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Implicit evaluation bias induced by approach and avoidance

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We report a study in which faces with a neutral emotional expression were shown on a computer screen. By means of a joystick, participants pulled half of the faces closer (positive approach movement), and pushed the half away (negative avoidance movement). As a result, an operant evaluative conditioning effect occurred in a subsequent affective priming task: Participants responded more quickly to positive target words if they were preceded by a previously pulled face than a pushed face, and vice versa for negative target words. The effect became stronger the more often the faces had been trained to approach or to avoid. No effect was observed on explicit evaluations of the faces: Pushed faces were rated as sympathetic as pulled ones.

Attitudes and preferences are important determinants of human behaviour. People are confronted with evaluation processes everyday, resulting in approaching objects they like, and avoiding objects they dislike. Therefore, several areas of psychology such as clinical or social psychology are engaged in studying the "acquisition of preferences" (Walther & Grigoriadis, 2004, p. 757). According to the De Houwer, Thomas, and Baeyens (2001), the affective-evaluative learning paradigm of evaluative conditioning (EC) might at least partly explain how human likes and dislikes are established or altered. EC is described as an associative transfer, and implies that the evaluation of a neutral stimulus (conditioned stimulus; CS) changes after being paired with a positively or negatively valenced stimulus (unconditioned stimulus; US+ or US−). The change in liking will be compatible to the valence of the affective stimulus it has been paired with. EC has often been

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studied using the "picture–picture paradigm" of Levey and Martin (1975), who found that pairing neutral and valenced pictures leads to congruent changes in evaluations of the neutral pictures. Similar effects can be observed when stimuli of different modalities are paired. For instance, Tordrank, Byrnes, Wrzesniewski, and Rozin (1995) paired pictures of faces showing neutral facial expressions with pleasant and unpleasant odours. As a result, faces previously paired with pleasant odours were evaluated more positively than faces paired with unpleasant odours.

Although EC has been investigated thoroughly, the understanding of the underlying mechanisms is still limited (see De Houwer et al., 2001). According to De Houwer (2007) three conceptual meanings of EC can be described. First, EC can refer to a procedure in which stimuli are paired, and it is investigated whether this procedural approach changes the liking of the stimuli. Second, EC can refer to an effect, implying that changes in liking are observed and attributed to the pairing of stimuli. Third, EC can refer to a theoretical process that is responsible for the fact that stimulus pairings lead to changes in liking (e.g., association formation). Describing changes in liking as an *evaluative conditioning effect* implies several advantages (see De Houwer, 2007, for an overview), and therefore it can be best defined as such.

Creating changes in liking was also the goal of the present study, however, we aimed to establish an *operant evaluative conditioning effect*. Here, changes in liking are not the result of pairing stimuli, but are the result of a method in which a certain behavioural response of the individual is paired with a valenced outcome (De Houwer, 2007). This means that the presence of a stimulus depends on the behavioural response of the individual (Sd–R–Sr), unlike the response-independent CS–US pairings in Pavlovian conditioning. In the current study, faces with neutral facial expressions were presented on a computer screen, and participants pushed some of these faces away (avoidance movement), while they pulled other faces closer (approach movement) by means of a joystick. All pictures were tainted slightly brown or blue. This colouring determined whether a face had to be pushed or pulled. According to this method, the Sd–R–Sr chain can be filled in as follows: The colour of the picture was the discriminative stimulus (Sd), which determined the response of pulling or pushing (R): half of the participants had to pull blue pictures and push brown ones, while the allocation was reversed for the rest. The identity of each face was confounded with the colours, such that some faces were always shown in brown, the others always in blue. We assumed that the proprioceptive cues of these pull and push movements would trigger the approach–avoidance system, resulting in two valenced outcomes (Sr): a pull movement should lead to a positive approach state; a push movement to a negative avoidance state. As a result, we expected an operant evaluative conditioning effect:

faces that were pulled closer repeatedly should be evaluated more positively, whereas faces that were pushed away should be evaluated more negatively.

An adapted version of the so called Approach–Avoidance Task (AAT), introduced by Rinck and Becker (2007), was used as the method for this procedure. Several studies have demonstrated that there is a bidirectional link between approach/avoidance movements and automatic evaluations (see Neumann, Förster, & Strack, 2003). Stimuli automatically trigger compatible action tendencies: A negative stimulus activates avoidance, while a positive stimulus activates approach. Likewise, approach/avoidance responses to stimuli influence their (implicit) evaluation: Avoiding leads to more negative stimulus evaluations, approaching to more positive ones. This latter prediction has recently been supported by Kawakami, Phills, Steel, and Dovido (2007), who demonstrated that approach reactions can be used to change implicit attitudes towards Blacks positively.

So far, operant evaluative conditioning has rarely been investigated (De Houwer, 2007). In a study by Beckers, De Houwer, and Eelen (2002), participants were instructed to move a response key up or down when getting a go signal. One of both responses was always followed by an unpleasant stimulus, whereas the other response was never followed by an unpleasant stimulus. Subsequently, the same response had to be executed according to the grammatical category of positive and negative target words (noun or verb). Results revealed affective compatibility effects: Participants were faster to react to the grammatical category of the target if its affective connotation matched the valence of the effect produced by the correct response during the first task. This way, operant evaluative conditioning effects were demonstrated. However, our design is different. Rather than trying to change the valence of responses by pairing those responses with valenced outcomes, we tried to change the valence of stimuli by pairing them with valenced responses. To the best of our knowledge, such an operant evaluative conditioning effect has not been studied yet. Another important difference is that we varied the number of responses: Faces could be pushed or pulled 10, 20, or 50 times during the joystick training. This manipulation was adopted from the evaluative conditioning literature, as it shows contradicting results regarding the amount of CS–US pairings needed to establish a conditioning effect (Baeyens, Eelen, Crombez, & Van den Bergh, 1992).

Two different tasks were applied to measure the operant evaluative conditioning effect. An Affective Priming Task (Fazio, Sanbonmatsu, Powell, & Kardes, 1986) was used to measure implicit evaluation processes. Words positively or negatively related to "sympathy" were used as target words that had to be categorised. The faces that had been pushed or pulled were used as primes. As a direct test of evaluation changes, participants had to rate the faces with regard to sympathy. The rationale for this is the assumption that implicit and explicit attitudes should not be regarded as a unitary construct: a change in one kind of attitude does not necessarily imply a corresponding change in the other kind of attitude (Gawronski & Bodenhausen, 2006). Some studies found changes in explicit but not in implicit attitudes (e.g., Gawronski & Strack, 2004), others found changes in implicit but not in explicit attitudes (e.g., Dasgupta & Greenwald, 2001; Karpinski & Hilton, 2001; Olson & Fazio, 2006). This could be explained by the hypothesis that implicit and explicit attitudes underlie (at least) two different semi-independent systems: implicit attitudes are determined by an associative system in which stimuli are automatically evaluated in terms of their emotional significance, explicit attitudes are determined by a reflective system, including rational and conscious processes (Gawronski & Bodenhausen, 2006; Strack & Deutsch, 2004). Due to these properties, tasks to change attitudes might influence the two systems differently.

In sum, we aimed to induce a face-evaluation bias by approach and avoidance movements. As a result of the training task, we expected an operant evaluative conditioning effect, which implies that the faces should not be experienced as neutral anymore. Although evaluative conditioning has been studied intensively, operant evaluative conditioning has been neglected so far (De Houwer, 2007). Therefore, our study could be a starting point for the structural investigation of this subclass of evaluative conditioning. Beyond this, our results could extend the current knowledge about the mechanism of evaluative learning in general. Traditional evaluative learning paradigms mostly use valenced stimuli, however, we make use of valenced movements to establish a change in liking, and, as far as we know, this has never been tried before. Faces and movements are important elements of human behaviour and interaction, therefore we expect that our results will have implications for a variety of psychological disciplines.

METHOD

Participants

Seventy-eight students of the Radboud University of Nijmegen participated in this experiment. Data from 8 participants had to be discarded as their score on the joystick task was greater than 2 standard deviations above the mean. This resulted in a final sample of 70 participants (52 women; mean age = 22.3).

Materials and procedure

Fourteen photographs (7 women and 7 men; mean age 25 years) served as stimuli. Each picture showed a neutral facial expression (as determined in a pre-test with 86 separate participants).

Joystick training. Participants first performed the joystick training. The joystick was positioned on a table in front of the computer screen. The instructions explained that all pictures were tinted a little, such that the background looked slightly brown or blue. This then determined whether a face had to be pushed or pulled: half of the participants pulled blue and pushed brown pictures; whereas the other half pushed blue and pulled brown pictures. Participants initiated each trial by pressing a button on the joystick with the index finger, while holding the joystick in a central position. When the face appeared, participants had to decide quickly whether the picture had a blue or brown background and respond according to their instructions. After pushing or pulling the joystick, they had to bring it back to the central position and start the next trial. Faces disappeared when the joystick was pulled or pushed by about 30 degrees. While pushing, the faces became smaller, whereas they became larger during pulling. This "zoom effect" created a strong visual impression of pushing faces away versus pulling them closer.

The joystick training was divided into several phases. During the practice block of 20 trials, 1 female and 1 male training picture had to be pushed or pulled 10 times each. After this, participants received 8 trainings blocks. Each training block included the 12 experimental faces, 6 of which were faces of men, and 6 were women. For each gender, 3 faces were always pushed away throughout the whole training, while the other 3 were always pulled closer. For each of these face triplets, we also varied how often they were paired with the movement. This could be once, twice or five times per block. Combining number of pairings, gender, and direction of movement, each block consisted of 32 trials. The calculation for this is as follows: The faces trained once per block by gender by direction yield 4 trials, faces trained twice per block by gender by direction yield 8 trials, and faces trained 5 times per block by gender by direction yield 20 trials. Adding these trials yields $4+8+20=32$ trials in each block.

Between the fifth and sixth training block, participants could take a break. After 8 training blocks, and unbeknown to the participants, the "diagnosis phase" followed, containing 24 trials. In this phase, all 12 experimental faces were shown twice, and each one had to be pushed and pulled once. Therefore, participants experienced 12 combinations of face and movement they had trained, and 12 combinations that were opposite to what they had trained. This phase served as a manipulation check, in that the trained movements should be faster than the opposing movements. Subsequently, two more training blocks of 32 trials each followed. The whole joystick training contained 364 trials. By means of counterbalancing, it was determined for each subject which picture was trained 10, 20, or 50 times, whether the picture had to be pushed or pulled, and whether this was a picture of a female or male person. In sum, the joystick task involved a

3 (Number of Pairings: 10, 20, 50) × 2 (Direction: push, pull) × 2 (Face Gender: female, male) within-subjects design. After the joystick training, participants performed the two post measures in counterbalanced order.

Affective priming task. In this task, participants categorised target words that were positively or negatively related to sympathy, for example “friendly” or “unpleasant”. In total, 6 positive and 6 negative words were used. Depending on the participant’s first language, the words were presented in Dutch or German, as the Radboud University also has a lot of German students. Participants were instructed to categorise the words as quickly as possible into the correct category (positive or negative). For that purpose, two keys were marked on the keyboard, representing the two categories (counterbalanced across participants). Immediately before the target word appeared, a prime picture was presented for 300 ms. If participants categorised a target word wrongly or if they did not react at all after 3 seconds, an error message was presented on the computer screen. The primes consisted of the 12 experimental pictures that had been pushed or pulled during the joystick training. This yielded prime–target congruent trials (pulled face before positive word, pushed face before negative word) and prime–target incongruent trials (pushed face before positive word, pulled face before negative word). The priming task followed in a 2 (Face: pushed, pulled) × 2 (Word: negative, positive) × 3 (Number of Pairings: 10, 20, or 50) design with 192 trials.

Face rating. In this task, participants had to rate how sympathetic they found the 12 experimental faces. These ratings were obtained using an 8-point scale with the end points labelled 0 = “*not at all*” and 7 = “*very*”. Each face appeared for 3 seconds, followed by the appearance of the rating scale under the face. Participants then had to give a rating. They had 10 seconds to react. After responding, the picture disappeared, immediately followed by the next one.

RESULTS

To correct for the potential effects of outlier reaction times, the median reaction time of each participant in each experimental condition of the AAT and the affective priming task was computed. Thus, the means reported below are means of medians.

Manipulation check. To test whether the training had worked, we analysed the reaction times of the diagnosis phase. The results revealed that participants had indeed learned which face they used to push and to pull, as the mean reaction times for trained face–movement combinations were shorter than for the opposite combinations: $F(1, 69) = 38.27$, $p < .001$, $\eta^2 = .36$. This difference was highly significant for faces that had been combined 10 times with pushing and pulling (trained $M = 677$, $SD = 138$, vs. not trained $M = 765$, $SD = 232$), $t(69) = 4.52$, $p < .001$, as well as for faces that had been combined 50 times with the movements (trained $M = 662$, $SD = 134$, vs. not trained $M = 790$, $SD = 217$), $t(69) = 5.66$, $p < .001$. For faces that had been combined 20 times with the movements, the difference was only marginally significant (trained $M = 708$, $SD = 170$, vs. not trained $M = 742$, $SD = 170$), $t(69) = 1.83$, $p = .07$.

Affective priming. The $2 \times 2 \times 3$ ANOVA of the reaction times in the priming task revealed a significant Target Word (positive, negative) $\times$ Face Prime (push, pull) interaction. It took participants more time to categorise a target word when it was preceded by a valence-incongruent face prime than when it was preceded by a valence-congruent face prime, $F(1, 69) = 20.19$, $p < .001$, $\eta^2 = .23$ (see Table 1). We also found a highly significant three-way interaction of Target Word, Face Prime, and Number of Pairings: $F(2, 138) = 7.48$, $p < .001$, $\eta^2 = .10$. This interaction indicates that the priming effect was stronger for faces that had been trained more often during the joystick task, as Table 1 illustrates.

Face rating. A second $2 \times 2 \times 3$ ANOVA was computed to identify effects of the joystick training on the sympathy ratings. Here we found no differences between ratings of pushed ($M = 3.95$, $SD = 0.96$) and pulled ($M = 4.09$, $SD = 0.84$) faces, $F(1, 69) = 1.98$, $p = .16$, $\eta^2 = .03$. This was true no matter whether the face had been trained 10, 20, or 50 times, and the

TABLE 1
Mean reaction times in ms during the priming task, with significance tests

	Face prime				
	Pulled faces		*Pushed faces*		
Number of pairings	*Target positive valence M (SD)*	*Target negative valence M (SD)*	*Target positive valence M (SD)*	*Target negative valence M (SD)*	*Significance of two-way interaction*
10	584 (78)	614 (86)	589 (81)	601 (81)	$F(1, 69) = 2.87$, $p = .09$, $\eta^2 = .04$
20	573 (62)	623 (79)	589 (78)	586 (69)	$F(1, 69) = 10.62$, $p < .001$, $\eta^2 = .13$
50	567 (62)	632 (94)	609 (81)	585 (63)	$F(1, 69) = 20.47$, $p < .001$, $\eta^2 = .23$

interaction of direction of training and number of pairings was not significant, $F(2, 138) = 0.64$, $p = .53$, $\eta^2 = .01$.

DISCUSSION

The aim of the present study was to induce a face evaluation bias through approach/avoidance motor actions. Pictures of faces with a neutral facial expression were shown on a computer screen and, according to the background colour of the face, participants pushed some faces away (avoidance), while they pulled other faces closer (approach). As a result of this procedure, we predicted an operant evaluative conditioning effect. We assumed a change in liking of the faces, depending on whether a face had been trained to approach or had been trained to avoid. An indirect and a direct measure were used to measure the effect.

According to the results of the affective priming task, we succeeded in establishing an operant evaluative conditioning effect. When participants had to categorise a positive word but were primed with a face they had been trained to push away, it took them longer to categorise it than if the positive word was preceded by a face they were used to pull closer (and vice versa for negative words). Thus, the face prime either facilitated or aggravated the categorisation of the target word. This implicit evaluation bias is the result of the conditioning procedure, and can be explained by the proprioceptive cues that were triggered during the joystick training: the execution of arm movements towards the body activated the approach system, whereas the execution of arm movements away from the body activated the avoidance system. This then influenced the (affective) processing of the faces: pulled faces became associated with a pleasant and positive connotation, while pushed faces became associated with an unpleasant and negative connotation. The compatibility effects measured during the affective priming are the result of this integration: a pulled face prime automatically facilitated positive affective processing; a pushed face prime automatically facilitated negative affective processing. This explanation fits very well with the conclusion of Neumann et al. (2003), who argued that approach and avoidance associations are closely linked to affective information processing, and therefore produce congruent response effects. Additional support for this argument comes from our trial manipulation: the effect of the face prime got stronger the more often it had been trained during the joystick task. This implies that the approach–avoidance training enhanced the affective information processing, and the measured categorisation differences could be regarded as an indication of the trained associative strength.

In contrast, no operant evaluative conditioning effect could be found on the direct measure: Somewhat surprisingly, whether faces had been pushed or pulled made no difference for the sympathy ratings, and participants experienced no explicit change in liking of the faces. A potential explanation could be that the joystick training influenced the associative system, but not the reflective system. The approach–avoidance system is characterised by its automaticity, and therefore might be able to change automatic, but not reflective patterns. This seems plausible in light of the argument made by Gawronski and Bodenhausen (2006) that implicit and explicit attitudes should be understood according to their underlying processes. As these processes embrace different properties, external influences might affect them differently. A second explanation could be that the training did influence the reflective system, but our sympathy rating was inadequate for detecting it. For instance, it might be that an 8-point Likert scale was too insensitive. Tordrank et al. (1995) found explicit changes in liking using a 20-point scale. Moreover, it might be that the question "How sympathetic do you find this face" was not the right question. A *feeling of sympathy* might not represent the participant's approach/avoidance association towards a particular face, and therefore did not adequately tap into the explicit changes in liking that might have had occurred. As a third explanation, it might be possible that the activated proprioceptive cues of the approach–avoidance system were not strong enough to establish an explicit change in liking. Tordrank et al. (1995) only succeeded in establishing an explicit change in liking when faces had been paired with "human plausible odours". Non-human plausible odours showed no effect, so the weakness of stimuli might be an alternative explanation. However, there are studies that showed explicit changes in liking faces when stimuli of mild valence were used. Walther (2002) used a sensory preconditioning paradigm, and paired liked and disliked male faces with neutral faces. Results revealed shifts in evaluation regarding the neutral faces, compatible to the valence of the faces they had been paired with. Moreover, this effect generalised to other faces that were (pre)associated with the neutral face. To conclude, results of (operant) evaluative conditioning effects regarding explicit face evaluations are quite inconsistent, maybe the differences in applied paradigms to establish the effect or the differences in tests to measures the effect might partly explain these contradicting results. These contradictions and open questions regarding explicit changes in liking will have to be addressed by future studies.

Follow-up studies should also focus on what should be regarded as the valenced outcome of the pull and push movements during the joystick training. We assumed that the proprioceptive cues triggered by the pull and push movements functioned as the valenced outcome. However, the fact that the pictures became larger while pulling and smaller while pushing could also be regarded as the crucial outcome. Moreover, Neumann and Strack (2000) demonstrated that exteroceptive cues were enough to trigger the approach–avoidance system, so this critical factor has to be addressed as well. It would also be worthwhile to investigate whether operant evaluative conditioning effects occur when participants are merely instructed with the verbal labels push and pull, without executing the movement itself. Another challenging question would be whether reversed results would be observed if the movements were labelled the other way around, namely *push the joystick towards the face* and *pull the joystick away from the face*.

To conclude, the present study showed that approach–avoidance associations could affect the implicit evaluation of faces. Whereas previous research applied "traditional" evaluative conditioning to create changes in liking (De Houwer, 2007), this study addressed an exceptional subclass, namely operant evaluative conditioning. Beyond that, we applied the paradigm in a way it has never been tested before. Therefore, our results could contribute to the establishment of operant evaluative conditioning, and might be motivating for other researchers to approach rather than avoid this interesting paradigm.

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REFERENCES

Baeyens, F., Eelen, P., Crombez, G., & Van den Bergh, O. (1992). Human evaluative conditioning: Acquisition, trials, presentation schedule, evaluative style and contingency awareness. *Behavior Research and Therapy*, *30*, 133–142.

Beckers, T., De Houwer, J., & Eelen, P. (2002). Automatic integration of non-perceptual action effect features: The case of the associative Simon effect. *Psychological Research*, *66*, 166–173.

Dasgupta, N., & Greenwald, A. G. (2001). On the malleability of automatic attitudes: Combating automatic prejudice with images of admired and disliked individuals. *Journal of Personality and Social Psychology*, *81*, 800–814.

De Houwer, J. (2007). A conceptual and theoretical analysis of evaluative conditioning. *The Spanish Journal of Psychology*, *10*, 230–241.

De Houwer, J., Thomas, S., & Baeyens, F. (2001). Associative learning of likes and dislikes: A review of 25 years of research on human evaluative conditioning. *Psychological Bulletin*, *127*, 853–869.

Fazio, R. H., Sanbonmatsu, D. M., Powell, M. C., & Kardes, F. R. (1986). On the automatic activation of attitudes. *Journal of Personality and Social Psychology*, *50*, 229–238.

Gawronski, B., & Bodenhausen, G. V. (2006). Associative and propositional processes in evaluation: An integrative review of implicit and explicit attitude change. *Psychological Bulletin*, *132*, 692–731.

Gawronski, B., & Strack, F. (2004). On the propositional nature of cognitive consistency: Dissonance changes explicit, but not implicit attitudes. *Journal of Experimental Social Psychology*, *41*, 535–542.

Karpinski, A., & Hilton, J. L. (2001). Attitudes and the implicit association test. *Journal of Personality and Social Psychology*, *81*, 774–788.

Kawakami, K., Phills, C. E., Steele, J. R., & Dovido, J. F. (2007). (Close) Distance makes the heart grow fonder: Improving implicit racial attitudes and interracial interactions through approach behaviors. *Journal of Personality and Social Psychology*, *92*, 957–971.

Levey, A. B., & Martin, I. (1975). Classical conditioning of human "evaluative" responses. *Behavior Research and Therapy*, *13*, 221–226.

Neumann, R., Förster, J., & Strack, F. (2003). Motor compatibility: The bidirectional link between behavior and evaluation. In J. Musch & K. C. Klauer (Eds.), *The psychology of evaluation* (pp. 371–392). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Neumann, R., & Strack, F. (2000). Approach and avoidance: The influence of proprioceptive and exteroceptive cues on encoding of affective information. *Journal of Personality and Social Psychology*, *79*, 211–223.

Olson, M. A., & Fazio, R. H. (2006). Reducing automatically activated racial prejudice through implicit evaluative conditioning. *Personality and Social Psychology Bulletin*, *32*, 421–433.

Rinck, M., & Becker, E. S. (2007). Approach and avoidance in fear of spiders. *Journal of Behavior Therapy and Experimental Psychiatry*, *38*, 105–120.

Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review*, *8*, 220–247.

Tordrank, J., Byrnes, D., Wrzesniewski, A., & Rozin, P. (1995). Odors can change preferences for people in photographs: A cross-modal evaluative conditioning study with olfactory USs and visual UCs. *Learning and Motivation*, *26*, 116–140.

Walther, E. (2002). Guilty by mere association: Evaluative conditioning and the spreading attitude effect. *Journal of Personality and Social Psychology*, *82*, 919–934.

Walther, E., & Grigoriadis, S. (2004). Why sad people like shoes better: The influence of mood on the evaluative conditioning of consumer attitudes. *Psychology & Marketing*, *21*, 755–773.