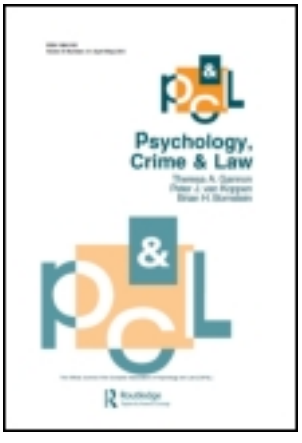

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# Memory conformity and suggestibility

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# Memory conformity and suggestibility

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The present study examined whether the degree to which participants engage in memory conformity, which occurs when a person alters their memory report of an event to be consistent with another person, can be predicted by their levels of interrogative suggestibility (IS), which is the degree to which people are susceptible to altering their memory reports during questioning. Memory conformity was introduced by having participant and confederate pairs study words and then complete a social recognition test where they took turns to make judgements to the same items. When the participants responded after the confederate, they tended to conform to confederate's judgements regardless of whether the confederate had made a correct or incorrect response. IS was measured using the Gudjonsson Suggestibility Scale 2. This scale allows separate measures of Yield, which is a measure of how susceptible people are to altering their memory reports of events as a result of leading questions, and Shift, which is a measure of how susceptible people are to changing responses to questions when placed under pressure to do so. Only Yield was a significant predictor of memory conformity.

**Keywords:** memory conformity; suggestibility; eyewitness testimony; collaborative remembering; individual differences



## *Memory conformity*

Memory conformity occurs when an individual alters their memory report of an event to be consistent with another person's differing, and sometimes erroneous, memory report of the same event (Gabbert, Memon, & Allan, 2003; Wright, Self, & Justice, 2000). Memory conformity can occur in forensic contexts as multiple eyewitnesses often discuss incidents before making a formal police testimony (Paterson & Kemp, 2005; Skagerberg & Wright, 2008) or providing evidence in court (Wagenaar & Crombag, 2005). There are several documented real world cases where misinformation has been imparted during an eyewitness discussion of an incident and those involved in the discussion have subsequently incorporated this misinformation into their testimonies (see Wright, Memon, Skagerberg, & Gabbert, 2009, and Wagenaar & Crombag, 2005, for examples).

Memory conformity has primarily been investigated in the laboratory. Some researchers have presented pairs of participants with slightly different versions of the same stimuli and then had them jointly recall/recognise what was studied. It has been found that when participants recall/recognise information that was unique to the stimuli they studied, their collaborative partner will often also claim to remember

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studying this information (e.g., Wright et al., 2000). Others researchers have had individuals and confederates jointly recall/recognise the same studied information, with the confederate introducing misinformation during collaboration. Participants often claim to remember this misinformation both during collaboration (e.g., Schneider & Watkins, 1996) and when later tested alone (e.g., Roediger, Meade, & Bergman, 2001). Memory conformity has also recently been demonstrated outside of the laboratory by Carlucci, Kieckhaefer, Schwartz, Villalba, and Wright (2011). In their study, a confederate approached small groups on a beach and interacted with one group member. After the confederate had departed, an experimenter asked the group members to identify the confederate in a target-absent line-up. Group members were twice as likely to conform to the responses of the person responding first if this person was the group member who interacted with the confederate. In a review of the literature, Wright et al. (2009) suggested memory conformity can occur as a result of either normative influence (whereby a participant knowingly reports errant information to avoid disagreeing), informational influence (whereby a participant is uncertain of the correct response and consequently reports the suggested errant information), or memory distortion (where a participant forms an episodic memory of the errant information). One of the current challenges in the literature is distinguishing between these three potential causes of memory conformity.



### *Individual differences in memory conformity*

Merckelbach, Van Roermund, and Candel (2007) tested for individual differences in participants' levels of compliance and their susceptibility to memory conformity. Compliance, in their study, referred to 'the tendency of the individual to go along with propositions, requests or instructions, for some immediate instrumental gain' (Gudjonsson, 2003, p. 370). To measure individual differences in compliance, Merckelbach et al. (2007) used the Gudjonsson Compliance Scale (GCS; Gudjonsson, 1989). It was found that participants who were susceptible to memory conformity had higher levels of compliance on the GCS than those who were not. This was, therefore, the first demonstration of individual differences in susceptibility to memory conformity. A further individual difference that seems to moderate memory conformity is social anxiety. This was demonstrated by Wright, London, and Waechter (2010) in a study where adolescents who scored high on measures assessing fear of negative evaluation, which is a component of social anxiety, were more likely to conform to the responses of others on a face recognition test than adolescents who scored low on measures assessing fear of negative evaluation.

### *Suggestibility*

An additional individual difference that may predict a person's susceptibility to memory conformity is their suggestibility. The term suggestibility is used within psychology to explain a wide array of diverse phenomenon, from hypnotic responsivity to simple gullibility (see Eysenck & Furneaux, 1945; Roediger, 1996; Schooler & Loftus, 1993, for reviews). The present article is referring to interrogative suggestibility (IS) which Gudjonsson and Clark (1986) define as 'the extent to which, within a closed social interaction, people come to accept messages communicated

during formal questioning, as the result of which their subsequent behavioural response is affected' (p. 84). There is evidence to suggest that there are two kinds of IS, called Yield and Shift, and these are only modestly correlated (see Gudjonsson, 2003, for a review). Yield measures the extent to which people give in to leading questions/misinformation implied in leading questions, whereas Shift is a measure of how people respond to interrogative pressure, which is pressure people face to change their answers to questions regardless of how accurate these answers are.

### *Aims and hypotheses*

The primary goal of the present research was to determine whether the degree to which participants succumb to memory conformity can be predicted by their levels of IS. To determine this, it was first necessary to create an instance of memory conformity. Memory conformity was introduced using a social recognition test, whereby participant and confederate pairs studied words lists and then completed a joint *old*/*new* recognition test where they took turns to respond to the same test items. For half the test items, the confederate responded first and provided a mixture of correct and incorrect responses. Using an identical procedure, Reysen (2005, Experiment 2) found that when participants responded second to a test item, then they tended to conform to the confederate's correct and incorrect responses. It is anticipated that a similar pattern of results will be observed in the present study.

IS was measured using Gudjonsson Suggestibility Scale 2 (GSS 2; Gudjonsson, 1987). The GSS 2 consists of a short narrative and 20 questions relating to the narrative: 15 of these questions are leading (implying details than never occurred in the narrative) and 5 are non-leading. The GSS 2 is used to objectively measure immediate and delayed recall of the narrative, the tendency of the participant to succumb to the 15 leading questions/ misinformation in these questions (Yield), and also the tendency of participants to change their answers to the 20 questions when told some of their original answers were incorrect (Shift).

Whereas memory conformity studies do not use leading questions, the present study does have a confederate introduce misleading information during a social interaction in an attempt to distort participants' memory. As people with heightened Yield scores have a tendency to be most susceptible to reproducing misinformation offered by others (see Gudjonsson, 2003, for a review), then it is possible that those participants in the present study who have the highest Yield scores will be the most susceptible to memory conformity. As Shift is a measure of how susceptible participants are to changing their answers to questions when experiencing pressure to do so, and no such pressure is applied in the present study, then it is expected that there will be no relationship between Shift and memory conformity.

Finally, the present study will examine if participants immediate and delayed GSS 2 narrative recall scores are predictors of the degree to which they are susceptible to memory conformity. This comparison is made as it is possible that participants who are most susceptible to memory conformity will also have the worst memory, meaning that they conform to the confederate's responses not because they are suggestible but because they do not remember the studied lists very well. Several researchers have, however, found no relationship between memory conformity and recall ability (e.g., Gabbert et al., 2003). It is, therefore, anticipated that no such relationship will be found in the present study.

## Method

### *Participants*

The participants were 30 female and 30 male undergraduate students from Edge Hill University who volunteered to take part in the study (age: $M = 21.34$, $SD = 5.28$). All participants spoke English as their first language. One 25-year-old female, who was not associated with any of the participants, acted as a confederate on all trials.

### *Stimuli*

Memory conformity was assessed using stimuli similar to that of Reysen (2005). Participants studied 60 common bi-syllabic items from the Toronto Word Pool (Friendly, Franklin, Hoffman, & Rubin, 1982). These words were incorporated into a PowerPoint presentation, with each displayed for two seconds. Participants then completed an *old/new* recognition test that contained the 60 studied words and 60 non-studied words also taken from the Toronto Word Pool. The recognition test was designed so that items 1–60 and items 61–120 both comprised of 30 studied and 30 non-studied words.

IS was assessed using the Gudjonsson Suggestibility Scale 2 (GSS 2; Gudjonsson, 1987). The standard GSS 2 procedure is for the experimenter to read out a story to participants that contains 40 main elements. The participants are asked to recall as much information from the story as possible, giving an 'Immediate Recall' score out of 40. Fifty minutes are then allowed to pass before free recall is tested again, giving a 'Delayed Recall' score out of 40. Interviewees are then asked 20 questions about the narrative; 15 of these are leading, in that they suggest certain non-existent details were part of the story. The number of leading questions participants answer incorrectly (i.e., confirming the existence of the non-existent details) is later tallied to provide a measure of Yield. After answering the 20 questions, the experimenter gives the participants negative feedback by stating that 'You have made a number of errors. It is therefore necessary to go through the questions once more, and this time try to be more accurate'. The questions are then asked again. The number of answers on the second set of questions that differed to the answers on the first set of questions is then tallied to provide a measure of Shift. The GSS 2 has high inter-rater reliability and validity (Gudjonsson, 2003).

### *Procedure*

Participants completed the social recognition test and the GSS 2 test over two separate testing sessions, one week apart. Participants were informed they would be taking part in a test of individual memory during one testing session and a test of collaborative remembering in a further session. The order in which participants completed each test was counterbalanced. For the social recognition test, individual participants and the confederate met outside the testing laboratory prior to the study commencing and both were greeted by the researcher as though they were genuine participants. The participant and confederate were seated at the same table and presented with the 60 items from the Toronto Word Pool PowerPoint presentation. The participant and confederate were asked not to talk or write anything down whilst studying these words. Following the presentation, the participant and the

confederate each completed a simple four-minute mathematical filler task. The participant and confederate were then provided with a single copy of the 120 item recognition test. They were told that they would be required to verbally report to the researcher whether each test item had previously been studied or not. The researcher then made a note of these responses on a sheet of paper. It was explained to both the participant and the confederate that they should try to be as accurate as possible when responding and they should not simply copy each other's responses. For items 1–60 on the recognition test, the researcher asked the participant to respond first to each item and the confederate second to each item. This created the control condition whereby the participant's uninfluenced responses could be examined. When responding second to these same test items, the confederate always made the correct response. For items 61–120, the confederate was asked to respond first to each item and the participant second to each item. For these items, the confederate made a mixture of 30 correct and 30 incorrect responses, with half the correct and incorrect responses relating to targets. This created two further conditions whereby the participants' responses after a correct and an incorrect confederate response could be examined separately.

When completing the GSS 2 test, the participants attended the laboratory alone. The participants were first asked to listen to the GSS 2 story being read aloud by the researcher. Following this, the participants were given a blank sheet of paper and asked to spend five minutes writing down as much information from the story as they could remember. The researcher then removed the recall sheet from the participant's view. The participants then watched a nature documentary that was completely unrelated to the present study. This documentary was introduced to ensure there was the required 50 minute delay between hearing the GSS 2 story and recalling it for a second time. After the 50 minute delay had elapsed, the participants were given a blank sheet of paper and asked to spend five minutes writing down as much information from the story as they could remember. Following this, the participants were informed that the experimenter was going to ask them 20 questions relating to the story they had heard at the start of the session. The experimenter read aloud each of the 20 questions to the participants, and the participants responded after each. After the 20 questions had been answered, the experimenter told the participants that several questions had been answered incorrectly and that a second opportunity to answer the questions would be given immediately. The study ended after the participants had answered all 20 questions for a second time.

It was only after all testing has been completed that participants were asked if they were aware that they had collaborated with a confederate during the social recognition test. None admitted to being suspicious. Had this been the case then all data from these participants would have been removed from the analyses.

## Results

### *Memory conformity*

The present analysis had three aims. The first was to determine whether or not memory conformity was occurring during the social recognition test. Signal detection theory is often used when analysing recognition test data to assess how well participants are able to discriminate between studied and non-studied stimuli

(e.g., Wright, Mathews, & Skagerberg, 2005). For readers not familiar with signal detection theory, a brief overview of it will now be provided (see Stanislaw & Todorov, 1999, for a comprehensive overview).

In signal detection theory, a hit refers to an instance where a participant correctly responds *old* to a studied item, whereas a false alarm refers to an instance where a participant incorrectly responds *old* to a non-studied item. Hits and false alarms are used to calculate an important signal detection theory measure called $d'$. $d'$ is the difference between the $z$-transformed probabilities of hits and false alarms and indicates how accurate participants are at discriminating between *old* and *new* items. No accuracy corresponds to a $d'$ of 0, with higher scores indicating greater accuracy. Memory conformity was measured by comparing participants accuracy levels (or $d'$) when they responded first, when the confederate responded first with a correct response, and when the confederate responded first with an incorrect response. If $d'$ increases following a correct confederate response and decreases following an incorrect confederate response, then this is indicative of memory conformity occurring. Participants' recognition test hits, false alarms, and $d'$ scores can be seen in Table 1. An alpha level of .05 was used for all statistical tests.

$d'$ score distributions, as assessed by the Kolmogorov-Smirnov test, were not significantly different from normal when participants responded first, $D(60) = .10$, $p = .20$, and after a correct confederate response, $D(60) = .10$, $p = .19$, but were significantly different from normal following an incorrect confederate response, $D(60) = .12$, $p = .30$, as a result of negative skew (Skewness = $-.60$, SE of Skewness = .31). Friedman's ANOVA was used to compare the participants $d'$ scores in each response condition. Prior to conducting Friedman's ANOVA, the statistical power of the analysis, with a sample size of 60 participants, was considered using Clark-Carter's (2009) guidelines. To achieve power of .80, using a medium effect size estimate, only 31 participants were required. Friedman's ANOVA revealed a significant effect of response condition $\chi^2(60) = 120.00$, $p < .001$. Follow-up Wilcoxon tests revealed an increase in participants $d'$ scores following correct confederate responses, $T = 0$, $p < .001$, $r = .61$, and a decrease in participants $d'$ scores following incorrect confederate responses, $T = 0$, $p < .001$, $r = .61$. Memory conformity was, therefore, observed in the present study.



Table 1. Participant hits, false alarms, hits-false alarms, and $d'$ scores during the social recognition test. Standard Deviations are in parentheses.

| Social Recognition Test Scores | | | |
|---|---|---|---|
| *Hits* | *FA* | *Hits-FA* | *d'* |
| | *Participant Responds First* | | |
| .63 (.04) | .25 (.06) | .38 (.04) | 1.03 (.22) |
| | *Confederate Responds First With Correct Responses* | | |
| .77 (.06) | .17 (.05) | .60 (.07) | 1.72 (.26) |
| | *Confederate Responds First With Incorrect Responses* | | |
| .48 (.05) | .58 (.08) | −.10 (.04) | −.24 (.12) |

***Memory conformity, Yield, and Shift***

The second aim of the present analysis was to determine whether participants' levels of Yield and Shift were predictors of memory conformity. Mean scores for each of these GSS 2 measures are included in Table 2 and are similar to the values reported by Gudjonsson (1987). Yield was calculated for each participant by tallying how many of the 15 leading questions they answered incorrectly. Shift was calculated by tallying how many answers to the 15 leading and 5 non-leading questions participants changed their answers to following negative feedback. The degree of memory conformity engaged in by each participant was calculated by tallying the differences between each participant's $d'$ scores when they responded first and when they responded after the confederate. This measure shall be referred to as *d′ change*. For example, if a participant's $d'$ score when responding first was .60 and after a correct confederate response it rose to .77, this is an increase in $d'$ of .17. Likewise if the same participants' $d'$ score after an incorrect confederate response dropped to .50, then this would be a decrease in $d'$ of .10. Together they provide a *d′ change* of .27 (.17 + .10).

Yield and Shift score distributions, as assessed by the Kolmogorov-Smirnov test, were significantly different from normal (Yield: $D(60) = .16$, $p < .001$; Shift: $D(60) = .17$, $p < .001$). The lack of normality in the Yield scores was related to positive skew (Skewness = .59, SE of Skewness = .31), whereas the lack of normality in the Shift scores was associated with extreme scores, whereby three (or 5%) participants obtained scores of 0 and two participants (or 3%) obtained scores of 5. *d′ change* was not significantly different from a normal distribution, $D(60) = .09$, $p = .20$. As the intention was to conduct two separate linear regressions with Yield and Shift as predictor variables and *d′ change* as the outcome variable, it was necessary to rank the data. Ranking is a common transformation to use when comparing scores among several variables as it makes the distributions of all these variables similar (Conover & Iman, 1981). Using Conover and Iman's classifications of rank transformations, the RT-2 transformation (ranking each of the variables) was used. The RT-2 transformation has previously been used successfully in a memory conformity study (Wright, Gabbert, Memon, & London, 2008) and is recommended for overcoming the problems associated with non-normality when conducting regression (Conover & Iman, 1981; Iman & Conover, 1979). The median rank for Yield was 25.50, for Shift was 24.00, and for *d′ change* was 30.50. Prior to conducting the linear regression analyses, the statistical power of the tests was again considered using Clark-Carter's (2009) guidelines. To achieve power above .80, using a medium effect size estimate, only 55 participants were required.

Table 2. Mean GSS 2 narrative recall scores and GSS 2 suggestibility scores. Standard Deviations are in parentheses.

| GSS 2 Narrative Recall Scores | |
|---|---|
| *Immediate Recall* | *Delayed Recall* |
| 21.92 (2.11) | 20.12 (2.99) |
| **GSS 2 Suggestibility Scores** | |
| *Yield* | *Shift* |
| 4.16 (1.84) | 2.37 (1.18) |

For the first linear regression, it was expected that Yield would be a significant predictor of *d′ change*. The linear regression revealed that Yield accounted for 12% ($R^2 = .12$) of the variance in *d′ change*, $F(1, 58) = 7.84$, $p = .007$. Moreover, Yield was a significant predictor of *d′ change* ($\beta = .34$, $p = .007$). Figure 1 shows a scatterplot of this linear regression. It was also predicted that Shift would not be a significant predictor of *d′ change* and results from the linear regression confirmed this ($\beta = .05$, $p = .71$). Yield is, therefore, a significant predictor of memory conformity in the present study whereas Shift is not.

### *Memory conformity, immediate narrative recall, and delayed narrative recall*

The final aim of the analysis was to determine whether participants' performance on the delayed and immediate GSS 2 narrative recall tests predicted the degree of memory conformity they engaged in. The GSS 2 narrative had 40 salient elements and participants were awarded one mark for each element correctly recalled. Mean and standard deviations for the amount of information recalled on both recall tests can be seen in Table 2. These are similar to those reported by Gudjonsson (1987). As discussed above, the lack of normality associated with the Yield and Shift scores led to an RT-2 transformation of all data, prior to two separate simultaneous multiple regressions being conducted where Yield and Shift were predictor variables and immediate recall (*Mdn Rank* = 30.50) and delayed recall (*Mdn Rank* = 36.00) were outcome variables. Also prior to conducting the multiple regression analyses, the statistical power of the tests was considered using Clark-Carter's (2009) guidelines. To achieve power above .80, using a medium effect size estimate, 79 participants were required, meaning the analyses had less than the desired power and any non-significant results need to be treated with caution. Simultaneous multiple regressions demonstrated that neither Yield nor Shift were predictors of immediate recall (Yield:

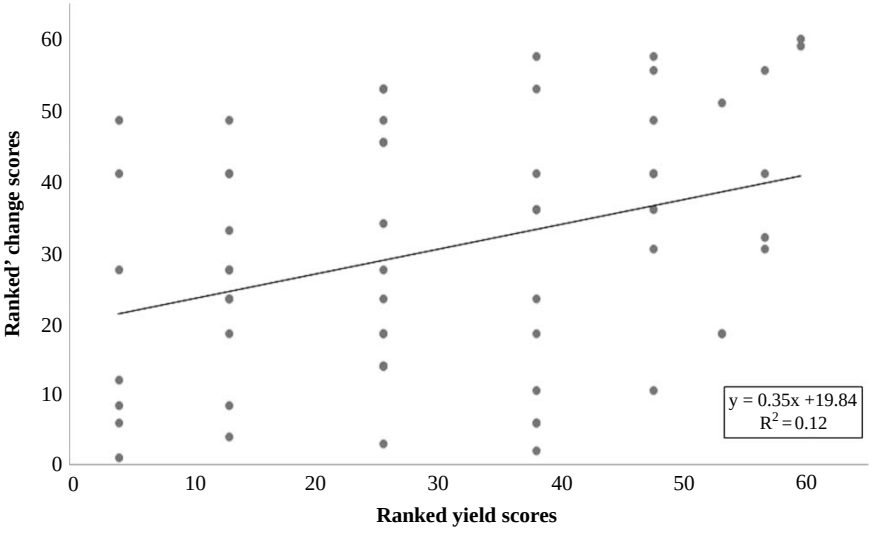


Figure 1. Scatterplot of the linear regression analysis for memory conformity (as measured by *d′ change*) and Yield.

$\beta = -.01$, $p = .93$, Shift: $\beta = -.10$, $p = .44$) or delayed recall (Yield: $\beta = .01$, $p = .99$, Shift: $\beta = -.02$, $p = .84$) in the present study.

## General discussion

The primary goal of the present study was to determine whether IS, as measured by the GSS 2 (Gudjonsson, 1987), is a predictor of memory conformity. IS has two moderately correlated components, namely Yield and Shift, and the GSS 2 provides a measure of both, so the ability of each to predict memory conformity was examined. Memory conformity was introduced by having participant and confederate pairs engage in a social recognition task where they took turns to make judgements to the same test items. It was found that when the participants responded second to the test items, they had a tendency to conform to the confederate's responses regardless of whether these responses were correct or incorrect. The memory conformity observed during collaboration in the present study is consistent with past research (e.g., Reysen, 2005; Roediger et al., 2001; Schneider & Watkins, 1996).

Participants levels of Yield, which is a measure of how likely they are to succumb to leading questions during a social interaction, was a predictor of the degree of memory conformity they engaged in. Although the misinformation in this study was not introduced via leading questions, people with heightened Yield scores do have a tendency to be most susceptible to reproducing misinformation offered in leading questions (see Gudjonsson, 2003, for a review). This finding therefore suggests that people who have high levels of Yield may be susceptible to both leading questions and memory conformity. Shift, which is a measure of how likely people are to change their answers to questions when put under pressure to do so, was not a predictor of the degree to which participants succumbed to memory conformity. This latter finding is unsurprising as there was no interrogative pressure during the collaborative remembering phase of the present study.

Finally, the present study found that narrative recall ability was not a predictor of memory conformity. Although these statistical analyses lacked the required power, this finding is consistent with past research which suggests participants who succumb to memory conformity are not necessarily those with the worst memory (Gabbert et al., 2003). This adds further credence to the suggestion that participants were succumbing to memory conformity as a result of their Yield levels and not because they had poor memories and were utilising the confederate's responses during collaboration to compensate for this.

From a psycho-legal perspective, memory conformity research is important as eyewitnesses often discuss incidents amongst themselves before providing a formal police testimony (Paterson & Kemp, 2005; Skagerberg & Wright, 2008) or giving evidence in court (Wagenaar & Crombag, 2005). There have been several reported real-world instances of misinformation being inadvertently introduced into such discussions and subsequently tainting eyewitness testimonies (see Wright et al., 2009, and Wagenaar & Crombag, 2005, for examples). Legal guidelines have been adopted in several countries, such as the United States (National Institute of Justice, 1999) and the United Kingdom (Home Office, 2008), where it is recommended to police officers that eyewitnesses are separated to prevent them discussing witnessed events.

The present study reinforces the importance of this and also provides an insight into why some eyewitnesses who have engaged in pre-interview or pre-trial

discussions may be more susceptible to having their testimonies contaminated than others. It is important to point out, however, that the relationship between Yield and memory conformity in this study was qualified by a medium effect size ($r = .34$), so no formal policy statements are being made concerning the adoption of the Yield measure as a way to assess a witnesses susceptibility to memory conformity if they have engaged in pre-interview or pre-trial discussions. Multiple studies confirming this effect are necessary before such policy statements can be made.

The present study does have several shortcomings. From a theoretical perspective, it is not possible to determine whether participants were succumbing to memory conformity as a result of normative influences, informational influences, or false remembering. There are, however, difficulties in making this distinction within the memory conformity literature as a whole and the failure to do so here is not central to the aims of this report. From a methodological perspective, the use of a word-list based recognition task to induce memory conformity also raises questions over the ecological validity of the findings as collaborative discussions amongst people outside of the laboratory are more complex than the simple recognition based decision making that was required in the present study. In such circumstances, people have more freedom to discuss and debate what they remember. It may be the case that if participants were asked to discuss a more realistic scenario, then the effects of memory conformity and its relationship to the Yield component of IS would be more pronounced. Finally, it should be acknowledged that always having the participant respond first to items 1–60 on the recognition test is a potential confound. It is unknown whether having participants respond second to items 1–60 on the recognition would have influenced their performance. Each of these issues warrants further research. Despite these potential shortcomings, the present study is the one of the few to examine individual differences in memory conformity and the first to demonstrate a relationship between memory conformity and suggestibility.



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