



Positive, negative, or all relative? Evaluative conditioning of ambivalence[☆]

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ABSTRACT

In evaluative conditioning (EC), the pairing of a positively or negatively valenced stimulus (US) with a neutral stimulus (CS) leads to a corresponding change in liking of the CS. EC research so far has concentrated on using unambiguously positive or negative USs. However, attitude objects are often ambivalent, i.e., can simultaneously possess positive and negative features. The present research investigated whether ambivalence can be evaluatively conditioned and whether contingency awareness moderates this effect. In two studies, positive, negative, neutral, and ambivalent USs were paired with affectively neutral CSs. Results showed standard EC effects that were moderated by contingency awareness. Most interestingly, EC effects were also obtained for the ambivalent USs, indicating that ambivalence can indeed be conditioned. However, contingency awareness seemed to play a lesser role in ambivalence conditioning. Ambivalence EC effects were obtained on subjective and objective direct measures of ambivalence as well as on a more indirect measure.

1. Theoretical background

Some people like chocolate ice cream, others prefer strawberry flavor; some love dogs, others lost their hearts to cats; some people prefer to spend their vacation in the mountains, others always travel to the sea. The question of how such individual likes and dislikes develop is still one of the most intriguing and well-researched questions in social psychology. One prominent effect in attitude research that refers to the formation and change of such attitudes is evaluative conditioning (EC). In EC, changes in (dis-)liking are caused by the pairing of stimuli (De Houwer, 2007). In a prototypical EC study, a subjectively neutral picture (conditioned stimulus; CS) is repeatedly presented with a positively or negatively valenced picture (unconditioned stimulus; US). The common result is that the formerly neutral CS acquires the evaluative quality of the US that it has been paired with. The EC effect is quite robust and has been demonstrated in a large number of areas with different kinds of USs and CSs (for a meta-analysis see Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010).

The variable most often investigated as a moderator of EC effects is contingency awareness (i.e., awareness of the CS–US pairings). The question of whether EC is independent of, facilitated, or impeded by contingency awareness (e.g., Balas & Sweklej, 2012; Gawronski & Walther, 2012; Hütter & Sweldens, 2013) is directly related to an

ongoing debate regarding the processes underlying EC. On the one hand, single-process propositional models assume that EC is based on the non-automatic formation and truth evaluation of propositions about CS–US relations: The evaluation of the CS changes because people form a conscious proposition that the CS is paired with a positive or negative US, and therefore they decide to also evaluate the CS positively or negatively (De Houwer, 2009; Mitchell, De Houwer, & Lovibond, 2009). Thus, propositional accounts imply that contingency awareness is a prerequisite for EC effects. On the other hand, dual-process accounts assume that EC effects can be either the result of propositional or associative processes (e.g., Gawronski & Bodenhausen, 2006, 2011) depending on contextual conditions such as simultaneous vs. sequential presentation (Sweldens, Van Osselaer, & Janiszewski, 2010) or the presentation and integration of relational information (e.g., Hu, Gawronski, & Balas, 2017; Moran & Bar-Anan, 2013). Thus, in some cases, the spread of valence from US to CS can also be explained with the associative link between the two stimuli. In this latter case, EC effects should occur in the absence of contingency awareness. Furthermore, the implicit misattribution account (Jones, Fazio, & Olson, 2009) assumes that evaluative reactions toward the US are incorrectly attributed to the CS during conditioning. In this case, contingency awareness could even interfere with EC if noting the CS–US co-occurrence leads the participants to correctly identify the source of their

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evaluative reaction (i.e., the US; Hofmann et al., 2010; Jones, Olson, & Fazio, 2010). Interestingly, there is evidence for EC to depend on contingency-awareness (e.g., Kattner, 2012; Pleyers, Corneille, Luminet, & Yzerbyt, 2007; Pleyers, Corneille, Yzerbyt, & Luminet, 2009; Purkis & Lipp, 2001), for EC to occur in the absence of contingency-awareness (e.g., Baeyens, Eelen, & Van den Bergh, 1990; Baeyens, Hermans, & Eelen, 1993; Hütter & Sweldens, 2013; Walther, 2002), and for EC to be impeded by contingency awareness (Fulcher & Hammerl, 2001; Walther & Nagengast, 2006). However, effects are usually larger when participants are aware of the CS–US contingencies (Hofmann et al., 2010). Thus, assessing whether EC effects are moderated by contingency awareness can give some insight into the processes underlying EC.

Common to almost all EC studies conducted so far is that the USs were either of pure negative or positive valence, respectively. However, whereas some attitude objects are clearly positive or clearly negative, there are also attitude objects that are ambivalent. For instance, on the one hand, a chocolate cake is really yummy because it tastes sweet and soft; on the other hand, it is unhealthy and has lots of calories, which could ruin a diet. Or, let us consider off-shore wind parks: They have positive aspects because they provide renewable energy but they can also harm maritime animals and birds. Consequently, attitudes toward such objects might be ambivalent, i.e., positive and negative at the same time. Attitude research confirms that absolute negativity or positivity hardly ever exists in the human attitudinal world (e.g., Jonas, Broemer, & Diehl, 2000; Maio, Esses, & Bell, 2000; Petty, Tormala, Briñol, & Jarvis, 2006; Thompson, Zanna, & Griffin, 1995; Wilson, Lindsey, & Schooler, 2000). Instead, it is more likely that many attitudinal objects possess positive as well as negative features. Attitudinal ambivalence is generally defined as “simultaneous existence of positive and negative beliefs or emotions with regard to the same object” (Jonas et al., 2000, p. 41). Thus, ambivalent attitudes (high in positive and negative beliefs) differ from neutral or indifferent attitudes (low in both positive and negative beliefs) and univalent attitudes (high in positive terms and low in negative beliefs, and vice versa).

The question of how to measure ambivalence can only be answered when taking into account the different kinds of ambivalence (Song & Ewoldsen, 2015). On the one hand, *subjective* ambivalence refers to a perception of psychological conflict, i.e., feeling ambivalent or conflicted. Consequently, measures of subjective ambivalence need to capture the “feeling of ambivalence”. This is often accomplished by simply asking participants whether they are one-sided or mixed with regard to the attitude object (Priester & Petty, 1996; Thompson et al., 1995). On the other hand, *objective* ambivalence refers to the underlying attitudinal structure of ambivalence (DeMarree, Petty, & Briñol, 2007). Objective (or structural) ambivalence is based on the premise outlined above, namely that positive and negative evaluations can exist separately and simultaneously. Moreover, ambivalence should increase as a function of the discrepancy between positive and negative evaluations and their respective intensity (Thompson et al., 1995). Therefore, when ambivalence is assessed with structural measures, participants are asked to separately indicate their positive and negative reactions to an attitude object while ignoring the opposite valence. Subsequently, these evaluations are entered into well-established mathematical formulas to derive the degree of ambivalence (Kaplan, 1972; Priester & Petty, 1996; Thompson et al., 1995).

In EC research, the stimuli used so far are clearly positive or negative. This is surprising, especially when considering that many “real-life” attitudinal objects do possess various (positive and negative) features. The present research aims to fill this gap in order to increase the ecological validity of EC. Therefore, our main goal is to answer the question of whether EC can also account for ambivalent attitudes. As the experience of attitudinal ambivalence might differ greatly between participants (e.g., one person dislikes chocolate cake, a second one just loves any form of chocolate, and a third one feels ambivalent), the present research used stimuli that should be ambivalent for all

participants. Specifically, we used stimuli that clearly contained both positive and negative aspects, i.e., we presented positive and negative pictures within one picture (see below for details) in order to operationalize ambivalence within one stimulus. Furthermore, we captured both aspects of ambivalence (i.e., subjective and objective) reported in the literature. Studies usually find only modest correlations of subjective and objective ambivalence (Priester & Petty, 1996, 2001; Thompson et al., 1995). We were interested in whether EC effects can be obtained on subjective as well as objective measures of ambivalence and whether we can observe a correlation of these measures. Finally, if contingency awareness serves as a moderator of ambivalence EC, it would shed some first light on the processes underlying the conditioning of ambivalent attitudes. We assume that ambivalence EC follows the same principles as and is not generally different from univalent EC. Thus, if ambivalence EC effects are larger when contingency awareness is high, propositional processes are most likely to underlie ambivalence EC. However, if ambivalence EC effects can also occur in the absence of contingency awareness, dual-process models that also involve associative learning are more likely to account for such a finding. Taken together, the present research addresses the following questions: Can ambivalence be evaluatively conditioned? Can ambivalence EC be observed on measures of subjective as well as objective ambivalence? What is the role of contingency awareness in ambivalence EC?

2. Overview of experiments

The overall aim of the two experiments was to investigate whether conditioning of ambivalence is possible within a standard EC picture-picture paradigm. Positive, negative, neutral, and ambivalent pictures (USs) were paired with pictures of polygons (CSs). Subsequent to the conditioning procedure, subjective and objective ambivalence measures were assessed by asking participants to rate the CSs with regard to their positivity and negativity (basis for calculating objective ambivalence) as well as with regard to their degree of ambivalence (i.e., subjective ambivalence). Finally, participants' awareness of the contingencies was assessed. In Experiment 2, we additionally used another, more indirect measure of ambivalence. Our general prediction was that ambivalence of the USs would transfer to the neutral CSs. Furthermore, we assumed that contingency awareness serves as a moderator for the EC effects.

3. Experiment 1

The main goal of Experiment 1 was to examine whether ambivalence can be evaluatively conditioned. Specifically, the following hypotheses were tested: First, we expected a standard EC effect such that CSs that were paired with positive USs would be evaluated more positively and less negatively than CSs that were paired with negative USs. Second, we predicted that the CSs that were paired with ambivalent USs would be evaluated both more positively and more negatively than the CSs that were paired with neutral USs. Third, the CSs that were paired with ambivalent USs should receive higher ambivalence ratings than all other CSs (i.e., higher subjective ambivalence). Fourth, the CSs that were paired with ambivalent USs should also be more ambivalent when using an objective ambivalence measure (i.e., the similarity-intensity index, Thompson et al., 1995). Fifth, contingency awareness is one important moderator of (univalent) EC effects and often serves as an indication for the processes underlying EC (Hofmann et al., 2010). We assumed that the conditioning of ambivalence should also be more effective when contingency awareness is high.

3.1. Participants and design

Participants were $N = 77$ (42 female, 35 male) students from a German university. Data of two participants had to be excluded from the analyses because they had already participated in a similar study

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