Never too old to learn : the effectiveness of the Coping with Depression course for elderly

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Effects of depressed mood on autobiographical memory in older adults with and without lifetime depression.

Abstract

Objectives

First, to investigate if reduced autobiographical memory specificity (AMS), is a marker for depression in older adults. Second, the separate effect of an induced sad mood on AMS was studied.

Design

Between groups design.

Method

The Autobiographical Memory Task (AMT) was administered twice in a single session to 63 remitted (RD) participants and 58 never depressed controls aged 55 – 85 years. A negative mood was induced in all RD individuals. The controls were randomly assigned to a neutral ($n = 26$) or a sad mood condition ($n = 32$). The course of depressive symptoms was assessed in RD individuals over a 14 months follow-up period.

Results

All individuals retrieved fewer specific memories than the norm for middle aged individuals. RD and controls did not differ in AMT scores or in their reaction to the mood induction. The mood induction did not affect the AMT. There were no practice effects. Changes in the level of depressive symptoms at the 14-month FU were not predicted by baseline AMT, changes in AMT or mood after mood induction.

Conclusion

Performance on the AMT is not a marker for vulnerability for clinical depression in older adults.

Introduction

The interest in and recognition of late-life depression as a serious mental health problem is relatively recent compared to depression in midlife adults. Also the search for markers for relapse or recurrence of depression has focused mainly on younger adults with remitted depression. However, reviewing studies that compared prognosis of depression in late life to mid life, Mitchell and Subramaniam (2005) concluded that remission rates hardly differ, but that relapse rates appear to be higher in older persons. The prevalence of major depression in older adults is about 3%, and 8 -15% have subclinical or minor depression (Beekman, Copeland, & Prince, 1999). For many individuals, this will be a relapse or recurrence, since the occurrence of geriatric depression was significantly associated with a personal history of depression (Schoevers et al., 2003). The question arises whether markers for depression in younger adults also apply to older adults.

In younger adults, impaired autobiographical memory specificity (AMS) is considered a possible cognitive marker for vulnerability for depression (Williams, 1996). Autobiographical memory is part of the episodic memory system (Tulving, 2002), involving the recollection of personally experienced events; it often entails remembering contextual details of the event e.g. time and place of the occurrence. Autobiographical memory specificity can be measured with the autobiographical memory task (AMT; Williams & Broadbent, 1986). The average retrieval of specific memories by depressed or remitted patients is 40%, compared to 70% in control subjects (Williams, 1996). Autobiographical memory specificity has been put forward as a possible marker of vulnerability to depression, because it is associated with depression and trauma, but not with anxiety disorders. In clinical samples, comparable retrieval patterns were found in both current (van Vreeswijk & de Wilde, 2004; Williams, 1996) and remitted or recovered depressed individuals (Mackinger, Pachinger, Leibetseder, & Fartacek, 2000; Nandrino, Pezard, Poste, Reveillere, & Beaune, 2002; Park, Goodyer, & Teasdale, 2002; Spinhoven et al., 2006; Williams, 1996). These findings suggest that autobiographical memory specificity is not dependent on mood state but an enduring memory style. However, the assumption of stability has been challenged by Kuyken and Dalgleish (1995), who found no difference between never depressed individuals and remitted/recovered depressed individuals.

Also in more studies (Brittlebank, Scott, Williams, & Ferrier, 1993; Dalgleish, Spinks, Yiend, & Kuyken, 2001; Peeters, Wessel, Merckelbach, H., & Boon-Vermeeren, 2002), but not in all (Brewin, Reynolds, & Tata, 1999), autobiographical memory specificity showed prognostic properties by predicting the persistence of an acute depression. However, it did not predict relapse/recurrence in a sample of remitted mid life adults (Raes, et al., 2006; Spinhoven et al., 2006).

To separate the effects of mood from the effects of the depressed syndrome, two recent studies have investigated the influence of an experimentally induced mood in non-clinical samples. The AMT was administered twice and the changes in specificity

were analyzed. Svaldi and Mackinger (2003) found that a musically induced sad mood resulted in a decrease of specificity, especially of negative memories. Yeung, Dalgleish, Golden and Schartrau (2006) induced a happy, sad or neutral mood in never depressed volunteers. Compared to the neutral condition, those in the sad condition showed a decrease of specific memories. It seems worthwhile to compare the direct effect of a sad mood on recall between remitted depressed (RD) and never depressed (ND) individuals, since there are strong indications that the results of a negative mood induction in normal samples might not replicate in clinical samples (Matt, Vazquez, & Campbell, 1992).

To summarize: a substantial number of studies (see van Vreeswijk & de Wilde, 2004 for a meta-analysis) have confirmed the relationship between depression and impaired autobiographic memory specificity in adults of middle age. Furthermore, in young non-clinical samples an induced sad mood led to a decrease of specific memories.

Age is known to affect episodic memory more than semantic memory (e.g. Levine, Svoboda, Hay, Winocur, & Moscovitch, 2002; Siedlecki, Salthouse, & Berish, 2005; Winthorpe & Rabbitt, 1988) and was associated with performance on the AMT in younger adults (see van Vreeswijk & de Wilde, 2004). However the AMT has hardly been studied in older adults. We know of only one study with older adults (aged 55 – 68) (Wessel, Merckelbach & Dekkers, 2002) not suffering from organic brain damage or mental decline. The present study was designed to investigate reduced autobiographical memory specificity as a possible marker for vulnerability of depression in late life by comparing the mean scores on the AMT of remitted depressed (RD) with never depressed (ND) adults of 55 and older. Since episodic memory is vulnerable to normal aging, we expected that ND elderly would retrieve fewer specific memories compared to healthy younger adults. Furthermore, we expected that RD elderly would retrieve fewer specific memories compared to ND elderly. Besides, we set out to investigate the influence of dysphoric mood on the AMT in older adults by exposing both RD and ND elderly to a MI experiment and analyze the changes in AMT. The effects of a neutral and a sad MI were compared in a sample of ND controls. We expected that the sad MI would lead to a decrease of specificity (Svaldi & Mackinger, 2003), whereas the neutral MI would have no effect. Furthermore, we explored whether depression history moderated the effect of the MI on AMT by comparing the RD with the ND individuals. We had no particular outcome expectations with regard to the valence of the cue words since findings across studies have been inconsistent on the effects of cue valence (van Vreeswijk & de Wilde, 2004).

In the second part of the study, which consisted only of the RD individuals, we investigated to what extent the AMT score could predict changes in depression symptomatology 14 months after the completion of a group treatment for the prevention of depression.

Method

Participants

Participants were 63 elderly with a history of depression and 58 healthy older adults. Clinical participants were recruited among the older adults participating in an effectiveness study of the Coping with Depression Course for older adults (CWD; Lewinsohn & Clarke, 1984). These participants were community living seniors who followed the course, provided by the prevention departments of the Dutch community mental health system. Participants for the course and hence for the study were recruited through the local media by the course leaders of the prevention departments. The experiment took place between one and 11 months after the conclusion of the course.

The healthy control group was recruited among relatives and acquaintances of university students and staff. Potential healthy participants were excluded if they met the the diagnostic and statistical manual of mental health (DSM-IV; American Psychiatric association [APA], 1994) criteria of for a current or lifetime major depressive episode, current anxiety disorder or alcohol dependency. Clinical diagnoses for all participants in the study were determined with the Mini International Neuropsychiatric Interview (M.I.N.I.; Sheehan et al., 1998a). All participants taking part in the experiment received a complete description of the study and written informed consent was obtained. The protocol has been approved by the institutional ethics review committee of Leiden University.

Measures

Clinical diagnoses

We used the Dutch version of the M.I.N.I. (Overbeek, Schruers, & Griez 1999; Sheehan et al., 1998a), a structured interview with which the most prevalent DSM-IV (1994) axis I disorders can be assessed (Sheehan, et al., 1998b). Validation of the M.I.N.I.-CR against the Structured Clinical Interview DSM-III-R- patient version (SCID-P) and the Composite International Diagnostic Interview for ICD-10 (CIDI) showed good to very good kappa values (Sheehan, et al., 1998b). In the present study, the interviews were conducted by trained interviewers. Interrater reliability (Kappa) between the interviewers and first author was 0.95 for MDD, and 0.61 for previous MDD. Fourteen months after the completion of the course the depression section of the M.I.N.I. was administered again.

Depression

The level of depression symptomatology experienced during the past week of the clinical sample was assessed with the Dutch version of Center for Epidemiologic Studies Depression scale (CES-D) (Bouma, Ranchor, Sanderman, & van Sonderen, 1995; Radloff, 1977) before the MI and at 14 months after the completion of the course. In this sample Crohnbach's alpha (α) was .90.

Autobiographical memory test – AMT

This test has been developed by Williams and Broadbent (1986) to measure memory specificity, and has later been modified by McNally and colleagues (McNally et al., 1995). Two versions were used, each with five negative and five positive cue words. In version 1, the cue words were: friendly (+), guilty (-), honest (+), impolite (-), helpful (+), jealous (-), clever (+), selfish (-), humorous (+), and hostile (-), and in version 2: happy (+), clumsy (-), loyal (+), mean (-), tolerant (+), cowardly (-), disciplined (+), distrusting (-), kind (+), and lazy (-).

Participants were asked to recall an event at which they had shown the trait displayed on a flashcard and simultaneously read aloud by the experimenter. The response was considered a specific memory if it referred to a particular event lasting not longer than a day. Three practice items were administered and direct feedback was given about the correctness of the response. Participants were allowed 60s to come up with a memory; expiration was scored as no memory. The specificity was checked by asking details such as dates, seasons, time of the day, dress etc. The number of specific answers formed the response variable AMT specific. All interviews were recorded on audiotape and scored by the first author as well as by trained student psychologists. The level of agreement was good (kappa .89; $p <.001$). For disagreements, a third rater broke the tie without knowledge of the previous ratings. The change in autobiographical memory specificity (ΔAMT) was defined as baseline AMT score minus AMT score after the MI.

Visual analogue mood scale (VAMS)

VAMS for mood are a quick and simple means for measuring mood state (Killgore, 1999) with good reliability and validity (Ahearn, 1997). Participants were repeatedly asked during the experiment to rate their mood on VAMS measuring 100 mm by crossing the line ranging from 'not at all gloomy' (zero) to 'very gloomy' (100 mm). The scales were scored measuring the length (in mm) from 'zero' to this mark. The change in mood (Δmood) was defined as the baseline VAMS minus VAMS after the MI.

Procedure

All participants received the CES-D beforehand to fill in at home. For all participants, MI took place at a research setting. The healthy controls were invited at the university, whereas for the clinical participants the procedure took place at their community mental health center.

The neutral control condition was a series of six geometric puzzles of increasing difficulty. It was administered to the healthy controls only. To induce a mild transient dysphoric mood, the musical MI procedure, described by Clark and Teasdale (1985), was used. Participants were asked to listen to a piece of sad music entitled "Russia under the Mongolian yoke" by Prokofiev for the film Alexander Nevsky (1934); the

segment was remastered at half speed and lasted 7 minutes. They were specifically instructed to recall a time in their life that they felt sad or dejected and to try to evoke that mood. This combination of music plus the instruction has been found to be effective in bringing on a transient dysphoric mood (Westermann, Spies, Stahl, & Hesse, 1996). It is also efficacious in older adults (Fox, Knight, & Zekinski, 1998).

Momentary mood was rated (VAMS) at entry, pre and post MI and before leaving. The healthy controls were randomized to either the puzzle or the sad music condition. The MI, the AMT interviews (the order of presentation was counterbalanced across participants) and pre and post mood VAMS ratings took place in a separate test room. The experimenter was not present during the MI, she re-entered when the MI was finished to administer the second AMT and the post MI mood VAMS. Next, participants returned to the first office and were debriefed by the experimenter. A final mood VAMS was rated before leaving.

Results

In the control group nine VAMS were missing: five in the puzzle condition and four in the music condition. Because of non-normal distribution, square root transformations were conducted on the VASMs and the ΔVAMS data. The similarity of the two AMT versions was checked at pre- induction in the total group and no significant differences were found [$F(1, 120) = 0.00$, $p = .983$].

Participant characteristics

Table 1 summarizes the descriptive data on socio-demographic characteristics and depression variables. There were statistically significant differences between the two groups in age, gender and level of education (6-10 vs. ≥ 11 years of formal education). Healthy participants were slightly older ($F(1, 120) = 3.66$, $p = .058$), counted a higher proportion of males ($\chi^2(1) = 15.67$, $p < .001$) and were higher educated ($\chi^2(1) = 21.54$, $p < .001$). All analyses comparing these two groups were corrected for age, gender and education.

There were no significant differences in age or gender between the puzzle and music groups in the ND group; subsequently these variables were ignored in the analyses in this group. Although the mean CES-D found in the clinical group was below the cut point of 16, it was much higher than the mean reported in Beekman et al. (1994), who found in a sample of the normal population of Dutch elders [$M = 8.8$, $SD = 6.9$), $t(62) = 5.44$, $p < .001$]. In the clinical group, the correlation between the AMT and the CES-D ($r = -.021$, $p = .87$) and the association between the AMT and the use of antidepressants/tranquilizers ($t = -0.31$, $p = .76$) were non-significant. Hence, the analyses of AMT scores were not corrected for depression severity or use of antidepressants or tranquilizers.

Table 1. *Socio-demographic and mental health characteristics*

	Remitted Depressed N=63	Never Depressed N=58	Test statistic	p
Age 55-86			$F(1) = 3.41$	**.067**
Mean (*SD*)	64.92 (6.84)	67.5 (8.5)		
55 – 59	16	11		
60 - 64	20	11		
65 – 69	10	12		
70 - 75	9	12		
75 – 85	8	11		
Gender M	15 (24%)	34 (58.6%)	$\chi^2(1) = 15.19$	**<.001**
Cohabiting	38 (60.3%)	39 (67.6%)	$\chi^2(1) = 0.63$	.429
EDU ≥ 11 yrs	30 (47.6%)	51 (88%)	$\chi^2(1) = 22.18$	**<.001**
Mental Health Characteristics				
Previous MDD	54 (85.7%)			
≥ 2 episodes	37 (59.7%)			
CES-D				
Mean (*SD*)	15.07 (9.14)			
Range	0 – 43			
≥ 16	29 (46%)			
≥ 22	12 (19%)			
Antidepressants or Tranquilliser [a]	13 (22%)			

[a] five missing

Comparison healthy and clinical elderly on AMT performance
Group differences on the AMT were analyzed with a multivariate ANOVA with group, gender and education level as BS variables and age as covariate. Only age had a significant main effect [Λ = 0.82, $F(2, 111) = 12.15$, p <.001]. Univariate tests showed that age affected the positive but not the negative cue words ($F = 24.50$, p <.001).

Effects of mood induction in healthy controls
Mood changes and the test-retest effect of the AMT were analyzed with a 2 (induction type: puzzle or music) x 2 (word valence: negative, positive) ANOVA repeated measures on the second factor. No different response pattern to positive and negative cue words was found. Hence, the data were collapsed across word valence and analyzed with multivariate General Linear Model (GLM) for repeated measures with Time as within-subject (WS) variable, and Induction type (puzzle or music) as

between-subject (BS) variable. The main effect Time [Λ = 0.73, $F(2, 46)$ = 8.33, p = .001] and the interaction effect Time x Induction [Λ = 0.77, $F(2, 46)$ = 6.70, p = .003] were significant. Univariate tests showed that both effects were significant for the VAMS [Time: F = 12.71, p = .001; Time x Induction: F = 3.62, p = .001]. The main effect of repeated administration showed a trend for the AMT [Time: F = 3.75, p = .059], with lower scores on the second administration. The results revealed that (a) participants in the puzzle condition did not show a change in mood, but those in the music condition felt more sad, (b) performance on the AMT was not subject to test-retest effects or to mood changes, but (c) there was a trend suggesting that fatigue affected the AMT performance.

Differential effects of musical MI on mood and AMT in healthy and clinical participants

The sad music MI was administered to 28 healthy controls and 63 clinical participants. Differences between the two groups in mood or AMT specific before the music MI were analyzed with GLM for multivariate ANOVA with group, gender and education level as BS variables and age as covariate. Results indicated a significant main effect for age (Λ = 0.93, $F(2, 81)$ = 3.27, p = .043) only; no significant interaction effects were found. Univariate tests showed that the AMT was only affected by age (F = 6.24, p = .014). Memory specificity decreased (r = -.31, p = .001) with increasing age.

Differential effects of the MI on mood and AMT were analyzed with a multivariate GLM for repeated measures analysis with group, gender and education level as BS variables and age as covariate. Main effects were significant for age [Λ = 0.92, $F(2, 81)$ = 3.61, p = .032], and education [Λ = 0.87, $F(2, 81)$ = 6.03, p = .004]. Univariate tests showed that the main effect for age (F = 5.57, p = .021) and education (F = 6.77, p = .011) affected memory specificity, but not mood. Table 2 gives the means and standard deviations of the AMT and VAMS during the experiment.

Summarizing the results, we found that in healthy older adults the musical MI worked well in inducing a sadder mood, and that performance on the AMT was not affected by repetition or by mood state. After controlling for the differences in age, gender and education, there were no significant differences between the healthy and the clinical group in mood or memory specificity before the start of the experiment. Looking for differential effects, the results revealed that age and education affected the performance on the AMT in both groups: higher age and lower education were associated with lower specificity on the AMT. There were no significant differences in effect between the two groups in changes on the AMT.

Predictors of depressive complaints during follow-up in the RD group

Two participants in the experiment could not be reached at FU. At 14 months FU, only three participants met the criteria for a new major depressive episode. As another categorical threshold for severity, we then took the cut point of 22 on the CES-D as a

Table 2. *Mood^a and AMT score before and after the neutral or sad mood inductions*

VAMS

	Never Depressed (N = 49[b])				Remitted Depressed (N = 63)			
	Pre-MI		Post-MI		Pre-MI		Post-MI	
Mood induction	M (SD)	range	M (SD)	range	M (SD)	range	M (SD)	range
Neutral (n = 21)	9.86 (10.13)	0-36	9.52 (9.83)	0-37	-		-	
Sad (n = 28)	7.82 (8.79)	0-33	25.18 (22.72)	0-75	16.56 (17.82)	0-62	34.62 (26.19)	0-92

AMT

	Never Depressed (N = 58)				Remitted Depressed (N = 63)			
	Pre-MI		Post-MI		Pre-MI		Post-MI	
Mood induction	M (SD)	range	M (SD)	range	M (SD)	range	M (SD)	range
Neutral (n = 26)	4.54 (2.23)	0-9	3.96 (1.84)	1-8	-		-	
Sad (n = 32)	5.13 (2.49)	0-9	4.61 (2.30)	0-8	4.74 (2.33)	0-9	4.47 (2.43)	0-10

threshold of severity. The cut point of 22 was found as the optimal cut point to detect those with subthreshold depression, dysthymia and major depression (Haringsma Engels, Spinhoven & Cuijpers, 2004).

Analyses showed that the change in status, from below to above 22 or vice versa, was not significant (McNemar (1, $n = 60$), $p = .388$). Hence, the level of depressive symptomatology as measured with the CES-D was chosen as measure of severity and the CES-D score at 14 month FU was chosen as dependent variable. Mean CES-D ($n = 60$) before the experiment was 15.10 ($SD = 9.12$), range 0–43. At FU it was 15.78 ($SD = 9.78$); range 3–41. To analyze which variables were associated with the change in depression symptomatology, the residual change score was correlated with the number of previous depressive episodes (these illness-related variables are strongly predictive of the course of depression, e.g. see Judd et al., 1998), baseline AMT, ΔAMT and Δmood. Only the correlation with the number of previous episodes (0-1 *vs.* ≥ 2 previous episodes) was significant ($r = .36$, $p = .004$). The positive sign indicates that those with ≥ 2 previous episodes had higher scores on the CES-D at FU. Change on the CES-D at FU was not predicted by baseline AMT score, or the changes in AMT scores or mood ratings that follow the MI.

Discussion

The aim of this study was to examine if autobiographical memory specificity was a possible cognitive marker for depression in older adults. As expected from the literature about the effects of aging on memory, older adults retrieved less specific memories than younger; 48% in our sample compared to 70% in younger adults (Williams, 1966). However, our hypothesis that older remitted depressed individuals (RD) would recall fewer specific autobiographical memories than never depressed elders (ND) was not confirmed. This was even more surprising since 19% of the RD group had a CES-D score above 22, which indicates that a number of participants suffered from subthreshold depression.

Age was the only predictor of specificity in the two groups. Means in both groups were similar ($M = 4.86$, $SD = 2.37$ in the ND and $M = 4.70$, $SD = 2.33$ in the RD group) and significantly lower than the means of middle aged euthymic RD patients ($M = 5.3$, $SD = 2.8$) (Spinhoven et al., 2005), middle aged depressed patients ($M = 5.2$, $SD = 2.2$) (Hermans et al., 2004), and adolescent psychiatric patients ($M = 5.8$, $SD = 2.4$) (Swales, Williams & Wood, 2001).

These results can be explained in several ways. The first one with regard to the effect of age is that a floor-effect is reached. With only ten observations the AMT may not be sensitive enough to differentiate between the decline in specificity which is part of normal aging of the episodic memory and additional decline due to depression. A suggestion for future work is to adapt the AMT for the use with elderly by increasing the number of cue words. Another possibility is increasing the stress under which participants have to perform by allowing less time to come up with a memory. This is

a based on the assumption that the performance on the AMT may be accounted for by executive functioning (Dalgleish et al., 2007). However, alternative measures such as the Autobiographical Interview (Levine et al., 2002) might prove to be a more valid instrument for the use with seniors. A second interpretation is that our results support Williams's theory (1996) that emotional factors may affect retrieval in the same way as structural changes caused by aging do. Hence, in late life, normal aging effects on the episodic memory system cannot be differentiated from the detrimental effects of depression. These changes in functioning could happen as early as adolescence (Park et al., 2002) and remain stable over time. In schizophrenia research, a similar conclusion has been drawn. After the onset of schizophrenia, cognitive deficits were found to be stable over time (Rund, 1998). Whether or not the impairment caused at an earlier age is reversible is not yet clear. Teasdale et al. (2000) reported an increase of specificity after a Mindfulness-based Cognitive Therapy for depressed patients in remission. In another study, older depressed patients became more specific after practice in autobiographical memorizing (Serrano, Latorre & Gatz, 2004). Results of both studies indicate that at least better use of the remaining faculties is possible.

Lastly, finding no difference between ND and RD adults is also in accordance with the results of Kuyken and Dalgleish (1995), who found no differences in autobiographical memory specificity between ND and RD individuals. They suggested that overgenerality might normalize on recovery. Yet, their sample was small ($N = 33$), and their results have not been replicated by other researchers.

Our second question concerned the effect of an induced mood on the AMT in RD and ND older adults. To study the possible practice effects we compared the effects of a neutral with a sad MI in the ND controls. First, we found no effect of repeated administration of the AMT in a single test session. Neither did we find a differential effect of the two conditions on the AMT. Next, we compared the effects of a sad MI on the AMT and mood between ND and RD individuals. There were no differences in the effects of the MI on the AMT or on mood between the two groups. Furthermore, the MI did not affect the AMT in either group, indicating that, contrary to the results of MI experiments in younger samples (Yeung et al., 2006; Svaldi & Mackinger, 2003), memory specificity in older adults, regardless of their clinical history, is not affected by a change in mood state. In the light of our first result, this is not surprising.

The second part of our study was directed to investigate the power of the AMT in predicting changes in depression symptomatology in RD individuals. As expected (Judd et al., 1998), the experience of previous depressive episodes was a strong predictor of change in depression severity. Baseline AMT score, changes in AMT and mood after a negative MI were not prognostic.

We conclude that in adults aged 55 and older, performance on the AMT is not a marker for vulnerability for depression, nor can it predict changes in depression symptomatology. Finding no difference in AMT between the ND and the RD individuals, the latter result stands to reason. Besides, two other studies also concluded

that AMT scores were not predictive of either the course of depression (Raes et al., 2006) or of relapse/recurrence of depression (Spinhoven et al., 2006).

This study had a number of limitations. With regard to the first part of the study, the control group was recruited among acquaintances of university staff and students, and was therefore much higher educated. However, this selection should have maximized the difference between the two groups. On the other hand the control group was slightly older which could have minimized the difference. No other memory tasks were administered; hence the two groups could not be compared on other correlates known to be related to aging. Executive control and some memory functions such as episodic memory deteriorate with age (Levine et al., 2002; Siedlecki et al., 2005; Winthorpe & Rabbitt, 1988), but are also consistently found to be impaired in depressed and RD individuals (e.g. Burt, Zembar, & Niederehe, 1995; Ilsey, Moffoot, & O'Carroll, 1995; Fossati, Coyette, Ergis, & Allilaire, 2002; Raes, et al., 2006; Spinhoven et al., 2006). A limitation of the second part of our study is the lack of data on the incidence of MDD between MI and the 14 months FU and the lack of assessments of depressive symptomatology during the FU period. More individuals may have suffered a relapse than the three at 14 months FU. Consequently our results pertain only to the level of depressive symptoms experienced by the participants at MI and 14 months FU.

Our study had the following merits. First, the AMT is much less studied in older than in younger adults. Second, performance on the AMT was compared between clinical and healthy older adults. Third, none of the individuals was currently depressed, which allowed us to examine if performance on the AMT could be a function of current mood state. Fourth, administration of the AMT twice within a single test session enabled us to examine test-retest effects. And finally, the second part of our study had a longitudinal design allowing us to conclude that performance on the AMT is not a predictor of changes in the level of depressive complaints in older adults who responded to the CWD course. In fact, our study results indicate that it is unwarranted to conceptualize performance on the AMT as a marker for vulnerability for clinical depression in older adults.

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