

## Disputed Memories of Twins: How Ordinary Are They?

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### SUMMARY

Two studies reported that twins may dispute ownership of autobiographical experiences. One observation made in both studies was that the events that were disputed by the twins were rather ordinary events. In the present study, we tested the idea that the disputed memories are such ordinary and mundane events. A brief narrative description of disputed and nondisputed events that were provided by participants in the Iker, Tekcan, Gülgöz, and Küntay (2003) study was given to an independent sample of participants who were asked to rate (a) the ordinariness of the event, given the age and sex of the protagonist of the event and (b) the likelihood that the event would have happened to them. Results showed that disputed memories were rated as more mundane than nondisputed personal memories. Moreover, a substantial portion of the disputed memories from the Iker et al. study were for events that our subjects reported to have also experienced. These findings are discussed in the context of cognitive processes contributing to formation of false memories. Copyright © 2004 John Wiley & Sons, Ltd.

In the last decade, errors of autobiographical memory have received considerable attention as a research question, partly because of increased concern for real life cases of apparently recovered memories of traumatic childhood experiences such as sexual abuse. There has been clear empirical demonstrations that people may be led to remember personal experiences that they never experienced (Hyman & Billings, 1998; Hyman, Husband, & Billings, 1995; Loftus & Pickrell, 1995), even when the events in question are mildly traumatic experiences, such as being lost in a shopping mall as a child (Loftus & Pickrell, 1995).

Some researchers emphasize the plausibility of the events as an important factor in the accuracy of autobiographical recollections. Especially, in the context of false memories, Pezdek and her colleagues showed that the plausibility of the events and presence of some background knowledge about the event might be crucial factors in moderating the effects of misinformation. For instance, Pezdek, Finger, and Hodge (1997) showed that high school and college-aged young adults were more likely to be planted with false memories if the events were plausible. In one of the studies, Catholic and Jewish high school students were more likely to form a false memory for the event that was consistent with their own religion (i.e. more plausible). Similarly, young adults were more likely to be planted with

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false memories for an event that purportedly occurred at age five if the event was more plausible (being lost in a shopping mall) than not (receiving a rectal enema). Pezdek and Hodge (1999) also showed that plausibility plays a central role in whether children between five and seven years of age form false memories; the proportion of children who were planted with a false memory was 36% for the plausible event and approximately 3% for the implausible event. Moreover, Barclay and Wellman (1986) showed that college students were more likely to adopt other individuals' autobiographical experiences as their own if the experiences were similar to their own (i.e. events experienced by other individuals who were not part of the study but were students at the same university). Heaps and Nash (2001) attempted to find qualitative aspects of false memories that distinguished them from true memories. Besides being more likely to be viewed from the observer perspective and being communicated with less information, false memories were also higher in typicality ratings. Thus, events that are more typical of previous experiences may influence the probability that a representation of that event be constructed. These findings imply that the nature of the autobiographical experiences (i.e. whether they are plausible, typical, ordinary, mundane, etc.) plays a role in the accuracy or inaccuracy of these recollections.

The purpose of the present study was to investigate the role of the plausibility on false memories in a more naturalistic context. Two research groups recently reported a new false memory phenomenon, in which twins tended to adopt each other's memories. In other words, participants agreed that an event occurred, but they disagreed about who—the participants themselves or their same-sex twins—experienced it. Sheen, Kemp, and Rubin (2001) reported the first empirical demonstration of this memory phenomenon with same-sex twin pairs. More than half the pairs produced at least one disputed memory in response to cue words. They also found that zygosity of the twins did not matter; monozygotic and dizygotic twins produced equal number of disputed memories. Finally, as a result of a cross-experiment comparison, they reported that only 8% of college students with non-twin siblings produced such memories compared to the twins at least 65% of whom produced such memories in their other two experiments. Therefore, Sheen et al. concluded that the twins were more likely than regular siblings to have such memories where there is dispute in respect to who the protagonist was.

Similarly, Ikier, Tekcan, Gülgöz, and Küntay (2003) also found empirical support for such autobiographical memory errors among twins. They found that 60% of the 15 monozygotic twin pairs in their study reported at least one disputed memory. In addition, unlike Sheen et al., they found that zygosity of the twins did matter: 60% of the monozygotic (MZ) twins, 30% of the dizygotic (DZ) twins, and 23% of the non-twin sibling pairs produced such memories. They also reported that these three groups of participants did not differ in terms of the frequency of personal memories they produced (i.e. autobiographical memories that were not disputed).

Although the results of these two studies differed in some respects (e.g. level of imagery associated with disputed and nondisputed memories, age of the memories etc.), one point both groups alluded to was the nature of the events reported as disputed memories. Sheen et al. (2001) commented that disputed memories of twins 'do not appear, in content, to be very different from non-disputed memories.' (p. 785). Ikier et al. (2003) pointed out that disputed events do not seem to be striking in any way but rather ordinary and mundane. However, despite some initial speculations, neither group provided any empirical analysis of the distinctive characteristics of events reported as disputed versus nondisputed memories.

To complement a group of studies conducted in an effort to identify discerning characteristics of false memories, the purpose of the study reported here was to test these anecdotal observations of mundaneness. In the present study, we investigated the extent to which disputed and nondisputed memories produced by twins in our previous study are judged as mundane and having been frequently experienced by an independent set of participants.

## METHOD

### Participants

Eighty-six university students participated in the study in return for course credit. This age group was targeted so that the participants are comparable to those in the Ikier et al. (2003) study. Most of the participants in the Ikier et al. (2003) study were also university students.

### Materials and procedure

Before describing the procedure for the current study, we first provide the relevant details of the Ikier et al. (2003) study. In the Ikier et al. study, participants were asked to provide memories where they and their sibling/twin disagree on which of the two experienced an autobiographical experience (i.e. disputed memories). Each participant was given 5 min to think about whether (s)he experienced such memories and was provided with pencil and paper to take notes if needed. At the end of 5 min, the participant was asked for a brief descriptive statement about each of the events that led to disputed memories. Then, they were asked to go through the same procedure for memories of events where they were sure it was their own personal experience (i.e. nondisputed memories). For both types of memories, most subjects provided extended narratives, which were more informative and elaborated than 'brief descriptive statements'. All these narratives were audio-recorded. These narratives were then used to prepare the materials for the current study. A research assistant blind to the hypotheses of the study prepared the following materials and also administered the studies with the participants.

In preparing the materials for this study, the previously audio-recorded narratives of disputed and personal (i.e. nondisputed) memories provided by the participants in the Ikier et al. (2003) study were all transcribed verbatim. All disputed events and an equal number of personal narratives from each participant were included. In cases where the number of personal events exceeded that of disputed, the inclusion was based on the order of recollection in the Ikier et al. study. In applying this selection criterion, 82 narratives were identified. Forty three of these narratives recounted disputed events and the remainder 39 were about personal events. There were four fewer nondisputed personal narratives because two participants reported more disputed memories than nondisputed memories. All of these narrative texts of unequal length were then reduced to one- to three-clause summaries of the events consisting of the narratives' gists. The summaries of memory descriptions were rendered in past tense and first person forms. Gender and the reported age of the protagonist at the time of the recounted event were also noted.

Table 1 presents some randomly chosen examples of summaries (English translations of Turkish originals) of disputed and personal events reported by four participants.

Table 1. Examples of disputed and personal memories (translations of Turkish originals)

	Disputed	Personal
Participant 1	I went to buy the shoes that I liked six months ago (age of experience: 27–28)	One evening, I ran across someone who looked like a pervert. I was very scared (age of experience: 28–29)
Participant 2	When I was going to my grandmother, my mother did not allow me to wear the dress I wanted, because it was not appropriate for the season. She made me wear something else, so I cried all the way to my grandmother's (age of experience: 4–5)	Although I learned how to ride a bike when I was a child, I later forgot. I learned again in Japan (age of experience: 18–19)
Participant 3	Once as I was having lunch, a piece of potato got stuck in my throat (age of experience: 5–6)	In high school, I saw someone being vaccinated. I passed out (age of experience: 19–20)
Participant 4	When my grandfather passed away, my finger got stuck in the door (age of experience: 6–7)	When I was in grade four or five, I got spanked by the teacher for the first time (age of experience: 10–11)

Two rating scales were prepared using the memory descriptions. The first form, which we call the Mundaneness form, presented a list of the 82 event summaries in a randomized order. Each of the summaries was followed by information about the gender and the age-at-event of the person who reported the event. Participants were asked to rate each of the events on a 5-point Likert scale ranging from 1, 'very mundane', to 5 'very extraordinary'. The following instructions were given on the Mundaneness form:

Below you will see a list of summaries of events experienced by various people. For all these events, you will also see around what age this event was experienced and the sex of the person who experienced this event. Please read each event carefully, trying to visualize it in your mind. Then, try to judge how mundane or extraordinary this event is, taking into account the sex of the person who experienced the event and his/her age at the time of the experience. Circle the number for the appropriate category.

The second form, which we will call the Personal Experience form, presented a list of the same 82 event summaries, in another randomized order than that used in the Mundaneness form. Again, information about the sex and the age of the 'experiencer' preceded each of the summaries. The participant was asked to indicate (a) whether he/she experienced the mentioned event, and (b) how sure he/she is of the response given to (a) on a 5-point Likert scale ranging from 1, 'I am not sure at all', to 5, 'I am very sure'. The following instructions were given on the Personal Experience form:

Below you will see a list of summaries of events experienced by various people. For all these events, you will also see around what age this event was experienced and the sex of the person who experienced this event. Please read each event carefully, trying to visualize it in your mind. Then, indicate whether you experienced such an event yourself or not, *without taking into account the sex of the person who experienced the event and his/her age at the time of the experience*. Once you indicate whether you had such an experience or not, indicate how certain you are of your response by circling the number in the appropriate category.

The participants filled both of the forms in succession in the same session. Forty eight of the participants took the Mundaness form first, followed by the Personal Experience form. Thirty eight of the participants took the Personal Experience form, then the Mundaness form.

## RESULTS

The data were analysed initially by considering ratings for each memory description as independent ratings. Thus, 86 participants rated 43 disputed and 39 personal memories to provide 3354 ratings of personal memories and 3697 (with one person's rating missing) ratings of disputed memories. A *t*-test comparing the means of these ratings indicated disputed memories to be rated as more mundane ( $M = 2.48$ ,  $SD = 1.15$ ) than personal memories ( $M = 2.89$ ,  $SD = 1.17$ ),  $t(7049) = 15.01$ ,  $p < 0.001$ . As a second analysis, the average rating of each participant for disputed ( $M = 2.48$ ,  $SD = 0.43$ ) and nondisputed memories ( $M = 2.89$ ,  $SD = 0.43$ ) were calculated and tested for a difference. A paired *t*-test of mean differences between the ratings of disputed and nondisputed memories indicated disputed memories to be rated as more mundane than personal memories,  $t(85) = 14.05$ ,  $p < 0.001$ .

In order to examine individual differences, the mean differences between the two memory types were converted to standard deviations for personal memories. This showed that only five out of 86 participants rated personal memories as more mundane with differences ranging between 0.02 and 0.13 standard deviations. The remaining 81 participants rated disputed memories as more mundane with differences ranging between 0.03 and 0.93 standard deviations. In addition, a sign test based on the number of participants who rated the nondisputed memories as more mundane versus those who rated the disputed memories as more mundane provided significant results ( $z = 8.09$ ,  $p < 0.001$ ). Clearly, the majority of the participants rated disputed memories as more mundane.

A reliability analysis was carried out on the level of agreement about the rating of mundaness across participants, where the participants and the events were treated as random variables, using an absolute agreement model. The results indicated that the Single Measure Intraclass Correlation was 0.33 and the Average Measure Intraclass Correlation was 0.98 ( $F(80, 6800) = 52.07$ ,  $p < 0.001$ ). The Cronbach's Alpha coefficient, treating the participants as items was 0.98. Thus, we observed that raters showed a significant agreement in rating the mundaneness of the events.

In the Personal Experience scale, the participants were asked to indicate whether they have personally experienced the described event. They were presented with 82 events and the number of people who reported experiencing the events ranged between one (1.2%) and 83 (96.5%). The mean number of people reporting having experienced an event was 5.5 ( $SD = 23.3$ ) and the median was 12.5. Among those memories that were reported to have been experienced (1886 altogether), 58.6% were disputed memories and 41.4% were personal memories. Among those reported not experienced (5157 altogether) 50.2% were disputed and 49.8% were personal memories. A chi-square analysis indicated this to be a significant deviation from the expected distribution of memories ( $\chi^2(1, n = 7043) = 38.94$ ,  $p < 0.001$ ). Disputed memories were the type of memories that were more likely to be experienced by other people.

An additional analysis was conducted by taking the proportion of events experienced for personal events and disputed events separately for each participant. Then, these were

compared for personal and disputed memories. The mean proportion of events claimed to be experienced also by the independent participants in the current study was 0.23 ( $SD = 0.12$ ) for personal events and 0.30 ( $SD = 0.11$ ) for disputed events and the difference was significant ( $t(85) = 8.15, p < 0.001$ ).

Ratings of mundaneness showed a significant difference according to whether the participant reported having experienced the same event ( $t(7040) = 3.12, p < 0.005$ ) such that experienced events were rated as more extraordinary ( $M = 2.75, SD = 1.23$ ) than those that were not experienced ( $M = 2.65, SD = 1.16$ ). On the other hand, when asked to rate their certainty of having experienced an event, the participants indicated higher certainty for events they reported not having experienced ( $M = 4.65, SD = 0.87$ ) than the events they reported having experienced ( $M = 4.23, SD = 1.07, t(6879) = 16.39, p < 0.001$ ).

Finally, a two-way, experience  $\times$  memory type ANOVA was conducted on the mundaneness ratings. The results replicated the previous findings on the effects of memory type ( $F(1, 7038) = 249.77, p < 0.001, MSE = 1.34$ ) and experiencing an event ( $F(1, 7038) = 24.06, p < 0.001, MSE = 1.34$ ). In addition, there was an interaction ( $F(1, 7038) = 24.59, p < 0.001, MSE = 1.34$ ). Post-hoc Scheffé's test ( $p < 0.05$ ) showed no differences between the mundaneness ratings of disputed memories that were reported as experienced ( $M = 2.48, SD = 1.17$ ) and those that were reported not experienced ( $M = 2.48, SD = 1.14$ ). Both types of disputed memories were rated as more mundane than both types of personal memories. Personal memories reported as not experienced were rated as more mundane ( $M = 2.82, SD = 1.15$ ) than those reported as experienced ( $M = 3.13, SD = 1.21$ ). It is evident that disputed memories that were experienced by the participants were rated at the same level of ordinariness as non-experienced disputed memories.

## DISCUSSION

One line of research in the field of autobiographical memory involves attempting to identify the conditions that determine implantability of false personal events in individuals. This endeavour has resulted in some controversies. For example, researchers disagree about whether imagination that accompanies repeated remembering can make false memories more acceptable (Garry, Manning, Loftus, & Sherman, 1996; Garry, Sharman, Wade, Hunt, & Smith, 2001; Pezdek & Eddy, 2001). On less controversial ground, the role of perceived event characteristics, especially plausibility, has been proposed and empirically established by Pezdek and her colleagues (Pezdek et al., 1997; Pezdek & Hodge, 1999) and Hyman (1999) to be one of the conditions that contribute to the suggestive implantation of false events in autobiographical memories. However, these studies are based on repeated remembering studies in which researchers, through manipulating conditions such as imagination or event plausibility, attempt to influence the subjective likelihood that a fictional or hypothetical event was actually experienced.

The current study is also an attempt to differentiate the characteristics of remembered events of which the participants are certain of the details, from those that include some uncertainties. As opposed to the existing studies looking at the conditions for implantability, in the current study, the 'uncertain' memories were spontaneously constructed and offered as disputed by the participants. That is, the researcher did not suggestively implant new memories in the participants' repertoire of remembered experiences. Another

difference of this study from existing studies is that an independent pool of raters, not the participants from whom the memories originated, judged the characteristics of the events constituting the memory descriptions.

Results suggest that memories that were offered as disputed with respect to who the protagonist was (Ikier et al., 2003) were rated as more mundane by independent observers than memories for which there is no such dispute. In examining individual differences among the raters, we see that the vast majority of the judges agree that disputed events are more mundane than personal events, leaving only a small percentage of individuals who rate personal events more ordinary than disputed events. In their responses to the Personal Experience form, more participants indicated having experienced the disputed events than those having experienced the personal events, although the mean number of people reporting to have experienced an event, whether disputed or personal, was quite low. Participants' ratings of mundaneness were also related to their reports of having experienced an event: they rated events they had experienced less mundane than those they had not experienced, although their levels of certainty for unexperienced events were higher. However, the interaction effect observed between the variables of experience and memory type suggests that the decrease of mundaneness rating with reports of having experienced an event is true only for events of personal type, not for events of disputed type. Disputed events, whether they were reported to have been experienced or not by the raters, were deemed to be relatively mundane.

One reason for the differences we observe between disputed and personal memories could be that personal memories are highly extraordinary, thereby making the disputed memories look mundane. However, this does not appear to be the case, given that none of the personal memories was rated greater than 4 on the mundaneness scale, which represents 5 as 'very extraordinary'.

Heaps and Nash (2001) recently asked: 'Are there ways . . . to distinguish memories of authentic experiences and representations of fictitious events that have become memories?' (p. 920). This study does not provide direct evidence that undisputed autobiographical memories are qualitatively distinct from memories that include disputed events from the perspective of the person who recollects it. But it does offer some indirect evidence regarding a rephrased version of this question: Are certain events more amenable for being constructed as part of one's repertoire of autobiographical experiences than others?

Acceptance of an event as part of one's autobiographical memory is a function of the extent to which individuals attribute plausibility to a suggested or a constructed event. Several studies demonstrated that false memories were rated by the possessors' of such memories as more plausible, more ordinary and more typical of one's own previous experiences. The current study shows that events that have disputed ownership (i.e. events that are implanted false memories for at least one of the siblings) are rated as more mundane by independent raters and they were more likely to have been experienced by total strangers as well.

Hyman (1999) proposes event acceptance as one of the three conditions necessary for a person to create a false memory. He adds that what determines event acceptance is a judgment of plausibility. One of the factors that can affect whether an event can be deemed plausible is how mundane or run-of-the-mill this event is perceived to be. In other words, when people perceive a certain event as something that happens in general to anybody and everybody, this event is likely to be adopted by others as an autobiographical memory. In this study, we tested this idea by taking adopted memories of a group of people as our

starting point, and investigated whether some other group of people view these events as extraordinary or things that ordinarily happen.

This study does not directly reveal the cognitive processes that underlie the construction of false memories in general, or disputed memories in the Ikier et al. study. Yet, it allows us to speculate about the nature of those cognitive processes. When an event is mundane, as opposed to being unique or extraordinary, it is more likely to be added to one's repertoire of autobiographical experiences. Why this is the case can be sought for in schema-based explanations of distortions of recollective memories (Barclay, 1986; Brewer, 1995). Ordinary events are, by their very nature, things that can plausibly happen to human agents. Thus, a mundane event, in comparison to events with extraordinary characteristics, will be more likely to be reconstructed as an actual autobiographical memory because it is in line with people's schema-based expectations regarding what could plausibly happen.

In Ikier et al. (2003), it was found that monozygotic twins recounted more events where they disagreed with their twin about who was the protagonist in those events than dizygotic twins and siblings. This study demonstrates that such disputes are more likely to happen for events that are considered mundane by people. One explanation for that finding is that one of twins is adopting an event that happened to the other member, only if that event is a run-of-the-mill event that can be smoothly integrated into existing schema-based frameworks.

Without doubt, schema-based processes cannot be the only reason for adopting someone else's memories. In Hyman's (1999) model of cognitive processes in false memory creation, event acceptance constitutes the first step of a three-step model that also includes image and narrative construction, and source monitoring error. That is, even if a person believes that an event is ordinary and likely to happen, this should not by itself lead to a source monitoring error. Thus, further research will be needed to identify other processes such as communication with other family members that mislead participants to be confused about whose experience they are remembering.

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