



Nonbelieved memories in middle-aged and older people



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ABSTRACT

Previous studies have reported that young participants typically date events that they remember, but no longer believe they experienced, to the period of childhood. The present study investigated whether participants aged between 40 and 79 years dated events related to relinquished memories to the period of childhood, as do younger people, or whether they dated such events to a period later in life. The study also compared believed and nonbelieved memories with respect to memory perspective (1st vs 3rd person perspective). Results indicated that the majority of middle-aged and older people dated nonbelieved memories to the period of childhood (median age = 8 years). No correlation was found between the participants' current age and their age at the time the nonbelieved event occurred. In addition, results showed that believed memories were more likely to be retrieved from a 1st person perspective than were nonbelieved memories.

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1. Introduction

The phenomenon via which an autobiographical memory is no longer believed to be a representation of an event that really happened, despite a vivid recollection of the event, has been termed a nonbelieved memory. (Mazzoni, Scoboria, & Harvey, 2010; for a review see Otgaar, Scoboria, & Mazzoni, 2014). The existence of nonbelieved memories indicates that autobiographical recollection is possible without accompanying autobiographical belief, supporting the view that autobiographical memory and autobiographical belief can be dissociated (Mazzoni & Kirsch, 2002; Mazzoni et al., 2010). Although there are some anecdotal descriptions of the phenomenon in the literature (Piaget, 1946/1970; Sacks, 2005), the systematic study of naturally occurring or experimentally induced nonbelieved memories (NBMs hereafter) started only in 2010. In their study of NBMs, Mazzoni et al. (2010) found that about 20% of screened participants reported naturally occurring NBMs, and that they rated NBMs similarly to believed memories with regard to some phenomenal features of the representation, such as the quality of visual details, the clarity of the contextual details (e.g., locations, people or objects), the feeling of reliving the event or the experience of mental time travel. NBMs were nevertheless rated lower than believed memories for other characteristics such as temporal duration, connectedness to other events in memory, event significance, or complexity (Mazzoni et al., 2010). The reasons why NBMs are no longer believed are multiple (Mazzoni et al., 2010; Scoboria, Boucher, & Mazzoni, 2015). Social feedback (social contradiction or a mere lack of corroboration) has been shown to be the most frequent reason for nonbelief in a memory, followed by event plausibility (either subjective or objective appraisals of implausibility). Other reasons were source reattribution (e.g., the event was dreamed or imagined rather than really lived), meta-memory beliefs (e.g., the knowledge of infantile amnesia), atypical internal features of the representation (e.g., the memory of the event is too disorganized to be true),

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the existence of disconfirming external evidence (or the lack of confirming evidence), the inconsistency of the event with the view of self or others, and, finally, personal motivation (see [Scoboria, Boucher, et al., 2015](#) for details of this classification).

In the [Mazzoni et al. \(2010\)](#) study, the event reported in NBMs was most frequently dated to childhood; the participant's mean age at the time of the event was 7.19 years (range = 1–21 years). On average, participants stopped believing that the event really occurred at 14.56 years (range = 6–30 years). Participants in that study were mostly young adults (mean age = 21.96 years, range = 17–50 years). The question therefore arises: were the NBMs reported in previous studies (see also [Scoboria & Talarico, 2013](#)) based mainly on childhood memories because of the participants' young age or because NBMs are typically childhood memories that are no longer believed later in life? In a recent study, [Scoboria, Memon, Gawrylowicz, and Clark \(2015\)](#) examined NBMs across the adult lifespan in order to address this question. The majority of their participants, aged from 18 to 72 years, dated NBMs to mid-to-late childhood (mean age = 8.84 years; median age = 7 years). About 67% of NBMs were dated to between the ages of 4 and 12, while 13% of cases were dated to age 3 or younger and 20% of cases were dated to between age 13 and 33. No significant correlation was found between the age at the time of the event and the participant's current age. These results suggest that autobiographical belief in childhood memories is particularly vulnerable to revision later in life. However, in their study, [Scoboria, Memon, et al. \(2015\)](#) reported that 4 out of 22 participants aged between 60 and 72 described NBMs that they dated to age 52–61. According to [Scoboria, Memon, et al. \(2015\)](#), the occurrence of these atypically late NBMs suggests that, in addition to childhood, there could be a second period of susceptibility to revising the belief in memories.

In the present study, given the paucity of data on NBMs in middle-aged and older adults, it was decided to collect and analyze NBMs in participants aged between 40 and 79. The main objective was to evaluate whether NBMs reported by middle-aged and older people were most frequently dated to childhood or to a period later in life.

Memories can be retrieved from either the 1st person perspective (field perspective), in which individuals see the event through their own eyes, or from the 3rd person perspective (observer perspective), in which individuals see themselves and the event from the perspective of an external observer ([Nigro & Neisser, 1983](#); [Robinson & Swanson, 1993](#)). Studies have reported that true autobiographical memories are most often retrieved from the field perspective than are false memories (e.g., [Heaps & Nash, 2001](#)). Since some NBMs may be false memories refuted because of external evidence or the impossibility of the remembered events, we might expect that BMs would be more likely to be retrieved from the 1st person perspective than would NBMs. On the other hand, it has recently been shown that visual perspective is the most reliable (i.e., the most consistent across different memories) memory characteristic among a set of characteristics usually included in memory-characteristics questionnaires ([Siedlecki, 2015](#)). Might it be possible that visual perspective is so stable across memories that it would not differentiate NBMs from believed memories? This is another question addressed in the present study.

2. Method

2.1. Participants and recruitment

Two hundred and seven (128 females and 79 males) people were screened using the following yes/no question: “Do you have a memory that you no longer believe? I mean an event that you can remember and that for a time you believed happened but, for some reason, you no longer believe that you really experienced it.” The *broken arm* example ([Mazzoni et al., 2010, p. 1334](#)) was given to illustrate the question. The authors screened people from among their acquaintances (e.g., colleagues, family members, neighbors, or friends), at the local Third Age University and in leisure clubs. Forty-five participants (31 women and 14 men, age range 40–76 years, $M = 56.6$, $SD = 11.3$) responded positively to the screening question. The average educational level measured by the number of years of study completed to achieve their highest level was 16.0 years ($SD = 3.1$).

The study was approved by the Ethics Committee of the Faculty of Psychology, Speech and Language Therapy, and Education of the University of Liège. All participants gave their informed consent prior to participation. The study was conducted in French with native French speaking participants (except for one perfect Dutch–French bilingual, who was a native Dutch speaker).

2.2. Procedure and materials

Participants filled out a questionnaire under the supervision of the experimenter. The first part of the questionnaire focused on the nonbelieved memory and the second part on a believed memory for an event that dated back approximately to the same age as the nonbelieved memory. Participants provided a description of the event (this description was recorded), indicated their age at the time each event occurred and rated the phenomenal characteristics of the event using a memory-characteristics questionnaire. For the nonbelieved memory, they also indicated the age at which they stopped believing that the event really occurred, and explained the reason(s) why they had stopped believing that memory.

The memory-characteristics questionnaire used in the present study was directly inspired by those used in the [Mazzoni et al. \(2010\)](#) and the [Scoboria, Memon, et al. \(2015\)](#) studies. The questionnaire included 20 items for nonbelieved memories and 19 for believed memories. On a 7-point scale (A 1–7 scale was used for all the items except for items 14 and 19, where a –3 to a +3 scale was used), participants indicated (1) the strength of their current belief that the event really occurred, (2) the clarity of their current representation/recollection of the event, (3) the plausibility of the event. For nonbelieved memories

only, participants also rated whether they were disappointed or relieved when they realized that the event had not occurred (Item 4). They also rated the perceptual (vision/sound/smell & taste; Items 5–7) qualities of their current representation of the event, the spatial (location/spatial arrangement of objects/spatial arrangement of people; Items 8–10) and temporal (time of day; Item 11) characteristics associated with the event. The questionnaire also assessed the way in which the event was represented (mental image vs verbal representation; Item 12), the coherence of the representation (Item 13), the valence and intensity of emotions experienced at the time of the event and the re-experiencing of these feelings at the time of the test (Items 14–16), the ability to relive the event (Item 17), and the ability to mentally travel back in time to the event (Item 18) and the perspective from which the event was retrieved: the field or the observer perspective (Item 19). It was explained to the participants that when adopting a field perspective, one remembers the event from the point of the view that was experienced in the original situation (i.e., through one's own eyes; extreme rating = -3), i.e., as a first-person memory in which one does not see oneself. By contrast, when adopting an observer perspective, one remembers the event as an external onlooker would see it, i.e., as a third-person memory in which one sees oneself from the outside as well as the other aspects of the scene (extreme rating = +3). Finally, the subjective importance of the event to the participant was assessed (Item 20).

3. Results

3.1. Frequency and general characteristics of nonbelieved memories

Forty-five out of the 207 screened persons, i.e., 21.7%, reported a nonbelieved memory. This proportion was similar to that reported in previous studies (21% and 25% in [Mazzoni et al., 2010](#); 18% in [Scoboria, Memon, et al., 2015](#)).

The mean age of participants at the time the event associated with the reported nonbelieved memory occurred was 14.98 [95% CI 10.20, 19.76], $SD = 15.91$, and the median age was 8 years. The distribution of age departed from normality, Shapiro–Wilk test ($df = 45$) = .74, $p < .001$, see [Fig. 1](#). Events dated to age 3 or younger represented 11.1% of the cases (5 out of 45 NBMs). Events dated to between age 4 and age 12 (childhood period) represented 57.8% of cases (26 NBMs). Events dated to between age 13 and age 20 (adolescence) represented 6.7% of cases (3 NBMs) and, finally, in 24.4% of cases (11 NBMs) events were dated to age 21 onward (from 22 to 69). Interestingly, in only 6.7% (3 cases) of NBMs, was the participant's age above 50 years at the time the event occurred. No statistical relationship was found between the participants' age at the time of the event and their current age, $r = -0.01$ [-0.31, 0.28], $p = .93$.

The average age for withdrawing belief was 31.53 years [25.67, 37.40], $SD = 19.51$, and the median was 30 years. No significant correlation was found between current age and age at withdrawal, $r = 0.17$ [-0.13, 0.44], $p = .27$. On average, participants were neither disappointed nor relieved when they realized that the event had not occurred, mean rating = 3.82 [3.40, 4.25], $SD = 1.42$, median = 4.

The mean age of participants at the time of the occurrence of the event associated with the reported believed memory was 15.31 [10.64, 19.98], $SD = 15.54$, and the median was 8 years. Although the difference was numerically small, the temporal distance was significantly shorter for believed memories than for nonbelieved memories, $t(44) = 2.45$, $p = .02$, (M_{diff} BM vs NBM = 0.33 [0.06, 0.61]; Cohen's $d = .37$).

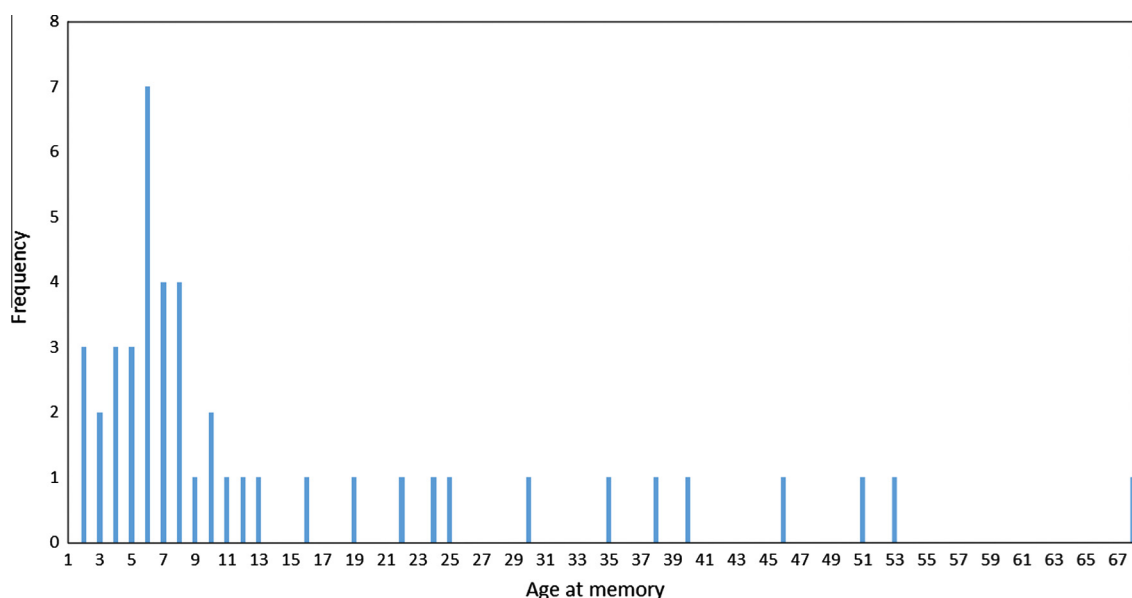


Fig. 1. Frequency distribution of age at the time the nonbelieved event occurred.

3.2. Reasons for no longer believing memories

Following previous studies (Mazzoni et al., 2010; Scoboria, Boucher, et al., 2015), the reasons given by the participants for withdrawing belief in a memory were classified into 7 major categories. The two authors coded independently participants' responses, and a Cohen's kappa was calculated for estimating the inter-coder agreement. The kappa value was .79 [.66,.91], indicating a very good agreement. The most frequently mentioned reason for no longer believing a memory was *social feedback* (46.7%), i.e., someone telling the participant that the memory was incorrect because the event never happened or happened differently. Two other frequent categories were the existence of *external contradictory evidence* (26.7%) and *event implausibility or impossibility* (24.4%). Less frequent reasons (each representing 4.4% of cases) involved *general beliefs regarding memory and memory ability*, *internal features of event representations* and *alternative attributions*. One further possible reason for the belief in a memory being withdrawn was that the event was judged to be inconsistent with *views of self or others* (11.1%).

3.3. Phenomenal characteristics associated with NBMs

Memory-characteristics ratings by event type are presented in Table 1. For the majority of the items, the pattern of results matched that reported in previous studies. Believed and nonbelieved memories received high ratings, but the ratings for believed memories were slightly, albeit significantly, higher, for the following characteristics: clarity of the representation of the event (M_{diff} BM vs NBM = .47 [.08,.85]; Cohen's $d = .37$), clarity of visual details (M_{diff} BM vs NBM = .56 [.16,.95]; $d = .43$), clarity of details regarding the time of day (M_{diff} BM vs NBM = .91 [.03,1.80]; $d = .31$), coherence of the representation (M_{diff} BM vs NBM = .82 [.21,1.44]; $d = .41$) and mental time travel (M_{diff} BM vs NBM = .64 [.06,1.23]; $d = .33$). In addition, ratings tended to be higher for BMs than for NBMs with respect to clarity of spatial arrangement of objects (M_{diff} BM vs NBM = .69 [−.02, 1.40]; $d = .30$).

Believed memories received significantly higher ratings than NBMs, with a medium or large effect size ($d > \text{or} = .50$) for the following characteristics: autobiographical belief (M_{diff} BM vs NBM = 5.09 [4.67, 5.51]; Cohen's $d = 3.69$), plausibility of the event (M_{diff} BM vs NBM = 2.07 [1.33,2.81]; $d = .85$), clarity of sound details (M_{diff} BM vs NBM = 1.67 [.94,2.39]; $d = .70$), and clarity of spatial arrangement of people (M_{diff} BM vs NBM = 1.18 [.58,1.78]; $d = .59$).

Some characteristics were rated relatively highly (>4 on average) for both BMs and NBMs and did not significantly differentiate BMs from NBMs: location details (M_{diff} BM vs NBM = .24 [−.24,.72]; $d = .16$), re-experiencing emotions (M_{diff} BM vs NBM = .24 [−.63,1.12]; $d = .08$), intensity of emotions experienced at the time of the event (M_{diff} BM vs NBM = .33 [−.41, 1.08]; $d = .14$), reliving the event (M_{diff} BM vs NBM = .44 [−.25, 1.14]; $d = .20$) and subjective importance of the event (M_{diff} BM vs NBM = .11 [−.68, .90]; $d = .04$). Ratings of clarity of smell and taste were low for both and were not significantly different for BMs or NBMs (M_{diff} BM vs NBM = .20 [−.24,.64]; $d = .14$).

The mean valence of emotions experienced at the time of the event did not differ for BM or NBM valence (M_{diff} BM vs NBM = −.56 [−1.53,0.42]; $d = .17$). Ratings of the representational format (mental image vs verbal representation) could not be used due to a misunderstanding of this item by several participants.

With respect to visual perspective, the first person perspective was more likely to be adopted when participants remembered BMs than when they remembered NBMs (M_{diff} BM vs NBM = −.98 [−1.90,−.06]; $d = .32$). The visual perspective adopted for BMs and the visual perspective adopted for NBMs did not correlate, $r = -.05$, [−.25,.34], $p = .75$.

Finally, the relationship between autobiographical belief and clarity of the mental representation was quite different in BMs and NBMs. Indeed, BM ratings were very high for both characteristics (see Table 1), albeit significantly higher for autobiographical belief, $t(44) = 3.95$, $p < .001$ (M_{diff} Autobiographical belief vs Clarity of representation = .44 [.21,.67]; $d = .60$). Conversely, NBM ratings were substantially higher for clarity of representation than for autobiographical belief, $t(44) = -14.67$, $p < .0001$ (M_{diff} Autobiographical belief vs Clarity of representation = −4.18 [−4.75,−3.60]; $d = 2.21$).

Following Scoboria, Memon, et al. (2015), it was evaluated whether the current age of participants correlated with any of the ratings for the BMs and NBMs. Of the 37 (18 for BMs and 19 for NBMs) calculated correlations, only a single one reached statistical significance: age negatively correlated with the rated intensity of emotions experienced at the time the event occurred for NBMs, $r = -.31$, [−.55, −.02], $p = .04$. Therefore, current age was not related to ratings of memory characteristics either for BMs or for NBMs.

4. Discussion and conclusion

The results of the present study indicate that the majority of middle-aged and older participants dated their NBMs to childhood, with a median age of 8 years. The frequency distribution of participants' ages at the time the event associated with the NBM occurred was very similar to that previously reported with younger participants (Mazzoni et al., 2010; Scoboria, Memon, et al., 2015). In addition, no correlation at all ($r = -0.01$) was found between age at the time of the event related to the NBM and current age (see also Scoboria, Memon, et al., 2015). Therefore, NBMs seem to be, for the vast majority, genuinely related to childhood memories, whatever the participant's current age. In a recent study of NBMs, Scoboria, Memon, et al. (2015) observed a small number of NBMs related to events dated to 50 years or older and suggested that there could be a second period of susceptibility to revising belief in memories later in life. In the present study, of the 30 (out of 45)

Table 1

Average ratings for items assessed with the memory characteristics questionnaire for believed (BMs) and nonbelieved (NBMs) memories. Item 4 was measured only for NBMs (see page 3 in main text). For Item 12 ratings could not be used due to a misunderstanding of instructions by some participants.

Items	NBMs	BMs	<i>t</i> (44)	<i>p</i>
1. Autobiographical belief	1.82 (1.28)	6.91 (0.36)	24.47	<.0001
2. Clarity of representation	6.00 (1.04)	6.47 (0.76)	2.46	=.018
3. Event plausibility	4.80 (2.41)	6.87 (0.40)	5.63	<.0001
5. Visual details	5.82 (1.25)	6.38 (0.96)	2.82	=.007
6. Auditory details	2.71 (2.06)	4.38 (2.22)	4.62	<.0001
7. Smell and taste details	1.56 (1.29)	1.76 (1.64)	0.92	=.362
8. Event location	6.36 (0.94)	6.60 (0.94)	1.03	=.310
9. Arrangement of objects	5.00 (1.83)	5.69 (1.47)	1.96	=.057
10. Arrangement of people	4.67 (1.94)	5.84 (1.31)	3.94	<.001
11. Time of day	4.24 (2.48)	5.16 (2.48)	2.08	=.044
13. Representation coherence	5.13 (2.00)	5.96 (1.68)	2.69	=.001
14. Emotion valence	0.44 (2.55)	−0.11 (2.64)	1.15	=.255
15. Emotion intensity	5.20 (1.94)	5.53 (1.67)	0.90	=.373
16. Re-experiencing emotion	4.96 (1.97)	4.71 (2.31)	0.56	=.576
17. Reliving the event	4.67 (1.97)	5.11 (1.91)	1.30	=.202
18. Mental time travel	4.98 (2.16)	5.62 (1.67)	2.22	=.031
19. Perspective	−0.91 (2.42)	−1.89 (1.99)	−2.15	=.037
20. Subjective importance	4.07 (2.17)	4.18 (2.10)	0.28	=.779

participants aged 50 years and over, 3 (10%) reported an NBM related to an event dated to 50 years or older. These data are insufficient to evaluate [Scoboria, Memon, et al.'s \(2015\)](#) suggestion.

Furthermore, the present study also replicated several findings of previous studies, although a different data collection procedure was used: previous studies collected data through the Internet, while we used a face to face interview/questionnaire procedure. First, the present study replicated, in the main, the [Mazzoni et al. \(2010\)](#) and the [Scoboria, Memon, et al. \(2015\)](#) studies with respect to the differences and similarities between the phenomenal characteristics of BMs and NBMs. Secondly, our results confirmed that NBMs were rated much lower for autobiographical belief than for clarity of representation, whereas BMs were rated high for both characteristics, with a slight dominance for autobiographical belief over clarity of representation. Thirdly, the categories of reasons given for relinquishing memories were the same in the present study as in previous studies ([Mazzoni et al., 2010](#); [Scoboria, Boucher, et al., 2015](#); [Scoboria, Memon, et al., 2015](#)), although no instance of the “personal motivation” category was recorded here. The replication of major findings of previous research on NBMs should not be overlooked, given the important issue of reproducibility of findings in experimental psychology ([Lindsay, 2015](#); [Open Science Collaboration, 2015](#)).

The average age at withdrawal of belief in the memory is very variable across studies: 31.5 years in the present study, 23.3 years in the [Scoboria, Memon, et al. \(2015\)](#) study and 14.6 years in the [Mazzoni et al. \(2010\)](#) study. According to the results of these three studies, the higher the participants' mean age (56.6 years in the present study, 44.8 years in the [Scoboria, Memon, et al. \(2015\)](#) study and 21 years in the [Mazzoni et al. \(2010\)](#) study), the higher the average age of withdrawal. This presumably reflects the fact that the older a participant, the greater the chance of withdrawing belief at a later age.

Finally, this study assessed the perspective from which BMs and NBMs are retrieved. As predicted, BMs were more likely to be retrieved from a 1st person perspective than were NBMs. Therefore, memory perspective may be added to the list of phenomenal characteristics that differentiate believed from nonbelieved memories. Previous research showed that recent autobiographical memories tend to be recalled from the field perspective, whereas older memories tend to be recalled from an observer perspective (for a review see [Sutin & Robins, 2008](#)). This recency factor is not, however, likely to explain the difference observed here between BMs and NBMs. Indeed, the average age associated with reported BMs was 15.31 years and the average age associated with NBMs was 14.98 years. Although the difference between these two ages was statistically different, it is numerically tenuous: a difference of one third of a year could hardly explain why BMs were more preferentially retrieved from a 1st perspective than were NBMs¹. The fact that many (but not all, see [Mazzoni et al., 2010](#)) NBMs are presumably relinquished false memories would seem to be a better explanation. In addition, the results suggest that visual perspective is not a property that remains stable across different memories when BMs and NBMs are compared. Prior research also showed that emotional memories were more likely to be retrieved from a first person perspective whereas neutral memories were more likely to be retrieved from a third person perspective ([D'Argembeau, Comblain, & Van Der Linden, 2003](#)) and that the intensity of emotions experienced while remembering events was an important predictor of visual perspective ([Talarico, LaBar, & Rubin, 2004](#)). However, these emotional factors are not likely to explain the difference between BMs and NBMs that we observed with respect to the perspective of retrieval. Indeed, the intensity of emotions at the time of the event and the re-experiencing of these feelings at the time of test were rated very similarly for BMs and NBMs.

¹ Note that the difference between the rated perspective for NBMs and BMs and the difference between the ages at which NBMs and BMs were dated did not correlate, $r = -.23$, $[-.49, .07]$, $p = .13$.

In conclusion, NBMs seem to be typically (although not exclusively) related to childhood events, whatever the participant's age at the time of recall.

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