Learning and Motivation 44 (2013) 312–325

Contents lists available at ScienceDirect

Learning and Motivation

journal homepage: www.elsevier.com/locate/l&m

The influence of extinction and counterconditioning instructions on evaluative conditioning effects☆

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ARTICLE INFO

Article history:
Received 13 October 2012
Received in revised form 21 March 2013
Accepted 21 March 2013
Available online 26 April 2013

Keywords:
Evaluative conditioning
Instructions
Extinction
Counterconditioning
Propositional model

ABSTRACT

In three experiments, we tested the influence of instructions about an allegedly upcoming extinction or counterconditioning phase on evaluative conditioning (EC) effects. After an acquisition phase in which neutral stimuli were related to positive or negative stimuli via instructions (Experiments 1 and 2a) or actual pairings (Experiment 2b), three different groups of participants were either informed that in the next phase the neutral stimuli would be presented without positive or negative stimuli (extinction instruction), that the neutral stimuli in the next phase would be paired with stimuli of the opposite valence than before (counterconditioning instruction), or received no further instructions. Afterwards, liking of the originally neutral stimuli was measured either with an evaluative rating (Experiment 1) or with an Implicit Association Test (IAT; Experiments 2a and 2b). EC was reduced in the counterconditioning condition of Experiment 1 and in the joint analysis of Experiments 2a and 2b. The extinction instruction led to a reduction of EC only in Experiment 1. Finally, whether the acquisition phase consisted of instructions about CS–US pairings (Experiment 2a) or the actual experience of CS–US pairings (Experiment 2b) did not significantly impact the observed changes in liking. Overall, our results suggest that similar mechanisms might mediate instruction- and experienced-based EC. Our results are in line with propositional models of EC but can be explained also by association formation models and dual process models of EC, provided that certain auxiliary assumptions are made.

Evaluative conditioning (EC) is a change in the valence of a stimulus (conditioned stimulus or CS) that results from a previous pairing of the stimulus with another stimulus, the US (unconditioned stimulus) (e.g., De Houwer, 2007; Gast, Gawronski, & De Houwer, 2012; Levey & Martin, 1975). EC is considered to be an important way in which implicit and explicit evaluations can be changed. In order to learn more about this important phenomenon, EC researchers have tried to uncover the conditions under which it occurs and the mechanisms that mediate it (for reviews see De Houwer, Baeyens, & Field, 2005; De Houwer, Thomas, & Baeyens, 2001; Jones, Olson, & Fazio, 2010; for a meta-analysis see Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010).

An important class of moderators that has been repeatedly studied in EC research are changes in the CS–US contingency. Examples for such changes in CS–US contingency are extinction or counterconditioning phases. In an extinction phase, CSs that were previously paired with positive or negative USs are presented alone, that is, without a US. In a counterconditioning phase, the participant continues to see CS–US pairings, but the valence of the US with which a particular CS is paired, is opposite to the valence of the US with which it was paired previously (e.g., a CS that was first paired with a positive US is paired with a negative US).

☆ The preparation of this paper was made possible by Methusalem Grant BOF09/01M00209 of Ghent University awarded to Jan De Houwer.

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0023-9690/$ – see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.lmot.2013.03.003

Extinction in particular has been studied extensively, although with mixed results. Most studies have shown that EC effects are resistant to the effects of an extinction phase: extinction trials did not significantly influence the size of the EC effect (e.g., Baeyens, Crombez, Vandenbergh, & Eelen, 1988; Blechert, Michael, Williams, Purkis, & Wilhelm, 2008; De Houwer, Baeyens, Vansteenwegen, & Eelen, 2000; Diaz, Ruiz, & Baeyens, 2005; Hermans, Crombez, Vansteenwegen, Baeyens, & Eelen, 2003; Kerkhof et al., 2009; Vansteenwegen, Francken, Vervliet, De Clercq, & Eelen, 2006). Only a much smaller number of studies found that EC can be reduced by presenting extinction trials (Lipp, Mallan, Libera, & Tan, 2010; Lipp, Oughton, & LeLievre, 2003). A recent meta-analysis, however, confirmed that across studies, EC effects are smaller after than before an extinction procedure, although the EC effects after extinction are still substantial (Hofmann et al., 2010). This suggests that some of the studies in which an extinction phase was not found to influence EC might have suffered from a lack of power to detect a reduction of the EC effect (see also Lipp & Purkis, 2006, for a moderator that has an influence on whether extinction effects are found).

Only a few studies have investigated the effect of a counterconditioning procedure in EC. The results of these studies, however, are quite consistent and confirm that EC can be reduced by a counterconditioning phase (Baeyens, Eelen, Vandenbergh, & Crombez, 1989; Kerkhof, Vansteenwegen, Baeyens, & Hermans, 2011; Lipp et al., 2010).

In a prototypical EC study, the participant is presented with multiple stimulus pairings. Recently, however, it has been demonstrated that EC effects can also be found if the participant is merely instructed about the pairings and does not actually perceive them. De Houwer (2006) informed participants that nonwords such as "Bayram" or "Udibnon" (CSs) would be paired with positive or negative photos (USs). After reading these instructions, but without actually seeing the pairings, the participants performed an Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) that provides an indirect measure of the valence of the stimuli. De Houwer showed that nonwords that were announced to be later paired with positive photos were evaluated more positively in an IAT than nonwords that were announced to be paired with negative photos. More recently, Gast and De Houwer (2012) showed that EC without actual pairings can also be found after instructions that only imply and do not explicitly mention the pairings. In one experiment, participants repeatedly saw positive and negative USs that were accompanied by a grey square and a number that depended on whether the US was positive (e.g., the Number 1) or negative (e.g., the Number 2). Later on, participants were informed that the grey square covered one particular CS picture whenever the Number 1 was displayed and that it covered another CS picture whenever the Number 2 was displayed. This information implied that one CS co-occurred with a positive US whereas the other CS co-occurred with a negative US. In line with this information, the former CS was preferred over the latter one.

Showing that EC effects can be based not only on actually experienced pairings, but also on instructions about pairings is not only important in its own sake, but also for the information it gives on the mental processes that could underlie EC. Typically, three classes of EC models are distinguished: propositional models, association formation models, and dual process models. According to propositional models, all EC effects are due to the formation and validation of propositional knowledge about CS–US relations (De Houwer, 2009; Mitchell, De Houwer, & Lovibond, 2009a). To the degree that mere instructions about CS–US pairings and actual experience of CS–US pairings result in the same propositions about the CS–US relation, propositional models of EC predict comparable EC effects with both types of acquisition.

Association formation models, on the other hand, typically say little about the possible effect of instructions about CS–US pairings. According to these models, EC effects are based on the (automatic) formation of associations between the CS and the US or between the CS and an evaluative response to the US during experience of the CS–US pairings (e.g., Baeyens et al., 1995; Jones, Fazio, & Olson, 2009). Association formation models typically emphasize the relevance of repeated direct experience of CS and US and state that conscious propositional knowledge about the pairings is not crucial for EC (e.g., Baeyens et al., 1992; Baeyens et al., 1995; Smith & DeCoster, 2000; Strack & Deutsch, 2004). Hence, on the basis of prototypical association formation models of EC, one would expect that mere instructions about CS–US pairings would not lead to the same effects as the actual experience of CS–US pairings. Although one can envisage variants of association formation models that do allow for EC via instructions (e.g., Field, 2006), finding important parallels between instruction-based and experience-based EC would put serious constraints on this class of models (i.e., limit the type of models that are plausible).

Finally, it has recently been proposed that EC might depend on both propositional and association formation processes (e.g., De Houwer, 2007; Gawronski & Bodenhausen, 2011). Like single-process propositional models of EC, such dual process models of EC can explain EC via instructions by attributing it to the formation and evaluation of propositional knowledge about CS–US relations. However, depending on when a dual process model postulates propositional and when associative processes to take place, it might predict differences between EC via instruction and EC via experience. Such differences would, for instance, emerge if association formation processes (a) operate under different conditions than propositional processes and (b) are involved only in EC via experience. Therefore, learning more about the similarities and differences between instruction-based and experience-based EC effects can also aid the development of dual process models of EC.

In his initial studies on instruction, De Houwer (2006) focused on the basic EC effect, that is, the effect of instructions about the presence of CS–US pairings on CS valence. An important next step is to examine the effect of instructions about procedures that have been shown to moderate EC effects. In the present studies, we examined whether EC effects are moderated by instructions about extinction and counterconditioning procedures. That is, rather than exposing participants to an extinction procedure (i.e., presenting CS-only trials after CS–US trials) or to a counterconditioning procedure (i.e., pairing a CS with a US of different valence than the US it was paired with during acquisition), we merely instructed participants that they would be exposed to such phases. In order to test the generality of our findings, we investigated the effects of instructions about