

Manipulating Power can Affect Memory Conformity

ELIN M. SKAGERBERG^{1*} and DANIEL B. WRIGHT^{1,2}

¹*University of Sussex, UK*

²*Florida International University, USA*

SUMMARY

Memory is malleable and open to influence between encoding and retrieval. Information about a past event given to us by, for example, a co-witness can be incorporated into our own memory reports. Pairs of participants were shown 50 photographs of faces, given a power task where one had to be a designer (low-power) and one a judge (high-power), and then given a recognition test where one partner had to answer before the other. The individuals in the low-power group were more influenced by their partner's responses than those in the high-power group. This has important forensic, educational and organisational applications and shows that memory conformity can be manipulated by power. Copyright © 2007 John Wiley & Sons, Ltd.

Remembering is a constructive process (Schacter, Norman, & Koutstaal, 1998) and is not just a process occurring within the individual, but can occur socially, such as when people discuss an event (Roediger, Meade, & Bergman, 2001). One person's memory of an event can influence another person and can become part of that person's memory report (Gabbert, Memon, Allan, & Wright, 2004). This is referred to as memory conformity and can result in a partly or completely false memory (Gabbert et al., 2004).

Memory conformity is very worrying in criminal events involving multiple witnesses because the witnesses usually discuss the event (Paterson and Kemp, 2006b). An example is the 1995 Oklahoma bombing where the culprit (McVeigh) arrived alone to rent the truck used in the bombing and where two witnesses, who originally reported having seen one man involved, reported having seen two men after discussing the matter with a confident third witness who believed that there were two people (Memon & Wright, 1999; Schacter, 2001). Another example is the murder of the Swedish foreign minister Anna Lindh where the witnesses were influenced by each other's memory reports as they were interviewed in the same room. This meant that the police were given incorrect information which led the investigation in the wrong direction (Granhag, Ask, & Rebelius, 2005).

Examples of memory conformity have also been found in laboratory studies showing that what one person reports could influence what another person reports (e.g. Gabbert et al., 2004; Gabbert, Memon & Wright, 2007, 2006; Luus & Wells, 1994; Paterson & Kemp, 2006a; Reysen, 2003; Roediger, Meade, & Bergman, 2001; Shaw, Garven, & Wood, 1997; Wright, Mathews, & Skagerberg, 2005). Several different methods have been used, for example: showing pairs of participants slightly different videos of an event (e.g. Gabbert, Memon, & Allan, 2003), showing pairs of participants two different images on the

*Correspondence to: Elin M. Skagerberg, Department of Psychology, University of Sussex, Brighton, BN1 9QH, UK. E-mail: elins@sussex.ac.uk

same screen by using polarizing filters (e.g. Mori, 2003; Mori, in press) and testing recognition in pairs using a large sequence of stimuli (e.g. Reysen, 2005; Schneider & Watkins, 1996; Wright, Mathews, & Skagerberg, 2005). Memory conformity could also be tested using feedback regarding a partner's identification given by an experimenter (e.g. Luus & Wells, 1994) or by a co-witness (e.g. Skagerberg, in press).

Memory conformity has been observed with young and old adults (Gabbert, Memon, & Allan, 2003) and with children (Principe & Ceci, 2002). Further, Shaw, Garven, and Wood (1997) found that conformity to a co-witness' memory report remained stable even after 48 hours.

Thus, memory conformity seems to be a relatively common occurrence. However, what factors influence a person's conformity to another person's report? One factor is confidence. The more confident an individual is about a memory, the more likely she or he is to influence other people and the less likely she or he is to be influenced (Schneider & Watkins, 1996; Wright et al., 2000). External factors such as group size have also been shown to influence the memory conformity effect. Vrij, Pannell, and Ost (2005) found that the memory conformity effect was stronger when there were several confederates present as the participant may have, as a consequence, felt less powerful.

It appears that power may be a critical factor in memory conformity. Power can be defined as 'an individual's relative capacity to modify others' states by providing or withholding resources or administering punishments' (Keltner, Gruenfeld, & Anderson, 2003, pp. 265–266). High-power individuals are generally more influential than low-power individuals and tend to be more resistant to social control and social influences (Guinote, Judd, & Brauer, 2002). They also tend to be more likely to express their ideas and lead group discussions (Keltner, Gruenfeld, & Anderson, 2003). Powerful individuals are less dependent on others than low-power individuals (van Dijke & Poppe, 2006). Thus, in testing situations in pairs, low-power individuals are likely to rely more on high-power individuals than vice versa. The reason for this, as described by Fiske (1993), is because powerful individuals do not have to pay attention to low-power individuals, because they do not depend on them. Powerful individuals are therefore more focused on their own task, whereas low-power individuals are more easily distracted and diverted by peripheral information (Guinote, in press). As a result, powerful individuals are less affected by and often oversee their subordinates. As an example, Goodwin and Fiske (1993) asked undergraduates to evaluate high school students' job applications and found that as power in the decision increased, attention to the high school students' qualities decreased. As described by Galinsky, Magee, Inesi, and Gruenfeld (2006), even when participants have been primed with power, those primed with high-power show a reduced tendency to understand how those primed with low power think, feel, and see. Conversely, low-power individuals tend to pay attention to high-power individuals as they often control their outcomes and as by attending to them they are likely to gain more control themselves (Fiske, 1993).

Powerful and powerless individuals differ in the way they behave, are evaluated, and in the way they perceive others (Brauer & Bourhis, 2006). Powerful individuals tend to be perceived as having more variability (Brauer & Bourhis, 2006; Chappe, Brauer & Castano, 2004). As an example, in a study by Guinote et al. (2002), high-power individuals were rated as more variable even when the power of the participants was randomly assigned. Due to this variability powerful individuals are less often the target of negative stereotypes as compared to powerless individuals (Brauer & Bourhis, 2006). Stereotype threat is an example of an area of research where cognition and individual differences are related to power and will therefore be discussed.

The fact that low-power individuals are often under *stereotype threat* (e.g. 'women are bad at math', 'men are emotionally insensitive', Marx & Stapel, 2006; 'ecstasy users suffer from memory loss', Cole, Michailidou, Jerome, & Sumnall, 2006) is worrying as it can result in inferior performance on, for example, memory tasks. Several studies show that the presence of a stereotype threat can damage a person's working memory capacity (e.g. Schmaders & Johns, 2003; Beilock & Carr, 2005). For example, Cole et al. (2006) told some ecstasy users that ecstasy use does not cause memory loss and some other ecstasy users that it does cause memory loss. The findings showed that the people who were under stereotype threat and who had been told that ecstasy causes memory loss performed worse on a memory test as compared to the other group of ecstasy users.

Additionally, Beilock, Jellison, Rydell, McConnell, and Carr (2006) found that even processes that do not rely profoundly on working memory (e.g. expert golf putting) are susceptible to the stereotype threat resulting in performance degradation. However, this threat could be decreased if attention is directed away from the stereotype-related behaviour. Similarly, a feeling of powerlessness is likely to affect memory performance negatively, but this power threat might be decreased if attention is directed away from it. Additionally, in eyewitness situations, it is likely that a decrease in memory performance due to feelings of powerlessness could in turn affect memory conformity and the reliance on a co-witness' memory report.

The idea that power may be a critical factor in memory performance and memory conformity has important implications both in education (e.g. power-relationship between pupil/teacher) and in organisations as well as for, therapist/client, parent/child, and other dyads which have clear within-group power differences. It is also of great forensic importance as although eyewitnesses' memories in court are treated as free from external influences, co-witnesses often discuss the criminal event (Paterson and Kemp, 2006b). Low-power individuals' memories of an event may be at increased risk of being affected by those of high-power individuals following a discussion. This is worrying as high-power individuals working in the forensic field (e.g. police officers) sometimes make false assumptions about criminal events and 'fill in gaps' (Hain, 1976).

In the present study we investigate whether one person's memory could influence that of another and, if so, whether this memory conformity can be affected by a power manipulation. Based on previous power-research (e.g. Guinote et al., 2002; Beilock et al., 2006) we predict that those in the low-power condition will be more influenced by their partner than will the individuals in the high-power group. Any effect found is likely to be due to feelings of powerlessness which will increase the reliance on a co-witness' memory. The technique we used to test this is based on Schneider and Watkins (1996) and Wright and colleagues (2005). This involves a recognition test with pairs of participants, which allows data from many trials to be collected. Therefore, in the statistical sense, this is a much more powerful procedure than having only a few stimuli per participant because the increased number of trials provides more information and therefore more precise measurement.

METHOD

Design

The study was a 2 (condition: paired *vs* individual) \times 2 (power: low *vs* high) \times 2 (order: first *vs* second) mixed design with the first two factors varied between subjects and the third factor varied, for the participants in the paired condition, within subject.

The participants who were assigned to the pair condition were randomly assigned a task (either designer [low power] or judge [high power]) and were either asked to answer first or second for the first 50 faces.

Participants

A total of 83 participants were tested. 52 of these were in the pair condition (mean age = 23.81 years; *sd* = 8.15 years; 77% female and 23% male) and 31 were in the individual condition (mean age = 22.68 years; *sd* = 5.76 years, 77% female and 23% male). The participants volunteered to take part in the study and they were all naïve to the experimental hypothesis. They were recruited through the University of Sussex participant pool and either received £2.50 (~ 4 US\$) or course-credits for participating.

Materials

Photographs

100 black and white close-up photographs of White male faces were shown to the participants. The photographs were used in previous research (Wright, Matthews, & Skagerberg, 2005) and were originally taken from the Psychological Image Collection at Stirling (PICS; <http://pics.psych.stir.ac.uk>) and from research by Wright, Boyd, and Tredoux (2003).

Power-task

The power task was adapted from the one used by Guinote, Judd, and Brauer (2002), which has been shown to produce reliable differences in power. The pairs of participants in the main experimental condition were given a power-task following the first set of photographs. One participant was randomly assigned to be the designer and one the judge. The designer (low power) was given an instruction sheet asking them to design a restaurant in 5 minutes. The judge (high power) was given a questionnaire which they were supposed to answer once their partner had finished their design. The questionnaire had questions on the originality, practicality, aesthetics, and cost-effectiveness of their partner's design, as well as a space for critical comments and improvements. We did not ask participants directly about power because we did not want to draw attention to the manipulation.

Procedure

Pair condition

Two previously unacquainted participants were asked to come to the laboratory at the same time. They sat down next to each other in front of the computer and were shown 50 faces on the computer with each face being shown for three seconds. They were then given the power task. A coin was tossed to decide who would be the judge and who would be the designer. Following this procedure they were shown 100 faces, one at the time, and told that half of these had been shown to them before. They were then given a response sheet with two columns with a four-point scale for each face. The response options were: 'Not seen before' (1), 'Probably not seen before' (2), 'Probably seen before' (3), and 'Seen before' (4). A coin was tossed to decide who answered first for the 50 first faces, and who for the 50 last faces. We used coin tosses to determine both the allocation into conditions and who was to respond first because we wanted to make sure that participants realized it was

random. This meant that there was an imbalance with 16 of the 26 high-power individuals answering first. However, we found no systematic differences between the amounts remembered by these groups.

For each face, the first participant answered by circling the appropriate number on the scale in the first column, the response sheet was then given to the second participant who circled the appropriate number on the scale in the second column. This was done for each face. The participants were under no time constraint and they clicked the mouse when they wanted to go to the next face. Following the 100 faces, the participants were debriefed. This follows the procedure used in Wright et al. (2005, Exp. 3).

Individual condition

The participants were asked to come to the laboratory individually. They were shown the 50 faces and were then given the instructions for the second phase. They were given the response sheet with only a single column of response options and were asked to go through the 100 faces and circle the appropriate number on the scale for each face. Following this they were debriefed. No power-task was conducted.

RESULTS

There were 31 people in the individual control condition who responded to all 100 faces and 52 people in the paired condition who responded to 50 faces before their partner responded. These 52 people include both designers and judges so in total there are three control groups. Because there are multiple trials for each person we treated this as a multilevel dataset and predicted the response, on the one to four scale, for each trial from whether the item was old or new and which condition the person was in. The multilevel approach has been advocated for memory research (Wright, 1998), as a general strategy for repeated measures designs (Goldstein, 2003; Pinheiro & Bates, 2000; Singer & Willett, 2003), and has been used in a similar way for previous research (Wright, Mathews, & Skagerberg, 2005). As expected, old items had much higher response values than new items (2.88 compared with 1.77; $\chi^2(1) = 1466.15, p < 0.001$). We compared the individual control condition with the two group conditions (designer and judge) and found no significant differences in accuracy ($\chi^2(2) = 4.20, p = 0.12$). For subsequent analyses we use the two paired control groups because there are more people in these and being within subject conditions they are more powerful.

The basic strategy for modelling these data is predicting the response, on the one to four scale, for each trial given whether the item was previously presented, what the other person said (or if the participant responded first), and whether the person was a judge or a designer. The variable, called *resp_{ij}*, has a standard deviation of 1.24. With only four values it is not normally distributed, but the residuals of the final model evaluated below are approximately normal, which is the assumption of these regressions. Because each person has several trials it is necessary, as above, to treat this as a multilevel data set with trial nested within participant. We develop the statistical model in steps. First we include the effects of whether the item is old (called *old_{ij}* with values of 1 for old items and 0 for new items), which measures accuracy, then whether there is an effect of what the other person says (called *other_{ij}*), and whether there were any effects of whether the person responded first or second to the 50 first faces. Several different codings for *other_{ij}* were tested and led to the same conclusions. Here we let -2 be very confident that the item is new,

-1 be less confident that the item is new, 0 be responding first, 1 be less confident that the item is old, and 2 be very confident that the item is old. The parameter associated with $other_{ij}$ measures the impact of what the other person says; the expectation is that this will be positive. At this stage we also examine some of the random terms associated with these variables (Goldstein, 2003). We then examine whether the experimental manipulation, whether the participant was the designer (low power) or the judge (high power), affects responses. We predict that the interaction between the manipulation and $other_{ij}$ will show that the effect of what the other person says is larger for the designers compared with the judges.

First, old_{ij} was included in the model and this, as expected had a large effect ($\chi^2(1) = 1601.97, p < 0.001$) with old items being given, on average, scores 1.18 units higher ($se = 0.03$), which is about a standard deviation of the response variable. Next, $other_{ij}$ was included in the model and this also increased the model's fit ($\chi^2(1) = 149.72, p < 0.001$). For each unit increase in $other_{ij}$, the predicted response went up by 0.16 ($se = 0.01$). The difference in predicted values between the other person giving a confident 'new' response and a confident 'old' response is 0.64, or about half a standard deviation of the response variable. The interaction between old_{ij} and $other_{ij}$ was non-significant ($\chi^2(1) = 0.11, p = 0.74$) so is not included in further models. One participant responded first on the first 50 trials and second on the next 50, and the other participant responded in the opposite order. We examined whether this affected responses, both as a main effect ($\chi^2(1) = 0.62, p = 0.43$), and as interactions between it and whether the item was old or new ($\chi^2(1) = 0.88, p = 0.35$), what the other person said ($\chi^2(1) = 2.60, p = 0.11$), and the 3-way interaction ($\chi^2(1) = 0.02, p = 0.89$). Thus, it appears that this made little if any difference, so is not included in any further models.

An assumption of most regression models is that the variability of residuals is unrelated to the predictor variables, what is called homoscedasticity. Examining these residuals showed a complex relationship between the variability of the residuals with old_{ij} and $other_{ij}$. The variance for new items was 0.80, but the variance for old items was 1.41, a statistically significant difference ($\chi^2(1) = 181.99, p < 0.001$), so a term for this was included in the random part of the model. The variance of the residuals was also related to $other_{ij}$, in a complex and statistically significant way ($\chi^2(3) = 41.68, p < 0.001$, each individual effect was also significant). The estimated variance function was: $0.83 + 0.57 old_{ij}^2 + 0.16 other_{ij} - 0.30 old_{ij} \cdot other_{ij} + 0.04 other_{ij}^2$. While this looks confusing, it basically shows that when the item is new, the variance goes up with the other person's response and when the item is old, the variance goes down with the other person's response. In other words, the variance of each is largest when the other person makes an error. The quadratic term ($0.04 other_{ij}^2$) shows that the lines deviate slightly from the linear ($\chi^2(1) = 4.99, p = 0.03$), but the other effects are more pronounced. The basic multilevel model allows a random intercept. We also included a random term for old_{ij} which allows people to vary in how accurate they are. This was statistically significant ($\chi^2(1) = 15.39, p < 0.001$).

Our primary interest is in the effects for the experimental condition, the variable $power_j$ (1 if designer [low power]; 0 if judge [high power]). The main effect was non-significant ($\chi^2(1) = 1.18, p = 0.28$), but is retained in order to examine interactions. The interaction between $power_j$ and $other_{ij}$ improved the fit of the model ($\chi^2(1) = 5.87, p = 0.02$) with the effect of $other_{ij}$ for judges being 0.12 and for designers being 0.18, so an increase of approximately 50% in the predicted direction. The interaction between $power_j$ and old_{ij} was nonsignificant ($\chi^2(1) = 1.15, p = 0.28$) as was the three-way interaction ($\chi^2(1) = 0.08, p = 0.77$). Therefore these interactions are not included in the final model, but the

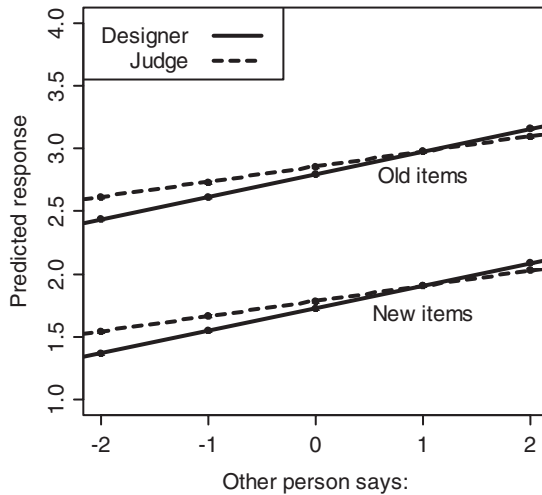


Figure 1. The predicted means depending on what the other person said (-2 = very confident new, -1 = less confident new, 0 = responding first, 1 = less confident old, 2 = very confident old)

interaction between $other_{ij}$ and $power_j$ is. The final model is depicted in Figure 1. It shows the main effect for old_{ij} (the old item lines being above the new item lines), the main effect for $other_{ij}$ (all four lines having positive slopes), and the interaction between $power_{ij}$ and $other_{ij}$ (the slopes of the lines for the designers being larger than those for the judges).

DISCUSSION

The aim of the present study was to combine research on memory conformity and power in order to establish whether pairs of participants could influence each other's memory reports when looking at faces and whether this effect could be manipulated by power. The findings showed that what one person reported was highly influenced by what the other person reported, thus, providing evidence for a memory conformity effect.

Our most important finding was that the size of the memory conformity effect was affected by our power manipulation with the low-power individuals (designers) being more influenced by their partner's memory report than were the high-power individuals (judges). This finding is applicable to eyewitness testimony, therapist or patient relationships, education as well as other situations involving power hierarchies and memory discussions (e.g. parent or child and police officer or witness). It is forensically relevant as many discussions about events involve pairs with a power differential. It is worrying as findings show that police officers have a tendency to make false assumptions about criminal events (e.g. Hain, 1976) and as forensic professionals are now, according to the 2003 UK Criminal Justice Act, allowed to be in UK juries. Power-relationships and the influences on memory conformity associated with these could, in forensic situations, help convict an innocent suspect or lead to a guilty person being freed.

Possible explanations for the occurrence of conformity effects include, firstly, the fact that members of subordinate groups often display poor working memory when surrounded by more powerful individuals. Several findings (e.g. Beilock & Carr, 2005; Schmaders & Johns, 2003) show that feelings of powerlessness can negatively influence a person's

working memory capacity. This can result in the less powerful individual being disrupted which could lead to them performing worse on memory tasks as compared to powerful individuals (Martens, Johns, Greenberg, & Schimel, 2006). This disruption might in turn affect their confidence in their own memories which leads them to conform more to their partner's answers.

Secondly, it is possible that the memory conformity effect seen in this study is due to source misattributions where a person remembers something from before, but is unable to attribute it to its right source (Johnson, Hashtroudi & Lindsay, 1993; Johnson & Raye, 1998). Therefore, a description given by, for example, a co-witness could be misattributed as a witness' own memory. It is possible that feelings of powerlessness lead to higher levels of source misattributions and to higher reliance on a co-witness' memory report.

Thirdly, another explanation is accepting a partner's response as correct due to them being more powerful and due to normative pressure and as to gain social approval (e.g. Asch, 1951, Shaw et al., 1997).

Fourthly, the difference in suggestibility between the individuals in the power condition and those in the powerless condition could be due to the tasks given. It is possible that being placed in a more creative role encourages permissiveness and suggestibility whereas being placed in a critical role does not encourage suggestibility.

Implications for eyewitness events involving high and low-power individuals include establishing whether they have discussed the eyewitness event and if they have then their accounts should not be treated as independent (Wright et al., 2000). Although it is worth discouraging witnesses from talking with each other about crimes they witness together, it inevitably will happen. It would be valuable to determine who seemed to be the most powerful person and whether this person's account might have influenced the other person's account. The eyewitnesses should be interviewed as early as possible in order to avoid conformity. High-power forensic professionals (e.g. police officers) should also be told not to discuss eyewitness events with other witnesses. Also, due to the effect feelings of powerlessness can have on memory and memory conformity, it is also important to establish whether such feelings exist and whether they might have biased eventual eyewitnesses. Future research should look at power and memory conformity within naturally occurring dyads with a clear power relationship. It would also be important to look at dialogues and how they may influence a person's memory.

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