Journal of Experimental Social Psychology 71 (2017) 49–58

Contents lists available at ScienceDirect

Journal of Experimental Social Psychology

journal homepage: www.elsevier.com/locate/jesp

Examining the contributions of memory-dependent and memory-independent components to evaluative conditioning via instructions☆

Mandy Hütter [a,*,1], Jan De Houwer [b]

[a] Eberhard Karls Universität Tübingen, Germany
[b] Ghent University, Belgium

HIGHLIGHTS

- Investigated whether instructions generate memory-independent attitudes
- Stochastic model that separates memory-dependent from memory-independent learning
- Demonstrates a significant contribution of memory-independent learning
- Modulated by the presence or absence of memorization and feelings instructions
- Calls for caution about interpreting the memory-independent parameter as "associative"

ARTICLE INFO

Article history:
Received 9 November 2016
Revised 12 February 2017
Accepted 22 February 2017
Available online 7 March 2017

Keywords:
Evaluative conditioning
Instructed learning
Awareness
Automaticity
Dual-process models

ABSTRACT

We investigated whether instructions have the potential to generate memory-independent attitude acquisition as indexed by a stochastic model of evaluative conditioning that distinguishes between memory-dependent and memory-independent learning. For that purpose, we instructed participants about pairings of conditioned and unconditioned stimuli without having participants experience them. We obtained a significant contribution of memory-independent learning that depended on whether instructions emphasized the importance of memorization at learning or the importance of feelings at either learning or retrieval. Our findings call for caution when interpreting the memory-independent contribution as an indicator of association formation on the one hand and unaware learning on the other hand. Our research demonstrates the need to clearly distinguish between processes operating at encoding and processes operating at retrieval in empirical and theoretical research on evaluative conditioning.

1. Introduction

Psychologists have long recognized that human behavior is strongly shaped by preferences (Zajonc, 1968). It is thus of importance to understand how preferences develop. Previous research suggests that many preferences are learned rather than innate (Rozin & Millman, 1987). A paradigm assigned a key role in this research is evaluative conditioning (EC). In EC studies, a conditioned stimulus (CS) is paired with an unconditioned stimulus (US) that typically carries valence (i.e., is positive or negative). As an effect of that pairing procedure, the CS typically acquires the valence of the US. The EC effect has been demonstrated with a wide variety of stimuli and pairing procedures (Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010). The nature of the processes underlying this effect has been debated intensely and approached with different correlational and experimental methodologies (e.g., Hofmann et al., 2010; Sweldens, Corneille, & Yzerbyt, 2014).

Interestingly, it has been argued that EC is only found when there is evidence for awareness of the CS-US contingencies (Pleyers, Corneille, Luminet, & Yzerbyt, 2007; Stahl, Unkelbach, & Corneille, 2009) and when the learning situation allows for the encoding of the pairings in explicit memory (Dedonder, Corneille, Bertinchamps, & Yzerbyt, 2013; Stahl, Haaf, & Corneille, 2016). This claim is controversial, because it is at odds with the idea that learning in general can proceed implicitly

☆ The preparation of this article was supported by an Emmy-Noether grant from the Deutsche Forschungsgemeinschaft (HU 1978/4-1) awarded to the first author. Jan De Houwer is supported by Methusalem Grant BOF16/MET_V/002 of Ghent University and an Interuniversity Attraction Poles grant of the Belgian Science Policy Office (P7/33). We thank Olivier Corneille and Christoph Klauer for helpful comments on a previous version of this manuscript.

* Corresponding author at: Fachbereich Psychologie, Eberhard Karls Universität Tübingen, Schleichstr. 4, 72076 Tübingen, Germany.
E-mail address: mandy.huetter@uni-tuebingen.de (M. Hütter).
[1] Mandy Hütter, Fachbereich Psychologie, Eberhard Karls Universität Tübingen, Germany; Jan De Houwer, Department of Experimental-Clinical and Health Psychology, Ghent University, Belgium.

http://dx.doi.org/10.1016/j.jesp.2017.02.007
0022-1031/

(e.g., Reber, 1993), that is, in the absence of conscious knowledge about the environmental regularities that drive learned changes in behavior. Claims that EC depends on contingency awareness have also featured heavily in the debate about the processes that mediate EC. More specifically, it has been taken as evidence for the role of propositional processes in EC and as evidence against association formation models (e.g., Hofmann et al., 2010). Whereas association formation models attribute EC to the (relatively) automatic formation of CS-US associations in memory, propositional models postulate that EC depends on the non-automatic formation of conscious propositional beliefs about the relation between the CS and US. In contrast to simple associations, propositions can specify the way in which CS and US are related (e.g., CS causes US, CS predicts US, CS is equivalent to the US, etc.). Hence, from the perspective of propositional models, EC is not a primitive mechanism that creates preferences in a bottom-up manner, but a complex cognitive phenomenon that has much in common with other complex phenomena such as problem solving and persuasion (De Houwer, 2009; De Houwer & Hughes, 2016).

However, the evidence for the role of awareness of the CS-US contingencies - and thus the evidence for propositional models - might have been overestimated. As argued by Hütter, Sweldens, Stahl, Unkelbach, and Klauer (2012), participants might use the conditioned valence of a CS as a valid cue for inferring the valence of a US (e.g., "I like the CS, so probably it was paired with a positive US"). Such an affect-as-information strategy would result in a strong relation between EC and indices of CS-US contingency awareness even though EC might have occurred in the absence of contingency awareness. Hütter et al. (2012) thus used multinomial processing tree (MPT) modeling (Batchelder & Riefer, 1999; Hütter & Klauer, 2016) to separate awareness from conditioned responses. In a memory task administered after conditioning, participants were asked to report for each CS whether it was paired with pleasant or unpleasant US pictures. Additionally, participants were instructed to report their evaluation of the CS when they did not remember the US valence. The MPT model underlying the estimation of these processes is depicted in Fig. 1. In the inclusion condition, participants remember US valence with the probability m. If they lack memory for the pairings (with the probability $1 - m$), the reported evaluation of the CSs is in line with US valence if the conditioning procedure generated representations that influence liking in the absence of memory. The probability of that process is estimated by the parameter a. If participants lack memory for the pairings and the learning phase did not generate evaluations in the absence of memory, participants simply guess. The parameter r represents the probability of giving a "pleasant" response in the absence of any learning. As both memory-dependent and memory-independent learning lead to the same responses in the inclusion condition, those processes cannot be dissociated on the basis of performance in this condition alone. Therefore, Hütter et al. also implemented an exclusion condition, in which they asked participants to reverse the responses based on their evaluations. That is, when participants remembered the valence of the US pictures with which a CS was paired, they simply had to report the valence of the US pictures (i.e., "pleasant" or "unpleasant" as in the inclusion condition). However, when they did not remember the valence of the US pictures, they were asked to respond in a way that is opposite to their evaluation of the CS picture (i.e., respond "pleasant" if they disliked the picture and response "unpleasant" if they liked the picture). In this exclusion

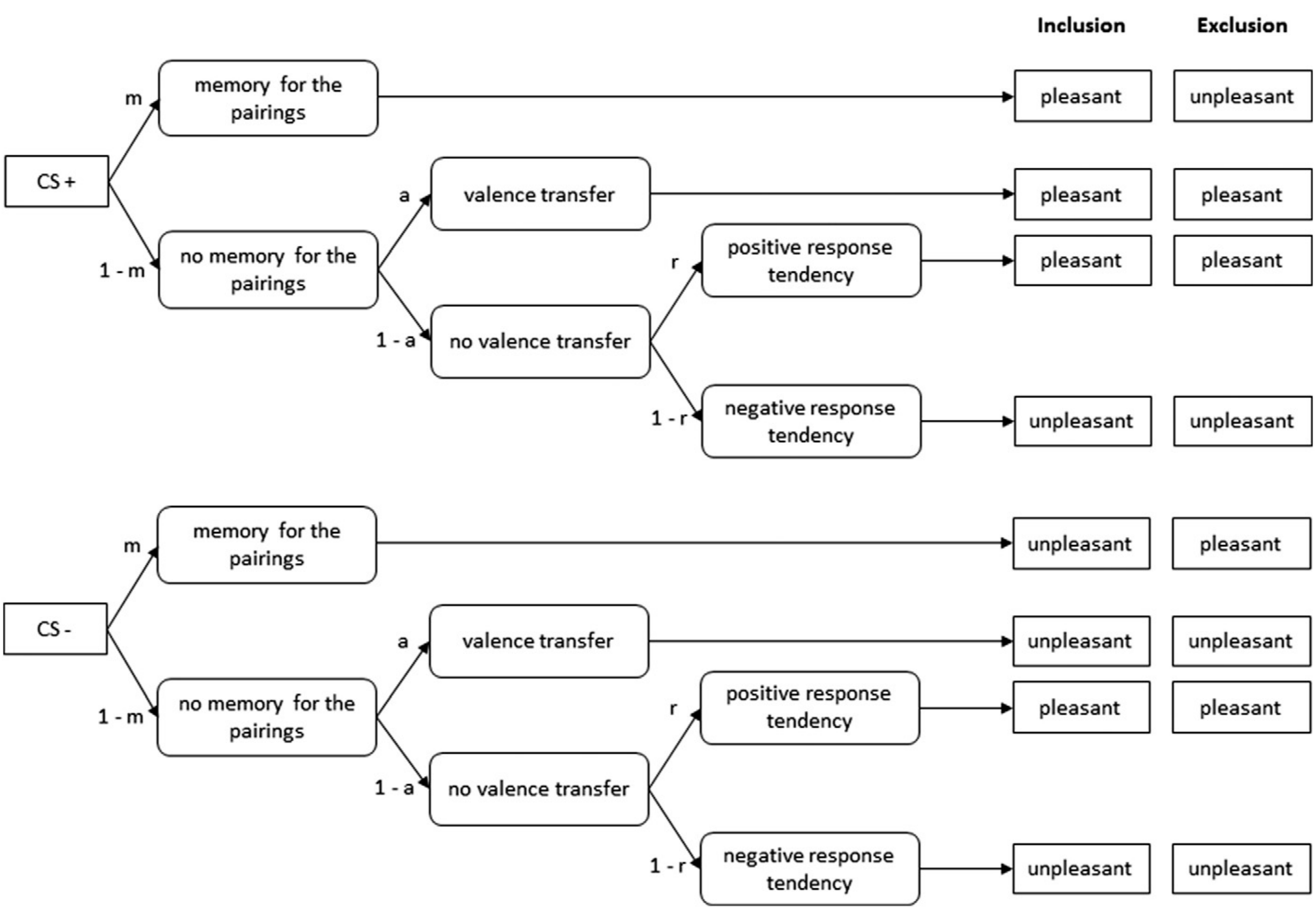

Fig. 1. Processing tree model of the MPT task in the inclusion and exclusion conditions for positively (CS+) and negatively paired CSs (CS−). The rectangles on the left denote the stimuli, the rectangles on the right the responses. The branches of the processing tree represent the combination of cognitive processes postulated by the model. m = probability of memory for the pairings; a = probability of acquiring an evaluation in the absence of memory for the pairings; r = response tendency towards "pleasant".