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Leiden  
The Netherlands

## Cognitive mechanism of conformity

Kim, D.A.

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## **Chapter 2**

### **An Event-Based Account of Conformity**

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**ABSTRACT**

People often change their behavior/beliefs when confronted with deviating behavior/beliefs of others, but the mechanisms underlying such phenomena of conformity are not well understood. Here we suggest that people cognitively represent their own actions and others' actions in comparable ways (theory of event coding), so that they may fail to distinguish these two categories of actions. If so, other people's actions that have no social meaning should induce conformity effects, especially if those actions are similar to one's own actions. We found that female participants adjusted their manual judgments of the beauty of female faces in the direction consistent with distracting information without any social meaning (numbers falling within the range of the judgment scale) and that this effect was enhanced when the distracting information was presented in movies showing the actual manual decision-making acts. These results confirm that similarity between an observed action and one's own action matters. We also found that the magnitude of the standard conformity effect was statistically equivalent to the movie-induced effect.

**Keywords:** Conformity; Theory of Event Coding (TEC); adaptive behavior

In 1951, Solomon Asch reported one of the most famous experiments in the history of psychology. He had participants watch confederates who judged the length of lines and often made obvious errors. When subsequently requested to make these judgments themselves, almost all participants went along with the confederates' incorrect judgments at least sometimes. Post experimental interviews revealed that the participants did not really believe in the answers they gave, which led Asch to the conclusion that this conformity effect reflected a belief in the superior knowledge of the group. Since then, Asch's study has been replicated in various forms and versions (Cialdini & Goldstein, 2004), and the results have overwhelmingly supported the classical finding. Conformity refers to changing one's attitude or behavior to be in line with the social norms accepted by other people (Baron, Byrne, & Branscombe, 2007; Cialdini & Goldstein, 2004), and most authors agree that people conform to the group's norms and values because they want to be accepted by the group (e.g., Brauer & Chaurand, 2010). Humans have a tendency to adopt behaviors of others for social purposes: to facilitate bonding of people into social groups with functional relationships. This adaptation (a form of conformity) happens rather automatically through mimicking other people's behaviors (Chartrand & Bargh, 1999; Lakin, Jefferis, Cheng, & Chartrand, 2003). Interestingly, conformity effects can occur in the physical absence of other people if participants are merely informed about the opinion of a group they personally do not know, such as "foreign students" (Klucharev, Hytönen, Rijpkema, Smidts, & Fernández, 2009; Shestakova et al., 2012). This runs counter to the assumption that conformity reflects the need to belong to the group whose values one encounters, but it seems consistent with Asch's (1951) assumption that the belief in the superior knowledge of the group is responsible for the effect.

The aim of the present study was to test whether even simpler mechanisms may account for at least some conformity effects. This idea was motivated by the theory of event coding (TEC), which posits that both produced and perceived events (i.e., action plans and perceptual representations of actions) are coded (a) in terms of their features and (b) in a common format (Hommel, 2009; Hommel, Müsseler, Aschersleben, & Prinz, 2001). TEC does not differentiate between the self and others, so actions performed by oneself and actions performed by another person are coded in roughly the same way (Hommel, Colzato, & van den Wildenberg, 2009)—even though one commonly has more information (e.g., proprioceptive, anticipatory, and historical) about one's own action. Experiencing a self- or other-performed action is assumed to lead to the creation of an *event file*, in which action-related feature codes and codes representing the perceptual context are bound together (Hommel, 2004). Event files operate according to a pattern-completion logic, so that the retrieval or stimulus-induced reactivation of one code spreads to the other components (Kühn, Keizer, Colzato, Rombouts, & Hommel, 2011).

Applying this reasoning to a typical conformity study results in the following interpretation: A participant who watches someone judge a stimulus will create an event file that binds the judgment action to the stimulus, much as if the participant had judged that stimulus him- or herself. When the participant encounters the same stimulus again, this reactivates the event file, which creates a response conflict between the judgment action that the participant was thinking of and the judgment action that the observed person performed. Response conflicts are known to slow down reaction time and lead to occasional errors, and the latter effect is consistent with Asch's (1951) observation. This logic also applies to more recent versions of the conformity paradigm (e.g., Klucharev et al., 2009; Shestakova et al., 2012; Zaki, Schirmer, & Mitchell, 2011), in which participants judge a stimulus themselves before they are presented with some "group opinion." If we assume that a participant stores these two events in a comparable format, when the participant is subsequently asked to judge the same stimulus again, this encounter with the stimulus will retrieve both event files, and the participant may not even know which of the reactivated judgment actions was his or her own. Accordingly, the participant's later judgments will be biased toward some average of his or her previous judgment and the group judgment—which is in fact what has been observed (Shestakova et al., 2012).

A unique feature of our account is that it does not require any specific status of the supposed group opinion the participant is confronted with: The participant does not need to know or believe that the response presented as group opinion is representative of group-related judgment, nor does he or she need to assume that the response is related to, or has any meaning for, the current task. We therefore tested the hypothesis that even unrelated, meaningless "judgments" (which we refer to as *intervening events*) that participants encounter between two of their own judgments of the same stimulus (in two separate sessions) would bias their second judgments toward the value indicated by the intervening event. The second hypothesis we tested refers to the perceptual similarity between people's own judgments and the intervening event. TEC assumes that overt and covert actions are cognitively represented by codes of their perceptual features, so greater perceptual similarity between one action event and another should lead to greater overlap of the features in the actions' event files. Accordingly, greater perceptual similarity between participants' initial judgments and the intervening event should yield more pronounced conformity effects.

## EXPERIMENT 1

Our experimental design was based on the study of Shestakova et al. (2012) and Klucharev et al. (2009), in which participants judged the beauty of same-gender faces. However, instead of presenting any normative group-related information after participants entered their first judgment

of a given face, we presented either a static slide with a number within the range of the scale or a short movie showing a female finger pushing a number button on a keyboard similar to the keyboard used by the participants (see Fig. 1). Participants were not given any reason for this presentation, and they were not encouraged to attend to it.



**Figure 1.** Examples of the intervening events, which appeared either as a static number between 1 and 8 (left panel) or as a short movie with a female hand pushing a number button on a keyboard (here number 4).

## Method

### *Participants*

Twenty female right-handed psychology students (aged 18-24 years) participated for a small compensation of 6 EUR or 2 study credits. No male participants were admitted to avoid cross-gender effects related to our stimuli (Cloutier, Heatherton, Whalen & Kelley, 2008). The sample size represents the Leiden lab standard for novel manipulations with unknown effects sizes.

### *Stimuli*

Our face stimuli were 220 pictures of Caucasian females taken, with permission, from the same database that was used by Shestakova et al. (2012). As in that study, only female pictures were used because crossgender rating of attractiveness is related to mate selection (Cloutier et al., 2008). The pictures were presented on a computer monitor using E-Prime (Schneider, Eschman, & Zuccolotto, 2012).

### *Procedure*

Prior to the experiment, all the participants read and signed an informed-consent form; the study was described as aimed at identifying the features that contribute to the attractiveness of female faces. In the first experimental session, participants rated the pictured faces on an 8-point

scale ranging from 1 (*very unattractive*) to 8 (*very attractive*); they entered their responses by pressing the corresponding number button on the keyboard in front of them using their right hand. Participants were informed that after each judgment they would see a number or short movie that would require no action on their part. After we made sure that all the instructions were well understood, participants were presented with the 220 pictures, one by one and in random order. Each rating was followed by an intervening event in the form of a number slide or a movie (the type of event was randomly chosen, but the two types appeared roughly equally often). The number value (implied rating) represented in the intervening event was equal to the participant's own judgment (roughly one third of the cases), 1 to 3 points higher than the participant's own judgment (roughly one third of the cases), or 1 to 3 points lower than the participant's own judgment (roughly one third of the cases). After participants evaluated all 220 pictures, they were offered a short break (20 min). In the second experimental session, the same 220 pictures of female faces were presented (in random order) for a second evaluation, this time without any intervening events. At the end of the experiment, all the participants were debriefed about its real purpose.

### *Analysis*

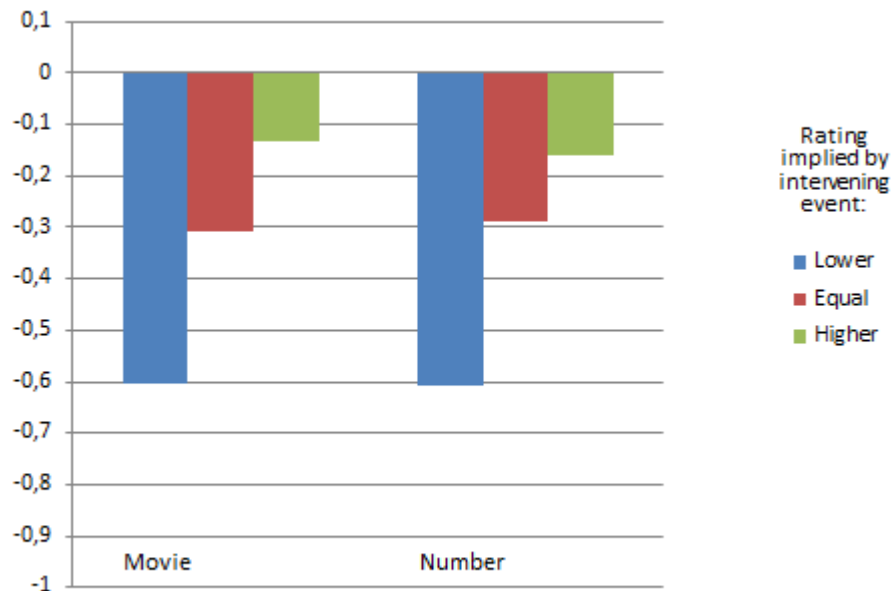
The conformity effect (the effect of the intervening event) was calculated as the change between a participant's first and second rating of the same face. This change was calculated separately for the trials on which the implied rating in the intervening event was equal to the participant's first judgment (*equal condition*), 2 to 3 points lower than the participant's first judgment (*lower condition*), and 2 to 3 points higher than the participant's first judgment (*higher condition*). We then analyzed mean rating change in a repeated measures analysis of variance (ANOVA) with direction of the intervening event (higher than vs. equal to vs. lower than the first judgment) and format of the intervening event (number vs. movie) as independent variables. ANOVA results were Greenhouse-Geisser adjusted in the case of significant Mauchley effects.

### *Results*

On average, participants rated the attractiveness of the presented faces lower on the 2<sup>nd</sup> session (3.75) than on the 1<sup>st</sup> session (4.06), indicating a small shift of the overall reference frame. In line with our first hypothesis, the change from the first to the second judgment was affected by the intervening event: faces were rated most negatively after lower intervening events and most positively after higher intervening events (see Figure 2). This was confirmed by a significant Direction effect,  $F(2, 38) = 35.87, p < .001, \eta^2_p = 0.65$ . Within-subject contrasts indicated that the equal condition differed significantly from both the lower condition,  $F(1, 19) = 25.96, p < .001, \eta^2_p = 0.58$ , and the higher condition,  $F(1, 19) = 12.50, p < .01, \eta^2_p = 0.40$ . Hence, we were able to demonstrate a

conformity effect in the absence of another person and without presenting any normative or otherwise socially meaningful judgments.

Our second hypothesis was not supported by the data, however. There was not any indication that the conformity effect might depend on the format of the intervening event; the corresponding interaction was far from significance,  $F(2, 38) = 0.02$ ,  $p = .97$ ,  $\eta^2p = 0.001$ .



**Figure 2.** Experiment 1: mean change in face attractiveness ratings on the 2nd as compared to the 1st experimental session, as a function of the format and the direction of the intervening event.

### Discussion

Even though the outcome of this experiment provides some evidence for our event-based approach to conformity, it would be premature to jump to conclusions regarding the presence of the conformity effect and the absence of the predicted similarity effect. First, even though we did nothing to encourage participants to interpret the intervening events as representing anything related to other people's opinions, the participants may very well have developed such an interpretation on their own, especially as we did not provide any explanation for presenting the numbers and movies. Accordingly, we conducted Experiment 2, which provided such an explanation. Second, using a within-participants trial-to-trial manipulation of the format of the intervening event might not have been the most effective way to make similarity effects visible. Experiencing random mixtures of different formats of the same kind of information can be argued to induce a more categorical representation of that information, so that participants might not have represented the

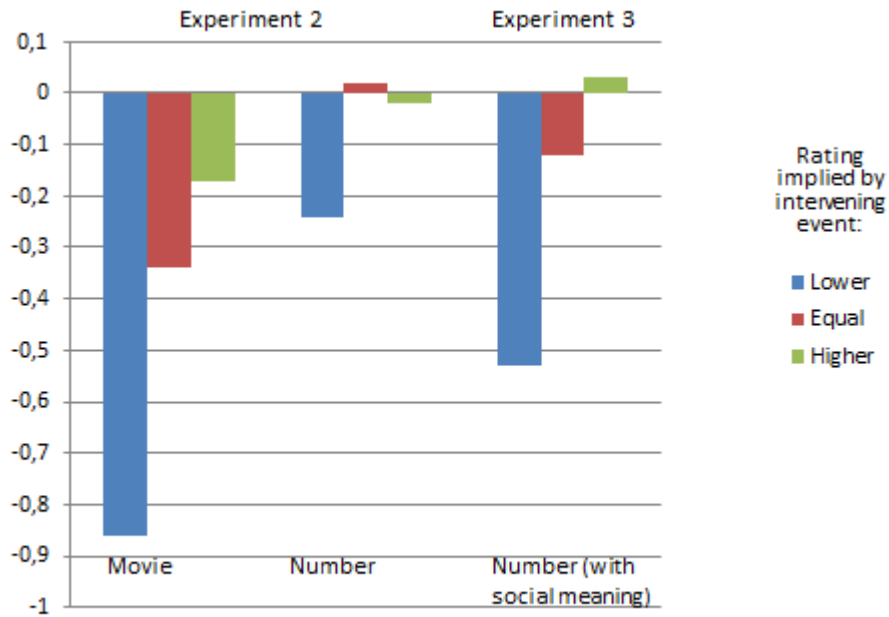
shown values as numbers vs. number-targeted actions—which would effectively prevent similarity effects. Accordingly, we used a between-participants manipulation of format in Experiment 2.

### *Method*

The method of this experiment was the same as in Experiment 1 with the following exceptions: The format of the intervening event was manipulated between participants; 20 new students (ages 18–30 years) were presented with number slides only, and another 20 new students (ages 18–28 years) were presented with movies only. The instructions were the same as in Experiment 1 except that they explicitly mentioned that the intervening events (the numbers or movies) were intended to distract the participant, that the values were chosen randomly, and that they did not represent anyone's opinion.

### *Results*

Again, the overall rating dropped a bit from the first judgment (3.97) to the second judgment (3.73), indicating a small shift of the reference frame. More importantly for our purposes, there was again a highly significant main effect of Direction,  $F(1.63, 62.10) = 29.88, p < .001, \eta^2p = 0.44$ , indicating that participants were systematically affected by the intervening event (see Figure 3). Also of interest, this conformity effect was mediated by an interaction of Direction and Format,  $F(1.63, 62.10) = 6.71, p < .005, \eta^2p = 0.15$ , showing that the direction effect was stronger for movies than it was for numbers. Separate ANOVAs revealed that the Direction effect was significant for both numbers,  $F(1.36, 25.74) = 6.02, p < .05, \eta^2p = 0.24$ , and movies,  $F(1, 19) = 26.66, p < .001, \eta^2p = 0.58$ . For movies, the equal condition was again significantly different from both the lower condition,  $F(1, 19) = 23.18, p < .001, \eta^2p = 0.55$ , and the higher condition,  $F(1, 19) = 4.41, p < .05, \eta^2p = 0.19$ . For numbers, the equal condition was significantly different from the lower condition,  $F(1, 19) = 7.14, p < .05, \eta^2p = 0.27$ , but not from the higher condition,  $F(1, 19) < 1$ . This pattern supports our second hypothesis by showing that greater similarity between the participant's own judgment action and the intervening event leads to a stronger impact of the latter.



**Figure 3.** Experiment 2 and 3: mean change in face attractiveness ratings on the 2nd as compared to the 1st experimental session, as a function of the format and the direction of the intervening event.

### Discussion

As expected, conformity effects were obtained even with instructions that emphasized the irrelevance of the intervening events and encouraged participants to ignore them. Moreover, the finding that the conformity effect was larger in the movie condition than in the number condition supports the hypothesis that the effect is modulated by the similarity between the intervening event and the participant's own judgment action.

### EXPERIMENT 3

The previous experiments demonstrated that conforming behavior occurs even in the absence of any social factors, suggesting that such factors are not necessary to create or explain conformity effects. However, it is possible that social factors increase the effect. To test this possibility we conducted Experiment 3, where we combined our experimental design with the design and instruction used in previous, more traditional studies on social conformity (e.g., Klucharev et al., 2009; Shestakova et al., 2012; Zaki et al., 2011). Thus, we replicated the number part of Experiments 1 and 2 but made participants believe that the numbers would represent the average ratings of a reference group.

### *Method*

Except for the instructions given to participants, the method was the same as in Experiment 2, with numbers as intervening events. In this experiment, the instructions explicitly mentioned that the intervening events represented the average ratings of the photos by the students of Leiden University. Accordingly, the experimental design was very close to the design used by Klucharev et al. (2009) and other researchers.

### *Results*

Again, the mean rating dropped from the first judgment (4.18) to the second judgment (3.97), indicating a small shift of the reference frame. There was again a highly significant main effect of Direction,  $F(2, 38) = 22.86, p < .001, \eta^2p = 0.52$ , indicating that participants were systematically affected by the intervening event (see Figure 3, Experiment 3). To see whether adding social meaning to the intervening event affects the strength of its influence on the rating change, we compared the results of the Experiment 3 with the results from the number condition of Experiment 2. A repeated measures ANOVA with the participant's mean rating change as dependent variable, "Direction" of the intervening event (higher vs. equal vs. lower as compared to first judgment) as within-participants independent variable and "Social meaning" (number "representing group's opinion" vs. "random" number) as between-subjects variable revealed that the conformity effect was mediated by "Social meaning" (i.e., experiment),  $F(1.46, 55.55) = 3.86, p < .05, \eta^2p = 0.09$ . This shows that the direction effect was stronger for numbers with added social meaning. Another ANOVA compared the results of Experiment 3 with the movie condition of Experiment 2, but there was no evidence of an interaction between the direction of the intervening event its format (experiment),  $F(1.70, 64.51) < 1$ . Hence, the conformity effects induced by the movie condition and the standard manipulation are statistically equivalent.

### **CONCLUSIONS**

Taken altogether, our findings demonstrate that adding social meaning to the intervening event is not required in order for conformity effects to occur: simply being exposed to another event that bears some relationship and similarity to one's own action can change one's behavior in similar situations in the future. Even though we obviously had no full control over the thoughts of our participants, we see no reason or evidence why they might have interpreted the numbers and movies they experienced as meaningful social actions of other people or even groups that might possess superior knowledge. This is not to say that such interpretations cannot play any role in

inducing conformity under some circumstances, but they are clearly not necessary to induce behavioral and judgmental conformity.

However, a direct comparison between the number conditions with and without social meaning revealed that adding social meaning can increase the conformity effect. Interestingly, this increase did not go beyond the effect obtained in the meaningless movie condition, suggesting that social implications of an otherwise meaningless event are functionally equivalent to the similarity of this event to one's own action. This might be due to one or both of the following reasons. For one, there is evidence that the actual or implied presence of other people attracts attention (Dolk et al., 2014; Friesen & Kingstone, 1998; Langton, Watt & Bruce, 2000). If we assume that the movie condition in Experiment 2 had a the greater effect than the number condition because of its more attention-attracting dynamic characteristics, it is possible that the lack of attentional saliency of the number condition was compensated by adding attention-attracting social implications to it in Experiment 3. For another, showing the actual manual judgment (as in the movie condition) and adding judgment-related aspects to the number presentation (as in Experiment 3) both can be assumed to increase the similarity between the intervening event and the participants own judgment actions, which according to TEC should increase the effect. Note that the two possible factors might interact, so that increasing attention to the intervening effects makes their similarity with one's own action more salient.

In any case, it is interesting to note that the principles and concepts we made use of to predict and interpret our present findings have been developed for entirely different, not dedicatedly socially purposes. This implies that at least some aspects and phenomena of social conformity emerge from domain-general characteristics of the human cognitive system. As we have pointed out, this system represents one's own actions and actions of other people in comparable ways (Hommel et al., 2001; Prinz, 1990), which facilitates imitation and other forms of social learning including, as the present findings suggest, the acquisition of social norms and rules. Our findings also suggest that perceptual similarity between observed actions and one's own actions promotes the transfer from one to another, which fits with observations that people one is sharing features with (such as virtual models that look just like oneself: Bailenson, 2012) are more likely to have an impact on one's own behavior.

**AUTHOR CONTRIBUTIONS**

Both authors contributed to the development of the study concept, data analysis and interpretation, and they both approved the final version of the manuscript. Testing and data collection were performed by D. Kim. D. Kim drafted the manuscript and B. Hommel provided critical revisions.