A multi-method comparison of autobiographical memory impairments amongst older

adults and adults of working age

Abstract

Objectives

Research indicates that, compared to adults of working age, older adults have difficulty recalling memories of specific past events (those lasting less than 24 hours) and this difficulty is associated with depression. These studies are largely confined to a single measure of specific memory recall and there are conflicting findings when alternative measures are used. This investigation provides the first comparison of memory specificity between adults of working age and older adults using several different measures.

Method

Older adults ($n = 105$) and adults of working age ($n = 88$) completed the Autobiographical Memory Test (AMT), Autobiographical Memory Interview (AMI) and Sentence Completion for Events from the Past Test (SCEPT) and the number of specific memories was quantified for each measure. Participants also completed the Beck Depression Inventory Version II (BDI-II).

Results

Compared to younger adults, older adults recalled fewer specific memories in the AMT and more specific memories in the AMI. This latter effect was particularly pronounced for memories related to childhood. There was no group difference in responses in the SCEPT. There was no evidence of an association between memory specificity and depression for any of the measures.

Conclusion

Older adults have difficulty retrieving specific memories after cuing by nouns and adjectives, as in the AMT, but they have enhanced recall of specific memories after cuing by life periods, as in the AMI, and this is particularly true of memories related to childhood.

Individual differences in memory specificity are not related to depression symptoms in healthy samples.

Introduction

Compared to adults of working age, older adults have difficulty recalling memories of specific autobiographical events (Wilson & Gregory, 2018). In particular, older adults have difficulty recalling events from their past that lasted for less than 24 hours (e.g., when I attended my daughters' 20th birthday party) and instead tend to retrieve *general* memories: memories for events that occurred multiple times (e.g., my daughters' birthday parties) or which occurred over extended periods of time (e.g., when my daughter was travelling during her twenties). This is important because the ability to retrieve specific memories has been suggested to help older adults regulate negative moods (Carretero, Latorre, Fernández, Barry, & Ricarte, 2019) and difficulty retrieving specific memories has been associated with the presence and severity of depression (Farina, Barry, Van Damme, van Hie, & Raes, 2018; Ono, Devilly, & Shum, 2015; Van Vreeswijk & De Wilde, 2004). Although autobiographical memory impairments and their association with depression in older adults has been widely researched (Wilson & Gregory, 2018), there are limitations to existing studies that must be overcome in order for us to better understand these problems and to inform the development of interventions to improve them (e.g., Leahy, Ridout, Mushtaq, & Holland, 2017).

The majority of studies in this area are confined to a single assessment method, the Autobiographical Memory Test (AMT; Williams & Broadbent, 1986). In a typical AMT, participants are presented with five negative and five positive cue words (e.g., sad, happy) and they are asked to retrieve a memory associated with each within 60 seconds. In studies with the AMT, older adults have shown problems recalling specific memories overall as well as particular difficulty recalling specific memories cued by negative words (Latorre et al., 2013; Ros & Latorre, 2010; Serrano, Latorre, & Gatz, 2007). AMT research has also found that older adults with elevated depression symptoms (Serrano et al., 2007) or diagnoses of depression (Birch & Davidson, 2007; Ricarte et al., 2011) appear to have marked difficulty

recalling specific memories compared to their low depression/diagnoses-free counterparts. However, there is little evidence that individual differences in depression symptoms are correlated with memory specificity (Serrano et al., 2007). In one study that used an adapted AMT that cued memories from different life-periods, participants with elevated depression symptoms showed difficulty recalling specific memories of events from childhood and adolescence compared to participants with lower depression levels (Gidron & Alon, 2007). It might be that the association between memory specificity and depression symptoms amongst older adults is most apparent when alternative cuing techniques to those used in the traditional AMT are used, and in particular those which probe early life periods.

Although the AMT has been invaluable in helping researchers elucidate the nature of reduced autobiographical memory specificity and its association with depression, it is merely one method for assessing memory specificity and the task itself has little relevance to the way that memories are cued or recalled in real life. In real life, memories are rarely cued using discrete nouns or adjectives that are free of any context and memories are typically not demanded within a time limit. In addition, with one exception (Gidron & Alon, 2007), the AMT does not typically account for differences in specificity that might occur for memories from different points across the lifespan or how this might differ between adults of working age and older adults.

One alternative to the AMT which accounts for this, the Autobiographical Memory Interview (AMI; Kopelman, Wilson, & Baddeley, 1990), instead cues memories related to times (childhood, adulthood and recently) and locations that are commonly experienced within a person's lifetime (e.g., when you were in primary school; when you were in, or visited, hospital) and participants are not given any time limit. To our knowledge, only two studies have used the AMI amongst older adults (De Medeiros, Mosby, Hanley, Pedraza, & Brandt, 2011; Gallassi, Di Sarro, Morreale, & Amore, 2006). Both of these studies involve

interventions and have not examined group differences in memory specificity between older

adults and any other control group (e.g., younger adults).

Another alternative to the AMT is the Sentence Completion for Events from the Past

Test (SCEPT; Raes, Hermans, Williams, & Eelen, 2007). In the SCEPT participants are

shown a series of sentence stems (e.g., I'll never forget when…) and they are asked to

retrieve a memory that completes the sentence. The SCEPT was initially created because the

AMT was seen as not sensitive enough to capture the problems with memory specificity that

are present in non-clinical participants; and, that there was so little variation in specificity

between such participants when it was measured using the AMT, that it appeared to be

unrelated to other aspects of psychopathology (e.g., depression and rumination)(Raes et al.,

2007). The SCEPT was thought to be more sensitive than the AMT given its focus on cuing

memories with sentence stems that are more closely aligned with the ways in which

memories are retrieved and discussed in regular discourse. Indeed, Raes et al. (2007) found

that the SCEPT was more sensitive than the AMT in terms of its ability to measure the

association between specificity and depression in non-clinical samples. However, to our

knowledge, no study has used the SCEPT to assess memory specificity amongst older adults.

In addition, to our knowledge no study has used multiple methods for assessing

autobiographical memory specificity within a single investigation. It is unclear whether

problems with memory specificity evident amongst older adults are consistent across cuing

methods or whether they are confined to a particular method. Also, many previous studies are

comparisons amongst older adults (e.g., Serrano et al., 2007) and so do not involve

comparisons with younger groups of adults of working age.

The present investigation overcomes these limitations by examining differences in

autobiographical memory specificity between older adults and adults of working age

measured with three cuing procedures: the AMT, AMI and SCEPT, whilst also examining the

contribution of individual differences in depression symptoms to memory recall. We also examined the extent to which each of the measures quantified the same underlying construct of autobiographical memory specificity and so whether performance in each tasks was related to one another.

Methods

Participants

196 participants were recruited to participate from different University academic programs of the region associated with the senior author where not only young but also older adults participate (e.g. summer schools, conferences, seminars, workshops, specific university program for those over 50 years old). Participation was voluntary and non-remunerated. Those participants with a possible psychiatric diagnoses according to screening with the Mini-International Neuropsychiatric Interview (Sheehan et al., 1998) were excluded from participation. In addition, in the group of older participants, the Mini-Mental Status Examination (MMSE; Lobo et al., 1979) was used so that participants with cognitive impairment could be excluded. One participant did not complete any items of the measure of depression symptoms and two participants did not complete one of the autobiographical memory tasks. These participants were excluded from analyses. Data from 193 participants' (Older adults: $n = 105$, $M_{age} = 64.85$, $SD_{age} = 5.27$, Females = 68 (65%); Adults of working age: $n = 88$, $M_{age} = 22.28$, $SD_{age} = 4.12$, Females = 62 (70%)) were analysed. Of these participants, one had six missing items on the measure of depression symptoms and seven had one missing item. These data were imputed using a person-level mean based on responses to the remaining items.

Measures

Beck Depression Inventory, second version (BDI-II)

The BDI-II is a self-report measure of depression severity (Beck, Steer, & Brown, 1996). Participants are presented with 21 items that refer to a range of depression symptoms and are asked to rate, on scales from 0 to 3, the intensity and frequency with which they experience each of these symptoms. A high score, therefore, reflects higher depression severity. In the present investigation, the BDI-II showed acceptable internal consistency (α = .75).

Autobiographical memory

Sentence Completion for Events from the Past Test (SCEPT). The SCEPT (Raes et al., 2007) records autobiographical memories cued by 11 short uncompleted sentences (e.g., Why I think back to…), wherein participants complete the stem of the sentence with a memory. There was no time limit for participants' responses. Sentences describing unique events lasting less than 24 hours were categorized as specific memories (e.g. …my wedding day); sentences describing repeated summaries of events were categorized as categoric memories (e.g…every time I saw my wife); sentences describing events lasting longer than 24 hours or periods of life were categorized as extended memories (e.g. …when I was a child"). Sentences completed with the name of persons, animals, or things, repetitions, expressions of feelings not associated with an event or a period of time, as well as the omission of a response, were categorized as non-responses. Two independent researchers categorized responses. Inter-rater agreement calculated on 15% of the total obtained sentences was 92%.

Autobiographical Memory Test (AMT). The AMT comprised five positive (Happiness, Friendship, Energy, Smile, Excited) and five negative (e.g., Guilty, Failure, Delusion, Worry, Sadness, Illness) cue words presented orally in a fixed order, alternating between positive and negative cue words (Williams, Barnhofer, Crane, & Beck, 2005). Participants were asked to generate a specific memory that happened on a particular day one week ago or more. Participants were told that they were not allowed to repeat memories. After 60-seconds the next cue word was presented. Responses were audio-recorded and transcribed. The same

coding framework as was used for SCEPT responses was employed for AMT responses. A subsample of 15% of recalled memories were coded by two different examiners. The percentage of agreement in the codes given by raters was 85%.

Autobiographical Memory Interview (AMI). Although the AMI measure includes items that assess both episodic and semantic aspects of autobiographical memory, as the focus of the present investigation was on the former, only these nine items were included. This section of the AMI asks participants to retrieve a memory related to each of several times and locations related to three periods of their lives: childhood (e.g., a memory from primary school), adulthood (e.g., a memory from college or first job) and recent years (e.g., a memory from a hospital within the past five years). Items were administered orally by the experimenter without time restriction. When no answer was obtained or the answer was not related to the questions, participants were prompted once after which the next cue was given. Memories were coded using the same framework as the SCEPT and AMT and also 15% of responses were coded by two independent examiners with 86% agreement between raters.

Procedure

Study delivery and data handling procedures followed legal standards set out by the Clinical Research Ethics Committee of the local University Hospital after the study protocol was approved (reference: CEIC06/2016). After participants arrived at the laboratory, they were given a summary of information regarding the study and its aims and were informed that they could drop out of the study at any moment. Researchers confirmed that participants had understood the instructions and then informed consent was obtained. Tests were collected by seven graduate students trained in the delivery of the tests. The BDI was administered first, then the SCEPT and, in the second session a week later, the AMI was completed and then the AMT.

Statistical procedure

First, we clarified whether and to what extent the groups differed in terms of their average age, their depression symptoms and their proportions of males and females and educational levels (coded as 0 and 1 where 1 was university-level education). Where there was evidence that the groups differed in terms of their gender distribution or education levels, these variables were included in subsequent analyses.

Then, in accordance with recommendations regarding the benefits of robust statistical methods (Field & Wilcox, 2017), the present investigation tested for group differences between adults of working age and older adults using robust linear models. Given that different measures had different numbers of cues, different models were tested for each of the task measures: SCEPT, AMT and AMI.

As the SCEPT has only a single cue type and so is scored using a single total score, two robust linear models (using the lmrob() function in the *robustbase* package in R (Maechler et al., 2019)) tested for group differences in the recall of specific autobiographical memories in the SCEPT. The first model examined age-group differences in recall whereas the second model further examined the contribution of group differences in depression symptoms to any age-group differences. Main effects and interactions were evidenced by p values less than .05.

Two robust linear mixed models with maximum likelihood estimation (using the rlmer() function in the *robustlmm* package in R (Koller, 2016)) tested for group differences in the recall of specific memories following positive and negative cue words in the AMT. These models included a random effect for between-participant variation and included fixed effects for cue valence (positive vs. negative) and group, and the interaction between these effects. As in the SCEPT analysis, the second model examined the additional contribution of depression symptoms, and group differences in depression, to recall within the AMT. The rlmer() function does not return p values. As such, in this analysis and other analyses using

this function, a main effect and interaction is evidenced by 95% CI that does not overlap with zero.

Two final robust linear mixed models (again using rlmer()) examined group differences in recall of specific memories in the AMI. These models were identical to those within the AMT analyses with the exception that the model included a fixed effect of time rather than cue valence. As time had three levels (childhood, adulthood, recently) this variable was modelled as dummy variables. Again, the second model examined the additional contribution of depression symptoms.

Where appropriate, main effects and interactions were followed up with comparisons of model estimated means using a Bonferroni correction.

Finally, total scores for the number of specific memories retrieved in each of the tasks were correlated with one another.

The analysis script and data are available on Open Science Framework (https://osf.io/ky3c2/).

Results

Participant characteristics

Adults of working age were significantly younger than the older adults, $t(191) = -61.65$, $p < .001$, 95% CI[-43.93, -41.20], $d = 2.91$. There was no difference between the groups in their proportions of female participants, $X^2(1) = 0.706$, $p = 0.401$, $d = 0.12$, *95% CI*[-0.16, 0.40]. Adults of working age had a significantly larger proportion of participants that had obtained University-level education (98%) than older adults (41%), $X^2(1) = 69.63$, $p < .001$, $d = 1.50$, *95% CI*[1.15, 1.86]. The adults of working age also reported significantly lower depression symptoms ($M = 4.50$, $SD = 3.59$) compared to older adults ($M = 6.64$, $SD = 5.28$), $t(191) = -3.22$, $p = .001$, *95% CI*[-3.45, -0.83], $d = 1.53$.

Group differences in autobiographical memory

See Table 1 for the summary statistics for the SCEPT, AMI and AMT.

Sentence Completion for Events from the Past Test (SCEPT)

In the first model, age group did not show a significant effect on recall within the SCEPT, β = -0.299, *SE* = 0.388, *p* = .443, 95% CI[-1.07, 0.47]. In the second model including BDI-II scores and its interaction with group, age group did not show a significant effect on recall, β = -0.200, *SE* = 0.374, *p* = .593, 95% CI[-0.94, 0.54]. Also, neither BDI-II scores, β = -0.051, *SE* = 0.062, *p* = .408, 95% CI[-0.17, 0.07], nor the interaction between BDI-II scores and age group, β = 0.010, *SE* = 0.077, *p* = .901, 95% CI[-0.14, 0.16], showed significant effects on recall. Education was not associated with recall in either the first model, β = -0.501, *SE* = 0.437, *p* = .252, 95% CI[-1.36, 0.36], or the second, β = -0.492, *SE* = 0.433, *p* = .257, 95% CI[-1.35, 0.36],

Autobiographical Memory Test (AMT)

In the first model, there was a main effect of group, β = -1.032, *SE* = 0.200, 95%CI[-1.42, -0.64]. The direction of this effect was such that adults of working age recalled significantly more specific memories than older adults. There was no main effect of valence, β = -0.087, *SE* = 0.112, 95% CI[-0.31, 0.13], or interaction between valence and group, β = 0.004, *SE* = 0.152, 95% CI[-0.29, 0.30]. Education was also not associated with recall, β = 0.209, *SE* = 0.196, 95% CI[-0.17, 0.59]

In the second model, there was a main effect of group, β = -1.042, *SE* = 0.207, 95%CI[-1.45, -0.64]. There was no main effect of valence, β = -0.078, *SE* = 0.118, 95% CI[-0.31, 0.15], or interaction between valence and group, β = 0.006, *SE* = 0.158, 95% CI[-0.30, 0.32]. Again, there was no main effects of BDI-II scores, β = -0.002, *SE* = 0.034, 95% CI[-0.07, 0.07], or interaction between BDI-II scores and group, β = 0.017, *SE* = 0.041, 95% CI[-0.06, 0.10], BDI-II scores and valence, β = 0.010, *SE* = 0.032, 95% CI[-0.05, 0.07], or a three-way interaction between BDI-II scores, group and cue valence, β = -0.030, *SE* = 0.037,

95% CI[-0.10, 0.04]. Education was not associated with recall, $\beta = 0.207$, $SE = 0.198$, 95% CI[-0.18, 0.59].

Autobiographical Memory Interview (AMI)

In the first model, there was a main effect of group, $\beta = 0.448$, $SE = 0.104$, 95% CI[0.24, 0.65]. However, contrary to the AMT analysis, the direction of this effect was such that, across cue types, adults of working age recalled significantly fewer specific memories compared to older adults. There was also main effect for the difference in specificity between memories recalled from childhood and those recalled from adulthood, $\beta = 0.650$, $SE = 0.099$, 95% CI[0.45, 0.84], and this variable interacted with group, $\beta = -0.532$, $SE = 0.135$, 95% CI[-0.80, -0.27]. There was also a main effect for the difference in specificity between memories recalled from childhood and those recalled from recent years, $\beta = -0.313$, $SE = 0.099$, 95% CI[-0.51, -0.12], and this variable interacted significantly with group, $\beta = -0.371$, $SE = 0.135$, 95% CI[-0.63, -0.11]. There was also a main effect of education, $\beta = 0.159$, $SE = 0.073$, 95% CI[0.02, 0.30].

In the second model, examining the contribution of depression symptoms to recall, again there was a main effect of group, $\beta = 0.463$, $SE = 0.107$, 95% CI[0.25, 0.67]. The main effect for difference in recall from childhood to adulthood continued to be significant, $\beta = 0.675$, $SE = 0.105$, 95% CI[0.47, 0.88], and this effect interacted with group, $\beta = -0.575$, $SE = 0.140$, 95% CI[-0.85, -0.30]. Also, the main effect for difference in recall from childhood to recently continued to be significant, $\beta = -0.328$, $SE = 0.105$, 95% CI[-0.53, -0.12], and this effect interacted with group, $\beta = -0.342$, $SE = 0.140$, 95% CI[-0.62, -0.06]. There was also a main effect of education, $\beta = 0.162$, $SE = 0.072$, 95% CI[0.02, 0.30]. All of the main or interacting effects of depression symptoms showed confidence intervals that overlapped with zero.

After correcting for multiple comparisons with a Bonferroni correction, contrary to the AMT analyses, adults of working age recalled significantly fewer specific memories from childhood than older adults, b = -0.463, SE = 0.107, t(489) = -4.327, p < .001, 95% CI[-0.78, -0.15]. There was no group difference for memories recalled from adulthood, b = 0.112, SE = 0.107, t(489) = 1.045, p = 1.000, 95% CI[-0.20, 0.43] or recently, b = -0.120, SE = 0.107, t(489) = -1.122, p = 1.000, 95% CI[-0.44, 0.20]. This change from a significant between-group effect in childhood to non-significant effects in adulthood and recently, was because adults of working age recalled significantly more specific memories from adulthood than childhood, b = -0.675, SE = 0.107, t(342), p < .001, 95% CI[-0.98, -0.37], whereas older adults did not, b = -0.100, SE = 0.093, t(342) -1.079, p = 1.000, 95% CI[-0.37, 0.17]. In addition, both older adults, b = 0.770, SE = 0.093, t(342) = 8.323, p < .001, 95% CI[0.50, 1.04] and adults of working age, b = 1.002, SE = 0.105, t(342) = 9.586, p < .001, 95% CI[0.69, 1.31] recalled significantly more specific memories from adulthood than recently.

Older adults recalled significantly more specific memories from childhood than adults of working age did and both groups were able to recall significantly more specific memories from adulthood than recently, with no difference between the groups for memories recalled from these timepoints.

Correlations between measures

The total number of specific memories retrieved in the AMT did not correlate with scores for the AMI, r = -.100, p = .167, 95% CI[-0.24, 0.04], or the SCEPT, r = -.042, p = .558, 95% CI[-0.18, 0.10]. However, AMI scores correlated significantly with SCEPT scores, r = .327, p < .001, 95% CI[0.20, 0.45].

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Discussion

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The present investigation provides an analysis of autobiographical memory specificity amongst older adults, relative to younger adults of working age, by comparing performance

in three measures of autobiographical memory. Compared to younger adults, older adults recalled significantly fewer specific memories cued by both positive and negative cue words in the AMT. However, when comparing performance between these groups in the AMI, relative to younger adults, older adults recalled significantly *more* specific memories. This group difference was also particularly pronounced for memories that were recalled from events in childhood. No group difference was evident in the third measure of autobiographical memory, the SCEPT.

That older adults had difficulty, compared to younger adults, recalling specific memories related to both positive and negative cues is consistent with the findings of a previous literature review (Wilson & Gregory, 2018). However, our analysis of the AMI did yield differences between cue types. In particular, older adults were better able than adults of working age to recall specific memories related to childhood whereas both groups did not differ in the number of specific memories they retrieved for other time periods. Given that adults also showed a significant improvement in specificity for memories from adulthood relative to childhood, and that older adults showed no such improvement, the most likely explanation for the group difference that was observed for memories cued from childhood is that it was due to worse recall amongst younger adults rather than an advantage amongst older adults. Indeed, previous results have shown that older adults remember more relevant life events from the end of childhood and beginning of adulthood than their younger counterparts because for younger people the most significant events in life are those things which are happening currently (e.g. marriage, stable work)(Rubin & Schulkind, 1997). One previous study using the AMI did not find significant differences between older and young participants in the total number of specific memories that were retrieved, although no information about differences by period was reported (Rathbone, Holmes, Murphy, & Ellis, 2015).

Given that no group difference was observed for two of the three cue types used in the AMI, it is perhaps not surprising that no group difference was observed in our third measure of memory specificity, the SCEPT. Nevertheless, that opposite findings evident in our AMT and AMI analyses are notable and in need of further research. It would be interesting for future research to codify the life periods of specific memories retrieved in the AMT. It may be that older adults who are more likely to retrieve memories from childhood are less likely to experience problems with memory specificity as measured using the AMT, than those who rely on more recent memories. In addition, research could explore the interaction between cue valence and the time period in a hybrid AMT/AMI task by asking participants for positive and negative memories from each of the three time periods referred to in the AMI (Gidron & Alon, 2007). Younger and older adults may differ in their abilities to retrieve positive and negative specific memories for each of the time points and this may contribute to the broader group differences that were observed in the present investigation in the AMT and AMI measures.

This is the first investigation to employ several different methods for measuring memory specificity within a single study amongst older adults. As all three measures employed here measure the same overarching construct, one might have expected performance in each of the measures to correlate with one another but this was not the case. There are important differences between the tasks that might explain these differences. In particular, the AMT cues memories using positive and negative nouns and adjectives; the AMI uses cues related to locations and time-periods from a person's past (e.g., an occasion when they were in hospital; or, an occasion from primary school); and, the SCEPT uses sentence stems from statements that typically precede instances of recollection (e.g., I'll never forget when…) from which participants must complete the sentence with a memory. The findings presented here suggest that older adults have particular difficulty retrieving

specific memories when these memories are cued by valenced nouns and adjectives and when these cues are free from information about physical (e.g., a memory from when you were in hospital) or temporal (e.g., a memory from childhood) context as in the case of the AMI.

It is of note that specificity measured using the AMI and SCEPT correlated positively. It could be that these measures share similar cuing procedures and so they quantify similar aspects of autobiographical memory specificity. Indeed, both measures ask for important, often life-defining memories (e.g., SCEPT: *I'll never forget when…*; AMI: *A memory from your first job.*) that are perhaps more accessible to older adults than the memories cued by the AMT. It may be that the AMT provides the most sensitive measure of specificity problems given that the cues that are used in this task are free from contextual information that might otherwise aid retrieval as in the AMI or SCEPT. However, it must also be noted that the tasks also differ in terms of whether a time limit was applied or not. Problems retrieving specific memories were seen amongst older adults only when a time limit was applied (AMT, 60 seconds) and in measures without a time limit, older adults either outperformed younger adults (AMI) or showed no difference from them (SCEPT). It may be that in the presence of a time limit and the absence of additional contextual information in the AMT cues, compared to the cues in the AMI or SCEPT, participants have to engage in lengthy and cognitive demanding generative retrieval that many participants fail to complete within the time limit. However, if the absence of a time limit caused the improvement in performance for older adult participants that was observed in the AMI then we would expect that the same would also be true for the SCEPT and also for all cue types within the AMI and not just for childhood. Future research could quantify the amount of time it takes younger and older adults to retrieve specific memories in all tasks or use time limits of varying length and explore the effects of this on between-group differences. Both of these options would enable researchers to examine whether younger and older adults differ in the speed with which they

retrieve specific memories and if, given more time in the AMT, older participants are better able to retrieve specific memories than if a time limit is imposed.

Although there was a group difference in self-reported depression symptoms between the groups, both groups were below BDI-II thresholds for likely depression diagnoses. Given the non-clinical nature of the present sample, it is not surprising that there was no association between memory specificity and self-reported depression symptoms in any of the analyses. This finding is similar to other studies using the AMT (Serrano et al., 2007) and is also consistent with research in adults of working age (Farina et al., 2018; Van Vreeswijk & De Wilde, 2004). Any association between problems recalling specific memories and depression seems only to emerge when comparing participants with and without depression diagnoses (Farina et al., 2018).

Due to practical constraints, the tasks were not counterbalanced. It appears possible that group effects are evident in the AMT may be because older adults fatigued by the time they completed the AMT. However, participants were given as much time to rest between tasks as they wanted. Also, there were no time limits on the SCEPT or AMI, so in the event that a participant was fatigued they could have taken longer to complete the tasks if they wanted to. It seems unlikely that group differences would emerge in the AMI but not the SCEPT if these effects were due to fatigue in one of the groups.

Despite this, and despite the relative advantage that older adults seemed to have when retrieving specific memories related to childhood, that is not to say that interventions for improving memory specificity would not be worthwhile amongst older adults. Clearly, older adults show problems with retrieving specific memories, especially when the stimuli used to cue their memories are lacking in temporal or spatial information. Existing interventions for memory specificity, such as Memory Specificity Training (MeST)(Raes, Williams, & Hermans, 2009), are effective at improving memory specificity and reducing depression

symptoms (Barry, Sze, & Raes, 2019). MeST involves cued-recall exercises that are similar to the AMT. Training in this form of retrieval would be beneficial to many older adults. MeST for older adults might also be enhanced by helping them to focus on time periods from their past as is the case in other memory therapeutic interventions such as Life Review (Serrano, Latorre, Gatz, & Montanes, 2004).

The present investigation therefore suggests that, although older adults show problems retrieving specific memories when they are cued by nouns and adjectives, their problems with memory retrieval seem to be confined to this form of cuing. When memories are cued by particular time periods from a person's past, older adults can even outperform younger adults. Memory therapeutics might capitalise on this relative advantage when developing memory therapeutic interventions.

Table 1. Means and standard deviations

	SCEPT	AMT			AMI			
		Positive	Negative	Total	Childhood	Adulthood	Recent	Total
AWA	2.68 (1.57)	4.38 (1.03)	4.26 (1.03)	8.61 (1.85)	1.98 (0.98)	2.77 (0.52)	1.82 (0.44)	6.57 (1.24)
OA	3.06 (2.45)	3.22 (1.32)	3.14 (1.38)	6.35 (2.38)	2.46 (0.67)	2.58 (0.63)	1.84 (0.80)	6.88 (1.41)

Note. Means (and standard deviations) for responses on each of the measures of autobiographical memory. AWA: Adult of working age; OA: Older adult; SCEPT: Sentence Completion for Events from the Past Test; AMT: Autobiographical Memory Test; AMI: Autobiographical Memory Interview.

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