical health problems</td>
<td>6</td>
</tr>
<tr>
<td>Fear of dementia</td>
<td>3</td>
</tr>
<tr>
<td>Always been forgetful</td>
<td>2</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>2</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
</tr>
</tbody>
</table>

sion scale. To examine the relative contribution of the various variables in distinguishing between the two groups, we performed a logistic regression analysis with group as the dependent variable and the memory tests, Zung, and the subscales of the MIA as the independent variables. To reduce the number of independent variables, we compressed the performance on the different memory tests into a single

TABLE 4  Logistic Regression Analysis with Group as the Dependent Variable and Memory Index, Zung Depression Score, and the Subscales of the MIA as Independent Variables

<table>
<thead>
<tr>
<th>Measure</th>
<th>B</th>
<th>SE</th>
<th>p</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory index</td>
<td>.12</td>
<td>.18</td>
<td>.467</td>
<td>.00</td>
</tr>
<tr>
<td>Zung depression score</td>
<td>-.01</td>
<td>.04</td>
<td>.808</td>
<td>.00</td>
</tr>
<tr>
<td>MIA Memory Self-Efficacy*</td>
<td>.72</td>
<td>.23</td>
<td>.002</td>
<td>.25</td>
</tr>
<tr>
<td>Memory Task</td>
<td>-.96</td>
<td>.81</td>
<td>.250</td>
<td>.00</td>
</tr>
<tr>
<td>Memory Strategy</td>
<td>-.82</td>
<td>.61</td>
<td>.180</td>
<td>.00</td>
</tr>
<tr>
<td>Memory Achievement</td>
<td>-.53</td>
<td>.64</td>
<td>.410</td>
<td>.00</td>
</tr>
<tr>
<td>Memory Locus</td>
<td>-.04</td>
<td>.57</td>
<td>.948</td>
<td>.00</td>
</tr>
</tbody>
</table>

Note.  B = estimated logistic regression coefficients; SE = standard errors of the coefficients; p = significance level for the Wald statistic for testing the hypothesis that the coefficient is different from 0; R = partial correlation between the dependent variable and each of the independent variables (if the Wald statistic is less than 2, R is set to 0).

*The Capacity, Stability, and Anxiety subscales were combined into a Memory Self-Efficacy score.
memory index score. For each memory measure, the median score for all participants was taken as a cutoff. If the individual test score was below the median, the memory score was set to 0; if the test score was equal to or above the median, the memory score was set to 1. All five memory scores were then condensed into a single memory index score (minimum–maximum score: 0–5). The high-complaint group had a significantly lower score on the memory index than did the low-complaint group (2.42 vs. 3.21), t(100) = 2.43, p = .017. As suggested by Hertzog et al. (1989), the MIA Capacity, Change, and Anxiety subscales were put together to form one MSE factor. The data from the neuroticism and anxiety questionnaires were not subjected to analysis. This reduced the number of participants for the analysis to 57; about 15 participants per independent variable are needed for a reliable regression equation. The memory index score and the Zung were entered first into the regression analysis, followed by the MSE and the MIA Task, Strategy, Achievement, and Locus subscales.

The results of the regression analysis are shown in Table 4. Overall, 73.5% of the participants were correctly classified according to the logistic regression model. Only the MSE of the MIA had a significant contribution in this model. Contributions of the memory index score, the Zung, and the remaining MIA subscales were nonsignificant.

To further examine the relation between the mood and personality variables, memory performance, and MSE, we computed correlations for these variables (Table 5). As expected, the mood and personality variables were highly correlated. MSE beliefs were positively correlated with memory performance, although this correlation was modest.

**TABLE 5** Pearson Product–Moment Correlations

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. MIA-MSE³</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2. Memory index²</td>
<td>.35**</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>3. Zung depression</td>
<td>-.43**</td>
<td>-.40**</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4. Trait Anxiety</td>
<td>-.38**</td>
<td>-.11</td>
<td>.68**</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5. Neuroticism</td>
<td>-.52**</td>
<td>.01</td>
<td>.54**</td>
<td>.74**</td>
<td>—</td>
</tr>
</tbody>
</table>

*Note. Correlations between MIA-MSE, memory index, and the Zung are based on 102 participants; correlations for Trait Anxiety and Neuroticism are based on 57 participants.*

*Memory self-efficacy score of the MIA; see text for explanation. **Memory index score; see text for explanation.

*p < .05. ** p < .01.
Negative correlations were found between depression, anxiety, and neuroticism, and MSE, but only depression showed a negative correlation with test performance.

DISCUSSION

Two remarks must be made about the generalizability of the findings in this study. First, the participants attending a memory training program were taken as models for elderly people with memory complaints. Attending such a program suggests that the person has an active and effortful way of coping with his or her memory problems. This way of dealing with memory problems may not be shared by all elderly people with memory problems. Second there may have been selection bias. Of a group of 74 training participants, 52 were willing to participate in the study. All invited participants knew that they would be given memory tests. It is thus conceivable that participants with memory deficits were too anxious to undergo the memory tests and did not participate for that reason.

The results show that the presence of memory complaints in a group of normal, healthy, community-dwelling older persons is not directly related to a clear decline in memory, as measured with standard and ecological memory tests. This is in line with the results of Scogin et al. (1985). As expected, the most important difference between the high- and low-complaint groups seems to be memory self-efficacy beliefs. This was the only factor of the MIA that clearly distinguished between the two groups. All other variables in the logistic regression model (memory index score, depression score, MIA Strategy, Task, and Achievement subscales) showed significant group differences, with the exception of the Locus subscale, but did not distinguish between the two groups.

Of the three memory tasks, only the fluency category discriminated the high-complaint group from the low-complaint group. It is interesting that fluency tasks have been shown to be very sensitive discriminators between normal healthy controls and mildly impaired patients with dementia of the Alzheimer type (Monsch et al., 1992). Most studies that focus on the relation between complaints and memory performance in elderly participants have only used tasks that involve encoding and retrieval of new information from long-term memory. These studies have shown there to be no or only modest correlations between complaints and memory performance. Studies need to be performed to determine whether fluency tasks are superior to encoding tasks in detecting people with memory complaints in a healthy population of elderly participants. Theoretically, this could mean that the earliest effect of aging on the memory system is a deterioration of or a
decreased access to the semantic knowledge system. This, in turn, would affect the encoding of new information.

Close relatives of the elderly participants in the high-complaint group also noticed that their relatives had daily memory problems more than did the relatives of the low-complaint participants. This finding is less plausible than it seems. An alternative explanation would be that the elderly participants in the high-complaint group overestimated their normal age-related daily memory failures because they were anxious about incipient dementia. For example, Commissaris, Verhey, Ponds, Jolles, and Kok (1994) found that 50% of the people who attended a public information meeting on the subject of age-related forgetfulness were worried about their memory, and more than half of this group were also afraid of dementia. About 10% of the people were even convinced that forgetfulness in people aged 65 years and older is a prodrome of dementia. In this study, however, fear of dementia was only mentioned by 3 of the 50 participants in the high-complaint group.

Personality measures were assessed in the second part of the study only. The high-complaint group not only had higher neuroticism scores than the control group, but also higher scores than a normal population. However, the depression and anxiety scores of the high-complaint group were within the normal range. Summarizing the literature on neuroticism, aging, and cognitive performance, Gold and Arbuckle (1990) concluded that greater neuroticism is in general associated with a poorer outcome on measures of cognitive functioning, although the effects are usually small. In a large sample of elderly participants, Arbuckle et al. (1986) found that neuroticism was negatively related to memory performance, but unrelated to subjective memory rating. In our study, however, we found the opposite. Neuroticism was significantly correlated to MSE, whereas no correlation with memory performance was found.

Several researchers (Ryan, 1992; Levy & Langer, 1994) have assumed that age-related decline in memory and low self-evaluation of memory are not determined solely by biological factors, but also by the widespread negative stereotypes about the inevitable decline of memory in old age. On the basis of this assumption, we expected that aging would be mentioned by most participants in the high-complaint group as the main cause of their forgetfulness. However, aging was mentioned by fewer than a quarter of the participants, with both emotional problems and problems of insufficient attention being mentioned as often as aging. This finding suggests that the contribution of negative social expectations in age-related memory decline, either objective or subjective, may be smaller than assumed.
Our findings suggest that MSE beliefs are more important for explaining daily memory problems in elderly people than memory competence or abilities themselves, with effort being the possible mediating factor (Bandura, 1989; Cavanaugh & Green, 1990). If people have low MSE beliefs, they may spend less effort in everyday situations that make demands on their memory (or they may even avoid them). This may in turn lead to an increase in everyday memory failures and further lowering of MSE beliefs. However, some of our findings are not in line with this explanation. The high-complaint group used memory strategies more frequently than the low-complaint group and sought help for their memory problems by attending a memory training program, which suggests that these participants took an active approach to coping with their memory problems. The data about daily activities in and out of the house are not consistent with the implicit assumption that the elderly people in the high-complaint group could be characterized by an avoidance of cognitively challenging social activities (e.g., participating in clubs) or cognitive activities (e.g., reading). It is also questionable whether it is necessary to hypothesize about a causal relationship between MSE beliefs and aged people’s everyday memory problems. Could it not be that complaining about memory is just an example of a general tendency to complain because of a neurotic personality structure, given the strong correlation between MSE and neuroticism in this study? It would be interesting to see whether differences in MSE beliefs between high- and low-complaint groups would still be found if participants were also matched on neuroticism.

Given that memory tests make demands on memory, one might also ask why the low MSE beliefs of the high-complaint group did not have a more detrimental effect on their memory performance. We think a plausible explanation is that the test situation is very different from the memory situation in daily life, in that during testing the participants were not only reassured but also encouraged to do their best, which led to the full use of their potential memory abilities. In other words, in a face-to-face test situation memory competence rather than memory confidence is measured.

Although this study was not designed to evaluate memory training for elderly people, its findings are relevant to the further development of memory training programs. Most of these programs focus explicitly on the learning of memory strategies. This is based on the mostly implicit assumption that memory function of elderly persons with memory complaints declines and this decline can be compensated by the use of memory strategies. The results of this study support the notion that memory training programs should focus more on restoring
the control over the intact memory skills of elderly persons, by paying
more attention to changing negative attitudes and expectations about
memory (e.g., Lachman, Weaver, Bandura, Elliott, & Lewkowicz,

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