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How do implicit effects of subliminal mere exposure become explicit?

Mediating effects of social interaction

Naoaki Kawakami<sup>1\*</sup> and Fujio Yoshida<sup>2</sup>

1. Faculty of Human Sciences, University of Tsukuba, Japan

2. Faculty of Applied Psychology, Tokyo Seitoku University, Japan

\*Corresponding author

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Correspondence concerning this article should be addressed to Naoaki Kawakami,  
Faculty of Human Sciences, University of Tsukuba, Tsukuba, Tennodai, 305-8572, Japan. E-  
mail: aki-kawa@human.tsukuba.ac.jp Tel: +81-29-853-6720

## MERE EXPOSURE AND SOCIAL INTERACTION 2

### Abstract

Recent studies have shown that the mere exposure effect under subliminal conditions is more likely to occur for implicit attitudes than for explicit attitudes. We tested whether the implicit effects of subliminal mere exposure could spill over to the explicit level through social interaction. Preliminary experiment replicated the findings that the subliminal mere exposure effect occurs only for implicit attitudes, and not for explicit attitudes. Main experiment showed that this implicit effect could become explicit through discussion between two individuals who had been subliminally exposed to the same stimuli. However, this transformation of attitudes through social interaction did not occur when the two individuals were exposed to different stimuli. Implications were discussed in terms of justification through social interaction.

*Keywords:* mere exposure effect; subliminal; implicit attitude; social interaction; Affect Misattribution Procedure.

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People often experience vague feelings. However, we do not know where these feelings originate, and therefore, we cannot express such feelings lucidly. Nevertheless, such vague feelings can be clarified through conversations with others. In this way, social interactions can transform vague feelings and vague attitudes into more specific feelings. We addressed these consequences of social interactions by investigating how the implicit effects of subliminal mere exposure could become explicit.

### **Subliminal Mere Exposure Effect**

Zajonc (1968) described the mere exposure effect, observing that “the mere repeated exposure of the individual to a stimulus is a sufficient condition for enhancement of his attitude toward it” (p. 1). More than 250 experimental articles in the past 40 years have examined this effect. A broad array of stimuli encountered in and out of the laboratory, including photographs, words, and people, have been shown to produce the effect (Bornstein, 1989).

The mere exposure effect is thought to be independent of the conscious awareness of the exposed stimuli (Kunst-Wilson & Zajonc, 1980). For instance, Kunst-Wilson and Zajonc (1980) showed participants 10 irregular polygon figures for 1 ms each and repeated this five times. After seeing the repeated stimuli, the participants made forced-choice liking judgments and recognition judgments on pairs of exposed and unexposed stimuli. The results showed that exposed stimuli were preferred significantly more than chance, even though recognition accuracy was no better than chance. However, follow-up research found that the mere exposure effect is less likely to occur under subliminal conditions (Brooks & Watkins, 1989; Fox & Burns, 1993; Newell & Bright, 2003; Newell & Shank, 2007; Seamon, Marsh, & Brody, 1984; Szpunar, Schellenberg, & Pliner, 2004). For example, Fox and Burns (1993)

attempted to replicate the findings of Bornstein and D'Agostino (1992) and showed that the mere exposure effect only occurred when stimuli were presented under supraliminal conditions but not under subliminal conditions. Thus, it is possible that the experimental manipulation of repeatedly exposing a person to a stimulus under subliminal conditions may not be sufficient to produce increased liking for the exposed stimulus.

### **Implicit and Explicit Attitude Changes**

Research on attitudes has been going through a revolutionary change due to newly developed implicit measures of attitudes. Implicit attitudes (i.e., attitudes to which people do not initially have conscious access and whose activation cannot be controlled) can be distinguished from explicit attitudes (i.e., attitudes that people can report and whose expression can be consciously controlled). Some researchers have suggested that implicit and explicit attitude measures tap two distinct evaluative tendencies with their roots in qualitatively different, though interrelated, processes (Olson & Fazio, 2006; Gawronski & Bodenhausen, 2006; Rydell & McConnell, 2006; Rydell, McConnell, Mackie, & Strain, 2006). In particular, Gawronski and Bodenhausen (2006) proposed the Associative-Propositional Evaluation (APE) model to explain differences between implicit and explicit attitude changes. According to this model, changes in implicit attitudes are likely to be caused by associative processes, whereas explicit attitudes are influenced by propositional processes. Therefore, in some cases, experimental manipulations could affect only implicit attitudes but not explicit attitudes. From the perspective of the APE model, such patterns should emerge when a given factor leads to a change in associative structure in memory and, additionally, other relevant propositions lead to a rejection of associative evaluations as a valid basis for an evaluative judgment. An illustrative example for this case is found in research on (subliminal) evaluative conditioning (Dijksterhuis, 2004; Gawronski & LeBel, 2008) and repeated approach-avoidance behavior (Kawakami, Steele, Cifa, Phills & Dovidio, 2008). Namely, in

order to change explicit attitudes, identifiable reasons to affirm the validity of the evaluative judgments are needed.

With regard to the mere exposure effect, little research has focused on differences between implicit and explicit attitudes (e.g., Kawakami, 2012; Smith, Dijksterhuis, & Chaiken, 2008). These studies have demonstrated that when stimuli are presented under subliminal conditions, changes occur in implicit, but not in explicit attitudes. In light of the APE model, this asymmetrical influence may have been caused by the fact that people usually feel they must have reasons to make explicit judgments (Yzerbyt, Schadron, Leyens, & Rocher, 1994). Under subliminal conditions, clearly identifiable reasons are absent, and they may reserve judgment because they do not feel “entitled” to judge. In particular, for nonsense or novel stimuli of the type mainly used in past research (Bornstein, 1989), it may be hard to come up with any reason to particularly like a given stimulus, so participants may revert to the scale midpoint, given that they have no justification for making any firm positive judgment. Previous findings suggesting that the mere exposure effect does not necessarily occur under subliminal conditions might have resulted from using self-report methods, such as Likert scales, which are likely to reflect the propositional processes underlying explicit attitudes based on deliberative and conscious thought.

Changes in implicit attitudes caused by subliminal exposure to stimuli are rarely expressed explicitly, as mentioned above. Can such changes become explicit? Of course, this question has not gone unasked, and several researchers have suggested possible answers (Loersch, McCaslin, & Petty, 2011; Rydell & McConnell, 2006). One proposal is that subliminal stimuli will affect explicit attitudes if the attitude reporting instructions for participants explicitly license intuitive responses (e.g., “Go with your gut reaction”). Loersch et al. (2011), for example, replicated previous research in finding no impact of subliminally-presented associative information on explicit attitudes when participants were given standard

attitude reporting instructions. However, when participants were given modified instructions that encouraged them to rely on their intuitions, the subliminal stimuli significantly affected their explicit attitudes. This result might be explained by the hypothesis that the modified instructions freed participants from concerns about social judgment for expressing irrational attitudes, thereby allowing them to feel justified in using associative information as the basis for their explicit attitudes.

### **Present Study**

Here, we propose another possible answer to this question by demonstrating that implicit effects may become explicit through discussion between two individuals who have the same implicit attitudes. Drawing on the APE model, participants often have access to the evaluative implications of associative information, but these evaluative implications are not incorporated into explicit attitudes because there is no explicit reason to report a given stimulus as likable. This is especially true when the stimuli are presented below conscious awareness and participants cannot subjectively perceive the stimuli. Therefore, if participants can, through discussion, generate reasons that justify their associative evaluations as a valid basis for explicit judgments, the subliminal mere exposure effect should spill over to the explicit level.

Research on collective decision making has investigated the process of coming to consensus within a group, demonstrating that when individuals, each of whom has a liking for the same subject, form a group and have a discussion, their positive attitudes towards the subject becomes stronger (Davis, 1973; Moscovici & Zavalloni, 1969; Myers & Bishop, 1970). This polarization is thought to be caused by explicitly reinforcing the validity of their opinion through social interaction in which participants are able to verbalize their own attitude and to experience the reactions of others to it (Festinger, 1954). If a member experiences other members as having the same attitude as him, he does not need to hesitate to

making a strong expression of this attitude any more. Moreover, past research on attitude similarity has reported a fair amount of evidence that similarity between the attitudes of two people regarding a given object is associated with mutual liking (Byrne, 1971; Eagly & Chaiken, 1993; Montoya, Horton, & Kirchner, 2008). According to Byrne's (1971) account of such similarity-attraction effects, people have a fundamental need for affirming the validity of their own attitudes (called the effectance motive). If a person's attitudes are similar to those of another, it consensually validates the attitudes held by the self. As a result, people prefer individuals who have similar attitudes to individuals who have dissimilar attitudes. For instance, in a conversation with another person, primitive positive feelings elicited by subliminal exposure to a given stimulus may be tentatively mentioned. Once the other person mentions liking the same stimulus, which leads to knowing that their attitudes are shared and similar, this becomes a reason to also express liking for it explicitly.

To test this idea, we conducted subliminal mere exposure experiments in which participants were exposed to novel figures and asked to report their explicit liking of them through discussion in a dyad. It was expected that subliminal mere exposure would affect not only implicit attitudes but also explicit attitudes when a pair of participants who had the same implicit attitudes resulting from exposure to the same stimuli discussed and decided their judgments.

As a measure of implicit attitudes, we used the Affect Misattribution Procedure (AMP; Payne, Cheng, Govorun, & Stewart, 2005). The AMP is an approach to implicit measurement that depends on evaluation of ambiguous stimuli. When an ambiguous stimulus (such as a Nepalese character) is preceded by an affective prime (such as a picture of a smiling or frowning face), the prime influences the impression of the stimulus (Murphy & Zajonc, 1993). This can make people more likely to misattribute their affective reaction caused by the prime picture to the target character. As a result, when participants are asked to rate the

pleasantness of the stimulus (e.g., the Nepalese character), they tend to rate it as more pleasant if they have seen a positive prime (e.g., smiling face) compared to a negative prime (e.g., frowning face).

Prior to the main experiment, we conducted a preliminary experiment that replicated previous findings suggesting that subliminal mere exposure affects implicit, but not explicit attitudes.

### **Preliminary Experiment**

#### **Method**

**Participants and Design.** Thirty-two undergraduates participated voluntarily in the experiment. Their mean age was 19.16 years ( $SD = 1.02$ ). A one-way within-participants design (figure: exposed vs. unexposed) was employed.

**Stimuli.** Ten nonsense figures were used as stimuli. These figures had been evaluated as equally favorable in a pilot study. All figures were shown as grayscale images, approximately 240 pixels wide by 240 pixels high.

**Procedure.** Participants were tested individually. The experimenter told participants that this experiment investigated how rapidly people could process visual information. Then they were asked to complete a few tasks on the computer and fill out some questionnaires afterwards.

Participants were first instructed to complete the exposure task on the computer. A cross mark appeared in the middle of the computer screen for 2,000 ms, then a figure was shown for 10 ms, and finally a black-and-white pattern mask appeared for 200 ms. There was a 1,000 ms interval between each trial. The exposure task consisted of 100 trials, in which five randomly-selected figures from the set of ten nonsense figures were presented 20 times each.

Next, participants completed a computerized AMP to measure their implicit attitudes



towards the exposed and unexposed figures. On each trial of this task, a cross mark was first shown for 2,000 ms and then replaced by one of three primes (an exposed prime, an unexposed prime, or a gray square serving as a control prime), which was shown for 70 ms. The exposed primes were the five figures presented in the exposure task, and the unexposed primes were the other five figures that had not been presented. Following the prime, a blank screen was shown for 125 ms, after which a Nepalese character appeared for 200 ms. The Nepalese character was then replaced by a black-and-white pattern mask, and participants were instructed to indicate whether they considered the Nepalese character more pleasant or less pleasant than the average ideograph. The pattern mask remained on the screen until participants made their response, and then the next trial began. A total of 60 randomly ordered trials were presented, consisting of 20 exposed, 20 unexposed, and 20 control primes paired with 60 different Nepalese characters. Based on the instructions employed by Payne et al. (2005), participants were instructed to remain unaffected by the preceding figures when evaluating the characters.

After the AMP, a figure rating task was conducted in order to measure participants' explicit attitudes towards the exposed and unexposed figures. Each figure was presented with a question asking "How much do you like this figure?" with a 6-point rating scale (from 1 = *not at all* to 6 = *very much*). At the end of the experiment, participants were fully debriefed.

## Results

**Implicit Attitudes.** Implicit attitude scores were created by calculating the mean proportion of more pleasant responses for each of the two types of figures (exposed vs. unexposed). The implicit attitude scores were significantly higher for the exposed stimuli than for the unexposed stimuli ( $M_s = .59$  vs.  $.49$ ,  $SD_s = .11$  vs.  $.15$ , respectively),  $t(31) = 3.20$ ,  $p < .01$ ,  $d = .72$ , indicating that attitudes were more favorable toward exposed figures compared with unexposed ones. Thus, the subliminal mere exposure effect occurred for

implicit attitudes.

**Explicit Attitudes.** To test the exposure effect for explicit attitudes, liking ratings of the exposed stimuli and unexposed stimuli were submitted to a *t*-test. No significant effect was found ( $M_s = 3.53$  vs.  $3.50$ ,  $SD_s = .55$  vs.  $.60$ , respectively),  $t(31) = .35$ ,  $p = .73$ ,  $d = .05$ . Thus, subliminal mere exposure did not affect explicit attitudes.

**Recognition Test.** None of the participants indicated awareness of the subliminal stimuli or suspicion of any sort. More specifically, none of the participants could report having seen the stimuli, and no participants came close to guessing the true nature of the experiment. As an additional test of the subliminality of the 10-ms stimuli, twenty additional participants took part in a forced-choice recognition task. Five figures used in the experiment were subliminally presented 20 times each using the same computer and display used in that experiment. Following this phase, a pair of exposed and unexposed figures was shown on a display, with each figure placed in the center of each half of the screen. The participants were asked to choose the one that they had been shown in the prior phase. In total, 5 pairs of exposed and unexposed figures were presented to participants. A one-sample *t*-test showed that there was no significant difference between the proportion of correct recognition of the exposed figure ( $M = .51$ ,  $SD = .15$ ) and the .50 chance level,  $t(19) = .57$ ,  $p = .57$ . Therefore, the exposures were subliminal, in that participants could not correctly recall the exposed stimuli.

## Discussion

The results demonstrated that subliminal mere exposure influenced only implicit attitudes, and not explicit attitudes, replicating previous research. Because subliminal mere exposure is independent of conscious awareness, it only influences implicit attitudes by directly affecting the associative structure, whereas it does not influence explicit attitudes, which are formed through information that is amenable to higher-order deliberative thought. This discrepancy

between implicit and explicit attitudes may be due to the absence of a clearly identifiable reason to express liking for the exposed stimuli explicitly. Indeed, participants' explicit attitudes toward the exposed stimuli were not significantly different from the midpoint,  $t(31) = .32$ ,  $p = .75$ , suggesting that participants reverted to the scale midpoint because they had no justification for making any firm positive judgments toward nonsense and novel stimuli (Yzerbyt et al., 1994).

### **Main Experiment**

The main experiment tested the prediction that the effects of subliminal mere exposure on implicit attitudes would become explicit through discussions between two individuals who have been exposed to the same stimuli. To examine this prediction, similar to the preliminary experiment, participants individually performed the exposure task and the AMP. Then, explicit attitudes were assessed in the course of a discussion with other participants who had been exposed to the same, or different stimuli.

### **Method**

**Participants and design.** One hundred and twenty undergraduates participated voluntarily in the experiment. Their mean age was 20.10 years ( $SD = 1.58$ ). They were randomly assigned to a 2 (figure: exposed vs. unexposed) x 2 (discussion target: same vs. different) mixed design, with repeated measures on the first factor.

**Stimuli.** Five figures were added to the stimuli of preliminary experiment, using a total of 15 figures. The added figures had received equally favorable ratings in the pilot study as the other 10 figures.

**Procedure.** Each participant was paired with another participant of the same gender whom they did not know, producing a total of 60 pairs. Upon entering the laboratory, each participant was seated in front of a computer in a separate room. Participants then completed the exposure task, identically to preliminary experiment. What was important in this exposure

task was that half of the pairs were randomly assigned five stimuli from the 15 figures, and each of the two pair members were exposed to these same five stimuli (*same* condition). With the other half of the pairs, each pair member was exposed to five stimuli that were different for the five stimuli that the other pair member was exposed to (*different* condition). In the *different* condition, five stimuli were selected randomly from one pair member from the 15 figures, and then from the remaining 10 figures, five more were randomly selected for the second pair member. Next, participants also completed the AMP individually, in which 10 figures were presented as primes; five figures were exposed ones from the prior task and the other five figures were unexposed ones. Following these trials, the paired participants were seated facing each other across a table and were instructed to evaluate some figures in a discussion. The participants were told that they could discuss these figures freely with each other until they were able to reach a common decision, and their discussion would not be analyzed by anyone. Each figure was presented along with a question asking “How much do you like this figure?” on a scale of 1 (*not at all*) to 6 (*very much*). After the participants reached a common decision on each figure, the discussion about the next figure began. After the discussions, the participants were individually asked to indicate their impressions about the discussions along with a question asking “How did you feel during the discussions?” on two 6-point scales (“My partner understood my opinion,” and “We could share opinions with each other”), ranging from 1 (*not at all*) to 6 (*very much*). At the end of the experiment, the participants were debriefed individually.

## Results

**Implicit Attitudes (Replication of Preliminary Experiment).** As in preliminary experiment, implicit attitude scores for both conditions were submitted to a *t*-test. Consistent with the preliminary experiment, participants’ attitudes showed a greater liking for exposed figures compared to unexposed ones ( $M_s = 0.59$  vs.  $0.49$ ,  $SD_s = 0.16$  vs.  $0.15$ , respectively),

$t(119) = 3.56, p < .01, d = .57$ . Thus we successfully replicated the finding that subliminal mere exposure effects occur for implicit attitudes at the individual level.

**Explicit Attitudes.** The mean liking ratings for the stimuli in both conditions are shown in Figure 1. A 2 x 2 mixed-model ANOVA showed the predicted significant interaction between the figure and the discussion target,  $F(1, 58) = 4.72, p < .05, \eta_p^2 = .08$ . As shown in Figure 1, when paired participants were exposed to the same stimuli, the exposed figures were evaluated as more likable than the unexposed figures,  $F(1, 58) = 12.10, p < .001, \eta_p^2 = .17$ . On the other hand, no such effect was observed when the paired participants were exposed to different stimuli,  $F < 1$ . This indicated that subliminal mere exposure effects on explicit attitudes were generated through discussions when the dyads were exposed to the same stimuli, but not in those dyads that had been exposed to different stimuli.

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**Mediation Analysis of Impressions during the Discussions.** We then analyzed ratings of impressions regarding the discussions. Both items (“My partner understood my opinion,” and “We could share opinions with each other”) were strongly correlated ( $r = .76, p < .001$ ). Therefore, we averaged the ratings of both items per participant. This rating was also positively correlated between members of each pair ( $r = .56, p < .001$ ). Moreover, a  $t$ -test showed that impression scores under the *same* condition were significantly higher than those under the *different* condition ( $M_s = 4.05$  vs.  $3.64, SD_s = .52$  vs.  $.57$ , respectively),  $t(118) = 4.05, p < .001$ . Thus, participants who were exposed to the same stimuli in a pair could feel that they understood each other’s opinions better than participants who were exposed to different stimuli in a pair.

To explore the potential process underlying the spill-over effect, we assumed the

following processes. First, the exposures to same stimuli would produce same implicit liking, thereby making participants feel that their opinions were shared and understood through the discussions. Second, this feeling would facilitate generating the reasons that justify their associative information as a valid basis for an evaluative judgment, resulting in the spill-over effects. To investigate these processes, we performed a multilevel mediation analysis using structural equation modeling (Mplus version 7.11; Muthén & Muthén, 2012). This analysis examined the influence of the discussion target (dyad-level) on the size of the mere exposure effect (dyad-level; the average difference between each pair's explicit ratings of unexposed stimuli subtracted from explicit ratings of exposed stimuli) was mediated by impressions caused during the discussions (individual-level). As Figure 2 shows, the discussion target (0 = different, 1 = same) did not influence the size of the mere exposure effect directly,  $b = .06$ ,  $t = .25$ , but significantly influenced the impression during discussions,  $b = .47$ ,  $t = 4.44$ ,  $p < .01$ . Moreover, the impression during discussions significantly predicted the size of the mere exposure effect,  $b = .86$ ,  $t = 2.00$ ,  $p < .05$ . More importantly, the indirect effects of the discussion target on the size of the mere exposure effect was mediated by the impression during the discussions,  $b = .41$ ,  $t = 1.80$ ,  $p < .05$ . To further explore this mediation effect, we used Preacher, Zyphur, and Zhang's (2010) procedure to determine a 95% confidence interval (CI) for the indirect effect, which confirmed the significant mediation effect because the CI (95% CI = [.04, .78]) did not include zero. These results indicate that the perception of mutual understanding and shared perspectives resulting from being exposed to same stimuli facilitates the explicit expression of implicit attitudes.

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**Recognition Test.** To evaluate subliminality in the dyad condition, forty additional

participants took part in a forced-choice recognition task. Each participant was paired with another participant of the same gender, producing a total of 20 pairs. Paired participants were subliminally presented with the same five figures 20 times each. Then, the paired participants were asked to decide in a discussion whether each figure had actually appeared in the prior task. A pair of exposed and unexposed figures was shown on a display, with each figure placed in the center of each half of the screen. In total, 5 pairs of exposed and unexposed figures were presented to participants. A one-sample *t*-test showed that there was no significant difference between the proportion of correct recognition of the exposed figure ( $M = .53$ ,  $SD = .12$ ) and the .50 chance level,  $t(19) = .54$ ,  $p = .61$ .

### **Discussion**

We successfully demonstrated that implicit effects of subliminal mere exposure spilled over to the explicit level through discussions when the dyads were exposed to the same stimuli, but not to different stimuli. Also, as shown in the mediation analysis, this spill-over effect was mediated by impression during the discussion: the effect of the discussion condition on the size of the mere exposure effect was predicted by the extent of mutual understanding and shared perspective during the discussion. This suggests that exposure to the same stimuli as a pair produced the same implicit liking, making the participants feel that their opinions were shared through the discussion. In the light of the justification processes, this would likely serve as a strong reason to justify their shared associative information as a valid basis for an evaluative judgment.

### **General discussion**

The main purpose of the present research was to investigate how implicit effects of subliminal mere exposure become explicit. Previous research showed that the mere exposure effect in a subliminal condition is likely to occur for implicit attitudes, but not for explicit attitudes (Kawakami, 2012). Indeed, preliminary experiment replicated previous research in

finding no impact of subliminal mere exposure on explicit attitudes at the individual level. However, main experiment showed that subliminal mere exposure effects on explicit attitudes occurred after discussion when dyads were exposed to the same figures, but not when they were exposed to different figures. These results suggest that an individual's implicit liking for a figure could spill over to the explicit level through discussion with another individual with the same implicit attitude.

Justification likely plays an important role in this process. The APE model explains patterns of attitude changes by allowing communication between the associative and deliberative systems (Gawronski & Bodenhausen, 2006). In light of research on the discrepancy in the impact of associative information such as those involved in subliminal stimuli on explicit attitudes (Gawronski & LeBel, 2008), participants have access to the evaluative implication of the associative information, but this information is not incorporated into an explicit attitude because they perceive it as an invalid input and do not have a reason to express an attitude change explicitly (Loersch et al., 2011; Rydell et al., 2006). As demonstrated in our experiments, even if the stimuli were presented below conscious awareness, discussion with paired participants who had been exposed to same stimuli allowed subjects to justify their associative information as a valid basis for evaluative judgment, resulting in an explicit attitude change. According to participants' impressions of the discussions, participants who were exposed to the same stimuli as their partner reported that they felt understood and that their opinions were shared, compared to the pairs who were exposed to different stimuli. In addition, this impression mediated the link between the discussion targets and the size of the explicit mere exposure effect. These results suggest that discussion with a partner who has the same implicit attitude justifies the primitive positive feelings elicited by subliminal mere exposure toward a given stimulus, providing a reason to explicitly express a liking for it. We are often taught to avoid basing our attitudes on vague



feelings whenever possible (Peng & Nisbett, 1999). This may have caused participants to hesitate to report an exposed stimulus as likable when they could not see it. However, if they interacted with another person who had the same implicit liking toward the same stimulus, this would likely serve as a strong reason to explicitly express the liking.

We showed a new possible answer to the following question. How do implicit effects of subliminally-presented associative information become explicit? Although our results seem to be similar to previous research which demonstrated that when participants were given modified instructions that encouraged them to rely on their intuitions, associative information presented subliminally also affected explicit measures (Loersch et al., 2011), our findings differ in the processes used to account for the spill-over effects. Loersch et al. (2011) posited that reading modified instructions made participants feel free from social judgeability concerns, thereby feeling that it was more acceptable to use associative information as the basis for their explicit judgments. This process encouraged participants to rely more on their intuitions which made them less reliant on deliberative thought, and allowed them to directly report the evaluative implications of the associative information. On the other hand, we successfully prompted implicit to explicit spill-over through social interactions, without specialized instructions to rely on intuitions. This suggests that people are able to identify the valid reason for expressing vague feelings through explicit reasoning in the form of discussion with others, who share the same implicit liking. Byrne (1971) emphasized the importance of effectance motive that voluntarily affirms the validity of own attitudes through interpersonal interaction. In addition, research on collective decision making has demonstrated that when individuals, each having a liking for the same subject, form a group and have a discussion, their positive attitudes towards the subject becomes stronger (Moscovici & Zavalloni, 1969; Myers & Bishop, 1970). However, there is a lack of research directly addressing the relationship between factors related to social influence (i.e., social

interaction) and the dual processes of attitudes. In this sense, although Loersch et al.'s (2011) results and ours might be based on one common mechanism, the justification of associative information as the basis for their explicit judgments, the processes used to prompt the spill-over effects was different in that our finding place more emphasis on the effect of social influence. To investigate this process further, future studies that analyze the interaction itself are required.

Our findings have implications for future research on the social influence. First, results of the discussion impression measure suggested that the participants were able to pick up on attitude similarity induced by shared mere exposure, resulting in the perception of mutual understanding and a shared perspective. Specifically, it is important that attitude similarity was perceived despite the participants being entirely unaware of the causal source of attitudes. Past research has shown that similarity between the attitudes of two people is associated with mutual liking (Byrne, 1971; Eagly & Chaiken, 1993; Montoya et al., 2008). Although we did not measure the liking of the partner, on the basis of attitude similarity research, it would be expected that paired participants in the *same* condition would show greater liking of the partner than those in the *different* condition. Future research needs to examine these issues and further investigate how being unaware of the causal source of attitudes interact with social interaction. Second, past research on attitude similarity effects in attraction and collective decision making has examined the similarity of explicit attitudes. In contrast, our results suggest that these effects could also be applicable to implicit attitudes. Namely, even if the participants cannot consciously access their attitudes, their similarity was perceived at an implicit level. In that respect, our findings bridge the dual systems of attitudes and various social influence-related factors. We look forward to future work that investigates the extent to which implicit attitudes are related to issues such as the perception of attitude similarity and collective decision making.

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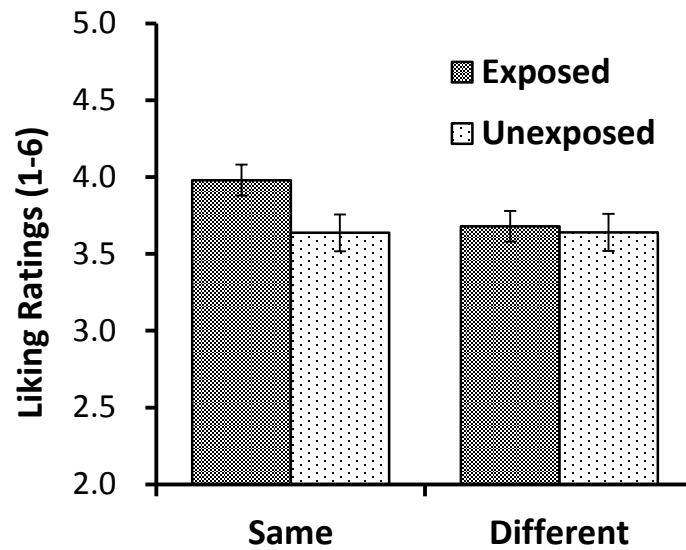
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*Figure 1.* Mean liking ratings of explicit attitudes as a function of figure (exposed vs. unexposed) and discussion target (same vs. different). The bars indicate  $\pm 1$  standard errors of the mean.

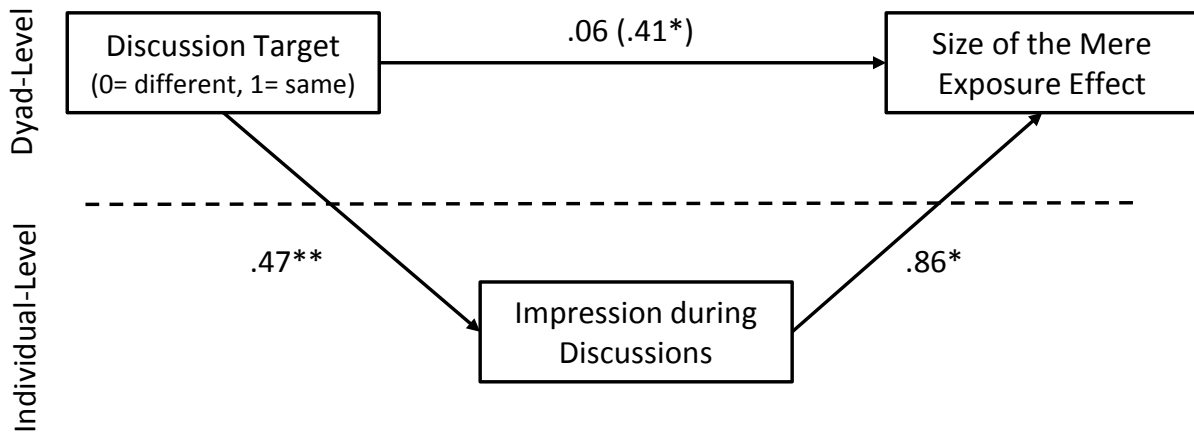


Figure 2. Mediation analysis in main experiment. All values represent unstandardized coefficients. The coefficient inside of the parentheses represents the indirect effect after accounting for the impression during discussions as a mediator.

\* $p < .05$ , \*\* $p < .01$ .