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## THE ROLE OF TIME DELAY IN MEMORY CONFORMITY

Memory conformity occurs when one person's memory report influences another person's subsequent report concerning the same event. In the study, we tested whether an increase in the time between a discussion of the event and its recall would be accompanied by an increase in the number of errors suggesting memory conformity. It turned out that their number was comparable, both a few minutes and a week after the conversation. In both cases, this effect was due to memory mechanisms.

**Keywords:** memory conformity; misinformation effect; social influence.

Past events are often reminisced about in the presence of other people. Memory conformity occurs when one person's memory report affects his or her interlocutor's later memory reports of the same event (Wright, Self, & Justice, 2000). Studies of this phenomenon have been focused on the misleading information provided during an interaction of two people. The main aim of this study is to investigate the influence of time delay between the discussion of a past event and its recollection on the frequency of errors caused by memory conformity. The second objective of this study is to investigate the mechanisms underlying memory conformity.

There is an important difference between the experimental conditions in which memory conformity has usually been investigated and the occurrence of

the phenomenon of memory conformity in natural settings (for example, during witness testimony). In most experiments there were no delays between the presentation of events, discussion, and memory test (e.g., Wright et al., 2000; Wright, Mathews, & Skagerberg, 2005), whereas in real-life situations there is usually a shorter or longer time delay between observing a certain event, talking about it with others, and recalling it later.

So far, there has been no published study about the effect of time delay between discussion and memory test on susceptibility to misleading information provided by another person. Two experiments investigating the misinformation effect, in which misleading information was provided in a different way than during an interaction between people, dealt with this problem (Loftus, Miller, & Burns, 1978; Peterson, Parsons, & Dean, 2004). The results of these studies suggested that a longer time delay between introducing misinformation and memory test resulted in a slight decrease in the number of answers consistent with the misleading information. It is possible that a longer time delay between talking about a certain event and memory test will also reduce the effect of misleading information from the discussion on memory reports. Different time intervals between the discussion of an event and recalling it may also change the underlying mechanisms of memory conformity.

In one of the review articles (Wright, Memon, Skagerberg, & Gabbert, 2009), three reasons for memory conformity were suggested: normative influence (compliance with the other person because of social norms), informational influence (compliance with the other person in order to be right), and memory distortion. In the present study, reasons for memory conformity have been divided into two groups. The first group explains memory conformity with changes that occur in memory. In other words, misleading information that is provided in a conversation changes the memory of the original event. For example, a person may feel that they saw a detail in the video, whereas they learned about it in the discussion. The second group of mechanisms operated in a situation when a person has an unchanged memory trace. In this case, memory conformity is caused by the social context of the described phenomenon, which means what takes place is either normative influence (a person remembers that they saw something different the video but does not want to disagree with the other person) or informative influence (a person remembers that they saw something different in the video, but has more trust in what the other person has said).

The aim of the present study was to investigate the relative contribution of these two groups of mechanisms to memory conformity and to answer the question of whether the relative contribution of these mechanisms depends on the

time delay between discussion and recall. A similar problem was investigated by Oeberst and Seidemann (2014). They found that it was mainly informational influence that was responsible for memory conformity. However, Oeberst and Seidemann did not test the effect of time delay. Also, misleading information was not provided in a conversation; the participants only took a true-false recognition test together. In the present study, it was assumed that social mechanisms would be more important in a condition with a short time delay between discussion and later recall. In this case, the mutual influence of two persons should be the most significant, and their memory of the original event should be fairly good. By contrast, the role of memory mechanisms should become more significant with a longer time delay. After a long time interval, the occurrence of errors resulting from forgetting and memory distortions that include information obtained from an interlocutor should be more likely.

To conclude, this study has been designed to test the following hypotheses:

1. The participants who have been given details absent in their version of the video by an interlocutor will make more errors related to memory conformity compared with the participants individually describing the video to the experimenter. Errors stemming from memory conformity will involve answers consistent with the alternative version of the video (seen by the interlocutor), but inconsistent with what the participants saw themselves. The confirmation of the first hypothesis will ensure us that memory conformity actually occurred in our experimental conditions.

2. There will be more errors related to memory conformity when the memory test occurs immediately after the discussion than when it is conducted a week after the discussion.

3. Errors related to memory conformity will include errors resulting from both social mechanisms (in the source memory test, the participants will indicate a difference between information from the video and information obtained from the interlocutor) and memory mechanisms (in the source memory test, the participants will indicate that the information that was in fact given by the interlocutor was present in the video).

4. If the memory test is conducted a few minutes after the discussion, errors caused by social mechanisms will be more frequent than errors caused by memory mechanisms.

5. If the memory test is conducted a week after the discussion, errors caused by memory mechanisms will be more frequent than errors caused by social mechanisms.

## METHOD

### Participants

The participants were 98 students of the Jagiellonian University in Cracow (including 76 women). We randomly assigned them to three groups: the pair condition without time delay (Pair Condition 1), the pair condition with a week-long delay (Pair Condition 2), and the individual condition. The participants were paired in both experimental conditions. We carefully checked to make sure that the two people in each pair had not been previously acquainted. There were 36 participants in the pair condition without time delay and 32 participants in the individual condition. Because of the week-long delay, some participants did not appear for the last experimental session in Pair Condition 2; ultimately, this condition included 26 participants. The youngest participant was 18 years old and the oldest one was 31 years old ( $M = 21.75$  years,  $SD = 2.75$ ).

### Materials

#### *Two versions of the video*

The two versions of the video were provided by Helen Paterson; they had been used in her experiments on memory conformity (e.g., Paterson & Kemp, 2006). The videos show a man who, pretending to be fixing something in the building, breaks into one of the flats. The versions differed in five details: the profession the burglar used to introduce himself (housing company employee vs. plumber), the clothes of the robbed woman (leather jacket vs. bright blouse), the day of the week (Tuesday vs. Thursday), one of the stolen items (mobile phone vs. no mobile phone), and the way the thief got inside the flat (pushed the unlocked door vs. turned the doorknob).

#### *The Memory Test*

A three-alternative forced-choice recognition test was prepared for the purpose of the experiment; it consisted of 12 questions concerning the details presented in the video. For each question, one of the three alternatives offered was the correct answer, describing a detail that actually appeared in the version of the video the person had seen. Five of the 12 questions referred to the critical items that were different in the two versions of the video. In the case of these five questions, one of the remaining two alternatives referred to a detail not present in

the subject's version of the video but present in the interlocutor's version. The remaining seven filler questions referred to details that were present and identical in both versions of the video.

### *The Source Memory Test*

For the purpose of the experiment, we modified the test that was used by Polczyk (2007) in his experiments on the misinformation effect. The test allows to infer about the mechanisms underlying the effect of misleading information on later memory reports. The participants are asked to determine what the source of their answer in the Memory Test was (video only, discussion only, both video and discussion). Additionally, the participants are asked to write down what information exactly appeared in the video and/or what information was mentioned in the discussion (if they believed that the information appeared in these sources). In the Source Memory Test, only those answers were analyzed in which the participants had made memory conformity errors in the Memory Test. The two groups of memory conformity mechanisms were identified based on performance in the Source Memory Test. In the case of social mechanisms, the participant correctly indicated what information appeared in the video and what information was present in the discussion. The person was thus aware of the difference between the information from the video and the information from the conversation. Memory mechanisms were identified when the participant did not possess an accurate and complete memory record of the video (see Polczyk, 2007, for a similar procedure). We divided these cases into three groups: (1) when asked about the presence of a given detail in the video, the participant answered affirmatively but gave information consistent with what they had learned from the interlocutor; (2) the participant was not able to provide information appearing in the video; (3) the participant believed that the information was not present in the video at all.

## **Procedure**

### *Pair Condition 1*

During one experimental session, two persons were tested. They were informed that the experiment concerned sharing information in the social context. Each participant was shown a video presenting a crime on an individual computer. They were unaware that the other person saw a different version of the video.

After that, they were asked to discuss the video freely, and they were told that their discussion should cover what the characters and the setting looked like, the sequence of events, and the dialogs. All discussions were recorded, and the experimenter was present in the laboratory room to make sure that the key details appeared in the conversations. After the discussion, the participants spent five minutes filling in personality questionnaires unrelated to the purpose of the study. Next, the Memory Test and the Source Memory Test were administered.

### *Pair Condition 2*

The procedure was similar to that in Pair Condition 1. The only difference was that there were two experimental sessions; the Memory Test and the Source Memory Test were administered individually after a one-week delay.

### *The individual condition*

The procedure was similar to that in Pair Condition 1, but instead of discussing the video with the interlocutor the participants individually described it to the experimenter. A comparison of the individual condition and Pair Condition 1 makes it possible to infer about the occurrence of the memory conformity effect without administering the Memory Test and the Source Memory Test twice. This comparison eliminates the possibility that errors related to memory conformity were caused by participants' guessing in the Memory Test in the pair condition.

## **RESULTS**

We adopted the .05 level of significance throughout the analyses. We excluded four participants from these analyses because during the discussion they figured out that two versions of the video were used in the experiment. In order to verify whether memory conformity occurred in the experiment, we compared the individual condition and Pair Condition 1 with respect to errors related to memory conformity. The discussion (when the participant could get to know the detail present in the interlocutor's version of the video) was the only difference between these two conditions. The Memory Test was conducted during the same experimental session in both conditions. The results were submitted for statistical analysis using Student's *t*-test. There was a statistically significant difference between the participants who discussed the video with an interlocutor ( $M = .97$ ,  $SD = .88$ ) and the participants who only described it to the experimenter

( $M = .41$ ,  $SD = .61$ ) in the number of the memory conformity errors,  $t(66) = -3.04$ ,  $p < .01$ ,  $d = 0.74$ .

Thus, Hypothesis 1, according to which people make more errors related to memory conformity when the interlocutor tells them about the details absent from their version of the video, was confirmed. Errors related to memory conformity were subtracted from the overall number of errors in the Memory Test. Then, we performed Student's  $t$ -test to compare the individual condition and Pair Condition 1. There was no significant difference between the conditions ( $t(69) = -1.06$ ,  $p = .29$ ): Pair Condition 1 ( $M = .64$ ,  $SD = 1.1$ ) and the individual condition ( $M = .41$ ,  $SD = .61$ ). Taken together, the results indicate that memory conformity did occur in the pair conditions, and the errors that involved participants' choice of those details that were absent in the video they had seen resulted from the discussion rather than other factors (e.g., guessing or poorer memory of the video).

Next, we compared Pair Condition 1 ( $M = .97$ ,  $SD = .88$ ) and Pair Condition 2 ( $M = 1.46$ ,  $SD = 1.05$ ) on the number of memory conformity errors. There was no significant difference between the conditions,  $t(60) = 1.74$ ,  $p = .09$ ,  $d = .51$ . There was only a slight tendency for the number of memory conformity errors to be higher when the Memory Test was administered a week later. This means Hypothesis 2 was not confirmed.

Another aim of the study was to investigate why individuals base their memory reports on misleading information provided by the interlocutor during the discussion. For that purpose, we used the Source Memory Test. Four people whose answers indicated that they did not understand the instructions were excluded from further analyses. Eventually, 68 errors related to memory conformity from both pair conditions were analyzed; there were 34 such errors in each condition. We found that 94.12% of all errors related to memory conformity were caused by memory distortion. In the case of 84.38% of such errors, the participants falsely reported that they had seen saw a detail in the video although they could learn about it only from the discussion. In 12.5% of cases, the participants did not remember what information was present in the video. More than 3 percent of errors (3.12%) occurred because the participants were convinced that a particular information was not present in the video at all.

Thus, in accordance with Hypothesis 3, both social and memory mechanisms were observed. However, memory conformity errors caused by social mechanisms were very rare. It was only in the case of 4 errors (2 per each condition) that the participants were aware of the differences between the details from the discussion and the details from the video. Errors caused by memory mechanisms

were significantly more numerous than errors caused by social mechanisms in both pair conditions (sign test:  $Z = 4.97$ ,  $p < .001$ ). Therefore, Hypothesis 5 was confirmed but Hypothesis 4 was not<sup>1</sup>.

## DISCUSSION

This study is the first replication of the experiments on memory conformity in a Polish population. To our best knowledge, it is also the first analysis of the influence of time delay on the size and mechanisms of memory conformity in the literature. The results of this study show that the risk of memory conformity is substantial when two people discuss a past event and their statements contain false information about the event. It was assumed that the number of the memory conformity errors would decrease with time, but we observed no such decrease. There was even a trend in the opposite direction, with more such errors made after a week. Therefore, the influence of the information obtained in a discussion with the other person about a past event does not seem to decline with time; it may even increase.

Our results are opposite to those obtained in studies on the misinformation effect (Loftus et al., 1978; Peterson et al., 2004). This may be due to the importance of the discussion. It is possible that direct interaction, which is a necessary condition for memory conformity, is of greater importance and arouses stronger emotions than a description of a past event or other types of misleading materials. This explanation seems to be supported by a study conducted by Paterson and Kemp (2006). In their experiments, misleading information provided by the interlocutor in a direct interaction had a stronger influence on the subsequent answers than the same information included in written material.

The analyses of the mechanisms underlying memory conformity suggest an additional explanation of the results of our study. Most errors related to memory conformity, regardless of whether they were made a week or just a few minutes after the discussion, were caused by memory distortion. Only four errors were made by the participants who were aware of the difference between the video and the discussion. Since just after the discussion a person was unable to recall the information seen in the video, the memory of the observed events may have got only worse with time.

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<sup>1</sup> Gender differences were measured as well. The number of memory conformity errors made by women ( $M = 1.1$ ,  $SD = 1.04$ ) and men ( $M = 1.5$ ,  $SD = 1.38$ ) did not differ significantly in the experimental groups:  $t(60) = -1.12$ ,  $p = .26$ .



It can be concluded that among individuals who witnessed a certain event a discussion about this event changes memory, especially when the discussion includes information inconsistent with the original event. However, another explanation is possible as well. Some participants might have not have remembered some details from the video already after the presentation, and the discussion could have been the source of information about these details for them. These participants might have been unaware of that because they mistakenly believed that the information they obtained in the discussion actually came from the video. Their lapses of memory might have been filled in that way. This possibility should be investigated in future research.

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