

Memory conformity: Disentangling the steps toward influence during a discussion

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When two people see the same event and discuss it, one person's memory report can influence what the other person subsequently claims to remember. We refer to this as *memory conformity*. In the present article, two factors underlying the memory conformity effect are investigated. First, are there any characteristics of the dialogue that predict memory conformity? Second, is memory conformity differentially affected when information is encountered that omits, adds to, or contradicts originally encoded items? Participants were tested in pairs. The two members of each pair encoded slightly different versions of complex scenes and discussed them prior to an individual free recall test. The discussions were audiotaped, transcribed, and analyzed. Our most striking finding was that the witness initiating the discussion was most likely to influence the other witness's memory report. Furthermore, witnesses were most likely to be influenced when an additional (previously unseen) item of information was encountered in the discussion.

It is natural for people to discuss their memories. However, research has shown that when two people discuss an event, what one says can influence the other, so that details encountered in the discussion are reported in subsequent recall (Gabbert, Memon, & Allan, 2003; Gabbert, Memon, Allan, & Wright, 2004; Kanematsu, Mori, & Mori, 2003; Wright, Self, & Justice, 2000). This has been described as memory conformity (Gabbert et al., 2003; Wright et al., 2000) and as social contagion of memory (Meade & Roediger, 2002; Roediger, Meade, & Bergman, 2001). Studies have shown that memory conformity can occur for autobiographical memories (e.g., Pasupathi, Stallworth, & Murdoch, 1998), as well as for episodic memories for either neutral or simulated crime events (e.g., Marsh, Tversky, & Hutson, 2005; Roediger et al., 2001). Although the effects of memory conformity are often without consequence, when they occur in an eyewitness situation, there can be serious implications. For example, what might look like *corroboration* between witnesses might actually be *contamination* of one witness's evidence by that of the other.

Often memory conformity studies have not allowed for a situation in which each person's memories for jointly

encoded stimuli can be freely discussed and in which conflicting recollections can be debated (e.g., Meade & Roediger, 2002; Roediger et al., 2001; Wright, Mathews, & Skagerberg, 2005). Thus, there has been no attempt to focus on the interaction that occurs during joint remembering, in order to investigate how memory conformity might occur in real life. The present study extended previous research by employing a paradigm in which such interaction was possible and, thereby, exploring the process by which individuals come to be influenced during a natural discussion. It is natural to expect that when an event is jointly remembered, there will be differences in the details that each discussant remembers and reports. Thus, each person can encounter novel items of postevent information (PEI) that do not match his or her original memory representation for the event. We were interested in how such discrepant items of PEI would be received in a discussion and whether or not they would be errantly reported in a subsequent individual free recall test. Previously, Edwards and Middleton (1986) had found that during collaborative retrieval, people negotiated memories by influencing each other's recollections. This was most clearly marked where disagreements occurred. Thus, we deliberately manipulated the stimuli that each member of a dyad encoded, to encourage disagreements about what had been seen. Our primary aim in Experiment 1 was to examine whether any characteristics of the dialogue (such as who mentioned discrepant PEI first and whether this was disputed) would predict memory conformity.

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A second aim was to examine the relative influence of different types of PEI. Previous research has most often explored the effect of encountering *contradictory* misinformation. For example, since Loftus's early work (e.g., Loftus, Miller, & Burns, 1978), participants in studies in which the misinformation paradigm has been used typically have made a choice between an original item and a contrasting postevent detail (e.g., a screwdriver vs. a hammer). Subsequently, Wright, Loftus, and Hall (2001) used a variant of the basic PEI procedure to show that it is possible to both *add* information into memory and to make it *less* accessible. Thus, PEI can result not only in memory change, but also in the creation of new memories by the addition of new details not witnessed or by the omission of a detail. In Experiment 2, we explored the *relative* influence of encountering PEI that takes the form of a *contradictory* detail (e.g., seeing a yellow car but hearing that it was green), an *additional* detail (e.g., hearing that a car was present when it was not), or an *omitted* detail (e.g., hearing no mention of a car that had been present).

EXPERIMENT 1

Method

Participants. Sixty-six first-year psychology students participated in return for course credit. One dyad was excluded from the analyses after expressing suspicion about the experimental manipulation. Thus, data from 64 participants were included (17–36 years; $M = 18.8$, $SD = 2.7$).

Materials. Four pictures of complex scenes containing a number of details regarding objects, descriptions, and so forth were used as stimuli for encoding (adapted from Forbes & Venneri, 2003). Two versions of each picture were created that were the same except for two *contradicting* details (see Table 1). We will refer to these as *critical items*. Each member of a dyad saw a different version of each of the four pictures. Thus, over four pictures, dyad members encountered eight critical items that contradicted a detail that his or her partner had seen. Pilot data ($n = 19$) showed that each of the details was remembered approximately as well as the contradicting item in the other version. The mean number of critical items remembered from Version A was 6.30 ($SD = 1.33$), and the mean number from Version B was 6.67 ($SD = 1.24$).

Procedure. Each participant was paired with a previously unacquainted person to form a dyad. The participants were informed that they were taking part in a picture memory study and would be shown four pictures that they would be asked to recall both jointly and individually. The dyad members were led to believe that they were seeing identical pictures.

To start the experiment, the first picture was placed face down in front of each participant. The participants turned the picture over

on the experimenter's command and placed it facedown again once an alarm indicated that 30 sec had passed. One person saw what we will call Version A, and another saw Version B. Neither participant could see the partner's picture. The participants then worked through a filler task individually for approximately 10 min. Next, the participants were asked to jointly recall the picture that they had just studied by discussing it in as much detail as possible. The participants then individually completed a free recall test. They were told to think back to the picture they had just viewed and to report the details that they could remember seeing. No time limits were imposed for the joint or the individual recall tasks. On completion, the participants worked through another 10-min filler task individually. The second picture was then studied for 30 sec in the same way as before, with each dyad member seeing either Version A or B. Filler tasks were then administered for 10 min before the co-witness discussion phase for the second picture. The same procedure was followed for the individual free recall test. This procedure was repeated until all four pictures had been shown.

Immediately following the experiment, all the participants were thanked and fully debriefed. In a posttest manipulation check, dyad members were asked if they had been aware that they had seen different pictures. One dyad expressed suspicion about the experimental manipulation, and their data were excluded from the analyses.

Coding. The four discussions for each dyad were audiotaped, transcribed, and coded in relation to which member of the dyad had been the first to mention a critical item and whether or not this item had been disputed by the other person. A response was considered to be a dispute when the second person either questioned or argued against what the first person had recalled.

The free recall responses were coded in relation to the number of accurate and errant neutral details from the pictures and the number of accurate and errant critical items. A critical item was deemed accurate or errant depending on whether the participant had accurately reported a critical item that he or she had seen or had errantly reported the critical item that his or her partner had seen.

Data from the four discussions and four individual free recall tests were pooled for the analyses.

Results and Discussion

The experiment was designed to test whether any specific characteristics of the dialogue between dyad members would predict memory conformity. Thus, the following analyses will focus only on the critical items that were discussed. Each dyad encountered 8 contradicting critical items that could potentially be discussed. The number of items actually discussed varied from 4 to 8, with 198 critical items discussed in total.

In the subsequent individual recall test, it was possible for each dyad member to (1) correctly report the critical item that he or she had seen, (2) report both his or her own and the partner's critical items, (3) report neither critical item, or (4) incorrectly report the critical item that his or

Table 1
Outline of the Critical Differences Between the Two Versions of Each Picture

Picture	Version A	Version B
1. Kitchen	a. Two cups and a plate near the sink b. Tree visible through kitchen window	a. Two cups and a teapot near the sink b. House visible through kitchen window
2. Town center	a. Man up ladder painting window frame b. Man walking his dog	a. Man up ladder washing window b. Woman walking her dog
3. Living room	a. Rug visible in bottom left of picture b. Woman holding a cigarette	a. Coffee table visible in bottom left of picture b. Woman holding a glass of red wine
4. Crossroad	a. Grocers shop on street corner b. Yellow car with baby in the back	a. Florists on street corner b. Green car with baby in the back

her partner had seen. Table 2 shows the accuracy of the critical items reported in the individual free recall test for those who had been the first to mention a critical item in the discussion and for the recipients of the information. Dyad members who were first to mention the critical item that they had seen correctly reported that critical item at test 79% of the time. This compares with 32% accuracy for the person who had been the recipient. The recipient often added the information suggested by the other person into his or her report, reporting either both items (11%) or just the incorrect item (35%). The corresponding percentages for the person first mentioning the item were 5% and 7%. This shows that the person initially mentioning the item most often influenced the other person. We will define *influenced* as a person's reporting an errant critical item that his or her partner had suggested.

Overall, following a critical item's being mentioned in the discussion, disputes occurred 39% of the time. Following a dispute, errant critical items were reported at test 31% of the time, as opposed to 26% when there was no dispute. Multilevel logistic regression analysis was performed with *influenced* (yes/no) as the outcome variable and two predictors: *mentioned critical item first?* (yes/no) and *disputed critical item?* (yes/no). The participants were more likely to be influenced if they were not the person who initially mentioned the item [$\chi^2(1) = 59.31, p < .001$]. Whether a critical item was disputed did not predict whether or not it was subsequently reported at test [$\chi^2(1) = 1.06, p = .30$], nor was there a significant interaction between the two predictor variables [$\chi^2(1) = 2.23, p = .14$].

In summary, a memory conformity effect was found in which the participants frequently reported the items suggested to them by their partners. A strong association was found between response order and memory conformity, where the first person to mention the item was *more* likely to influence the other person. Even when a critical item was recalled in the discussion and then disputed by the partner, the person who mentioned the item first was unlikely to be influenced.

The association between response order and memory conformity is both novel and intriguing. In Experiment 2, we attempted to replicate this result with a different set of stimuli (simulated crime videos). In addition, in Experiment 2, we compared the relative strength of the memory conformity effect depending on whether the details discussed were contradictory, added, or omitted. It is possible that these forms of PEI are processed differently when they

are encountered (Wright et al., 2001; Wright, Mathews, & Skagerberg, 2005). For example, contradictory PEI might be more salient than added PEI details and, thus, more likely to be detected as discrepant and rejected. This theorizing is based on Loftus's *discrepancy detection* hypothesis, which proposes that the more likely a person is to detect a discrepancy between his or her original memory and the PEI, the less likely he or she is to be influenced by it (see Loftus, Levidow, & Deusing, 1992). In a similar way, if an individual notices that his or her partner has not mentioned a particular item or if the partner claims to have no memory for the item, the individual is likely to think that the item has simply gone unnoticed or has been forgotten by the partner, rather than questioning whether or not it was present. We would, therefore, expect that omitted items are not very influential.

EXPERIMENT 2

Method

Participants and Design. Fifty-eight first-year psychology students participated in return for course credit (18–24 years; $M = 18.83, SD = 1.26$). The study had a between-subjects design with two conditions, in which either added and omitted PEI details were encountered or contradicting PEI details were encountered. Twenty-eight participants were randomly allocated to the *addition/omission* condition, and 30 participated in the *contradiction* condition.

Materials. A *simulated crime event* depicted a man committing an opportunistic car break-in, followed by a house break-in, where he steals a number of items. Four versions of this event were filmed, each approximately 3 min in length. Each version contained exactly the same sequence of actions and events, with the exception of four critical items (see Table 3). In the addition/omission condition, each member within a dyad saw two critical items that the co-witness had *not* seen in his or her version of the event—that is, items that were present in one video, but not in the other. For example, the participant either saw a version in which the thief put on a hat before leaving the house (Version A) or a version in which the thief simply left the house without putting a hat on (Version B). In the contradiction condition, the participants saw four contradicting details—for example, the thief wearing a blue hat (Version C) versus the thief wearing a white hat (Version D). Pilot data ($n = 15$) showed that the contradicting details of the different versions were remembered approximately as well as each other: Version A, $M = 1.47, SD = 0.88$; Version B, $M = 1.53, SD = 0.64$; Version C, $M = 3.40, SD = 0.83$; and Version D, $M = 3.20, SD = 1.01$.

Procedure. Each participant was paired with a previously unacquainted person to form a dyad, and then they were randomly allocated to one of the two experimental conditions. On arrival, they were informed that each of them would be completing a set of tasks in a different order and were separated at this point. One dyad member worked through a filler task while the other was seated in front

Table 2
Accuracy for Critical Items Reported at Test by the Participants Who Had Been the First to Mention a Critical Item in the Discussion and by the Recipients of the Information

	Correct Critical Item Reported		Both Critical Items Reported		Neither Critical Item Reported		Incorrect Critical Item Reported		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Mentioned first	157	79	9	5	19	10	13	7	198	100
Did not mention first	63	32	21	11	45	23	69	35	198	100

Table 3
Outline of the Critical Differences Between the Versions of Each Event

Condition 1: Additions	
Version A	Version B
Thief steals £20 from purse in car.	Thief <i>does not steal anything</i> from purse in car.
Thief steals a <i>mobile phone</i> from the living room.	Thief <i>does not steal a mobile phone</i> from the living room.
Thief looks at the <i>computer disks</i> but <i>does not knock them to the floor</i> .	Thief purposefully knocks <i>computer disks</i> off the desk.
Thief <i>does not put on a hat</i> before leaving the house.	Thief puts on a <i>white</i> hat before leaving the house.
Condition 2: Changes	
Version C	Version D
Thief steals £20 from purse in car.	Thief steals a <i>credit card</i> from purse in car.
Thief steals a <i>mobile phone</i> from the living room.	Thief steals a <i>watch</i> from the living room.
Thief knocks a stack of <i>music CDs</i> off the desk.	Thief knocks a stack of <i>computer floppy disks</i> off the desk.
Thief puts on a <i>blue</i> hat before leaving the house.	Thief puts on a <i>white</i> hat before leaving the house.

of a television at the opposite side of the room to watch the event. The participant watching the video was asked to stop and to rewind the video once it had finished. Unknown to either dyad member, the first person watching the video had actually viewed the version that was in the second position on the videotape (Version B or D, depending on experimental condition). Thus, once the video had rewound to the beginning of the tape, the second participant was able to view the alternate version of the event (Version A or C). This setup enabled each dyad member to view a different version of the event, while believing that both members had seen the same version.

Once both participants had completed the filler task and viewed the videotaped event, they were given filler tasks to work through individually for approximately 10 min. Following this, the participants were asked to jointly recall the event they had just viewed by discussing it together in as much detail as possible. The dyad members then worked through further filler tasks for approximately 10 min before being given an individual free recall test. The instructions for the recall test were to report the details that they could remember having seen in the video.

Immediately following the experiment, all the participants were thanked and fully debriefed. A posttest manipulation check then asked the dyad members whether they had been aware that they had seen different pictures. None of the participants expressed suspicion about the experimental manipulation.

Coding. The same coding scheme as that used in Experiment 1 was applied to the transcribed discussions and free recall tests.

Results and Discussion

Data analysis focused on the following questions. First, was the relationship between response order and memory conformity seen in Experiment 1 replicated here? Second, what was the relative influence of contradictory, added, or omitted PEI on subsequent memory recall?

Each person encountered four critical items that differed from his or her partner's items. During the discussions, not all of these items were mentioned. Between one and four critical items were discussed by the members of each dyad. In total, there were 73 incidents where the members of the dyads discussed a critical item. In every one of these cases, the person who mentioned the item first was *not* influenced by the other person, whereas in 41 of the 73 cases (56%), those encountering the information were influenced. Thus, the association between mentioning an item first and influencing the other member of the dyad was very strong and replicated the finding in Experiment 1. Because of the strength of this relationship and,

in particular, our finding that nobody who mentioned a critical item first was influenced by his or her partner, we will not use the factor of who mentioned the item first when using more complex models to predict influence. The empty cell means that it is unwise to make inferences on the basis of models in which this factor is partialled out. Instead, we will examine in parallel how the other variables (type of PEI encountered and whether or not the critical item was disputed) predict who is subsequently influenced.

We treated the individual memory trials as nested within person (Wright, 1998) and ran a logistic regression using type of PEI encountered (contradictory, added, or omitted) to predict influence (run using MLwiN 2.0; Rasbash, Steele, Browne, & Prosser, 2004). The participants were most influenced when encountering *added* items (45% influenced), followed by *contradictory* items (29%) and then by seen but *omitted* items (10%). *Omitted items* refer to when an individual fails to report an item that he/she has actually seen, after discussing it with his/her partner, who has not seen it. The contradictory and omitted conditions were significantly different [$\chi^2(1) = 4.74, p = .03$]. The contrast between contradictory and added items approached significance [$\chi^2(1) = 2.84, p = .08$]. Given the exploratory nature of this research, this marginally significant effect deserves further scrutiny.

We performed a second logistic regression analysis to see whether influence would be predicted with the addition of a second predictor variable, *disputed* (yes/no). Overall, following a critical item's being mentioned in the discussion, disputes occurred 32% of the time. The association between dispute and influence was different for the added items than for the contradictory items [$\chi^2(1) = 5.55, p = .02$]. For the contradictory items, if there was a dispute, people were influenced only 15% of the time. This compared with 38% when there was no dispute. This condition was similar to Experiment 1, and the findings were replicated; that is, the presence/absence of a dispute had no relation to subsequent memory conformity [$\chi^2(1) < 1$]. When PEI that omitted a detail that had been seen was encountered, the percentage was 7% for disputed items and 12% for nondisputed items. However, when added items were encountered, if there was no dispute, people

were influenced 36% of the time. If there was a dispute, this went up to 60% (see Figure 1).

In summary, Experiment 2 replicated the finding of Experiment 1 that there is a strong association between response order and memory conformity. The person who first mentioned an item was most likely to influence the other person. In line with predictions, the participants were most likely to be influenced when encountering an *additional* item of PEI. The effect was strongest when the item was disputed in the co-witness discussion. It is possible that the uncertainty surrounding the additional information and the subsequent confirmation from a co-witness that the item had been present convinced the participants that they had missed this particular detail, perhaps due to a lapse of attention. Therefore, this information might simply have been accepted and subsequently reported at test.

As can be predicted from Loftus's discrepancy detection hypothesis, the participants were less likely to be influenced when encountering omitted items or contradictory PEI. It is possible that contradictory details allowed the participants to evaluate the PEI in relation to their original memory for the event, thus making it easier to detect a discrepancy between the two (e.g., Loftus, 1979; see also Schooler, Gerhard, & Loftus, 1986; Wright et al., 2005). Memory conformity was least likely to occur for omitted items.

GENERAL DISCUSSION

When two people see the same event and discuss it, what one person says can influence the accuracy of what the other person subsequently reports. This memory conformity effect was reliable across different stimuli and when the misleading PEI took the form of additional, omitted, or contradicting details.

When the transcribed discussions were analyzed, both experiments showed a relationship between response order and memory conformity. Specifically, the first dyad member to report a critical item was resistant to influence even when the memory was disputed. In contrast, dyad members who were *not* the first to mention a critical item

and, therefore, heard their partners report a detail that differed from their own memory were likely to be influenced and subsequently report what their partners had seen, as opposed to what they themselves had seen. Conformity to the person reporting a critical item first could occur as a consequence of normative or informational influence (Deutsch & Gerard, 1955). The distinction between these two motivations to conform continues to receive support, as a recent review of the social influence literature has demonstrated (Cialdini & Goldstein, 2004). Informational motivations to conform occur when an individual has a desire to be accurate. Thus, at test, an individual might choose to report an item of PEI encountered from the partner if he or she believed it to be correct. This may account for why increased conformity was found in Experiment 2 when added critical items were disputed. For example, participants often debated whether these additional items were present before apparently accepting that they were and, thus, (errantly) reporting them at test. In contrast, normative influence occurs when individuals want to appear to be in agreement with others in order to create a smooth interaction and increase their chances of being liked. The social psychological literature suggests that this type of conformity should occur only in public (see Cialdini & Goldstein, 2004). However, recent research has shown that normative motivations to conform can subsequently affect an individual's ability to remember the originally encoded stimuli (Gabbert & Allan, 2005; Reysen, 2005).

The relationship that we have found between response order and memory conformity does not imply causation, however. Instead, it is possible that the association between the two is spurious, with *each* being influenced by other variables. For example, it may be that there are particular individual and task characteristics that affect both who is likely to respond first in a two-person dialogue and who is likely to conform. An obvious candidate is that if someone believes that he or she has a very accurate memory, he or she is likely to respond first and not to be easily influenced. Future research implementing a procedure in which response order is brought under experimental con-

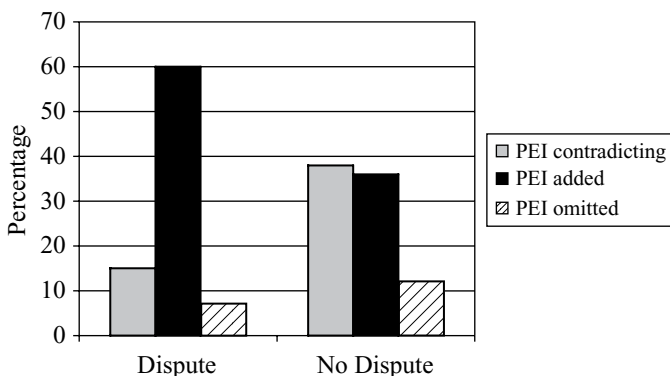


Figure 1. Percentage of errant critical items reported at test for each type of postevent information (PEI), split according to whether items were disputed or not disputed in the discussions.

trol, such as assigning dyad members the role of recalling first/second or employing a confederate to manipulate response order, would allow such individual and/or task characteristics to be investigated more precisely.

The extent to which memory conformity varies with the type of postevent detail (a contradiction, addition, or omission) has theoretical and applied relevance. It shows that different types of PEI are not equally influential, suggesting that they are perhaps processed differently. For example, drawing on Loftus's discrepancy detection hypothesis (Loftus et al., 1992) mentioned earlier, PEI that is relatively salient as a discrepant detail is more likely to be rejected as errant. The differing levels of conformity to each type of PEI in Experiment 2 thus supports Loftus's theory. Furthermore, this difference in susceptibility to different types of PEI suggests that perhaps informational, rather than normative, motivations to be correct underlie the conformity. Uniform susceptibility to PEI would be expected if normative motivations to conform were primarily accountable. From an applied perspective, the present research improves our understanding of the conditions under which memory conformity is most likely to occur and, possibly, the conditions under which it is likely to result in the creation of false memories.

In conclusion, two experiments have shown that susceptibility to memory conformity is associated with whether or not one is the first to mention one's own recollections when jointly remembering an event with another person. Further investigation of the factors that are actually responsible for the relationship between response order and memory conformity is clearly warranted. For example, what factors might influence someone reporting his or her recollections first in a discussion? The different levels of memory conformity following additions, omissions, or contradicting details suggest that individuals may process PEI in relation to informational evaluations of what might, or might not, have been seen.

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