

The Role of Evaluative Conditioning in Attitude Formation

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Abstract

In this article, we address how attitudes are acquired. We present evaluative conditioning (EC) as an explanation for attitude formation and attitude change. EC refers to changes in liking due to pairings of affectively meaningful and neutral stimuli. We discuss four different theoretical accounts of EC and outline current issues and avenues for future research.

Keywords

evaluative conditioning, attitudes, awareness

“Perhaps no single concept within the whole realm of social psychology occupies a more nearly central position than that of attitudes.” As late-breaking as this quote might appear to contemporary attitude researchers, it was already written in 1937 by Murphy, Murphy, and Newcomb (1937, p. 889) in their famous book on experimental social psychology. Apparently, social psychologists have always been fascinated with attitude research. One reason for this special role of attitudes is the important influence they have on guiding our behavior: We approach people we like and we avoid people we dislike. We help to break in a likeable new colleague and we freely ignore the e-mails of a nasty colleague. However, it appears that there are strong interindividual differences in preferences, likes, and dislikes. Although we certainly dislike the nasty colleague, there are indeed some people in the company who appear to like her. Facing these differences, the question remains: How are individual attitudes acquired?

One experimental answer to this question comes from evaluative conditioning (EC) research (for reviews, see De Houwer, Thomas, & Baeyens, 2001; Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010; Walther, Nagengast, & Trasselli, 2005). EC refers to changes in liking or disliking that are due to the pairing of stimuli (De Houwer, 2007). In a prototypical EC study, a neutral picture of a human face (conditioned stimulus; CS) is repeatedly presented with a liked or disliked human face (unconditioned stimulus; US). The common result is a substantial shift in the valence of the formerly neutral CS such that it becomes evaluatively similar to the US (see Fig. 1). Because the formation and change of liking are the core elements of attitude research, it is no wonder that EC has received a lot of attention in this area.

According to the EC account, we start to like a new colleague because she was accompanied by positive stimuli in the first place. Thus, the mere co-occurrence of a neutral person and a (dis)liked event is sufficient for one to form an attitude toward the neutral person. One interesting aspect of EC is that evaluative conditioned attitudes, once formed, appear to be resistant to extinction. Unlike conditioned reactions that are acquired in a standard classical conditioning paradigm, evaluative conditioned attitudes do not disappear when the US is no longer present. For instance, if an eyeblink reaction toward a tone that was previously paired with an airpuff is acquired, the reaction degrades when the airpuff is not applied anymore. However, an evaluative conditioned attitude seems to be more robust than reactions in classical conditioning even when the original source of evaluation is long gone. Another feature of EC is its independence of CS-US contingency (i.e., correlation), which suggests that predictability of the US from the appearance of the CS is not a principal component in the EC learning process. However, the most debated topic in this area is the question of whether EC is dependent on awareness of the correlation between the CS and the US. The question of whether such awareness is a prerequisite of EC is important because it speaks to the question of whether EC should be considered an automatic or a higher-level cognitive process

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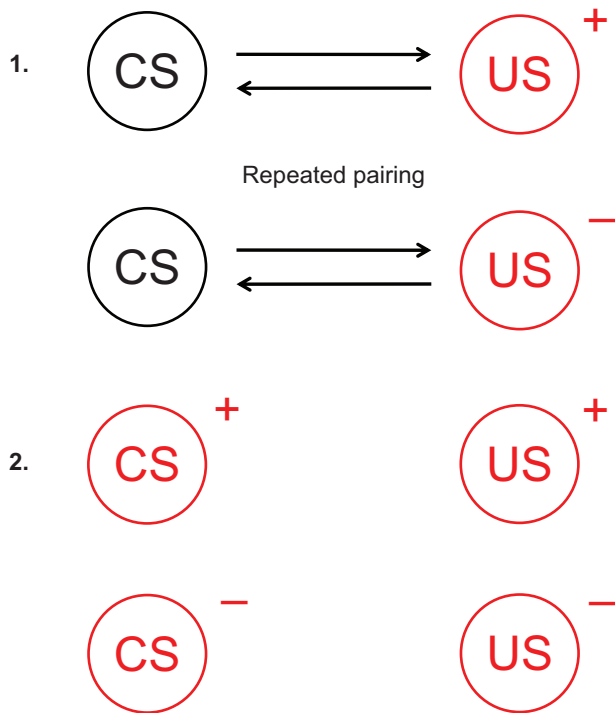


Fig. 1. Schematic illustration of evaluative conditioning (EC). At the first stage, the pairing of a neutral conditioned stimulus (CS) and a positive unconditioned stimulus (US⁺) or negative unconditioned stimulus (US⁻) is illustrated. Based on this co-occurrence (illustrated by the two arrows), the CS becomes evaluatively similar to the US at the second stage.

(Stahl, Unkelbach, & Corneille, 2009). Whereas some researchers found EC to be independent of awareness of the contingency of the CS and the US (e.g., Walther & Nagengast, 2006), there are studies in which only participants aware of the contingencies exhibited EC effects (e.g., Pleyers, Corneille, Luminet, & Yzerbyt, 2007). This so-called awareness issue is also reflected in the accounts formulated to explain EC.

Explaining Evaluative Conditioning: A Short Review of EC Accounts

The holistic account

Over the last several years, a number of explanations for EC have been proposed. According to Martin and Levey (1994), co-occurrence of a US and CS triggers the formation of a “holistic representation” that consists of stimulus elements of the CS and the evaluative nature of the US. The holistic account can explain the CS’s resistance to extinction because the CS itself acquires aspects of the US during conditioning. Moreover, based on the findings that most participants were unable to recall which CSs had been paired with stimuli, Martin and Levey concluded that EC does not require awareness of the CS–US contingency. The holistic account, however,

is not universally applicable to the phenomenon of conditioned preferences. Although not explicitly stated by Martin and Levey (1994), it can be assumed that a certain degree of similarity between CS and US is necessary for the formation of a holistic representation to occur. However, the many instances of cross-modal EC (Hofmann et al., 2010) suggest that CS–US similarity is not a necessary precondition for EC effects to occur. Another issue is that the holistic account is rather vague with respect to the question of how and which characteristics are fused into a holistic representation.

The referential account

Unlike the holistic account, the referential model (Baeyens, Eelen, Crombez, & van den Bergh, 1992) claims that EC is based on an associative link between the CS and the US. If the CS is presented after conditioning, the CS automatically activates the US representation. However, the referential model makes no assumption about the learning process. More specifically, it is not clear what exactly an association is and how an association is formed.

The implicit misattribution account

The implicit misattribution model of EC (Jones, Fazio, & Olsen, 2009) assumes that a CS is liked or disliked to the extent that people misattribute the valence to the CS, which was actually elicited by a US presented with it. Because the model proposes that the evaluative response evoked by a valenced stimulus is *implicitly* misattributed to the CS, one could assume that EC effects only occur for participants who are unaware of the CS–US contingency. What the model cannot explain are EC effects in dissimilar stimuli (i.e., stimuli that belong to different sensory modalities). Moreover, and most importantly, the account does not explain why valence is misattributed at all to the CS instead of being correctly attributed to the US. If the CS and the US are maximally confusable and, hence, ascription of valence is at the level of chance, in 50% of all cases individuals should *guess* correctly. This, however, would imply that EC only occurs in 50% of all learning cases. A further issue of this account is that attribution is mostly assumed to be a process that works in an all-or-none and not in a graduated manner (Kelley, 1972).

The propositional account

This account states that propositional (e.g., rule-based) knowledge about the CS–US correlation underlies EC. The formation of these propositions is assumed to be a conscious and effortful mental process that involves the assignment of truth values (Mitchell, De Houwer, & Lovibond, 2009). Based on this assumption, the propositional account cannot explain results showing that EC is independent of awareness. Moreover, it is not clear how propositional knowledge is translated into liking. A further problem of the propositional account is that EC cannot be distinguished from simple demand effects.

People may exhibit evaluative responses toward a CS because they infer that this stimulus co-occurred with a US (e.g., people start to dislike an individual because she is often in company with another disliked person). However, it could also be the case that participants simply conform to the experimenters' intention by inferring which evaluation might be expected from them without having any authentic affective reactions. The holistic, the referential, and the misattribution accounts are consistent with EC effects in participants unaware of the CS-US contingency, whereas the propositional account assumes conscious awareness of that contingency as a necessary prerequisite for EC effects to occur. One problem with all of these accounts is that they are relatively silent on the specific processes that underlie the formation of attitudes. If anything, they suggest that different mechanisms (e.g., attributional, associative, propositional) lead to phenomena that fit into the definition of EC. Given these different accounts, however, it might be plausible to assume that more than one process could be involved in the formation of preferences. In fact, there are phenomena like the spreading-attitude effect (Walther, 2002) or US revaluation (Walther, Gawronski, Blank, & Langer, 2009) that fit well with the hypothesis that associative mechanisms underlie EC. However, there are also phenomena like the formation of balanced triads that more likely rely on propositional knowledge (Gawronski, Walther, & Blank, 2005).

Spreading Attitudes, US Revaluation, and the Balance Principle

Imagine a situation in which your mean colleague Monica is often in the kitchenette when Linda is there also. Then later, Linda shows Susan, the new secretary, around. Based on this simple (and presumably accidental) co-occurrence, which impression would you form of Linda and Susan? Referring to Linda, the case is simple. Due to her co-occurrence with mean Monica, forming a negative attitude toward Linda is just an instance of EC. But would Susan also be affected by this negative attitude? According to the spreading-attitude effect (Walther, 2002), the answer is yes. The spreading-attitude effect refers to the phenomenon that an evaluated stimulus (Monica) may influence not only the evaluation of an event that co-occurs with the stimulus (Linda) but also the evaluation of other stimuli that are merely associated with it (Susan).

A further example of an EC effect that is presumably based on an unconscious transfer of valence is the US-revaluation effect. US revaluation means that subsequent changes in the valence of a US after pairing it with a CS also changes the valence of the CS. For instance, Walther, Gawronski, Blank, and Langer (2009) paired positive USs with negative information and negative USs with positive information after an initial conditioning phase. This revaluation not only led to a reversal in the valence of the US but also changed the affective quality of the preassociated CS in the direction of the revaluated US.

The fact that spreading-attitude effects increase rather than decrease when people are distracted during the conditioning procedure and the findings that people have no memory for the revaluating information of the US suggest that the spreading-attitude effect, as well as US revaluation, are independent of contingency awareness. This means that both effects are consistent with all the above-mentioned EC accounts except the propositional account. However, there are also EC phenomena that seem to imply the use of propositional knowledge.

Imagine again a situation in which your mean colleague Monica is bothering you with how much she hates the new secretary Susan, who started her job a couple of days ago. Imagine you had not met Susan yet, however, based on the information you already have, would you like or dislike her? According to mere associative-process models, you would start to *dislike* Susan because she is associated with two negative evaluations: mean Monica and being disliked (Gawronski & Bodenhausen, 2006). Thus, associative-process models predict that the negative valence of both the person Monica and her attitude are transferred to the new colleague Susan, resulting in a negative attitude toward her. Conversely, if propositional processes are at work, the resulting attitude toward Susan might be positive. This is because people are able to form balanced triads based on propositional reasoning (Heider, 1958). Forming a balanced triad means, for example, that people like individuals who are disliked by people they personally dislike. In this example, one would start to like Susan because she is disliked by mean Monica. The formation of balanced triads means that individuals are not bound to rely on information as it is presented in the environment. Rather, due to the balance principle, people may overcome, for instance, the negativity out there (e.g., mean Monica and her negative attitude) and form a positive attitude instead.

Concluding Remarks

Despite the long tradition in learning theory to explain conditioning effects by means of associative models, propositional accounts have recently become very popular in this area (De Houwer, 2009; Mitchell et al., 2009). However, the question remains whether associative and propositional accounts are mutually exclusive. Generally, an association merely refers to a connection between events in memory (Carr, 1930). Thus, the term *association* is descriptive in nature and refers neither to the substance of this link nor to a particular theory of how this link is formed or maintained. Although most associative approaches implicitly assume that the link in memory is formed automatically, the question of how associations are formed and how they influence the organism's behavior has so far been insufficiently addressed in learning theory. From this perspective, a distinction between, for instance, associative and propositional learning is misleading. This is because associative learning is inherent in propositional learning as long as we assume that a link (an association) between the mental representations has been formed (but see De Houwer, 2009, for a different perspective).

Based on the finding that EC effects for participants aware and unaware of the CS-US contingency exist, one conclusion might be that EC effects can be the result of different processes. An alternative conclusion, however, could be that a single cognitive process underlies all types of (aware and unaware) EC effects (Kruglanski, Erb, Pierro, Mannetti, & Chun, 2006). Whether awareness is necessary or not to produce EC effects may depend on the different parameters given in the learning situation. For instance, it could be assumed that cognitive resources (e.g., time pressure or load), task demand (e.g., number of trials, interstimulus interval), and motivation parameters (e.g., salience or intensity of the US) play important roles in attitude formation. Based on this assumption, the particular composition of parameters given in the respective context, rather than different processes, may constitute outcome differences such as EC effects in aware or unaware participants. Thus, differences on the phenomenological level can be considered as an epiphenomenon of the very same learning process. To be sure, these rules might be different, reaching from primitive if-then heuristics (e.g., if I feel positively in the context of this stimulus, I like it) to more sophisticated contingency-based rules of prediction.

Depending on certain parameters like motivation, the if-then rule might therefore vary from very basic similarity heuristics to more sophisticated causal-inference rules. Applying this logic to the awareness issues, it is not implausible to assume that, for instance, the relevance (intensity) of the US determines the degree of awareness. Contingency awareness in turn might be necessary in order to predict the US. Thus, with increasing intensity of the US, the influence of awareness on conditioning might increase. Admittedly, these possibilities are speculative in nature. However, they can be put to empirical test by experimentally manipulating learning parameters in EC studies. Support for a single rule-based process that underlies all types of conditioning has come from recent research showing causal reasoning in rats (Blaisdell, Sawa, Leising, & Waldmann, 2006). This result not only challenges the view of causal reasoning as the key operation that differentiates humans from other animals but also supports the approach that the same process underlies all kinds of learning.

Recommended Reading

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- ### Declaration of Conflicting Interests
- The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.
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