Implanting False Autobiographical Memories and the Effect of Mood on False Autobiographical Memory Creation

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Abstract

Although human memory appears to be highly reliable, memory distortions are inevitable, influenced by external factors or the passage of time. Researchers have extensively studied these memory distortions, commonly known as false memory. The present study has two main objectives. Firstly, it aims to replicate a new method for implanting false autobiographical memories. Secondly, it seeks to explore the impact of mood on the false autobiographical belief and memory implantation. For the replication phase, the participants were divided into Single and Repeated groups. Participants were presented with a set of 20 autobiographical events, including a critical false event (swimsuit falling off), and were asked to recall whether they had experienced these events. After one week, participants who had not encountered the false event were given a second survey that suggested they had indeed experienced it ones or repeatedly. They were then asked to provide belief and recollection ratings. The replication of the study was partially successful, with the successful implantation of false beliefs and false memories ranging between 4% and 12%. For the mood induction phase, participants were divided into four groups: Single-Positive, Single-Negative, Repeated-Positive, and Repeated-Negative. The same procedure was followed, but at the onset of the second survey, participants' mood was manipulated using video clips. The mood induction part of the study was also partially successful. Regardless of the event frequency groups, the false belief creation was significantly higher in the Negative mood groups than in the Positive mood groups. The study's results, clinical implications, limitations, and future recommendations were discussed.

Keywords: Autobiographical memory; false memory; false memory implantation; false belief; mood; mood induction

INTRODUCTION

False Memory and Autobiographical Memory

When the intersection of autobiographical memory and false memory are examined, discovering numerous examples revealing the creation of false autobiographical memories would not be surprising. According to the literature, there are three well-known and powerful procedures that researchers use to study the development of false (childhood) autobiographical memories (Scoboria et al., 2017). These methodologies are known as the "lost-in-the-mall" (Loftus & Pickrell, 1995), "familial-informant false narrative" (Lindsay et al., 2004), or "memory implantation" (Wade et al., 2002) techniques. The first developed technique, the lost-in-the-mall experiment, involves three induction sessions where researchers suggest to participants that they were lost in a shopping mall during childhood and rescued by an elderly stranger. Participants are then asked to recall more details about the event, along with some true childhood memories collected from their families. Subsequently, two interviewers discuss true and fabricated childhood memories. This experiment successfully implanted false autobiographical memories in nineteen out of twenty-four participants, who correctly identified the false event (Loftus & Pickrell, 1995). Similarly, all these techniques use suggestive methods and social pressure to convince participants of the reality of false events during their childhood. In fact, a recent replication of the lost-in-the-mall experiment, conducted 28 years after its original creation, reported that they implanted false memories in 35% of their participants (N = 123) using the same procedure, supporting the conclusions of the original study (Murphy et al., 2023).

There are three theoretical reasons to explain and to create such distortions, among many others (Jablonka, 2017): The imagination inflation paradigm refers to the occurrence of fabricated memories or heightened confidence in a non-existent past event because of envisioning a new event in the present (Goff & Roediger, 1998). Gist-based associative memory errors involve the false recollection or recognition of a previously experienced perception or word due to its association with a newly introduced, different perception or word (Reyna & Kiernan, 1994). Post-event information effects pertain to situations where the introduction of incorrect information about a past event leads to the formation of false memories concerning that event (Addis et al., 2007). These reasons not only contribute to memory fallacies but are also used in memory implementation studies as techniques to induce false memories.

The variation in results among studies can be attributed to various factors, including disparities in the theoretical and operational definitions of false memory, the categorization of false memory, and the methods used for coding false memory (Shaw, 2018). These factors are crucial and must be taken into consideration while conducting false memory studies to ensure accurate results. For instance, some studies involve multiple impartial evaluators reviewing subjects' memory reports in the form of transcripts to assess whether the subjects outright reject the suggestion, genuinely believe the suggestion, or exhibit indications of recalling details about the non-existent event in coding false memories (Wade et al., 2018). On the other hand, other studies prioritize participants' ratings of their memories because it is believed that they are in the best position to classify the falseness of their memories and determine whether they genuinely believe they are recalling a memory, they believe they are unable to remember something, or they are consciously fabricating a falsehood in autobiographical memory research (Shaw, 2018). Similar but different classification and coding strategies exist in the literature, which can lead to problems. Therefore, the field has seen a push to collect various ways of defining false memories and developing a reliable coding system. A mega-analysis of memory reports from eight false memory implantation studies was conducted, and transcripts were coded using seven criteria: "accepting the suggestion, elaboration beyond the suggestion, imagery, coherence, emotion, memory statements, and not rejecting the suggestion" (Scoboria et al., 2017, p. 146). Based on these criteria, 30.4% of cases out of 423 were classified as false memories, another 23% of cases were classified as partial false memories, and together with self-relevant information, not accompanied by a photo depicting the event, and an imagination procedure, the formation of false memory rate was 46.1%.

Mood and False Memory

Similarly, to the relationship between false memory and autobiographical memory, there is also a connection between mood and false memory creation (Wright et al., 2005). Previous studies have shown that individuals in a negative mood are less susceptible to false memory creation due to item-specific processing, while those in a positive mood are more prone to false memory creation because of relational processing (Storbeck & Clore, 2005). Other studies in the literature support these findings (Storbeck, 2013). Many of these studies use the Deese/Roediger-McDermott (DRM) paradigm, which involves presenting negative, positive, or neutral word lists to measure the occurrence of false memories (Deese, 1959; Roediger & McDermott, 1995). Typically, participants recall a word related to the list but not actually presented, known as a critical lure. This paradigm has been widely used in mood and false

memory induction studies, with researchers employing mood induction techniques to conduct their experiments. For example, one study suggested that false-memory production is amplified when the material aligns emotionally with the participant's mood during encoding. The findings indicated that false memories are more likely to occur for emotionally congruent materials compared to incongruent ones, even when accounting for valence and arousal (Bland et al., 2016).

In addition to the DRM paradigm, the Misinformation Paradigm is also used in similar studies (Loftus, 1979). The misinformation effect refers to the integration of false information into a person's memory of an event. Researchers study the misinformation effect using the misinformation paradigm, in which participants are shown an event and then provided with information, some of which intentionally includes false details. During a memory test, individuals exposed to misinformation tend to accept it as true more often than those who were not exposed (Loftus, 1979). Studies employing DRM and the misinformation paradigm to induce false memories have also explored the effects of arousal. In the DRM Paradigm, low-arousal moods resulted in a higher occurrence of false recognition compared to high-arousal moods, regardless of emotional valence (van Damme, 2013). Most of the studies mentioned above have evaluated participants' moods and arousals in general terms, and it has been generally stated that negative mood is more resistant to false memory formation compared to positive mood.

However, some studies have suggested that the effect of mood changes under certain conditions. For example, a recent research project examining the effect of positive, negative, and neutral moods on positive, negative, and neutral word lists inducing false memory found that negative mood is more likely to process item-specific information, but only for positive and neutral word lists that decrease false memory (Zhang et al., 2017). In negative word lists, participants in a negative mood relied on gist, leading to false memories of the negative word list, similar to those in a positive mood (Zhang et al., 2017). Additionally, an examination of the persistence of mood-congruent false memories with the DRM paradigm found that a negative mood state resulted in higher "remember" judgments for negative-emotion critical lures compared to neutral-emotion critical lures, both in immediate and delayed testing (Knott & Thorley, 2014). Furthermore, some clinical and subclinical psychopathology symptoms that cause frequent and intense negative moods, such as PTSD and depression, might predispose individuals to suggestion-induced memory distortions, particularly when repeatedly reporting these negative experiences in settings like psychotherapy or legal contexts (Scoboria et al.,

2017). For instance, it has been found that persistent negative moods, such as depression, facilitate the creation of false memories (Bookbinder & Brainerd, 2016). In another study, mood did not affect susceptibility to the misinformation effect, but it significantly influenced participants' confidence in their false memories. Specifically, feeling sad resulted in the highest confidence ratings for these erroneous recollections (van Damme & Seynaeve, 2013).

All the findings mentioned above have inspired further investigations into false memory creation in different mood conditions, particularly in the context of autobiographical memories. Most of these studies have utilized the DRM or misinformation paradigm, leading to varied conclusions about the tendency of false memory creation under different mood conditions and with different mood word lists. As a result, understanding the effect of different moods on the formation of false memories in autobiographical memories and whether similar findings can be observed in both directions remains a matter of interest.

Relevance with and Significance of the False Memory in Clinical Psychology

The early exploration of false memory dates to 1974 when the first successful experimental study aimed to measure false memories (Loftus & Palmer). During the same period, the emergence of recovered childhood memories of abuse through therapy or spontaneous recovery became known as repressed memories (Loftus, 1993). This debate sparked a similar discussion in clinical psychology, reminiscent of the works of Pierre Janet and Sigmund Freud on dissociation and memory retrieval through hypnosis (Gleaves et al., 2004), and it has been discussed in terms of different psychoanalytic perspectives (Berger, 1996). The discourse around repression, memory recovery, and the phenomenon of false memory not only influenced psychology but also extended to other social sciences, including law. Its impact on legal matters, such as false confessions (Nash & Wade, 2009), false accusations (Otgaar et al., 2013), false convictions (Howe & Knott, 2015), and false eyewitness testimonies (Wade et al., 2010), has been extensively studied and continues to be investigated.

In the realm of psychology, the false memory phenomenon, initially observed within clinical discussions regarding repressed memories, has been the subject of investigation in experimental studies, cognitive psychology, and autobiographical memory. Theoretical studies on memory suggestibility have investigated various phenomena, including presuppositions and the misinformation effect associated with false information suggestions (Loftus, 1975b), the construction hypothesis, and skeleton theory linked to memory's malleability (Loftus, 1975a), word lists linked to semantic meanings (McDermott & Roediger, 1998). Drawing from these

theoretical explanations, the factors contributing to false memory formation include social desirability and social pressure (Ost et al., 2005), childhood trauma affecting children's attachment style with their parents (Edelstein, 2006), anchoring effects (Wade et al., 2010), sleep deprivation (Diekelmann et al., 2008), and PTSD (Friedman, 1996).

Considering all the mentioned frameworks, the impact of the false memory phenomenon on society is substantial. Legal cases involving therapy-induced memory recovery, particularly concerning sexual abuse, have been extensively discussed in terms of their validity (DePrince et al., 2012). In addition to legal cases, trauma victims, especially childhood sexual abuse victims, are central subjects of false memory research concerning dissociative amnesia, victim narratives, selfhood, and source misattribution (Christianson & Loftus, 1987; Davis, 2005). False memories can arise naturally or due to external influences, with the most concerning cases being those associated with seeking repressed memories to explain unexplained symptoms during therapy. While it is known that depression can lead to lower memory confidence and capacity (Fastame, 2014), and PTSD can cause individuals to doubt their memory abilities (Sacher et al., 2018), caution is necessary when dealing with such risks during treatments and interventions.

Goals and Hypotheses of the Study

Based on the objectives of the study, the hypotheses are presented below:

Objective 1: To replicate a new false autobiographical implantation method (Otgaar et al., 2022).

Hypothesis 1: The likelihood of false belief creation is higher in the Single group compared to the Repeated group.

Hypothesis 2: The imagination instruction leads to an increase in false belief creation.

Objective 2: To investigate the influence of mood on false belief and false memory creation.

Hypothesis 3: False belief and false memory creation are more likely to occur under Negative mood than under Positive mood.

Hypothesis 4: Differences exist in the rates of inducing false beliefs and false memories, as well as in belief and recollection ratings, among the experimental groups (Single-Positive, Single-Negative, Repeated-Positive, Repeated-Negative) both before and after imagination instruction, even though the direction of these differences is unpredictable.

Objective 3: To examine the self-reported mood of all participants in relation to false belief and false memory creation, irrespective of their assigned experimental groups.

Hypothesis 5: Regardless of the material they were exposed to, varying levels of false belief and false memory induction might occur based on participants' perceived mood.

Hypothesis 6: There might be different false memory and false belief induction rates, as well as belief and recollection ratings among condition groups: Event Frequency (Single and Repeated), Perceived Mood (Positive, Negative, and Neutral), and Imagination Instruction (Before and After).

RESULTS

Participants

In the present study, participants from the general population were recruited through an online platform, Google Forms. Initially, 1642 participants were recruited for the first survey. However, the last 237 participants (based on the submission time of the first survey) were not considered since the required sample size had nearly been reached. Out of the remaining 1405 participants, 750 were eligible for the second survey, meaning they had not experienced the critical false event and had at least four true events they had experienced. In total, 310 participants returned for the second survey, with an average age of 31 years (SD = 9.36, range: 18 to 66). Among these 310 participants, 104 were in the replication groups (M = 31, SD = 8.76, range: 18 to 61), and 206 were in the experimental groups (mood induction groups) (M = 31, SD = 9.67, range: 18 to 66). The study received approval from the ethical committee of Yeditepe University.

Materials

At the beginning of each session, participants were presented with a written informed consent form. Only after providing open consent to the informed consent form were participants allowed to continue with the study. A demographic questionnaire, which included participants' age, gender, and education level, was utilized to gather information about the sample characteristics. The list of events used in the study was the same as in the original research (Otgaar et al., 2022), except that they were translated into Turkish by a certified translator in collaboration with a psychologist. The critical false event was "swimsuit falling off," which was the third event in both the first and second surveys.

The mood induction material was a video clip created specifically for this study, featuring a combination of musical pieces, and carefully chosen images. The images were selected from the Open Affective Standardized Image Set (OASIS) (Kurdi et al., 2017). The complete stimulus set, along with their valence and arousal ratings, is available on https://www.benedekkurdi.com (Benedek Kurdi, n.d.; Kurdi et al., 2017). For the positive group, the mean valence of all selected photos was above 6, and the mean arousal ratings were kept around 4, meaning they were around the midpoint of the scale. Conversely, for the negative group, the mean valence of all selected photos was below 2, and the mean arousal ratings were also kept around 4. Each video consisted of 18 photos, and each photo remained on the screen for 10 seconds, after which the next photo was displayed. Background music was played during the presentation of the photos. The total duration of the video clip was 3 minutes for both the positive and negative videos. The positive mood group listened to "Eine Kleine Nacht Musik" by Mozart for 3 minutes, while the negative mood group listened to "Adagietto" by Mahler for 3 minutes. These musical pieces were selected because previous studies had found that they could successfully alter mood (Storbeck & Clore, 2005). The neutral mood group (replication) did not listen to any music or watch any video clip, and they served as the control group for mood manipulation. A mood manipulation check was conducted with one self-report question for each type of mood induction (Storbeck & Clore, 2005). The question asked, “How do you feel right now at this moment?” and participants responded using a 7-point Likert scale (*extremely negative (1), somewhat negative (2), slightly negative (3), neither positive nor negative (4), slightly positive (5), somewhat positive (6), extremely positive (7)*).

Procedure

The research followed an experimental design and was conducted fully online, following the same procedure as the original study (Otgaar et al., 2022), with the addition of a new variable, mood. There were two manipulations: memory manipulation (critical false event induction) and mood manipulation. The order of the procedure for the replication study was as follows: First, participants received 20 autobiographical events, including one critical false event, and they had to indicate whether they had ever experienced them. If they had experienced the event, they were asked how many times they had experienced it (never, once, twice, or three or more times). One week later, participants who did not experience the false event and had at least four true experienced memories received a second personalized survey, which included four random true events (they experienced) and the false event (suggested as 'experienced by you'). There were two groups: one group was told they experienced the false event once (Single group), and the

other group was told they experienced the false event repeatedly (Repeated Group). Participants in the Single group received the true events they experienced once in their childhood, as indicated in the first survey. Meanwhile, participants in the Repeated group received the true events they experienced more than once in their childhood. Participants in both groups provided belief and recollection ratings for each event both before and after receiving imagination instructions (instruction: *Close your eyes and try to imagine that the event took place. Go back to the place where it happened. Who is with you? When did it happen? What are you feeling?*). After the imagination instructions, participants were also asked to provide event-related details (*Which details can you remember about the event?*). Lastly, after collecting their beliefs and recollections for the true/false events, they were informed that one of them was not experienced by them and asked to choose which one it was and how certain they were of their answer.

In addition to the above design, the proposed research included another variable: mood. There were three mood conditions: positive, negative, and no mood induction (replication). Mood induction was achieved using a 3-minute video clips. The video clip was shown at the beginning of the second survey to the mood induction groups (Four groups: positive–single, negative–single, positive–repeated, negative–repeated). A mood manipulation check was made with one self-report question for each type of mood induction after completion of the video, and the control group was also asked to answer this question at the beginning of the second session. All manipulations were conducted in accordance with ethical boundaries, and participants were fully debriefed after the completion of the study.

Data Analytical Approach and Scoring

The design was a mixed design, incorporating both between-subjects and within-subjects variables. The first between-subject variable was event frequency (single or repeated), and the second was mood (negative, positive, and no mood induction). Additionally, there was a within-subject variable, which was imagination instruction (before and after). False belief, false memory, and detailed false report creation were measured both before and after the imagination instructions. Participants were randomly assigned to six groups: Single-Positive, Single-Negative, Single-replication, Repeated-positive, Repeated-Negative, and Repeated-Replication. Various analyses, including both parametric and non-parametric tests, were conducted to examine the different objectives and hypotheses of the study. Data analyses were conducted using JASP Team Version 0.17.2 (JASP Team, 2023), while IBM SPSS Version 25 was also used as a support for some parts.

Replication

In this section, the same analyses as those of the replicated study were conducted once again. Only the replication groups were included in all analyses, comprising 104 participants (M = 31, SD = 8.76, range: 18 to 61) in total (i.e., Single vs. Repeated Groups).

Percentages of False Beliefs and False Memories

As in the original study, first, the overall percentages of false belief and memory induction were examined. All percentages of memories, including true ones, before and after the imagination technique can be found in Table 1. Based on the information presented in Table 1, the rates of successful implantation of false beliefs and false memories varied between 4% and 12% among the 104 participants. Additionally, percentages of true events were examined, and their rates varied between 22% and 76%. Generally, their percentages were higher than the percentages of false beliefs and false memories.

When examining the provided details of the false event, it is interesting to note that there were 10 additional participants who offered extra information about the false event, apart from the reported number in Table 1 (i.e., n = 12). However, their belief and recollection ratings did not meet the category conditions (i.e., false belief or false memory) based on the scoring rules of the original study. As a result, they were not included in these categories. Despite this, even if their belief and recollection scores did not place them in the false belief or false memory category, the fact that 22 out of the 104 participants provided details about their experience of the false event suggests that a certain degree of false memory or false belief might have been present. Setting this aside, below is an example story of the false event from the original category:

> I remember going to the aqua park in Istanbul, getting on the slide at the insistence of my friends despite my fear, and after slipping, I quickly fell into the pool and my swimsuit fell into the pool and my friend's mother grabbed me and I was not overly ashamed because we were very few people, but I had the feeling that I was a little disgraced.

False Beliefs and Memories for Single and Repeated Events

As a second step, the amounts of false beliefs and memories, along with their statistical differences across the group conditions, were examined (refer to Table 2). According to the analyses, the amounts of false belief formation did not differ across the groups of event

frequency: Single and Repeated groups, $\chi 2(1) = .18$, $p = .67$, Cramer's $V = .08$. Similarly, there was no statistically significant effect after the imagination instruction, $\chi 2(1) = .26$, $p = .61$, Cramer's $V = .10$. In relation to the formation of false memories, there was also no statistically significant effect both before the imagination instruction, $\chi 2(1) = .14$, p = .71, Cramer's $V = .07$, and after the imagination instruction, $\chi 2(1) = .00$, $p = 1.00$, Cramer's $V = .03$. Lastly, the results of participants who provided additional details while having false beliefs or false memories were examined. Once again, there was no statistically significant effect of event frequency (Single and Repeated Groups) on the formation of false statements with additional details, $\chi 2(1) = 1.51$, $p = .22$, Cramer's $V = .12$. Because of the sample size violation in the Chi-squared Tests (i.e., at least one cell has an expected count smaller than 5), all statistics reported here are based on $\chi 2$ continuity correction.

Exploratory Analyses

Continuing with the same methodology as the original study, the next step involved examining the raw false belief and recollection ratings instead of categorizing them (i.e., not as False Belief and False Memory). A 2x2 mixed ANOVA was conducted on the belief and recollection ratings. Event frequency was treated as a between-subject variable (Single vs. Repeated), while Imagination instruction served as a within-subject variable (Before and After). However, no statistically significant effects were observed (all $p > .11$). Additionally, the word count of detailed false reports provided by the participants was examined to determine whether it differed between the Single ($M = 0.50$, $SD = 26.06$) and Repeated ($M = 3.60$, $SD = 11.23$) groups. Although an independent samples t-test indicated a statistically significant effect, $t(102) = 1.95$, $p = .05$, Cohen's $d = .38$, a Mann–Whitney U test was conducted due to violations in normality. This time, no statistically significant effect was found ($U = 1238$, $p = .18$). In the final step, an examination was conducted to determine whether participants correctly identified the false event and the level of certainty they held in their choice. While 58% ($n = 60$) of the participants accurately pinpointed the false event, 42% ($n = 44$) selected one of their true memories as the false event or expressed uncertainty. This selection did not display statistically significant differences between the Single and Repeated groups, $\chi 2(4) = 6.19$, $p = .19$, Cramer's $V = .24$. Interestingly, among the 44 participants who incorrectly chose a true memory as the false event, only 11 reported being uncertain and relying on guessing, while the remaining 33 participants claimed to be (almost) certain of their choice. However, the $\chi 2$ statistic ($\chi 2(2) = 13.41$, $p < .001$) indicates a significant connection between the accurate identification of the false event and the certainty of the selection. This implies that participants who accurately

identified the false event were more confident in their decision compared to those who mistakenly chose true events, as indicated by the percentages within rows of contingency tables. The level of certainty in their selections showed no variance between the two groups, $t(102) = .41$, $p = .68$, Cohen's $d = .08$.

Mood Induction Groups

In this section of the results, the replication groups have been omitted from the analyses. The analyses encompass only the mood induction groups, namely Positive-Single, Positive-Repeated, Negative-Single, and Negative-Repeated, comprising a total of 206 participants ($M = 31$, $SD = 9.67$, range: 18 to 66), excluding the mood manipulation check.

Mood Manipulation Check

To assess the success of the mood manipulation, the connection between participants' mood statements and their assigned groups was examined using the Chi-squared test. In this analysis, the event frequency groups were disregarded to solely gauge the effectiveness of the mood induction material. The $\chi 2$ statistic ($\chi 2$ (2) = 135, $p < .001$) indicates a substantial correlation between participants' mood statements and their assigned groups, with a very strong effect size, Cramer's $V = .81$. As illustrated in Table 3 and when observing the percentages within rows, it is evident that the positive groups reported feeling more positive compared to the negative groups, while the negative groups conversely reported feeling more negative compared to the positive groups.

Among the initial 206 participants, 45 were excluded from the analysis due to unsuccessful mood manipulation, resulting in a final sample size of 161 participants ($M = 32$, $SD = 10.05$, range: 19 to 66) for subsequent analyses in this section. Furthermore, a Binomial test was conducted to cross-validate the success of mood manipulation between participants who experienced successful mood induction and those who did not. The reported relative proportion of successful mood induction within the experimental groups was 50% each. The Binomial test unveiled a significant difference ($p < .001$) in the proportion of participants who experienced successful mood induction (78%) compared to those for whom mood induction was unsuccessful (22%) in the mood induction groups ($N = 206$), with a 99% confidence interval of 0.70 to 0.85. Collectively, these findings underscore the success of the mood induction video materials developed for the first time in this study. They have effectively induced mood and are projected to maintain a success rate between 70% and 85% within a 99% confidence interval for their prospective application.

Percentages of False Beliefs and False Memories

Firstly, the overall percentages of false belief and memory induction were examined. All percentages of memories, encompassing both true events before and after the imagination technique, can be found in Table 4. Based on the data provided in Table 4, the successful implantation rates of false beliefs and false memories ranged between 6% and 11% among the 161 participants. Additionally, the percentages of true events were investigated, showing rates ranging between 17% and 72%. Notably, the percentages of true events were generally higher compared to the percentages of false beliefs and false memories.

When examining the provided details of the false event, it is noteworthy that there were 19 additional participants beyond the reported number in Table 4 (i.e., n = 17) who provided additional details about the false event. However, their belief and recollection ratings did not meet the category conditions (i.e., false belief or false memory) based on the scoring rules of the original study. As a result, they were not included in these categories. Nevertheless, even though they did not fit into the false belief or false memory category, it can be suggested that a certain degree of false memory or false belief might have existed in 32 out of the 161 participants, considering their provision of details about their experience of the false event. Setting this aside, an example story of the false event from the original category is presented below:

> In the summer, I used to go to aquaparks with my grandmother all the time. I bought a new swimsuit on a trip. It had a skirt, but it was removable, and it had 2-3 accessories, you could replace it by plugging it in. But I had lost a lot of weight that summer, so it was a little big. The ropes were opened in the wave pool, too, I was very embarrassed, but we fixed it immediately.

False Beliefs and Memories for Single and Repeated Events

Secondly, the levels of false beliefs and memories, along with their statistical differences between the single and repeated groups, were examined while disregarding the influence of mood groups (refer to Table 5). This means that both the Single and Repeated groups encompassed participants who experienced both negative and positive moods due to the manipulation. Based on the analyses, the amounts of false belief formation did not show significant differences across the event frequency groups, $\chi 2(1) = 2.79$, $p = .10$, Cramer's $V = .13$. Similarly, there was no statistically significant effect observed after the imagination instruction, $\chi 2(1) = .43$, $p = .61$, Cramer's $V = .09$. When considering the formation of false

memories, there was no statistically significant effect both before the imagination instruction, $\chi 2(1) = .05$, $p = .82$, Cramer's $V = .04$, and after the imagination instruction, $\chi 2(1) = .00$, $p = 1.00$, Cramer's $V = .08$. Lastly, an examination was conducted on participants who provided additional details while holding false beliefs or false memories. Once again, there was no statistically significant effect of event frequency on the formation of false statements with additional details, $\chi 2(1) = .82$, $p = .37$, Cramer's $V = .07$. Because of the sample size violation in Chi-squared Tests (i.e., at least one cell has an expected count smaller than 5), some of the statistics reported here are based on $\chi 2$ continuity correction.

False Beliefs and Memories for Negative and Positive Mood Induction Groups

As a third step, the amounts of false beliefs and memories, as well as their statistical variances across the negative and positive groups, were examined by disregarding the impact of event frequency groups (refer to Table 6). In other words, the groups were categorized into negative and positive, irrespective of the event frequency. Both single and repeated event frequencies existed within the negative group, and the same applied to the positive group.

According to the analyses, there was an almost statistically significant difference in false belief formation across the mood groups, $\chi 2(1) = 3.83$, $p = .05$, Cramer's $V = .15$. As can be observed in Table 6, the formation of false beliefs was higher in the negative group than in the positive group. However, this difference disappeared after the imagination instruction. Interestingly and unexpectedly, there was a decrease in the number of participants who formed false beliefs without transitioning into false memory formation, $\chi 2(1) = .23$, $p = .63$, Cramer's $V = .06$. When it comes to the formation of false memories, there was also no statistically significant effect both before the imagination instruction, $\chi 2(1) = .19$, $p = .67$, Cramer's V = .03, and after the imagination instruction, $\chi 2(1) = .19$, $p = .67$, Cramer's $V = .03$. There was neither a rise nor a fall in false memory formation after the instruction. In the final aspect, participants who provided additional details while having false beliefs or false memories were examined. Once again, there was no statistically significant effect of mood on the formation of false statements with additional details, $\chi 2(1) = .22$, $p = .64$, Cramer's $V = .04$. Due to the sample size violation of Chi Squared Tests (i.e., at least one cell has an expected count smaller than 5), some of the statistics reported here are based on $\chi 2$ continuity correction.

False Belief and Memories Between Groups

Lastly, the quantities of false beliefs and memories, along with their statistical variances across the four groups, were examined (refer to Table 7). This examination encompassed the

predefined categories of randomly assigned groups, as detailed in the research methodology (i.e., Single-Positive, Single-Negative, Repeated-Positive, Repeated-Negative), concerning the formation of false beliefs and memories. According to the analyses, no statistically significant difference was observed in false belief formation among the groups, $\chi 2(3) = 6.62$, $p = .09$, Cramer's $V = .20$. Despite this non-significant result, given the moderate effect size, it is reasonable to conjecture that with a larger sample size, a statistically significant distinction between the groups might emerge. After the imagination instruction, any potential significant effect, if present, was further diminished, $\chi 2(3) = 2.00$, $p = .57$, Cramer's $V = .11$. Regarding the formation of false memories, there was no statistically significant effect, both before the imagination instruction ($\chi 2(3) = .88$, $p = .83$, Cramer's $V = .07$) and after the imagination instruction ($\chi 2(3) = .20$, $p = .98$, Cramer's $V = .03$). An examination was also conducted on participants who provided additional details while having a false belief or false memories. Once again, there was no statistically significant effect of mood on the formation of false statements with additional details ($\chi 2(3) = 1.07$, $p = .78$, Cramer's $V = .08$.

Exploratory Analyses

In this section, belief and recollection ratings were examined separately as an alternative approach to the previous analyses. To investigate their variations across the groups, a 2x2x2 mixed ANOVA design was conducted. This three-way mixed ANOVA design comprised three factors, with two of them being between-subjects variables (Event frequency and Mood), while one being a within-subject variable (Imagination). All factors had two levels (Single vs. Repeated & Positive vs. Negative & Pre and Post).

The initial analysis indicated that, for the main effect of mood on belief ratings, the between-subjects effects table presented a small F-statistic that was not statistically significant ($p = .26$), with a negligible effect size (0.07). Consequently, regardless of event frequency and imagination instruction, there was no significant difference in belief ratings between positive and negative moods. This similar situation was also applicable for the main effects of event frequency ($p = .64$) and imagination ($p = .91$). Additionally, none of the four interaction effects demonstrated statistical significance (all $p > .56$). According to the descriptive plots of the analysis, although the score differences were small, there was no overlap between the scores. Therefore, the lack of significant results might be attributed to the sample size. According to the results of the second mixed ANOVA, the main effect of mood on recollection ratings was examined. The between-subjects effects table presented a small F-statistic that was not statistically significant ($p = .87$). Therefore, regardless of event frequency and imagination

instruction, there was no significant difference between positive and negative moods concerning recollection ratings. A similar scenario was observed for the main effects of event frequency ($p = .96$) and imagination ($p = .57$). Furthermore, there was no statistically significant effect for any of the four interaction effects (all $p > .58$). Additionally, the word count of detailed false reports provided by the participants was examined to determine if there were differences between the Single group ($M = 1.80$, $SD = 7.58$) and the Repeated group ($M = 1.31$, $SD = 3.61$), as well as between the Negative group ($M = 1.78$, $SD = 6.01$) and the Positive group ($M = 1.31$, $SD = 5.98$). A Mann–Whitney U test was conducted, revealing no statistically significant effect for event frequency ($U = 3067$, $p = .30$) or mood ($U = 3343$, $p = .47$). Lastly, an examination was conducted to determine whether participants correctly identified the false event and the level of certainty they had in their choice. Among the participants, 58% ($n = 93$) accurately identified the false event, while 42% ($n = 68$) chose one of their actual memories as the false event or indicated uncertainty. According to the contingency table results, the Repeated group was more successful in identifying the false event compared to the Single group, and this difference in selection was statistically significant between the groups, $\chi 2(4) = 11.04$, $p = .03$, Cramer's $V = .26$.

Interestingly, only 10 out of the 68 participants who chose a genuine memory as the false event mentioned that they were uncertain or guessed, while the remaining 58 participants expressed a (near) certainty in their choice. Nevertheless, the $\chi 2$ statistic ($\chi 2(2) = 8.27$, $p = .02$) indicated a significant association between correctly identifying the false event and the certainty of the selection, with a moderate effect size, Cramer's $V = .23$. This implies that participants who correctly identified the false event were more assured in their decision compared to those who selected true events, as observed from the percentages within rows of the contingency tables. Furthermore, the level of certainty in participants' choices showed no distinction between the event frequency groups, $t(159) = 1.14$, $p = .26$, Cohen's $d = .18$, and the mood groups, $t(159) = 0.82$, $p = .42$, Cohen's $d = .13$.

DISCUSSION

Replication

Overall, it is probably accurate to say that the replication of the original study was only partially successful (Otgaar et al., 2022). On one hand, the original study reported false belief and false memory induction rates ranging from 9% to 30%, while the present study achieved success rates of 4% to 12%. Similarly, the percentages of true events ranged from 33% to 83% in the

original study, whereas the present study observed percentages of 22% to 76% for true events. Notably, not only the false belief and false memory percentages were lower, but the belief and recollection rates for true events were also lower in this sample. These lower overall belief and recollection rates for both true and false events made it difficult to classify them as false beliefs or memories, and as a result, they could not be categorized as detailed false reports either. However, there were 10 additional participants who provided further details about the false event, but their ratings did not satisfy the category conditions. If these participants were included in the percentages, the false memory induction rates would increase to a maximum of 22% instead of 12%, bringing them closer to the original study's induction range.

Based on statistical analysis results, the present study has failed to replicate the results of the original study, which found a statistically significant effect of false belief creation in event frequency groups. The original study observed that false beliefs were more easily found in single groups than in repeated groups, and this effect increased after imagination instructions. However, in the present study, such an effect was not observed. The occurrence of false beliefs and false memories was equally probable in both the Single and Repeated groups.

In the mixed ANOVA, there was no statistically significant effect of belief and recollection ratings across groups. Interestingly, just over half of the participants were able to detect the false event ($N = 60$), while analyses based on recall and belief scores did not yield significant results. Moreover, it was particularly intriguing that out of the remaining 44 participants who identified one of the true events as false, 33 of them were almost certain about their decision. These findings are consistent with the original study. One addition to the original study's findings is that regardless of the number of participants who made a correct identification, they were significantly more certain about their decision. This certainty did not differ between event frequency groups.

There might be several ways to interpret the findings and differences from the original study, but the three most salient ones were selected. First, the data were collected from a general sample, which included primary school graduates as well as PhD students, rather than solely university students. The effect of education level might influence the results since a significant majority of induction studies have been conducted among university students. Secondly, the original study included participants with a mean age of 22, ranging from 18 to 30. In contrast, the mean age of the 104 participants in replication study was 31 years ($SD = 8.76$, range = 18 to 61 years). This discrepancy might have originated from the age of the sample. The study had a large sample size and a representative population, not limited to college students, suggesting

that these results might have greater generalizability. Thirdly and, most importantly, given that the present study was conducted in a completely different culture, the results of the study need to be examined from this perspective as well. For example, to closely replicate the original study, the false event (critical event) remained unchanged, involving "going to a swimming pool and that your swimming trunks fell off." However, in Turkish culture, especially among individuals with a mean age of 31, going to the swimming pool was an uncommon activity during their childhood, which was nearly 20 years ago. This inference is based on both common sense and the notes from participants who correctly rejected the false event. Some participants mentioned in the open-ended question that they had never gone to a swimming pool during their childhood.

According to the literature, there exists a relationship between recollection rejection and the rejection of misinformation (Moore & Lampinen, 2016). Recollection rejection refers to the act of dismissing an item based on a clear and vivid memory of a different event that logically contradicts it, and it is used as a metacognitive strategy to reduce false recognition (Gallo, 2004). According to Moore and Lampinen (2016), participants spontaneously utilized recollection rejection to reject both types of misinformation, with a higher tendency to do so for contradictory misinformation. Additionally, shorter delays before encountering misinformation led participants to be more likely to use recollection rejection to reject contradictory misinformation. Thus, it is plausible to say that the suggested critical event was a contradictory misinformation for our sample characteristics. It directly contradicted their life experiences, and they likely employed recollection rejection by recalling their never-occurred swimming pool experience to reject the false suggestion and prevent false memories. Moreover, the scale presented immediately after the false suggestion and the short time facilitated the probability of rejecting contradictory misinformation for this sample. If they had never gone to a swimming pool during their childhood, or even seen one, it was almost impossible to induce this implausible memory. Nevertheless, there were still some success rates.

Mood Induction Groups

When it comes to the mood induction groups, one distinctive addition to the original study was the assessment of the success of the mood manipulation. As a first step, the effectiveness of the mood manipulation material designed for this study examined. The analyses showed that the mood manipulation was successful in manipulating mood, with a very strong effect size in the Chi-squared test (Lee, 2016). Also, it was evident that the negative mood manipulation was more effective than the positive mood induction by examining the contingency tables and

within-rows. Further proportion analyses revealed that the success rates of mood induction ranged between 70% and 85% at a 99% confidence interval. This positive outcome of the present study suggests that the mood induction material can be utilized in future studies.

The same analyses as in the original study were repeated here, along with some additional ones. According to the Chi-squared test results, the occurrence of false memories was equally probable in both the Positive and Negative mood groups. However, one significant result emerged. Irrespective of the event frequency groups, the amount of false belief creation was statistically significantly higher in the Negative mood induction groups than in the Positive mood induction groups. This finding aligns with the general literature (Kersten et al., 2021). For instance, in DRM, a negative mood state resulted in higher 'remember' judgments for negative-emotion critical lures (Knott & Thorley, 2014; Zhang et al., 2017). In this study, the false event can also be considered as a negatively valanced event since it includes embarrassment. Furthermore, since these analyses were conducted by ignoring the effect of event frequencies, this presents a significant contribution to the literature. It provides evidence that, regardless of the event frequencies, a negative mood is more susceptible to false belief creation compared to a positive mood. This finding is relevant to the ongoing discussion about the limitations of false memory studies that mainly concentrate on events occurring singularly, whereas instances like childhood sexual abuse frequently manifest in multiple cases (Otgaar et al., 2022). However, after the imagination instruction, this effect surprisingly disappears. This is an unexpected result since previous studies have shown that the effect of imagination can change autobiographical beliefs and successfully create false autobiographical memories (Mazzoni & Memon, 2003). While some studies argue that even bizarre or unfamiliar actions, such as "balancing a spoon on your nose," can be induced using the imagination inflation procedure (Li et al., 2020), the situation here might have been even more unlikely than balancing a spoon on their noses. This could be a reason for the failure or lack of success of the imagination instruction in general. It is possible that when a completely impossible event (for the present group of some participants) is imagined, the imagination inflation works in the opposite way. This could be a research question for future studies and is worth examining.

In general, despite the successful implantation of the intended mood through mood induction materials and the exclusion of unsuccessful data from the analyses, why were most of the results insignificant? One possible explanation might be the effect of arousal. According to the literature, while the effect of positive and negative mood on false memory creation is well-established, there is also an effect of arousal (van Damme, 2013). Some studies even argue that

the actual effect is due to arousal rather than the valence of the mood, and high arousal makes people more susceptible to false memory creation than low arousal (Corson & Verrier, 2007). In the present study, an effort was made to control for the effect of arousal by balancing the selected images' arousal rates around the midpoint of the 7-point Likert scale, which is considered a neutral arousal level (4). However, there might still be an unknown effect of arousal since the specific arousal effects of the combined mood-inducing images and music are not controlled in the present study.

Clinical Implications

The most significant clinical implication is that individuals in a negative mood are more susceptible to develop false autobiographical beliefs, with far-reaching consequences. Especially noteworthy are the recovered or repressed memories from childhood related to abuse, which hold great relevance in clinical applications and psychotherapy settings, often emerging during therapy sessions rather than spontaneously (Loftus, 1993). When people step into a clinical environment seeking treatment, they are likely to have experienced events that negatively impacted them in some way, or at least they might have confusion about certain aspects. During this process, they can experience a wide range of emotions and sensations, from joy to sadness, hope to despair, excitement to anger. Thus, when they experience relatively negative emotions (Bookbinder & Brainerd, 2016) or feel high motivational intensity (van Damme et al., 2017), they become more receptive to misinformation and sensitive to cue-related words that they consider as real, even without necessarily having psychopathology.

Moreover, specific psychopathologies, such as depression and PTSD, are particularly susceptible to cognitive biases and false memories due to their persistent negative mood states (Bookbinder & Brainerd, 2016), as they are among the most common conditions that negatively impact memory (Burriss et al., 2008). For instance, a meta-analysis of 147 recall and recognition studies involving clinically depressed individuals revealed that depression leads to memory impairment (Burt et al., 1995). Additionally, in cases of comorbid depression and anxiety, both immediate recall and subsequent retrieval of new information are adversely affected (Kizilbash et al., 2002). When the retrieval of new information is negatively impacted, false beliefs or false memories can easily fill gaps in the narrative, especially when experiencing a persistent negative mood state. Encouragingly, recent findings indicate that Metacognitive Training for Depression (D-MCT) has been effective in reducing false memory occurrence in depression after four weeks compared to baseline, particularly in cognitive biases and errors characterized by high individual confidence levels (Moritz et al., 2018).

Furthermore, current research suggests that individuals with social anxiety disorder, who undergo social stress, may be more susceptible to memory distortions (Cody et al., 2015). Individuals simultaneously dealing with borderline personality disorder and PTSD exhibit a greater occurrence of false memories for word lists related to these conditions compared to those with only PTSD (Miano et al., 2022). Additionally, a history of trauma and PTSD makes people more susceptible to false memories when they encounter information related to their experiences (Otgaar et al., 2017). Certain medical conditions, such as coexisting HIV and PTSD, can also contribute to attentional bias and an inclination towards false memory (Mashayekhi et al., 2023). To alleviate the effects of memory impairment associated with PTSD and thereby diminish vulnerability to the creation of false beliefs and memories, strategies and protocols centered on memory consolidation and reconsolidation could be incorporated into PTSD treatment methodologies. This could encompass the implementation of cognitive task memory interference procedures involving memory reactivation (MR) to address intrusive memories, as well as the utilization of the Reconsolidation of Traumatic Memories (RTM) technique to address the symptoms of PTSD (Astill Wright et al., 2021).

When all the given evidence is considered, the dangers of being open to suggestion while experiencing negative emotions or having certain psychopathologies become evident, especially when these occur in a psychotherapy room. Inside the therapy room, clinicians bear the greatest responsibility in managing what transpires during sessions and face the risk of unintentionally leading clients to develop false beliefs or false memories, often through seemingly innocent leading or suggestive questions aimed at understanding a situation, event, or traumatic experience. To avoid such scenarios, clinicians must be mindful of the words they use, the gestures they express, and the questions they ask when dealing with active traumatic experiences or depression. Otherwise, the negative consequences may not be limited to just one person, one lawsuit, or one therapy environment, but rather expand to impact society at large.

Limitations and Future Recommendation

To begin with the general limitations, one of them might be the age and education level diversity. While this could have advantages, such as generalizing the results, there might also be unknown disadvantages. For instance, there might be some neurological conditions among the participants, especially among those of advanced age, and neurological or psychiatric diseases like amnesia or depression could be highly relevant to memory processing (Fossard et al., 2006; Hu et al., 2023). Therefore, if the study were to be replicated, the population criteria should be carefully considered. Secondly, the use of the Belief and Recollection Scale in this

population seemed to yield lower ratings for both false and true events. As support for this, even some participants gave low ratings on the scale that could not be categorized as false belief or false memory; they provided additional details about the false event, indicating that they thought they had experienced it. Perhaps using a different scale or adapting the scale in a different format, such as using a 5-point Likert scale instead of 8, might be more appropriate. Third, the false event suggested as real might have been particularly difficult to induce as a false memory in this population, for the reasons explained earlier. Using a procedure with a different and more plausible memory might increase the induction rates to the expected range (Scoboria et al., 2004). As a further recommendation, the procedure could be repeated using both a bizarre and common event as a false event to observe the difference in induction ratings and the nature of false events. Fourth, in this population, it seems that the imagination instruction decreased the plausibility of the suggested false event for most of the analyses to some degree, although it was small. This could be related to the selected false event or the characteristics of the population. While imagination is a powerful method to develop belief in a never-occurred event, it might have an opposite effect in certain situations, or there might be a negative correlation between the likelihood of an event for an individual or population and the effect of imagination. It could either increase the effect of suggestion by visualizing or decrease the effect of suggestion and make individuals more resistant to it by imagining a highly unlikely event for them and thinking, "no way it happened to me." The exact explanations or reasons for this are unknown, making it a very interesting future research question.

In terms of the mood manipulation, the design of materials for mood induction was successful in inducing positive and negative moods, which can be considered a success in itself. However, despite this success, the effects of moods on false memory creation were found to be small compared to previous studies. There might be several reasons for this, but the first plausible one is the effect of arousal along with the mood. For future research, controlling not only the mood but also the arousal might yield different results. Secondly, the positivity or negativity of autobiographical memory was perhaps affected the results. That is, not only the mood of the individual during recall affects the information retrieved, but also the emotional valence of the information or memory influences how the materials will be remembered, as their nature, phenomenology, distribution, vividness, encoding mechanisms, and cognitive processes differ (García-Bajos & Migueles, 2013; Talarico & Rubin, 2003). When considering this, both the valence of the false event and true events might influence the induction rates. The suggested false event could be considered negative due to its involvement of embarrassment for many

people, and this most probably influenced the success of the false suggestion. As far as is known, the valences of the autobiographical memories that will be recalled and induced are not generally considered in false memory research. For future research, the possible effect of the negativity or positivity of the memory could also be taken into consideration.

CONCLUSION

In the present study, a new false memory implantation method has been replicated in the Turkish culture. The replication was partially successful. Despite the rates being lower than those in the original study, we were able to successfully implant some degree of false autobiographical beliefs and false autobiographical memories in the participants. However, the event frequency groups did not differ in the creation of false autobiographical beliefs, which did not align with the original study. Interestingly, in some parts, even though it was not statistically significant, the repeated groups had higher implantation rates than the single groups. Other findings are aligned with the original study.

In addition to the replication of the original study, the effect of mood on the creation of false beliefs and memories were also investigated. The aim was to measure any differences in false autobiographical belief and false autobiographical memory implantation rates across the positive and negative mood groups. Accordingly, individuals in the negative mood were found to be more prone to create false autobiographical beliefs than individuals in the positive mood. This finding is consistent with the literature. The mood induction materials designed for this study successfully induced the intended moods for the participants and can be used in future research.

Lastly, it can be said that the most significant feature of the study is its large sample size. To the best of our knowledge, no other false memory implantation study has ever reached this magnitude of sample size. The nonsignificant results seem to have important implications when considering this fact. The conditions under which autobiographical memory is open or resistant to suggestion have been better understood, and from the courtroom to the psychotherapy room, there is beneficial guidance to be taken into consideration.

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Table 1.

Percentage and Number of Participants Producing Different Memory Types

Memory Type	Percentage	Numbers
False belief	6%	*n* = 6
False memory	8%	*n* = 8
False belief after imagination	4%	*n* = 4
False memory after imagination	9%	*n* = 9
Detailed false report	12%	*n* = 12
True belief (first event)	27%	*n* = 28
True memory (first event)	41%	*n* = 43
True belief after imagination (first event)	22%	*n* = 23
True memory after imagination (first event)	48%	*n* = 50
Detailed true report (first event)	65%	*n* = 68
True belief (second event)	28%	*n* = 29
True memory (second event)	49%	*n* = 51
True belief after imagination (second event)	25%	*n* = 26
True memory after imagination (second event)	53%	*n* = 55
Detailed true report (second event)	76%	*n* = 79
True belief (fourth event)	27%	*n* = 28
True memory (fourth event)	48%	*n* = 50
True belief after imagination (fourth event)	23%	*n* = 24
True memory after imagination (fourth event)	49%	*n* = 51
Detailed true report (fourth event)	68%	*n* = 71
True belief (fifth event)	24%	*n* = 25
True memory (fifth event)	45%	*n* = 47
True belief after imagination (fifth event)	25%	*n* = 26
True memory after imagination (fifth event)	43%	*n* = 45
Detailed true report (fifth event)	67%	*n* = 70

Table 2.

Percentage and Number of False Beliefs and Memories as a Function of Conditions

Memory Type	Single	Repeated
False belief	4 (8%; 4/52)	2 (4%; 2/52)
No false belief	48 (92%; 48/52)	50 (96%; 50/52)
False belief after imagination	1 (2%; 1/52)	3 (6%; 3/52)
No false belief after imagination	51 (98%; 51/52)	49 (94%; 49/52)
False memory	3 (6%; 3/52)	5 (10%; 5/52)
No false memory	49 (94%; 49/52)	47 (90%, 47/52)
False memory after imagination	4 (8%; 4/52)	5 (10%; 5/52)
No false memory after imagination	48 (92%; 48/52)	47 (90%; 47/52)
Detailed false report	4 (8%; 4/52)	8 (15%; 8/52)
No detailed false report	48 (92%; 48/52)	44 (85%; 44/52)

Table 3.

Mood Manipulation Check

		Mood Statements			
Experimental Groups		Positive	Neutral	Negative	Total
Positive Groups	Count	75.00	22.00	6.00	103.00
	Expected count	39.50	17.50	46.00	103.00
	% within row	72.82 %	21.36 %	5.83 %	100.00 %
Negative Groups	Count	4.00	13.00	86.00	103.00
	Expected count	39.50	17.50	46.00	103.00
	% within row	3.88 %	12.62 %	83.50 %	100.00 %
Total	Count	79.00	35.00	92.00	206.00
	Expected count	79.00	35.00	92.00	206.00
	% within row	38.35 %	16.99 %	44.66 %	100.00 %

Mood Manipulation Check

Experimental Groups	Mood Statements			Total
	Positive	Neutral	Negative	

Table 4.

Percentage and Number of Participants Producing Different Memory Types in Mood Groups

Memory Type	Percentage	Numbers
False belief	7%	*n* = 11
False memory	6%	*n* = 10
False belief after imagination	6%	*n* = 9
False memory after imagination	6%	*n* = 10
Detailed false report	11%	*n* = 17
True belief (first event)	19%	*n* = 31
True memory (first event)	54%	*n* = 87
True belief after imagination (first event)	17%	*n* = 27
True memory after imagination (first event)	53%	*n* = 86
Detailed true report (first event)	65%	*n* =104
True belief (second event)	25%	*n* = 41
True memory (second event)	49%	*n* = 79
True belief after imagination (second event)	19%	*n* = 31
True memory after imagination (second event)	53%	*n* = 85
Detailed true report (second event)	70%	*n* = 113
True belief (fourth event)	22%	*n* = 36
True memory (fourth event)	51%	*n* = 83
True belief after imagination (fourth event)	20%	*n* = 32
True memory after imagination (fourth event)	55%	*n* = 89
Detailed true report (fourth event)	72%	*n* = 116
True belief (fifth event)	25%	*n* = 40
True memory (fifth event)	48%	*n* = 78
True belief after imagination (fifth event)	22%	*n* = 35
True memory after imagination (first event)	49%	*n* = 79
Detailed true report (fifth event)	68%	*n* = 109

Table 5.

Percentage and Number of False Beliefs and Memories as a Function of Conditions in Single and Repeated Groups

Memory Type	Single	Repeated
False belief	3 (4%; 3/83)	8 (10%; 8/78)
No false belief	80 (96%; 80/83)	70 (90%; 70/78)
False belief after imagination	3 (4%; 3/83)	6 (8%; 6/78)
No false belief after imagination	80 (96%; 80/83)	72 (92%; 72/78)
False memory	6 (7%; 6/83)	4 (5%; 4/78)
No false memory	77 (93%; 77/83)	74 (95%, 74/78)
False memory after imagination	5 (6%; 5/83)	5 (6%; 5/78)
No false memory after imagination	78 (94%; 78/83)	73 (94%; 73/78)
Detailed false report	7 (8%; 7/83)	10 (13%; 10/78)
No detailed false report	76 (92%; 76/83)	68 (87%; 68/78)

Table 6.

Percentage and Number of False Beliefs and Memories as a Function of Conditions in Negative and Positive Groups

Memory Type	Negative	Positive
False belief	9 (10%; 9/86)	2 (3%; 2/75)
No false belief	77 (90%; 77/86)	73 (97%; 73/75)
False belief after imagination	6 (7%; 6/86)	3 (4%; 3/75)
No false belief after imagination	80 (93%; 80/86)	72 (96%; 72/75)
False memory	6 (7%; 6/86)	4 (5%; 4/75)
No false memory	80 (93%; 80/86)	71 (95%, 71/75)
False memory after imagination	6 (7%; 6/86)	4 (5%; 4/75)
No false memory after imagination	80 (93%; 80/86)	71 (95%; 71/75)

Detailed false report	10 (12%; 10/86)	7 (9%; 7/75)
No detailed false report	76 (88%; 76/86)	68 (91%; 68/75)

Table 7

Percentage and Number of False Beliefs and Memories as a Function of Conditions Between Groups

Memory Type	Single Positive	Single Negative	Repeated Positive	Repeated Negative
False belief	0 (0%; 0/39)	3 (7%; 3/44)	2 (6%; 2/36)	6 (14%; 6/42)
No false belief	39 (100%; 39/39)	41 (93%; 41/44)	34 (94%; 34/36)	36 (86%; 36/42)
False belief after imagination	1 (3%; 1/39)	2 (5%; 2/44)	2 (6%; 2/36)	4 (10%; 4/42)
No false belief after imagination	38 (97%; 38/39)	42 (95%; 42/44)	34 (94%; 34/36)	38 (90%; 38/42)
False memory	2 (5%; 2/39)	4 (9%; 4/44)	2 (6%; 2/36)	2 (5%; 2/42)
No false memory	37 (95%; 37/39)	40 (91%, 40/44)	34 (94%, 34/36)	40 (95%, 40/42)
False memory after imagination	2 (5%; 2/39)	3 (7%; 3/44)	2 (6%; 2/36)	3 (7%; 3/42)
No false memory after imagination	37 (95%; 37/39)	41 (93%; 41/44)	34 (94%, 34/36)	39 (93%; 39/42)
Detailed false report	3 (8%; 3/39)	4 (9%; 4/44)	4 (11%; 4/36)	6 (14%; 6/42)
No detailed false report	36 (92%; 36/39)	40 (91%; 30/44)	32 (89%; 32/36)	36 (86%; 36/42)