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Non-Believed Memories

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Abstract

This is the first empirical study of vivid autobiographical memories for events people no longer believe happened to them. Until now, this phenomenon has been the object of relatively rare albeit intriguing anecdotes, such as Jean Piaget's description of his vivid memory of an attempted abduction that never happened. The results of our study show that non-believed memories are much more frequent than expected. Approximately 20% of our initial sample reported having at least one non-believed autobiographical memory.

Participants' ratings indicate that non-believed memories share most recollective qualities of believed memories, but are characterized by more negative emotional events. The results have important implications for the way autobiographical memory is conceptualized and for the false memory debate.

Imagine that you are trading stories about your shared childhood with a close sibling. You describe a memory about the time that you fell out of a tree and broke your arm. Your memory is vivid - you feel the bark on the tree, hear the leaves blowing in the breeze, experience the fear as you plummet to the ground. It is one of your most clear childhood memories. But your brother looks at you oddly, pauses, and then tells you that it was he and not you who fell and broke his arm. After arguing, you turn to your mother as arbiter. She decrees that this happened to your brother. For the sake of our narrative, we will even have her dig up a hospital bill featuring your sibling's name and yellowed photos (or perhaps a digital slide-show) of him with arm in sling. In the face of overwhelming evidence, you are forced to conclude that your memory is erroneous. Despite your newfound knowledge, you remain able to "remember" the scene, which continues to feel very much like a true memory. This is a memory for an event you no longer believe has occurred to you.

Until now the existence of this type of memory has been little more than the object of rare albeit intriguing anecdotal reports, such as the widely cited example from the prominent developmental theorist Jean Piaget. For much of his life, Piaget had a detailed memory of a man attempting to kidnap him at the age of two whilst he was out with his nurse (Piaget, 1951). He described vividly visualizing, for example, the scratches on his nurse's face caused by the attacker. Thirteen years later Piaget's former nurse confessed that she had fabricated the story. Based upon this evidence, Piaget stopped believing that he was nearly kidnapped as a child. However, he was unable to stop remembering the event.

These events are assumed to be rare, but Piaget's anecdote is not the only one. The potential greater frequency of spontaneous memories for events that did not occur is highlighted by a number of anecdotal experiences reported by several different individuals to one of the authors (GM) while collecting data for various studies between 2004 and 2008.

Among them, one person mentioned a vivid memory of Santa Claus climbing down the fireplace. Although she stopped believing the memory many years before, as an adult her memory remained very vivid. Another person reported a childhood memory of a car accident, but as an adult discovered that it had instead happened to his brother. In this case too, the memory persisted after many years, despite no longer being believed.

In a study investigating the relative strength of autobiographical memories and beliefs in general, Scoboria, Mazzoni, Kirsch & Ryelya (2004) found that in a small percentage of cases (4%) memory ratings exceeded belief ratings, suggesting that these events were remembered more strongly than they were believed. Consistent with the assumption that non-believed memories are rare, these differences were typically small and may have reflected random error. Nevertheless, those data, along with the anecdotal evidence reported by Piaget and by others, suggested that an examination of non-believed memories might be worthwhile. This paper is devoted to examining the frequency and characteristics of non-believed memories. While the existence of such mental experiences has been known for some time, no empirical attention has been paid to the phenomenon which has important theoretical and applied implications.

Theoretically, the existence of non-believed memories would support the claim that autobiographical beliefs and memories are partially independent (see also Mazzoni & Kirsch, 2002; Scoboria et al, 2004) and that belief and recollection are fundamentally attributions, or ‘meta-cognitive judgements based on the activity of other systems’ (Rubin , 2006, p. 278). It would also be in line with the distinction between two routes for reality monitoring in memory (Johnson & Raye, 1981). From an applied perspective, the empirical study of non-believed memories addresses the important issue of the consequences of successful false autobiographical memory implantation. Studies in which imaginative and other procedures are used to implant false autobiographical memories report success rates of about 25% (e.g.

Hyman & Pentland, 1996; Mazzoni, Seitz, Loftus & Lynn, 1999). They also report that participants come to believe in their newly acquired false memories. Presumably when participants are told that the false event did not occur, their belief in its occurrence is undermined. But does the mental image subsequently disappear? Or might it retain a memory-like quality which is no longer infused with belief, similar to Piaget's anecdote?

In this initial attempt to explore the phenomenon, we first examined the frequency with which non-believed memories occurred. Next we investigated the factors that had led participants to stop believing that the events had occurred. Our third goal was to describe the characteristics of *non-believed memories* and to compare them with the characteristics of memories for autobiographical events that are believed to have occurred (*believed memories*). Contrasts between these types of events reveal which characteristics are associated with recollection, with or without belief. We also compared both of these types of events with an event people believed had occurred to them but for which they had no memory, a *believed not remembered event*. We were not interested in the accuracy of these mental representations and thus accepted for the study all memories that participants stated they did not or did believe.

For non-believed memories, we also asked the age at which individuals stopped believing and why the events were not believed to have occurred, despite the presence of a memory. To explore the characteristics of events, we collected phenomenological ratings using items frequently used to assess autobiographical recall (Johnson, Foley, Suengas & Raye, 1988; Rubin, Schrauf, & Greenberg, 2003; D'Argembeau & Van der Linden, 2006) and compared average ratings between the three types of event.

Method

Initial screening and participants.

At the University of Hull, 207 first-year psychology students (92% of all first-year psychology students) underwent an initial screening session for various unrelated studies, which included a yes/no question asking whether they had a non-believed memory, preceded by an example to help them identify a non-believed memory. Forty-three participants indicated having a non-believed memory and forty were successfully recruited for the study. At the University of Windsor, all 1386 undergraduate students who enrolled in the psychology department participant pool during a single term responded to the same non-believed-memory screening question, which was embedded in a list of about 50 on-line screening questions pertaining to other unrelated studies. Of these participants, 349 indicated having a non-believed memory. During the remainder of the term and the following term, participants could access the departmental website and choose from a large number of available studies. Among them was the memory questionnaire, which only participants who had answered yes in the initial screening could access. Of the 349 who responded yes to the screening question, 58 completed the study. Thus, the final sample consisted of 98 students (76 women), aged 17-50 ($M = 21.96$, $SD = 5.40$).

Procedure

The Ethics Committee at the University of Hull and the University of Windsor Research Ethics Board approved the study. The final group of 98 participants completed an online memory characteristics inventory for three categories of autobiographical events, (1) a *non-believed memory*, (2) a *believed memory*, and (3) a *believed-but-not-remembered* event, in that order. For the second and third types, participants were asked to report an event that approximately dated back to the age of the non-believed but remembered event.

For each event, participants indicated their age at the time it occurred, provided a description of it, and rated its phenomenal characteristics using the memory characteristics

inventory. For non-believed memories, they also indicated the age at which they stopped believing the event and described why they stopped believing it.

Memory Characteristics Inventory

Participants rated 26 phenomenological characteristics of the events on 1-7 point scales drawn from the literature (Johnson, Foley, Suengas & Raye, 1988; D'Argembeau & Van der Linden, 2006; Rubin, Schrauf, & Greenberg, 2003). The inventory contained items referring to the recollective quality of the mental experience, perceptual qualities (vision, taste, sound, touch and smell), spatial characteristics (location, spatial arrangement of people and objects), valence and intensity of emotions triggered by the memory representation or experienced at the time of the event, completeness and integrity of the mental representation of the event, the subjective importance of events, prior conversations about them. The complete set of characteristics is reported in the online material. Clarity and sharpness of details were combined into a single *vividness* variable (D'Argembeau & Van der Linden, 2006), as were smell and taste, and two questions about the valence of feelings, leading to 23 characteristics.

Results

The Maximum Likelihood Estimation method was used to impute a small number (< 1%) of randomly distributed missing values using SPSS 17.0 statistical software. All variables were reasonably normally distributed. Each event type had a total of 2548 observations (98 participants by 26 characteristics; 2254 after reducing the characteristics to 23).

Frequency of non-believed memories

In the two samples included in this study non-believed memories were rather frequent, and definitely more frequent than what we expected on the basis of previous theory and studies (e.g. Scoboria et al, 2004). In the UK sample, 21% the 207 students who were

screened reported a non-believed memory. In the initial Canadian screening, 25% of the 1386 screened students indicated a non-believed memory.

General characteristics of non-believed memories

Because of the difference in recruitment strategy adopted at the two sites, site was entered as a factor in all subsequent analyses. As none of the analyses indicated an interaction involving site, all descriptive statistics presented below refer to the two sites collapsed. Besides analyzing data from the combined sample, we also conducted separate analyses on each sample. As all analyses produced the same pattern of results, only the results of the combined analyses are presented.

The mean age of participants at the time that non-believed memories occurred was 7.19 ($SD = 3.41$; range 1 - 21) (see *Figure 1*). The mean age at which they stopped believing in it was 14.56 ($SD = 4.07$, range 6- 30). Hence the non-believed memories primarily originated in middle childhood, and belief came into question during adolescence. The average age of believed memories was 7.83 ($SD = 4.13$), and of believed but not remembered events was 6.46 ($SD = 4.01$). The difference in age for the three types of events was not statistically significant, $F(2,276) = 2.75, p > .07$.

Why memories are no-longer believed

The reasons given by participants for no longer believing their memories were sorted into three categories. The first and largest category (56%) was being told by someone else that the memory was incorrect. This category was further divided into two sub-categories. The first included events that allegedly happened to someone else (4%); for example being told by a parent that a sibling experienced the event. The second sub-group comprised instances in which someone (e.g. parent, sibling, friend) indicated that the event never happened (52%). The second category centred on implausibility (36%), and some memories ($N=9$) were implausible to the point of being impossible. For example, one participant

remembered seeing the real Santa Claus, another recalled seeing a living dinosaur, two remembered flying unaided, two recalled seeing a monster, one remembered being a hockey player even though she had never played hockey. Several referred to bizarre parental behaviours. The third category involved contradictory evidence (7%). For example, one participant could not find any reference to a film she remembered seeing, but that no one else remembered seeing. In addition to providing a main reason for stopping believing, 35% of the participants specifically mentioned doubting whether the content was instead a dream. For one participant this was the only explanation provided.

Characteristics of the mental experience

We next examined differences in characteristics of the mental experience as a function of event type. Statistical details of this and of the following analyses are available in the online material. Because we sought to contrast three types of event, not-believed in and remembered, believed and remembered, and believed but not remembered, using a large number of items in a relatively small sample, we took steps to account for alpha inflation. We conducted a Multivariate Analyses of Variance, with the 23 items as dependent variables and event type and site as between subjects factors (we note that a within-subjects MANOVA produced a similar pattern of results for many items; however due to violations of statistical assumptions we adopted the more conservative between-subjects approach. This was deemed reasonable due to our primary interest in contrasting event types). The multivariate test was statistically significant, $F(46, 522) = 12.53, p < .01$, as were all associated univariate F-tests (all $p < .01$); hence contrasts between the three event types for all variables were appropriate. Neither the main effect for site nor the interaction approached significance, both F^2 's < 1.5 . We used Bonferroni corrections for all post-hoc contrasts discussed below.

The results of the comparisons are categorized in three groups, which are depicted in Figure 2. The first group (*Figure 2a*) included characteristics for which non-believed and

believed-memories did not differ, but for which both exceeded ratings for believed-not-remembered events. This was the largest group of characteristics. These items refer to elements that characterize a memory and thus index recollection. Regardless of belief, remembered events showed higher ratings of reliving, mental time travel, vividness of details, perceptual visual and tactile characteristics, intensity of feeling, richness of emotional content, and clarity of the location and spatial arrangements of elements in the event, including people and objects. In addition, these mental representations of remembered events (believed and not believed) were rated as being organized like single, unitary episodes with narrative coherence, rather than being made of isolated elements. Finally, both believed and not believed (but remembered) events had been the object of previous conversations, more so than non-remembered events.

All these characteristics appear to provide a memory-like quality to mental experiences, irrespective of whether these mental representations are believed in (i.e. are considered true) or not (i.e. they are considered false). Because ratings of non-believed memories remain endorsed at levels that are both high on the scale and equivalent to believed memories, these dimensions appear to be core in providing a sense of recollection and also seem to be disconnected from, or contribute less, to believing an event to be true.

The second group of characteristics (*Figure 2b*) includes those for which believed memories differed from both non-believed memories and believed-but-not-remembered events, with the latter groups not differing. Believed memories were rated as having greater personal significance, greater connectedness to other life events, and were rated as longer in temporal duration. They were characterized by more intense positive emotions and also by greater perceptual auditory and smell/taste characteristics.

The third group (*Figure 2c*) included items for which ratings of believed memories were significantly higher than ratings for non-believed-memories, which in turn were

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significantly higher than believed but not-remembered events. The four characteristics in this group discriminate between believing and not believing in a memory. They also discriminate between not believing but remembering and believing but not remembering. Experiencing feelings, the sense of the time at which the event occurred, the vividness of details associated with the event, and the degree of complexity of the event appear to reflect aspects of the mental experience that are partially linked with belief, but not to such a degree that they are eliminated when a memory is no longer believed.

One characteristic did not fit any of the three patterns. Strength of negative emotions was higher for non-believed memories ($M = 3.82$, $SD = 1.92$) than for believed memories ($M = 2.75$, $SD = 1.97$) and believed not-remembered events ($M = 2.63$, $SD = 1.73$).

Exploratory Analyses

Although most non-believed events were recollected as having occurred during childhood, there were a few that were remembered to have happened in late adolescence and young adulthood. To see if these might have affected the results, we redid the analysis of memory characteristics excluding four participants whose age for their non-believed memories was more than two standard deviations above the mean. Excluding these participants did not affect the pattern of results.

We also wondered whether memory characteristics might vary in relation to the reason that participants gave for no longer believing the event occurred. To examine this, we conducted an additional MANOVA, with the 23 items as dependent variables and reason for disbelieving (told it had not happened, implausibility, and contradictory evidence) and site as independent variables. This analysis failed to reveal any significant effect (all F 's < 1.5).

Discussion

The aim of this study was to examine the frequency and characteristics of memories for events which people no longer believe had occurred to them. Until now non-believed

memories have been reported only in anecdotal form and never studied, probably because of its presumed scarcity. Of more than 1500 students in an initial screening, approximately 20% reported at least one non-believed memory, mostly referring to childhood events recalled as happening, but then correctly or incorrectly rejected during adolescence.

Of the three main reasons for rejecting the memory, the least common was lack of external evidence, followed by implausibility of the event. The most common was being told by others that the event had not happened, or that it happened to someone else. This latter reason bears some similarity to so called ‘disputed memories’, situations in which two people (e.g., twins) each claim that the event happened to him or her, rather than to the other (Sheen, Kemp & Rubin, 2001).

In most respects non-believed memories were very similar to memories of events in which people still believe. Defining characteristics of autobiographical recollection (Rubin et al, 2003) appeared in the mental experience of non-believed events. Believed and non-believed memories shared a sense of being able to travel back in time and relive the experience, the ability to re-experience the same intense emotions, the presence of clear visual and other perceptual details, and a clear idea of where objects and people were in the original event. In both believed and non-believed events the memory was experienced as a single, unitary and coherent episode. These data speak to the continued power and compelling nature of these mental representations, despite their lack of credibility.

The strong sense of recollection conveyed by non-believed memories is clearly independent and dissociated from the belief in the accuracy of the memory. In other words, there is no need to believe in the occurrence of an event, to still ‘feel’ the memory as a compelling experience. This similarity between believed and non-believed memories strongly supports the idea that autobiographical memory and autobiographical belief are partially independent processes (Mazzoni & Kirsch, 2002). We propose that autobiographical beliefs

consist in the attribution of a truth value to the mental representation of an event (see also Damasio, 2000). This truth value depends on several factors. In some cases it depends on the existence and quality of the memory; in other cases it depends on other types of available information supporting the occurrence of an event (see also Johnson et al 1988; Mazzoni & Kirsch, 2002; Schacter & Scarry, 2000). From this perspective, non-believed memories might be vivid mental representations of events that formerly held a high truth value. The truth value, for one reason or another, has been undermined, but this has not affected or fully eliminated the memory-like qualities of the mental representation itself.

Independence between beliefs and memories in autobiographical memory is also consistent with the view that calling a mental event a ‘memory’ is the result of attributional processes (e.g., Johnson et al, 1988; Whittlesea, 2004). It is also in accord with the basic-systems model of episodic memory (Rubin, 2006), which asserts that belief and recollection are independent meta-cognitive judgments about the contents of the systems that compose autobiographical memory.

Although most characteristics of spontaneous memories for non-believed events were indistinguishable from those of memories for believed events, there are some characteristics that differentiated the two. Non-believed memories refer to less complex events that have less personal significance and are considered less connected to other personal events, presenting also less positive emotions and a more vague sense of the time in which they had occurred. Thus, overall, non-believed memories seem to be less personal or less connected to the self than the memories for events which occurrence has never been doubted.

One characteristic uniquely associated with non-believed memories is the intensity of negative emotions. This rather unexpected result could be attributed to the nature of the remembered event or to negative feelings linked to having to disavow the memory. Although

our data cannot discriminate between the two, this result is in agreement with similar findings on disputed memories in siblings (Sheen et al, 2001), which tend to be for unpleasant events.

Because of the retrospective nature of this study, it is not clear whether differences in characteristics precede or follow the removal of belief in the accuracy of the memory. On one hand, the lack of some memory characteristics might render a belief more easily questioned. Belief in a memory that is lacking in positive emotional intensity might be challenged more easily than that for a memory saturated with positive feelings. Conversely, it is possible that these differences emerge only once the belief is challenged. When the belief is undermined, in the process of questioning the event the quality of the memory may be altered so that it is experienced as being more consistent with the belief. Characteristics can be modified after the change in belief, in an attempt to distance the non-believed event from the autobiographical history of an individual.

Documenting the existence and characteristics of non-believed memories has important implications for the study of spontaneously developed false autobiographical memories (Barclay & Wellman, 1986; Merckelbach, Wessel, & Horselenberg, 1997) and, more generally, for the false memories debate. In principle, there are two possible types of non-believed memories, those which are correctly rejected, which we will term “refuted memories”, and those which are incorrectly rejected, for which the term “disowned memories” seems appropriate. Except for impossible events (e.g., seeing a live dinosaur), we have no way of knowing whether the non-believed events did or did not in fact occur. However, the presence of memories for impossible events demonstrates that lack of plausibility did not prevent the spontaneous creation of false memories during childhood (Pezdek, Finger & Hodge, 1997; Mazzoni, Loftus & Kirsch, 2001; Mazzoni, 2007). Thus, at least some of the non-believed memories are refuted false memories that seem to be mostly

created during childhood and only later recognized to be false. The extent to which non-believed memories are false should be the object of future investigation.

The fact that non-believed memories maintain an intact sense of recollection raises questions about the consequences of the implantation of vivid false memories in therapeutic and experimental settings. What happens to the mental representations of the false events that clients have come to “remember” during therapy and only subsequently recognize to be false? And do experimental participants continue to remember implanted events even after being debriefed at the end of a false memory study? One of the effects of the successful implantation of vivid false memories both in therapy and in the laboratory might be the long-term presence of a vivid memory for an event that is no longer believed in. Future research should address this crucial issue.

A more thorough understanding of the issues raised in this study requires prospective and/or experimental research. While prospective research using naturally occurring non-believed events seems quite difficult, we wonder about the potential for the experimental study of non-believed memories (e.g., via the experimental creation of false memories followed by debriefing). Because false memory research shows that suggesting counterfactual events can result in increases in memory ratings (Garry, Manning, Loftus, & Sherman, 1996; Mazzoni & Memon, 2003), we anticipate that such paradigms could also be adapted to examine changes in memory characteristics when participants are subsequently informed that remembered events are not true.

References

- Barclay, C.R., & Wellman, H.M. (1986). Accuracies and inaccuracies in autobiographical memories. *Journal of Memory and Language*, 25, 93–103.
- Damasio, A.R. (2000). Thinking about Belief: Concluding Remarks. In D.L. Schacter & E. Scarry (Eds.), *Memory, Brain and Belief* (pp. 325-334). Cambridge: Harvard University Press.
- D'Argembeau, A., & Van der Linden, M. (2006). Individual differences in the phenomenology of mental time travel: The effect of vivid visual imagery and emotion regulation strategies. *Consciousness and Cognition*, 15(2), 342-50.
- Garry, M., Manning, C., Loftus, E.F., & Sherman, S.J. (1996). Imagination inflation. *Psychonomic Bulletin and Review*, 3, 208-214.
- Hyman, I.E., & Pentland, J. (1996). The role of mental imagery in the creation of false childhood memories. *Journal of Memory and Language*, 35, 101-117.
- Johnson, M.K., Foley, M.A., Suengas, A.G., & Raye, C.L. (1988). Phenomenal characteristics of memories for perceived and imagined autobiographical events, *Journal of Experimental Psychology: General*, 117, 371–376.
- Johnson, M.K., & Raye, C.L. (1981). Reality monitoring. *Psychological Review*, 88, 67-85.
- Mazzoni, G. (2007). “Did you witness demonic possession?” A Response Time Analysis of the Relationship between Event Plausibility and Autobiographical Beliefs. *Psychonomic Bulletin & Review*, 14 (2), 277-281.
- Mazzoni, G.A.L., & Kirsch, I. (2002). Autobiographical memories and beliefs: A preliminary metacognitive model. In Perfect, T. J. & Schwartz, B.L. (Eds). *Applied Metacognition*, (pp. 121-145). Cambridge University Press, New York.

- Mazzoni, G., Loftus, E.F., & Kirsch, I. (2001). Changing beliefs about implausible autobiographical events: A little plausibility goes a long way. *Journal of Experimental Psychology: Applied*, 7, 51-59.
- Mazzoni, G., Memon, A. (2003). Imagination can create false memories. *Psychological Science*, 14(2), 186-188.
- Mazzoni, G., Seitz, A., Loftus, E.F., Lynn, S.J. (1999). Changing beliefs and memories through dream interpretation. *Applied Cognitive Psychology*, 13, 125-144.
- Merckelbach, H., Wessel, I., & Horselenberg, R. (1997). The accuracy of autobiographical memory: a replication of Barclay & Wellman (1986). *Behavioural and Cognitive Psychotherapy*, 25, 103–111.
- Pezdek, K., Finger, K., & Hodge, D. (1997). Planting false childhood memories: The role of event plausibility. *Psychological Science*, 8, 437-441.
- Piaget, J. (1951). *Play, dreams, and imitation in childhood*. Trans. by L. Gattegno and F. M. Hodson. New York: Norton.
- Pillemer, D. B. (1998). *Momentous events, vivid memories: How unforgettable moments help us understand the meaning of our lives*. Cambridge, MA: Harvard University Press.
- Rubin, D. C. (2006). The Basic-Systems Model of Episodic Memory. *Perspectives on Psychological Science*, 1, 277-311.
- Rubin, D. C., & Berntsen, D. (2003). Life scripts help to maintain autobiographical memories of highly positive, but not highly negative events. *Memory & Cognition*, 31, 1-14.
- Rubin, D.C., Schrauf, R.W., & Greenberg D.L. (2003). Belief and recollection of autobiographical memories. *Memory & Cognition*, 31, 887-901.
- Schacter, D.L. & Scarry, E. (Eds.), *Memory, Brain and Belief* (pp. 325-334). Cambridge: Harvard University Press.

Scoboria, A., Mazzoni, G., Kirsch, I. & Relya, M. (2004). Plausibility and belief in autobiographical memory. *Applied Cognitive Psychology, 18*, 791-807.

Sheen, M., Kemp, S., Rubin, D. (2001). Twins dispute memory ownership: A new false memory phenomenon, *Memory & Cognition, 29* (6), 779-788.

Whittlesea, B.W.A. (2004). The Perception of Integrality: Remembering Through the Validation of Expectation. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 30*, 891-908.

Figure captions:

Figure 1. Frequency distribution of the age at which participants report the occurrence of the event mentioned in the non-believed memory.

Figure 2a. Average memory characteristic ratings by event type for items for which ratings for non-believed and believed memories exceeded ratings for believed, not-remembered events. Bars show standard errors.

Figure 2b. Average memory characteristic ratings by event type for items for which ratings for non-believed memories and believed not-remembered events were equivalent, and both were rated lower than believed remembered events. Bars show standard errors.

Figure 2c. Average memory characteristic ratings by event type for items for which ratings for believed memories exceeded ratings for non-believed memories which in turn exceeded ratings for believed, not-remembered events. Bars show standard errors.