

Measuring shared knowledge with group false memory

Research has shown that when we make decisions, we are influenced by biases relating to the way we structure knowledge in our brains. If these biases are shared by others, they can be exaggerated. This often results in false memories, which is the recall or recognition of phenomena that did not occur. Yoshiko Arima and colleagues at Kyoto University of Advanced Science investigated the conditions that could lead to false memories within a group process, and the relationship between false memories and shared knowledge structure.

Collaborative groups are known to create a higher level of memory accuracy than individuals. This is thought to be the result of a larger information pool, the opportunity to revise errors and efficient decision-making. Despite their improved accuracy, collaborative groups tend to make errors in recall tasks. Several studies have found that people are more confident about the accuracy of memories recalled by a group than those recalled by individuals, even when these memories are false. Taken together, this suggests that group false memory occurs when all group members fail to detect errors.

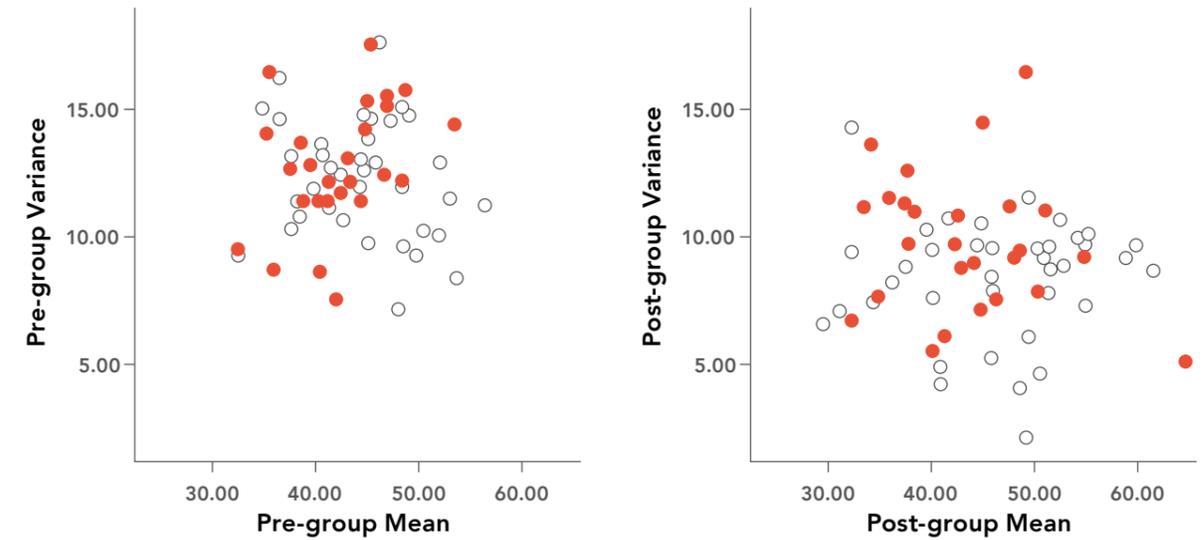
REACHING CONSENSUS IN GROUP DECISIONS

There is wide variability in the time taken to reach consensus when making a decision through a group process. The two main factors which

influence the likelihood of reaching agreement are within-group discrepancy (differences among group members) and between-group discrepancy (difference among groups). The former has been considered the basis for intragroup disagreements and the latter for intergroup disagreements. However, previous research has suggested that these behaviours can influence each other. Studies have found that between-group discrepancies influence not only intergroup processes but also intragroup processes.

FACTORS INFLUENCING GROUP CONSENSUS

Group polarization is the tendency for a group to make decisions that are more extreme than the initial inclination of its members (known as the mean tendency). Groups polarize their attitude to the direction of mean



Scatter plots of the pre-test and post-test means and variances for the consensus and disagreement groups. Results of discussion: Consensus (○); Disagreement (●). Source: Y. Arima, R. Yukihiro & Y. Hattori Scientific Reports 8, Article number: 10117 (2018) www.creativecommons.org/licenses/by/4.0/.

tendency of whole sample even though they do not know which direction it was. Using the group polarization paradigm, research conducted by Dr Yoshiko Arima based at Kyoto University of Advanced Science, explored the conditions that lead to intragroup disagreement and attitude change following a disagreement among 269 participants. Her results show that the probability of consensus was low when the group means differed from the mean of the whole sample. When small differences among group members were found, depolarization (reverse direction to the polarization) followed disagreement. This suggests that the groups which deviated most from the population tendency were the most likely to cause within-group disagreement, while within-group differences determined the direction of attitude change following disagreement within the group.

Groups seem to reach a consensus or not randomly, however, they are controlled by the variance of the whole society. There is an 'Invisible Hand' who controls public opinion from one pole to another. The basic assumption of Dr Arima's study is the invisible hand of our shared knowledge structure that needs identity and difference. The problem was, how to measure it?

Dr Arima investigated the effect of shared knowledge, manipulated using

associated or randomly ordered word lists, on the association between group remembering and group polarisation. In one experiment, 159 university students answered a questionnaire about the common stereotype that blood type determines personality. Half were given lists of words that were consistent with this idea and the other half were provided with randomly ordered word lists. After completing the questionnaire, students were tested on how many words they could recall from the lists that had appeared in the questionnaire. Tests were conducted in either a group or an individual setting. The results demonstrated that stereotype-consistency of the word list reduced the groups' ability to detect incorrect answers, compared with the individual condition.

In another experiment, 131 high school and university students were divided into three groups: group members having the same blood type (low-diversity), members with two different blood types (medium-diversity), and members with three or more different blood types (high-diversity). This condition induces three levels of variety of memories

because of self-reference effect, which is the finding that information relating to oneself is easier to recall than unrelated information. The difference of belief in blood type stereotypes before versus after the recall task is called the shift score and represents the extent of group polarisation. The results showed an association between the shift score and the total number of recalled words including false memories when the word list was consistent with the blood type stereotype. This suggested that shared knowledge influenced group polarisation.

FALSE MEMORY VS ERRORS

To measure shared knowledge structure, Dr Arima and her colleagues investigated whether group collaboration increases false memories if a word list is arranged in a way that is consistent with pre-stored group knowledge. This was studied using the Deese-Roediger-McDermott (DRM) paradigm. This involves participants first taking a free recall test after learning a word list associated with a certain non-presented word (known as the critical word) which is not presented within the list. After several of these recall tests, participants take a recognition test that includes the presented associative

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