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Hypnotic Suggestions Can Induce Rapid Change in Implicit Attitudes

Pieter Van Dessel and Jan De Houwer
Department of Experimental Clinical and Health Psychology, Ghent University

Abstract
We sometimes evaluate our environment (e.g., persons, objects, situations) in an automatic fashion. These automatic or implicit evaluations are often considered to be based on qualitatively distinct mental processes compared with more controlled or explicit evaluations. Important evidence for this claim comes from studies showing that implicit evaluations do not change as the result of counterattitudinal information, in contrast to their explicit counterparts. We examined the impact of counterattitudinal information on implicit evaluations in two experiments (N = 60, N = 72) that included an innovative manipulation: hypnotic suggestions to participants that they would strongly process upcoming counterattitudinal information. Both experiments indicated that hypnotic suggestions facilitated effects of counterattitudinal information on implicit evaluations. These findings extend recent evidence for rapid revision of implicit evaluations on the basis of counterattitudinal information and support the controversial idea that belief-based processes underlie not only explicit but also implicit evaluations.

Keywords
implicit attitudes, automatic evaluation, implicit-explicit dissociation, counterattitudinal information, hypnotic suggestions, open data, open materials, preregistered

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Encountering a specific object (e.g., a pizza) or person (e.g., Donald Trump) can trigger an evaluative response (e.g., a smile, a frown) in a spontaneous or automatic manner. Research suggests that these automatic or implicit evaluations are important determinants of behavior (for reviews, see Cameron, Brown-Iannuzzi, & Payne, 2012; Friese, Hofmann, & Schmitt, 2008). For instance, implicit evaluations of unhealthy foods can bias food choices (Marty et al., 2017), and implicit evaluations of politicians can affect voting behavior (Raccuia, 2016).

Interestingly, implicit evaluations do not always accord with evaluations that arise in a more controlled manner (explicit evaluations, such as self-reported ratings of liking; for a review, see Petty & Briñol, 2009). Most prominently, information that contradicts prior evaluations (i.e., counterattitudinal information) sometimes leads to rapid changes in explicit but not implicit stimulus evaluations. In one of the most-cited studies in the field of attitude research in the past 20 years, Gregg, Seibt, and Banaji (2006) installed evaluations of two fictitious social groups (Niffites and Luupites) by informing participants that one group had positive traits and the other group had negative traits. When participants afterward saw information that ascribed traits of the opposite valence to Niffites and Luupites, implicit evaluations of the groups did not change even though explicit evaluations completely reversed.

This intriguing finding of a dissociative effect of counterattitudinal information on implicit and explicit evaluations is considered one of the most important pieces of evidence for the idea that two qualitatively distinct processes underlie implicit and explicit evaluation. Dual-process theories of evaluation typically postulate that implicit evaluation results from the automatic activation of learned associations in memory, whereas explicit evaluation depends on belief-based processes such as the validation of activated information (e.g., Rydell & McConnell, 2006; Strack & Deutsch, 2004). Associations

Corresponding Author:
Pieter Van Dessel, Ghent University, Department of Experimental Clinical and Health Psychology, Henri Dunantlaan 2, 9000 Ghent, Belgium
E-mail: pieter.vandessel@ugent.be

are often construed as links between mental representations (e.g., a link between representations of pizza and of positive valence) that, once established, cannot be simply erased from memory and might therefore drive implicit evaluation even when the implied evaluation is no longer endorsed explicitly.

The idea that inherently stable mental associations underlie implicit evaluations is often used to explain dissociations between implicit and explicit evaluation (e.g., in-person perception: Okten, 2018; racial prejudice: James, 2018; addiction: Wiers et al., 2017). Moreover, it has directed intervention research that aims to modify unwanted implicit preferences. Changing implicit evaluations is often assumed to require repeated pairings of stimuli with valenced events because this produces gradual changes in associations (Rydell & McConnell, 2006). Intervention studies have therefore mainly used procedures that continuously pair target stimuli with valenced stimuli (evaluative conditioning; Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010) or valenced responses (approach-avoidance training; Van Dessel, Hughes, & De Houwer, 2019).

Importantly, however, recent studies have challenged the idea that the modification of implicit evaluations requires repeated pairings by demonstrating that counterattitudinal information can sometimes induce rapid change in implicit evaluation. For instance, participants who had learned positive information about a person named Bob exhibited a rapid negative shift in implicit evaluations of Bob when they learned new information that they considered more diagnostic of Bob's true character (e.g., that Bob was a convicted child molester; Cone & Ferguson, 2015). Other studies indicated that the extent to which counterattitudinal information is believable and allows reinterpretation of the initial information also moderates rapid change in implicit evaluation (for an overview, see Cone, Mann, & Ferguson, 2017). These results suggest that belief-based processes contribute to implicit evaluation and have bolstered the innovative idea that both implicit and explicit evaluations constitute evaluative responses that are triggered by beliefs about the valence of a stimulus that are readily available under the different measurement conditions (Van Dessel et al., 2019).

One particularly useful method to systematically examine the belief-based processes that underlie implicit evaluation might be hypnosis. Hypnosis is commonly defined as "an event or ritual between a hypnotist and a hypnotic subject(s) in which both agree to use suggestion to bring about a change in perception or behavior" (Kulleseid & Surman, 2000, p. 467). This ritual typically involves (a) an induction during which the hypnotist invites the subject to experience a state in which the subject focuses on, accepts, and acts in line with verbal suggestions that are provided by the hypnotist and (b) the verbal suggestions (Oakley & Halligan, 2013). Research has shown that hypnotic suggestions can sometimes facilitate responding in line with specific suggestions even when the hypnotist provides information that contrasts with the subject's prior beliefs (Raz & Shapiro, 2002). Thus, the aim of using hypnosis has often been to change a person's current beliefs in order to promote new, adaptive behavior (e.g., the inhibition of pain responses in pain management; Patterson & Jensen, 2003). Previous studies have found that hypnotic suggestions can influence even highly automatic behavior (see Lifshitz, Bonn, Kashem, & Raz, 2013), yet no study to date has examined the effects of hypnotic suggestions on implicit evaluation. Importantly, however, if beliefs (rather than learned associations) determine implicit evaluation, then providing hypnotic suggestions could be a very potent method for changing even highly robust implicit evaluations because it is a very potent method for changing beliefs. Hence, our research can shed new light on the conditions under which implicit evaluations change and thus the nature of the underlying representations.

In the current research, we tested the effects of hypnotic suggestions on implicit evaluation in two paradigms that are known to generate robust changes in explicit but not implicit evaluations as the result of counterattitudinal information. In Experiment 1, we adopted the procedure of the influential Gregg et al. (2006) studies, testing effects of counterattitudinal information on evaluations of fictitious social groups that were installed via a historical narrative. In Experiment 2, we probed effects of counterattitudinal information on evaluations of two unfamiliar persons as installed via evaluative conditioning, which capitalizes on repeated pairings and is therefore considered the most direct way to install strong implicit evaluations from dual-process perspectives (Hu, Gawronski, & Balas, 2017; Rydell & McConnell, 2006). In both experiments, we examined the relative resistance of implicit and explicit evaluations to verbal counterattitudinal information. Importantly, we provided half the participants with hypnotic suggestions that they would strongly process and incorporate the counterattitudinal information. We predicted that these hypnotic suggestions of enhanced processing of counterattitudinal information would facilitate effects of this information not only on explicit but also on implicit evaluations.

Method

Participants

A total of 60 and 72 native-Dutch-speaking undergraduates were recruited from the Ghent University participation pool for Experiments 1 and 2, respectively. The initial sample size was determined on the basis of an a priori power analysis indicating that power greater than .80 would be sufficient in Experiment 1 to detect an effect of similar magnitude to the results found by Gregg et al. (2006) and sufficient in Experiment 2 to detect an effect of similar magnitude to that observed in Experiment 1.[1] We ensured that we had sufficient statistical power to also detect smaller effects by planning sample-size increases until decisive evidence was obtained (as indicated by the Bayes factor, or BF) for the presence or absence of an effect (Schönbrodt, Wagenmakers, Zehetleitner, & Perugini, 2017), but increases proved unnecessary. Bayesian analyses were performed according to the procedures outlined by Rouder, Speckman, Sun, Morey, and Iverson (2009) and provided a BF that indicates how strongly the data support either the null hypothesis (BF_{01}) or the alternative hypothesis (BF_{10}). Prior to data collection, the target sample size was preregistered together with the study design, data-analytic plans, and hypotheses for both experiments. The raw data, materials, and experimental and analytic scripts are available at https://osf.io/wkjp6/, and the preregistered design and analysis plans are available at https://osf.io/v6sx8.

Because suggestibility can be a potent moderator of hypnosis effects (see Raz, Kirsch, Pollard, & Nitkin-Kaner, 2006), all participants in the Ghent University participation pool completed the brief version of the Multidimensional Iowa Suggestibility Scale (Kotov, Bellman, & Watson, 2004), and only participants with the highest 50% of scores were invited to participate in Experiment 1. In Experiment 2, we measured suggestibility but did not preselect participants on suggestibility scores to facilitate generalizability.

Procedure

After entering the research lab, participants received information about the phenomenology of hypnosis (standard hypnosis rationale; Shor & Orne, 1962). Next, participants provided informed consent and were seated in front of a computer screen.

Evaluation induction. In Experiment 1, participants were informed that they would learn about a real historical conflict between two social groups (i.e., Niffites and Luupites) whose true identities were concealed. They then read a story describing one group as civilized and constructive (positive-induction group) and describing the other group as aggressive and destructive (negative-induction group; Gregg et al., 2006, Experiment 4).

In Experiment 2, participants were informed that they would learn about two persons (i.e., Bob and Jan) whose pictures were presented below the instructions (images of neutral valence taken from the Chicago Face Database; Ma, Correll, & Wittenbrink, 2015). Participants were then subjected to an evaluative-conditioning procedure (adapted from Hu et al., 2017). They were informed that they would see pictures and words on the screen and that they should be attentive to these presentations because they would be asked questions about them afterward. There were 80 evaluative-conditioning trials, and each trial involved the presentation of one target person together with a positive picture or word (positive-induction person) or the other person together with a negative picture or word (negative-induction person). Items were displayed for 1,000 ms each; the intertrial interval was 2,000 ms. We collected evaluations at two separate times in Experiment 2, in contrast to our procedure in Experiment 1. After the evaluative-conditioning procedure, participants completed implicit- and explicit-evaluation measures of the two target persons for a first time (measurement details are described below).

Hypnosis induction. After the evaluation induction, participants were led to another room, where they met a trained hypnotist (the first author) who asked them to sit down in a comfortable chair. Half of the participants (hypnosis condition) then received standard hypnotic induction via a verbal-suggestion induction procedure (Shor & Orne, 1962). This procedure consisted of elaborate instructions to focus on the words provided by the hypnotist, experience a state of deep relaxation, and let happen what the hypnotist tells them would happen. The induction procedure ended with a short test of hypnotic suggestibility in which participants were asked to imagine arm lowering and arm immobilization, and the hypnotist scored how well they complied with these suggestions. After the hypnosis-induction procedure, participants were given the following hypnotic suggestions (translated from Dutch): "You will now receive information that you will process more strongly than you normally can. Please remember well that the information that you will hear next will sink in more deeply than is typically the case." An English translation of all the instructions that were given to participants in the hypnosis condition can be found in the Supplemental Material available online.

Following the procedures of Raz et al. (2006), the first author asked the other participants (relaxation control condition) to close their eyes, perform several relaxation exercises, and listen carefully to the information they would hear next. This condition matched the hypnosis condition on important factors, such as the person providing the information, the place, and the approximate timing of the event. However, participants did not undergo hypnosis, that is, the ritual that involved (a) providing instructions to focus on the hypnotist's words and (b) suggesting that participants would more strongly process the upcoming information.

Counterattitudinal information. In Experiment 1, half of the participants in both the relaxation and hypnosis conditions were given a narrative describing how, following the events they learned about previously, the positive-induction group (e.g., Niffites) became hateful and aggressive (e.g., engaging in terrorist attacks) and the negative-induction group (e.g., Luupites) became peaceful and noble (e.g., donating their possessions). The other participants heard a control narrative describing flora and fauna in Niffites' and Luupites' residential areas. Texts were adopted from the work by Gregg et al. (2006).

In Experiment 2, all participants were told the following information (translated from Dutch): "I will now tell you about the two people you learned about previously, that is, Bob and Jan. I want you to know that Jan is a very nice and friendly person, whereas Bob is very unpleasant and mean."

Implicit- and explicit-evaluation measurement. After participants were instructed to open their eyes to terminate the relaxation or hypnosis phase, they returned to the evaluation-induction room to complete evaluation measures. The order of implicit- and explicit-evaluation measurement was counterbalanced across conditions. In Experiment 1, measurement followed Gregg et al.'s (2006) procedures. An Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) was used to measure implicit evaluations of Niffites and Luupites. In this task, participants categorized 24 attribute words (e.g., "wonderful," "painful") as positive or negative and eight names of Niffites and Luupites as their respective group labels. In one experimental block, stimuli related to one group (e.g., Niffites) and to positive attributes shared a response key and stimuli related to the other group (e.g., Luupites) and to negative attributes shared a second response key. In the other experimental block, response-key assignment was reversed. Both experimental blocks consisted of 48 trials. It is assumed that faster responding in one block (e.g., the Niffites–positive and Luupites–negative block) is indicative of a more positive automatic (e.g., fast, unintentional) evaluation in line with the category pairings (e.g., Niffites are evaluated more positively than Luupites). Explicit evaluations of Niffites and Luupites were measured by asking participants to rate both groups using four 7-point semantic-differential scales with the following end points: horrible–wonderful, unpleasant–pleasant, bad–good, and corrupt–virtuous.

In Experiment 2, evaluations of Bob and Jan were measured in accordance with the procedures of Peters and Gawronski (2011). Implicit evaluations were probed with an affect-misattribution procedure (AMP; Payne, Cheng, Govorun, & Stewart, 2005) consisting of 60 trials. On each trial, participants were shown a prime stimulus that depicted the face of Bob or Jan (75 ms), followed by a blank screen (125 ms), a Chinese ideograph (100 ms), and a black-and-white pattern mask. Participants were asked to indicate whether they considered the Chinese ideograph more or less visually pleasant than average by pressing either "E" or "I," respectively, on a keyboard. A higher proportion of positive evaluations of Chinese ideographs with Jan than with Bob as a prime stimulus was assumed to reflect a more positive evaluation of Jan. Such evaluations are often considered automatic (in the sense of unintentional) because participants are instructed to ignore the prime stimuli (in this case, pictures of Bob and Jan). Explicit evaluations of Bob and Jan were measured with three self-report items probing likability, friendliness, and trustworthiness (random order). Responses were provided on 7-point scales ranging from 1 (*not at all*) to 7 (*very much*).

Final questions. Participants indicated (a) whether their evaluative ratings reflected actual liking or demand compliance, (b) the extent to which they had felt under hypnosis (hypnosis condition only), (c) the perceived believability of the historical texts (Experiment 1), and (d) observed contingencies in the evaluative-conditioning task (Experiment 2). Participants in Experiment 2 also completed a measure of suggestibility (brief version of the Multidimensional Iowa Suggestibility Scale) and psychological reactance (Hong & Faedda, 1996). Finally, participants also indicated the implied valence of the counterattitudinal information. All participants (except for 2 hypnosis-condition participants in Experiment 2) answered these questions correctly, indicating that participants in both conditions had been attentive to the information. Exclusion of participants who gave an incorrect response did not change the significance level of any of the reported findings.

Results

Experiment 1

Implicit evaluation. Following Gregg et al. (2006), we excluded trials with latencies above 3,000 ms or below 300 ms (1.2%) and transformed trial latencies by dividing 1,000 by the respective latencies. IAT scores were computed by subtracting participants' mean transformed latencies in the compatible IAT block (positive-induction group and positive words assigned to the same key) from mean transformed latencies in the incompatible IAT block (positive-induction group and negative words assigned to the same key). Overall, IAT scores were higher than zero, indicating an implicit preference for the positive-induction group over the negative-induction group (M = 0.14, SD = 0.20, 95% confidence interval, or CI = [0.09, 0.19]), $t(59)$ = 5.32, p < .001, d = 0.69, 95% CI for d = [0.40, 0.97], BF_{10} = 9,782. An analysis of variance (ANOVA) on IAT scores revealed a main effect of counterattitudinal information, $F(1, 56) = 9.20$, $p = .004$, $\eta^2 = .16$, $BF_{10} = 3.29$, and the predicted interaction with hypnosis, $F(1, 56) = 5.39$, $p = .024$, $\eta^2 = .09$, $BF_{10} = 2.60$. Planned contrasts revealed that participants in the hypnosis condition had lower IAT scores when they had learned counterattitudinal information ($M = 0.01$, $SD = 0.20$) than when they had learned control information ($M = 0.22$, $SD = 0.19$), $t(28) = –0.92$, one-tailed $p = .003$, 95% CI for the mean difference = [∞, −0.09], $d = 1.07$, 95% CI for d = [0.21, 1.07], $BF_{10} = 13.44$. In contrast, and in line with the results of Gregg et al. (2006), IAT scores of participants in the relaxation condition were not moderated by the type of information (counterattitudinal information: $M = 0.17$, $SD = 0.22$; control information: $M = 0.16$, $SD = 0.13$), $t(28) = 0.26$, one-tailed $p = .60$, 95% CI for the mean difference = [−∞, 0.13], $d = 0.10$, 95% CI for d = [−0.65, 0.84], $BF_{01} = 3.45$. Analyses of IAT scores computed with the *D* scoring algorithm that incorporates errors in IAT scores produced similar results (see the Supplemental Material). For the sake of conciseness, preregistered analyses that are not of focal interest are reported in the Supplemental Material.

Explicit evaluation. Explicit ratings were collapsed into one score for each group (Cronbach's α = .96). Explicit-evaluation scores were computed by subtracting rating scores for the negative-induction group from scores for the positive-induction group. Overall, explicit-evaluation scores indicated a preference for the positive-induction group ($M = 1.21$, $SD = 4.53$, 95% CI = [0.04, 2.38]), $t(59) = 2.06$, $p = .043$, $d = 0.27$, 95% CI for d = [0.01, 0.52], $BF_{10} = 1.02$. An ANOVA revealed a main effect of counterattitudinal information, $F(1, 56) = 123.11$, $p < .001$, $\eta^2 = .51$, $BF_{10} > 1{,}000$, and an (unexpected) interaction with hypnosis, $F(1, 56) = 5.85$, $p = .019$, $\eta^2 = .02$, $BF_{10} = 1.03$. Participants in the hypnosis condition preferred the positive-induction group less when counterattitudinal information was presented ($M = −3.85$, $SD = 2.65$) than when control information was presented ($M = 5.23$, $SD = 2.09$), $t(28) = −10.42$, one-tailed $p < .001$, 95% CI for the mean difference = [−∞, −7.60], $d = 3.80$, 95% CI for d = [2.17, 5.41], $BF_{10} > 1{,}000$. Similarly, and in line with the results of Gregg et al. (2006), scores of participants in the relaxation condition were also moderated by counterattitudinal information (counterattitudinal information: $M = −1.42$, $SD = 1.89$; control information: $M = 4.87$, $SD = 2.26$), $t(28) = −8.25$, one-tailed $p < .001$, 95% CI for the mean difference = [−∞, −4.99]. Notably, this effect was smaller than in the hypnosis condition, $d = 3.01$, 95% CI for d = [1.63, 4.36], $BF_{10} > 1{,}000$. Results of exploratory (correlational) analyses involving IAT scores, rating scores, self-reported hypnosis scores, and hypnotic-suggestibility scores are described in the Supplemental Material.

Experiment 2

Implicit evaluation. Scores for the pre- and postmanipulation AMP were computed by subtracting the percentage of "pleasant" responses on trials with the negative-induction person from the percentage of "pleasant" responses on trials with the positive-induction person. An ANOVA on AMP scores revealed a main effect of time, $F(1, 68) = 35.07$, $p < .001$, $\eta^2 = .34$, $BF_{10} > 1{,}000$, and a marginally significant interaction effect of time and hypnosis, $F(1, 68) = 3.52$, $p = .065$, $\eta^2 = .05$, $BF_{10} = 1.09$. Planned contrasts did not reveal a significant difference between the hypnosis condition ($M = 0.25$, $SD = 0.28$) and relaxation condition ($M = 0.25$, $SD = 0.38$) at Time 1, $t(70) = −0.01$, one-tailed $p = .50$, 95% CI for the mean difference = [−∞, 0.13], $d = 0.00$, 95% CI for d = [−0.23, 0.23], $BF_{01} = 4.50$. In contrast, and most crucially, at Time 2, AMP scores were lower in the hypnosis condition ($M = −0.24$, $SD = 0.43$) than in the relaxation condition ($M = −0.01$, $SD = 0.40$), $t(70) = −2.42$, one-tailed $p = .009$, 95% CI for the mean difference = [−∞, −0.07], $d = 0.41$, 95% CI for d = [0.17, 0.65], $BF_{10} = 4.57$. Interestingly, AMP scores were reduced from Time 1 to Time 2 in both the hypnosis and relaxation groups, ts < −3.01, ps < .005, BF_{10}s > 17.08.

Explicit evaluation. Explicit ratings were collapsed into one score for Bob and Jan at each time of assessment (Cronbach's α = .94). Explicit-evaluation scores were computed by subtracting rating scores for the negative-induction person from scores for the positive-induction person. An ANOVA on explicit-evaluation scores revealed a main effect of time, $F(1, 68) = 70.03$, $p < .001$, $\eta^2 = .51$, $BF_{10} > 1{,}000$, but no interaction of time and hypnosis, $F(1, 68) = 2.67$, $p = .11$, $\eta^2 = .04$, $BF_{01} = 1.31$. At Time 1, we did not observe a difference between the hypnosis condition ($M = 1.99$, $SD = 1.72$) and relaxation condition ($M = 1.82$, $SD = 1.83$), $t(70) = 0.40$, one-tailed $p = .65$, 95% CI for the mean difference = [−∞, 0.87], $d = 0.09$, 95% CI for d = [−0.14, 0.32], $BF_{01} = 6.49$. At Time 2, participants had lower scores in the hypnosis condition ($M = −1.38$, $SD = 2.44$) than in the relaxation condition ($M = −0.44$, $SD = 2.11$), $t(70) = 1.74$, one-tailed $p = .043$, 95% CI for the mean difference = [−∞, −0.04], $d = 0.34$, 95% CI for d = [0.10, 0.58], $BF_{10} = 2.51$.

Discussion

People sometimes evaluate stimuli in an automatic manner, and changing these implicit evaluations has often proven difficult (e.g., Gregg et al., 2006; Lai et al., 2014). For a long time, the dominant explanation was that implicit evaluations reflect the automatic activation of highly stable mental associations that are insensitive to rational reasoning and that changing implicit evaluations therefore requires repeated pairings of stimuli and valenced events (e.g., Rydell & McConnell, 2006). The current results contrast with this view. First, we observed rapid change in implicit evaluations as the result of a single piece of counterattitudinal information. Second, we extended previous reports of similar effects (see Cone et al., 2017) by showing that hypnotic suggestions of enhanced processing of the counterattitudinal information moderated this effect. These findings have important implications.

Theoretical and practical implications

On a theoretical level, the current results support the idea that belief-based processes determine implicit evaluation (De Houwer, 2014; Van Dessel et al., 2019). Previous studies have found that implicit evaluations can be readily updated on the basis of counterattitudinal information that is much more diagnostic than the initial information (e.g., "Bob is a child molester"; Cone & Ferguson, 2015). We observed rapid change in implicit evaluation without requiring this type of information by providing hypnotic suggestions about the impact of upcoming counterattitudinal information. Because these suggestions did not include any stimulus information, this effect cannot be explained with changes in mental associations if it is assumed that these changes require pairings of the target stimuli with valenced information (Rydell & McConnell, 2006; for an alternative view, see Gawronski & Bodenhausen, 2006). Instead, the observed change in implicit evaluations might reflect the impact of newly learned beliefs on implicit evaluation. We recently proposed that implicit evaluations result from automatic inferences and low-level action predictions (active inference) that take into account readily available information (Van Dessel et al., 2019). For instance, the presentation of Niffites' names in an implicit-evaluation task leads to the prediction and resulting execution of a positive response when participants can easily retrieve information about positive characteristics of Niffites. Hypnotic suggestions about the enhanced impact of counterattitudinal information might lead to the formation of an easily accessible belief that strongly biases implicit evaluations.

In this inferential framework, dissociations between implicit and explicit evaluations are thought to arise as the result of processes operating during retrieval (i.e., at the time of evaluation) rather than during learning. Because implicit-evaluation measures typically provide less opportunity and motivation to engage in a comprehensive validation of activated information (Gawronski & Bodenhausen, 2006), implicit evaluations might be influenced more strongly by information that is easy to retrieve (Van Dessel et al., 2019). Experiment 1 replicated Gregg et al.'s (2006) finding that counterattitudinal information impacts implicit evaluation (no effect) and explicit evaluation (reversal) differently. One possible explanation is that the counterattitudinal information facilitated automatic retrieval of the evaluation supported by the initial stimulus information because it referred to this information. As a result, the initial information more strongly determined implicit evaluation. In contrast, the instruction to provide a thoughtful opinion during explicit evaluation facilitated expression of the more recent counterattitudinal information in explicit evaluation, leading to the observed dissociation. Note that dual-process theories that assume that belief-based processes moderate association formation can also explain such dissociations (Gawronski & Bodenhausen, 2006).

On a practical level, our results support and extend recent evidence that robust implicit evaluations can be changed quickly on the basis of evaluative-learning procedures that are designed to maximize belief-based learning (e.g., the presentation of believable and diagnostic verbal information; Cone & Ferguson, 2015; Van Dessel, Ye, & De Houwer, 2019). This is crucial information for intervention research aimed at changing automatic evaluations that might have unwanted effects on behavior—for example, in the context of addiction (Wiers et al., 2017), phobia (Jones, Vilensky, Vasey, & Fazio, 2013), and depression (Becker et al., 2016). Most importantly, it supports a shift in focus from procedures that draw on repeated pairings to procedures that facilitate durable changes in beliefs. A recent study illustrates the applied potential of this novel approach, revealing stronger effects of a belief-based compared with a pairing-based training procedure for changing implicit evaluations (and consumption) of unhealthy foods (Van Dessel, Hughes, & De Houwer, 2018).

The current results also establish a novel procedure for changing implicit evaluations—via hypnotic suggestions that focus on the impact of upcoming information. They extend evidence that hypnotic suggestion can induce changes in automatic responses into the attitudes domain (Lifshitz et al., 2013) and support the idea that hypnosis might enable the formation of new beliefs that are (automatically) integrated in action (e.g., on the basis of low-level action predictions; Jamieson, 2016). Our results can also inform clinical practice, in which hypnotic suggestions (which usually do not focus on the impact of upcoming information) have already been used for the treatment of unwanted stimulus-related behavior, such as anxious and addictive behavior (with unclear effectiveness; for relevant reviews, see Barnes, McRobbie, Dong, Walker, & Hartmann-Boyce, 2019; Pelissolo, 2016).

Constraints on generality

Results were obtained in a sample of undergraduate Ghent University students. The fact that these participants were receptive to the idea of hypnosis could have moderated the observed effects of the hypnotic suggestions. Effects might also be contingent on characteristics of the hypnotist that facilitated or impeded agreement between hypnotist and participant and on the specific initial and counterattitudinal information that was provided. The effect of hypnotic suggestions on implicit evaluations was reduced in Experiment 2, possibly because the initial information provided a weaker basis for robust implicit evaluations in the control group. Finally, implicit evaluations were inferred on the basis of responses in specific measures (Experiment 1: IAT; Experiment 2: AMP). Although it is reassuring to see similar effects on these two measures that are known to differ in important ways (Gawronski & De Houwer, 2014), it is possible that effects might not generalize to other implicit-evaluation measures. We have no reason to believe that results depend on other characteristics of the participants, materials, or context.

Action Editor

Leaf Van Boven served as action editor for this article.

Author Contributions

Both authors developed the study concept and designed the study. P. Van Dessel collected and analyzed the data and drafted the manuscript. J. De Houwer provided critical revisions. Both authors approved the final manuscript for submission.

ORCID iDs

Pieter Van Dessel https://orcid.org/0000-0002-3401-780X
Jan De Houwer https://orcid.org/0000-0003-0488-5224

Declaration of Conflicting Interests

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Supplemental Material

Additional supporting information can be found at http://journals.sagepub.com/doi/suppl/10.1177/0956797619865183

Open Practices

All data and materials have been made publicly available via the Open Science Framework and can be accessed at https://osf.io/wkjp6. The design and analysis plans for both experiments were preregistered at https://osf.io/v6sx8. The complete Open Practices Disclosure for this article can be found at http://journals.sagepub.com/doi/suppl/10.1177/0956797619865183. This article has received the badges for Open Data, Open Materials, and Preregistration. More information about the Open Practices badges can be found at http://www.psychologicalscience.org/publications/badges.

Note

1. The Action Editor pointed out that there are reasons to believe that published effects are often exaggerations of the size of true effects because of publication bias and other factors (e.g., Szucs & Ioannidis, 2017).

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