

Generalization Versus Contextualization in Automatic Evaluation

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Research has shown that automatic evaluations can be highly robust and difficult to change, highly malleable and easy to change, and highly context dependent. We tested a representational account of these disparate findings, which specifies the conditions under which automatic evaluations reflect (a) initially acquired information, (b) subsequently acquired, counterattitudinal information, or (c) a mixture of both. The account postulates that attention to contextual cues during the encoding of evaluative information determines whether this information is stored in a context-free representation or a contextualized representation. To the extent that attention to context cues is low during the encoding of initial information but is enhanced by exposure to expectancy-violating counterattitudinal information, initial experiences are stored in context-free representations, whereas counterattitudinal experiences are stored in contextualized representations. Hence, automatic evaluations tend to reflect the valence of counterattitudinal information only in the context in which this information was learned (*occasion setting*) and the valence of initial experiences in any other context (*renewal effect*). Four experiments confirmed these predictions, additionally showing that (a) the impact of initial experiences was reduced for automatic evaluations in novel contexts when context salience during the encoding of initial information was enhanced, (b) context effects were eliminated altogether when context salience during the encoding of counterattitudinal information was reduced, and (c) enhanced context salience during the encoding of counterattitudinal information produced context-dependent automatic evaluations even when there was no contingency between valence and contextual cues. Implications for automatic evaluation, learning theory, and interventions in applied settings are discussed.

Keywords: automatic evaluation, context effects, evaluative learning, occasion setting, renewal effects

Over the past decade, researchers across a wide range of areas in psychology have become interested in the dynamic processes underlying automatic evaluation (Ferguson & Zayas, 2009).¹ This trend has been stimulated in large part by the development of a new class of measurement procedures that infer automatic evaluations from participants' performance on a variety of cognitive tasks (for an overview, see Gawronski, 2009). Examples of these tasks include the Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998), different kinds of sequential priming tasks (e.g., Fazio, Jackson, Dunton, & Williams, 1995; Payne, Cheng, Govorun, & Stewart, 2005; Wittenbrink, Judd, & Park, 1997), and

adaptations of the Simon task (e.g., De Houwer, 2003; Voss, Rothermund, & Wentura, 2003). Even though most of these measurement procedures have been developed to address research questions in social psychology, their usefulness for assessing automatic evaluations has found widespread appreciation in virtually all areas of basic and applied psychology (for an overview, see Gawronski & Payne, 2010).

Despite the widespread interest in automatic evaluations, their functional properties and the nature of their underlying mental representations are still the subject of ongoing debate (De Houwer, 2009; Klauer, 2009). On the one hand, there is a large body of research showing that automatic evaluations can be relatively rigid and difficult to change (e.g., Gregg, Seibt, & Banaji, 2006; Petty, Tormala, Briñol, & Jarvis, 2006; Rydell, McConnell, Strain, Claypool, & Hugenberg, 2007; Wilson, Lindsey, & Schooler, 2000). On the other hand, there is a considerable amount of evidence indicating that automatic evaluations can change rather quickly with relatively little counterattitudinal information (e.g., Gawron-

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¹ In the current research, we use the term *automatic* to describe the elicitation of an evaluative response that occurs in the absence of the perceiver's intention to evaluate the object. This conceptualization remains agnostic about other potential features of automatic evaluation, such as their resource dependency, consciousness, and controllability (see Bargh, 1994; Moors & De Houwer, 2006).

ski & LeBel, 2008; Gibson, 2008; Grumm, Nestler, & von Collani, 2009; Olson & Fazio, 2006). Making the situation even more complex, an accumulating body of research has shown that automatic evaluations can be highly context dependent, such that automatic evaluations of the same object may differ as a function of the context in which it is encountered (e.g., Barden, Maddux, Petty, & Brewer, 2004; Roefs et al., 2006; Rudman & Lee, 2002; Wittenbrink, Judd, & Park, 2001).

To account for these disparate findings, researchers have proposed various theories about the mental processes (e.g., Gawronski & Bodenhausen, 2006, 2007) and mental representations (e.g., Petty, Briñol, & DeMarree, 2007) underlying automatic evaluations. Even though these theories specify when and why automatic evaluations should be more or less sensitive to counterattitudinal information, current explanations of context effects seem fairly vague and, to some extent, circular. A common assumption in these explanations is that the same object may activate different mental associations as a function of momentarily available contextual cues (for a review of different accounts, see Gawronski & Sritharan, 2010). To the extent that these associations differ in terms of their valence, the same object may elicit different evaluative responses depending on the context in which it is encountered (see also Ferguson & Bargh, 2007; Schwarz, 2007). For instance, a study by Wittenbrink and colleagues (2001) showed that an African American man activated negative automatic evaluations when he was shown in front of a graffiti covered wall, but the same individual activated more favorable evaluations when he was shown in the context of a family barbeque. Similarly, Roefs and colleagues (2006) found that automatic evaluations of high-fat foods were more favorable when the food primes were presented in a restaurant context than when they were presented in a health-related context.

Even though it seems intuitively plausible to explain such effects in terms of the context-dependent activation of associations in memory, this explanation is largely circular because existing theories do not specify on an a priori basis the conditions under which different contexts activate either the same associations or different associations in response to the same stimulus. In the present research, we aim to fill this important theoretical gap by specifying (a) the nature of the mental representations that underlie automatic evaluations, (b) the learning processes that are involved in the formation of these representations, and (c) the conditions under which these representations are activated. Drawing on insights from the animal learning literature (e.g., Bouton, 1994, 2004, 2010), we present a representational account of generalization versus contextualization effects in evaluative learning that specifies the conditions under which automatic evaluations reflect (a) initially acquired information about an object, (b) subsequently acquired, counterattitudinal information about the object, or (c) a mixture of both. Thus, our account not only explains when and why automatic evaluations vary as a function of the context; it also provides novel predictions about the conditions under which automatic evaluations are sensitive or insensitive to counterattitudinal information.

For this purpose, our research draws on the concepts of occasion setting and renewal effects in the animal learning literature. Applied to automatic evaluations, the term *occasion setting* refers to the phenomenon in which a particular target stimulus can evoke different automatic evaluations as a function of the context (i.e.,

occasion setter) in which it is encountered (for an overview, see Schmajuk & Holland, 1998). An important feature of occasion setters is that they do not directly elicit a corresponding response but rather simply modulate the response that is elicited by the target stimulus (Bouton, 2010). The term *renewal effect* refers to the phenomenon that an initially learned response reemerges after successful learning of a new response (Bouton, 1994). As we outline below, renewal effects are closely linked to occasion setting because renewal effects tend to emerge in contexts that differ from the one in which the new response has been learned, which implies a contextual modulation of the particular response that is elicited by the stimulus.

A Representational Account of Renewal Effects and Occasion Setting

Our representational account starts with the assumption that the encoding of evaluative information about an object produces a memory trace that links the object to that information. Depending on the strength of this memory trace, encountering the object in the future may automatically reactivate the associated information, thereby producing a corresponding evaluative response (Fazio, 2007; Gawronski & Bodenhausen, 2006). A crucial question for the present investigation is what happens when individuals are later exposed to information that is evaluatively incongruent with the initially acquired information. Drawing on previous research on expectancies and information processing (Roese & Sherman, 2007), we argue that expectancy violations trigger a search for contextual factors that may explain the observed discrepancy, thereby drawing attention to momentarily available contextual cues. As a result, these cues are integrated into a contextualized representation of the object that includes the newly acquired, counterattitudinal information and the particular context in which it was acquired, with the context serving as an occasion setter (Bouton, 1994). In line with previous evidence on subtyping (e.g., Kunda & Oleson, 1997; Moreno & Bodenhausen, 1999; Richards & Hewstone, 2001; Weber & Crocker, 1983), we further assume that the newly formed, contextualized representation is simply added to the existing memory structures instead of erasing the initially formed, context-free representation from memory (see also Bouton, 2004). As a result, the mental representation of the object acquires a dual nature, in that it involves (a) a context-free representation that includes the object and the initially acquired evaluative information, and (b) a contextualized representation that includes the object, the subsequently acquired, counterattitudinal information, and the context in which this information was acquired as an occasion setter. Considering that formalized memory models can integrate context-free and contextualized representations of the same object in a single memory structure (e.g., Bouton, 1994), it is important to note that our claims are not meant to imply two fully independent representations of the same object in memory. For these reasons, we use quotation marks to emphasize the metaphorical meaning of the term *dual* in the context of memory representations.

Combined with the notion of pattern matching in memory retrieval (Smith, 1996), the proposed “dual” representation can lead to different automatic evaluations of the object depending on the context in which it is encountered. First, if positive or negative information about an object is learned in an initial context, Context

A, and if this information is subsequently challenged by evaluatively incongruent information in another context, Context B, encountering the object in Context A should activate the original, context-free representation, which should produce evaluative responses that reflect the valence of the information acquired first. Adopting terminology from the animal learning literature, this outcome can be described as a case of *ABA renewal* (Bouton, 2004), in that an initial response that was acquired in Context A reemerges in the original learning Context A after a different response has been learned in a different Context B (e.g., Bouton & Bolles, 1979; Bouton & Peck, 1989).

Second, if positive or negative information about an object is learned in an initial context, Context A, and this information is subsequently challenged by evaluatively incongruent information in another context, Context B, encountering the object in a novel context, Context C, should also activate the original, context-free representation. As a result, evaluative responses in Context C should reflect the valence of the initially acquired information. This outcome can be described as a case of *ABC renewal* (Bouton, 2004), in that an initial response that was acquired in Context A reemerges in a novel Context C despite a different response being learned in Context B (e.g., Bouton & Bolles, 1979; Bouton & Brooks, 1993).

Third, if positive or negative information about an object is learned in an initial context, Context A, and this information is subsequently challenged by evaluatively incongruent information in a second context, Context B, encountering the object in Context B should activate the contextualized representation, which should produce evaluative responses that reflect the valence of the information learned in Context B. In combination with the above cases of ABA and ABC renewal (Bouton, 2004), this pattern reflects the notion of occasion setting, such that the presence of Context B, versus the absence of Context B, modulates the type of evaluation that is elicited in response to the object (e.g., Hardwick & Lipp, 2000; Lipp & Purkis, 2005). If Context B is present, the newly acquired response will be activated. If, however, Context B is absent, the initially acquired response will be activated. It is important that the notion of occasion setting implies that Context B does not become directly associated with a corresponding response. Instead, the presence of Context B, versus the absence of Context B, simply determines which representation of the target object will be activated, thereby modulating the evaluative response that is elicited by that object (Bouton, 2010).

Renewal Effects and Occasion Setting in Evaluative Learning

Even though the available evidence for renewal effects and occasion setting in human evaluative learning is scarce and rather mixed (e.g., Baeyens, Crombez, De Houwer, & Eelen, 1996; Baeyens, Hendrickx, Crombez, & Hermans, 1998; Hardwick & Lipp, 2000; Lipp & Purkis, 2005), recent research by Rydell and Gawronski (2009) provided evidence that is consistent with the principles of ABA renewal, ABC renewal, and occasion setting. In their research, participants were first presented with either positive or negative information about a target person against a meaningless, colored background (e.g., a yellow screen). In a second block of the learning task, participants were presented with information that was evaluatively opposite to the information provided in the

first block, and this information was presented against a different colored background (e.g., a blue screen). Immediately afterward, automatic evaluations of the target person were assessed with a sequential priming task (Payne et al., 2005) in which the target person was presented against either (a) the background of the first learning block (Context A), (b) the background of the second learning block (Context B), or (c) a novel background that was not part of the learning task (Context C). Results showed that automatic evaluations reflected the valence of the initially learned information when the target individual was subsequently encountered in Context A (ABA renewal). The same was true when the target individual was encountered in Context C, such that automatic evaluations in a novel context reflected the valence of the initially learned information (ABC renewal). These responses were in contrast to the ones in which the target person was encountered in Context B, in which automatic evaluations reflected the valence of the counterattitudinal information presented in the second learning block (occasion setting). It is important that all of these effects were limited to automatic evaluations of the target individual presented in the learning task and did not generalize to automatic evaluations of other individuals who were displayed against the same backgrounds. These results suggest that the contexts as such did not evoke a corresponding evaluative response, which is in line with the notion of occasion setting, according to which the background color of the second learning block should simply modulate the response that is elicited by the target object (see Bouton, 2010).

Rydell and Gawronski's (2009) results are consistent with the assumption that participants formed a "dual" representation of the target individual during the two learning blocks: a context-free representation during the first learning block and a contextualized representation during the second learning block. In the remainder of this article, we derive a number of novel predictions from this explanation and present four studies in which we tested these predictions.

Attention to Context Cues During Encoding

A central assumption of our model is that attention to context cues during the encoding of evaluative information functions as the critical factor that determines whether this information is stored in a context-free representation or a contextualized representation (see Rosas & Callejas-Aguilera, 2007). To the extent that attention to context cues is usually low during the encoding of initial information but is enhanced by exposure to expectancy-violating counterattitudinal information, initial experiences are stored in context-free representations, whereas subsequent, counterattitudinal experiences are stored in contextualized representations. In some circumstances, however, attention to the context may already be enhanced during the encoding of initial information about an object. According to our model, such cases should lead to an integration of the context into the initial representation of the object. Along the same lines, it is possible that attention to the context is sometimes reduced during the encoding of expectancy-violating counterattitudinal information, which should lead to an integration of the counterattitudinal information into the initial, context-free representation. These assumptions have important implications for the emergence of renewal effects and occasion setting in evaluative learning.

One implication is that renewal effects in novel contexts (ABC renewal) should disappear if attention to the context is already enhanced during the encoding of the first information about an object. In this case, two evaluatively incongruent learning experiences should still produce a “dual” representation of the object. However, in contrast to the scenario outlined above, the inclusion of context cues in the initially formed representation should result in two contextualized representations, one including the context during initial learning (Context A) and the other including the context during subsequent learning (Context B). To the extent that a novel context is equally (dis)similar to either of these contexts, encountering the object in a novel context should activate the two representations to the same extent, thereby producing an averaging effect of the two kinds of information rather than a renewal effect. In other words, automatic evaluations in novel contexts should reflect a neutral (or ambivalent) evaluation rather than an evaluation that reflects the valence of the information learned in Context A. It is important that the proposed account implies that enhanced attention to the context during initial learning should attenuate only ABC renewal, not ABA renewal. In fact, ABA renewal should remain perfectly intact because automatic evaluations in Context A should be driven by the contextualized representation that includes the information that has been learned in that context. The same is true for automatic evaluations in Context B. Again, as automatic evaluations in the subsequent learning context are driven by a contextualized representation formed during learning in that context, enhanced attention to the context during the first learning episode should leave these evaluations unaffected. In sum, our account predicts that enhanced attention to the context during the first learning episode should attenuate ABC renewal, whereas ABA renewal and the occasion setting function of the second learning context should remain unaffected.

Another implication of our model is that both ABA and ABC renewal should be attenuated if attention to the context is reduced during the encoding of counterattitudinal information. In such cases, the counterattitudinal information should be integrated into the initial, context-free representation, which should eliminate context effects altogether. That is, automatic evaluations should reflect all of the available information about the target, regardless of whether the target is encountered in the initial learning context, Context A, the second learning context, Context B, or a novel context, Context C. In technical terms, this prediction implies that reduced attention to the context during the second learning episode should eliminate ABA renewal, ABC renewal, and the occasion setting function of the second learning context, Context B.

The Current Research

To test these predictions, in Experiment 1, we manipulated context salience during the initial learning of evaluative information by means of a preceding priming task. In line with the above considerations, we expected that enhanced attention to the context during the first learning episode would attenuate ABC renewal, whereas ABA renewal and the occasion setting function of the second learning context would remain unaffected. Our aim in Experiment 2 was to replicate and extend the findings obtained in Experiment 1 by manipulating context salience during the actual learning task rather than by means of a preceding priming task. In Experiment 3, we tested the prediction that ABA renewal, ABC

renewal, and the occasion setting function of the second learning context would be attenuated when attention to the context is reduced during the encoding of expectancy-violating counterattitudinal information. Finally, in Experiment 4, we examined whether enhanced attention to contextual cues is sufficient to produce context-dependent automatic evaluations even when there is no contingency between contextual cues and the nature of the evaluative information.

Experiment 1

In Experiment 1, we tested the emergence of ABA and ABC renewal effects on automatic evaluations as a function of context salience during the initial learning of evaluative information. For this purpose, we adopted the learning paradigm used by Rydell and Gawronski (2009) and combined it with a context priming task that preceded the actual learning task. In the main task, participants were presented with evaluative information about a target individual named Bob. The participants' task was to form an impression of Bob on the basis of the information presented. In a first learning block, participants received either positive or negative information about Bob against a colored background (e.g., yellow) that continually remained on the screen during the entire learning block. In a second block, participants were presented with evaluative information of the opposite valence that was presented against the background of a different color (e.g., blue). Immediately afterward, all participants completed a sequential priming task (Payne et al., 2005) designed to assess automatic evaluations of Bob against the background color of the first block (ABA design), the background color of the second block (ABB design), and a novel background color that had not been part of either learning block (ABC design).

To manipulate the salience of the background color during the first learning block, participants first completed a context priming task that involved the presentation of evaluative information about another individual named Jim before they learned about the target individual, Bob. The presented information about Jim included both positive and negative information that was randomly interspersed across trials. Evaluative information was presented against two background colors that differed from the ones in the subsequent learning task about the target individual, Bob (i.e., brown, green). For half the participants, there was a perfect contingency between background color and valence of information about Jim (e.g., positive-green; negative-brown). For the remaining half, there was no contingency between background color and valence of the information. The first case was assumed to enhance the salience of background color as a predictive context cue; the second case was assumed to reduce the salience of background color as a context cue because background color is inconsequential in this case.

Method

Participants and design. One hundred and sixty-four undergraduates (118 women, 46 men) participated for research credit. The experiment consisted of a 2 Primed Context Salience (low vs. high) $\times$ 2 Valence Order (positive-negative vs. negative-positive) $\times$ 2 Valence-Context Match (positive-yellow, negative-blue vs. positive-blue, negative-yellow) $\times$ 3 Context During

Measurement (yellow vs. blue vs. white) mixed-model design, with the first three factors varying between subjects and the last factor varying within subjects. Data from 5 participants who reported knowing the meaning of the Chinese ideographs used in the measure of automatic evaluations were excluded from the analyses (see below).

Context priming task. To manipulate the salience of the background color as a context cue, participants first completed an impression formation task that was roughly similar to the evaluative learning task used to manipulate evaluative representations of the target individual, Bob (see below). Over the course of 40 trials, participants were asked to form an impression of a target person named Jim. The task included 20 positive and 20 negative behavioral descriptions about Jim that were concurrently presented with a picture of Jim. Statement–picture pairs were presented for 5,000 ms on the computer screen, with an intertrial interval of 1,000 ms. In the high context salience condition, the valence of the statements about Jim was perfectly correlated with the background color against which these statements were presented, such that positive statements were always presented against one type of background (e.g., green) and negative statements were always presented against a different background (e.g., brown). The particular matching of valence (positive vs. negative) and background color (brown vs. green) was counterbalanced across participants. In the low context salience condition, the correlation between valence and background color was zero, such that positive and negative statements were presented in equal proportions against each of the two background colors.

Evaluative learning task. After the context priming task, participants completed an evaluative learning task adopted from Rydell and Gawronski (2009). Participants were asked to form an impression of a new target person named Bob based on written information about this person. Over the course of 80 trials, participants read brief descriptions of 80 behaviors that Bob had performed while a picture of Bob was presented on the screen. Statement–picture pairs were presented for 5,000 ms on the computer screen with an intertrial interval of 1,000 ms. The trials were divided into two learning blocks of 40 trials. One of the two blocks contained 40 positive descriptions (e.g., Bob bought groceries for an elderly lady next door who was ill.); the other block contained 40 negative descriptions (e.g., Bob continually yells at his girlfriend in public.). The order of the two blocks was counterbalanced across participants, such that half the participants were shown 40 positive behaviors in the first block and 40 negative behaviors in the second block; the remaining half saw 40 negative behaviors in the first block and 40 positive behaviors in the second block. In addition to the manipulation of valence, the two blocks varied in terms of the background color against which the behavioral descriptions were presented. For half the participants, the behavioral information during the first block was presented against a blue background and the behavioral information during the second block was presented against a yellow background. For the remaining half, the behavioral information in the first block was presented against a yellow background and the behavioral information in the second block was presented against a blue background. The background colors used in the evaluative learning task were selected to be different from the ones used in the context priming task, such that the context priming task used green and brown backgrounds, whereas the evaluative learning task used yellow and blue back-

grounds. For each of the two learning blocks, the respective backgrounds were presented continually on the screen during the entire block.

Automatic evaluations. Upon completion of the evaluative learning task, we assessed participants' automatic evaluations of Bob with Payne et al.'s (2005) affect misattribution procedure (AMP). Past research with the AMP showed high effect sizes and satisfactory reliability estimates in the range of .70 to .90 (Cronbach's alpha). In addition, the AMP has been shown to be resistant to deliberate attempts to control responses (Payne et al., 2005), making this measure suitable for assessing automatic evaluations. Even though the current studies exclusively relied on the AMP, it is worth noting that Rydell and Gawronski (2009) obtained equivalent patterns for Payne et al.'s (2005) AMP and Fazio et al.'s (1995) evaluative priming task, indicating that the basic effects generalize across different measures of automatic evaluation (for a discussion, see Deutsch & Gawronski, 2009).

On each trial of the AMP, participants were first presented with a face prime for 75 ms. The face was then replaced by a blank screen for 125 ms, which was followed by a Chinese ideograph for 100 ms. Immediately after the presentation of the Chinese ideograph, a black-and-white pattern mask was presented, and participants were asked to indicate whether they considered the Chinese ideograph as visually more pleasant or visually less pleasant than the average Chinese ideograph. Participants were asked to press a right-hand key (number pad 5) when they considered the Chinese ideograph more pleasant than average and a left-hand key (A) when they considered the Chinese ideograph less pleasant than average (see also Murphy & Zajonc, 1993). As in the procedures used by Payne and colleagues (2005), participants were told that the face primes tend to influence evaluations of the Chinese ideographs and that they should try their absolute best not to let the faces bias their judgments of the Chinese ideographs in any possible way. The AMP consisted of 90 trials. Half of the trials had the picture of Bob as prime stimulus; the remaining half had pictures of five unknown individuals as primes. To keep the AMP comparable with the one used by Rydell and Gawronski (2009) and to avoid potential distortions resulting from the type of control primes used in the task (Scherer & Lambert, 2009), the AMP did not include any trials with pictures of the target person Jim from the context priming task. To investigate occasion setting and renewal effects in automatic evaluations, we manipulated the background color during the 75 ms presentation of the face primes, with one third of the prime stimuli being presented against a yellow background, one third being presented against a blue background, and the remaining third being presented against a white background. Whereas the yellow and the blue backgrounds reflected the context colors of the evaluative learning task, the white background represented a novel background that was not part of either the context priming task or the evaluative learning task. The order of trials on the AMP was determined randomly by the computer.

Results

Main analyses. To test the effects of context salience during the first learning block on the emergence of occasion setting and renewal effects, we calculated the proportion of *more pleasant* responses for each of the three relevant types of primes (i.e., Bob-yellow; Bob-blue; Bob-white). The data were then collapsed

across the counterbalanced method factor of background color to obtain our major within-subjects factors of context during measurement (i.e., first context vs. second context vs. novel context). The resulting scores were submitted to a 2 Primed Context Saliency (low vs. high) $\times$ 2 Valence Order (positive–negative vs. negative–positive) $\times$ 3 Context During Measurement (first context vs. second context vs. novel context) mixed-model analysis of variance (ANOVA), with the first two variables as between-subjects factors and the third variable varying within subjects. This analysis showed a significant two-way interaction of valence order and context during measurement, $F(2, 310) = 10.71, p < .001, \eta_p^2 = .065$, which was qualified by the predicted three-way interaction of primed context saliency, valence order, and context during measurement, $F(2, 310) = 3.64, p = .03, \eta_p^2 = .023$. To specify the three-way interaction in terms of the present hypotheses, we analyzed the effects of valence order and primed context saliency separately for each of the three contexts during measurement with 2 Valence Order $\times$ 2 Primed Context Saliency ANOVAs.

For automatic evaluations in the context of the first learning block (see Figure 1, left panel), there was a significant main effect of valence order, $F(1, 155) = 4.68, p = .03, \eta_p^2 = .029$, indicating that participants showed more favorable evaluations of Bob when the first learning block involved positive information than when it involved negative information. This finding reflects the notion of ABA renewal, implying that automatic evaluations in the initial learning context are driven by initially acquired information rather than subsequently acquired information. It is important that primed context saliency did not reveal any significant main or interaction effect ($F_s < 1, p_s > .71$), supporting our prediction that enhanced context saliency during the encoding of initial information should leave ABA renewal unaffected.

For automatic evaluations in the context of the second learning block (see Figure 1, middle panel), there was a significant main effect of valence order, $F(1, 155) = 5.15, p = .02, \eta_p^2 = .032$, indicating that participants showed more favorable evaluations of Bob when the first learning block involved negative information (and, thus, the second block positive information) than when the first learning block involved positive information (and, thus,

the second block negative information). This finding represents the notion of occasion setting, in that the second learning context modulates the evaluation that is evoked by the target individual Bob. That is, automatic evaluations in the context of the second learning block reflected the valence of the information that was acquired in that context. Again, primed context saliency did not reveal any significant main or interaction effect ($F_s < 1, p_s > .47$), which supports our prediction that enhanced context saliency during the encoding of initial information should leave the occasion setting function of the second context intact.

Automatic evaluations in novel contexts revealed a significant main effect of valence order, $F(1, 155) = 14.46, p < .001, \eta_p^2 = .085$, and more important for the current investigation, the predicted two-way interaction of primed context saliency and valence order, $F(1, 155) = 12.26, p = .001, \eta_p^2 = .073$ (see Figure 1, right panel). When context saliency during the first learning block was low, automatic evaluations in novel contexts were more favorable when the first learning block involved positive information than when it involved negative information, $F(1, 74) = 23.21, p < .001, \eta_p^2 = .239$. This result reflects the notion of ABC renewal, such that automatic evaluations in novel contexts were dominated by initially acquired information rather than subsequently acquired information. If, however, context saliency during the first learning block was high, ABC renewal effects disappeared, such that automatic evaluations did not differ as a function of the valence of the information presented during the first learning block, $F(1, 81) = 0.05, p = .82, \eta_p^2 = .001$.

Supplementary analyses. The notion of occasion setting implies that the context of the second learning episode is not directly associated with a corresponding evaluative response. Instead, the presence, versus absence, of the second context should simply modulate the responses elicited by the target individual, Bob (Bouton, 1994). This explanation entails that the obtained pattern of automatic evaluations should be limited to the target individual, Bob, and it should not generalize to other unknown individuals, particularly when they are encountered in the context of the second learning block (see also Rydell & Gawronski, 2009). A possible alternative is that context cues that are integrated in a contextualized representation become directly associated with the informa-

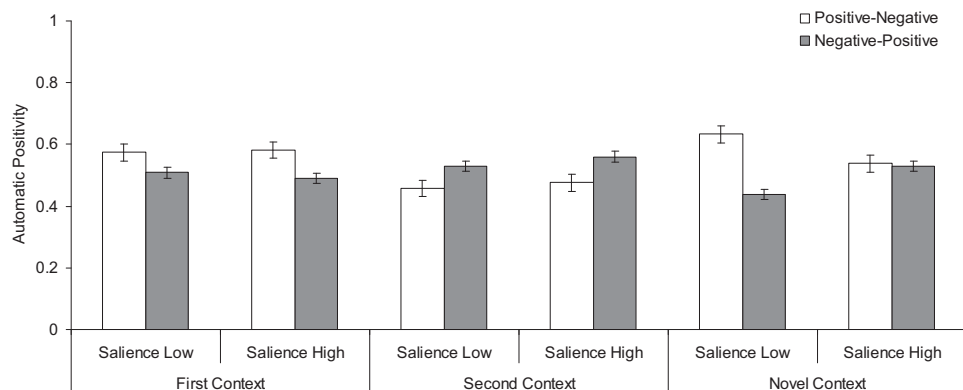


Figure 1. Automatic evaluations as a function of valence order (positive–negative vs. negative–positive), priming of context saliency before the first learning episode (saliency low vs. saliency high), and context during the measurement of automatic evaluations (first context vs. second context vs. novel context) in Experiment 1 (error bars depict standard errors).

tion acquired in these contexts (Urcelay & Miller, 2010). As a result of this process—which we refer to as *evaluative binding*—the relevant context cues may directly elicit a corresponding evaluative response, at least when the context salience during encoding was high. In this case, automatic evaluations of unknown individuals should resemble the ones obtained for the target individual, Bob, if they are encountered in either (a) the first context when the primed context salience was high or (b) the second context, irrespective of primed context salience.

Submitted to a 2 Primed Context Salience $\times$ 2 Valence Order $\times$ 3 Context During Measurement ANOVA, automatic evaluations of unknown individuals revealed a marginally significant two-way interaction of primed context salience and valence order, $F(1, 155) = 3.40$, $p = .07$, $\eta_p^2 = .021$, showing that evaluations of unknown individuals reflected the valence of the first learning block when context salience was high ($M = .58$ vs. $M = .50$, respectively), $F(1, 81) = 5.75$, $p = .02$, $\eta_p^2 = .066$, but not when it was low ($M = .54$ vs. $M = .55$, respectively), $F(1, 74) = 0.08$, $p = .77$, $\eta_p^2 = .001$. It is important that this effect was independent of the particular contexts in which the unknown individuals were presented, as indicated by a nonsignificant three-way interaction, $F(2, 310) = 1.83$, $p = .16$, $\eta_p^2 = .012$.² No other main or interaction effect reached statistical significance ($F_s < 2.03$; $p_s > .15$). These results suggest that the second learning context simply modulates automatic evaluations of the target individual Bob (occasion setting) instead of directly eliciting a corresponding evaluative response (evaluative binding). However, it should be noted that this conclusion is based on the interpretation of a null effect, and should therefore be treated with caution.

Discussion

Results from Experiment 1 support our prediction that enhanced context salience during initial learning should attenuate ABC renewal, whereas the emergence of ABA renewal and the occasion setting function of the second learning context should remain unaffected. In the present study, automatic evaluations of the target individual, Bob, in novel contexts reflected the valence of initial information about Bob when context salience during the first learning block was low, but not when it was high. In contrast, automatic evaluations in the initial learning context were dominated by the valence of the first experiences with Bob, regardless of context salience. Likewise, automatic evaluations in the context in which counterattitudinal information had been acquired were consistent with the valence of the subsequently presented, counterattitudinal information, regardless of context salience. Taken together, these results provide preliminary support for the proposed representational account. According to this account, attention to context cues during the encoding of evaluative information determines whether this information is stored in a context-free representation or a contextualized representation, which in turn determines whether automatic evaluations in a given context are dominated by (a) initially acquired information, (b) subsequently acquired, counterattitudinal information, or (c) a mixture of both.

Experiment 2

The main goal of Experiment 2 was to replicate the findings obtained in Experiment 1 with a different manipulation of context

salience. Instead of priming the salience of background color as a context cue prior to the actual learning task by means of an unrelated learning task, Experiment 2 manipulated context salience during the main task by presenting positive and negative information about the target individual, Bob, either in a blocked or an interspersed manner. Similar to the procedural setup of the primary learning task in Experiment 1, participants in the blocked condition received evaluative information about Bob in two consecutive blocks that differed in terms of valence and background color. For this condition, we expected that attention to the context would be low during the encoding of initial information about Bob. However, attention to the context should increase when participants are exposed to expectancy-violating counterattitudinal information. As a result, automatic evaluations should reflect patterns of ABA renewal, ABC renewal, and occasion setting when evaluative information about Bob is presented in a blocked manner.

A different outcome was expected for interspersed presentations. For participants in this condition, the two contexts and their associated valence information varied randomly on a trial-by-trial basis. In this setup, the background becomes a valid cue for predicting the valence of the information about Bob for each trial of the task, which should enhance attention to the background color during the encoding of the presented information. It is important that whereas context salience during blocked presentations is enhanced only for the second of the two contexts, context salience during interspersed presentations should be high for both contexts. As a result, interspersed presentations should lead to an integration of positive and negative information in two contextualized representations, one including Bob and the context associated with positive information and the other including Bob and the context associated with negative information.

With the valence of the very first learning trial as a common reference point to define the valence of the initially learned information, these assumptions imply that automatic evaluations in novel contexts should reflect the valence of the first learned information when evaluative information is presented in a blocked manner but not when it is presented in an interspersed manner. In

²To avoid a premature acceptance of the null hypothesis, we also inspected the overall pattern of mean values to rule out any resemblance to the three-way interaction pattern that may be expected on the basis of evaluative binding. Even though automatic evaluations of unknown individuals in the first context showed a weak tendency consistent with the predictions of the evaluative binding account, automatic evaluations in the second context and the novel context showed exactly the same pattern of means. That is, automatic evaluations of unknown individuals in all three contexts tended to be more favorable when the first information about Bob was positive than when it was negative. This effect emerged when the context salience was high, but not when it was low (see the two-way interaction reported in the main text). Even though this pattern suggests that evaluative binding may have occurred for the first context when primed context salience was high, the pattern obtained for the second context directly contradicts the evaluative binding account, which implies a main effect of valence order in the opposite direction. Thus, the pattern for the second context is consistent with the claim that the second context simply modulates the response elicited by the target individual, Bob, instead of becoming directly associated with a corresponding evaluative response. In fact, this modulation may occur even if the second context elicits an evaluative response that is directly opposite to the one that is elicited by the target individual in the presence of that context.

contrast, automatic evaluations in either of the two learning contexts should reflect the valence of the information that was presented in these contexts, and this effect should emerge for both blocked and interspersed presentations. In technical terms, ABC renewal should occur only when the presentation of evaluative information is blocked, not when it is interspersed. In contrast, ABA renewal and the occasion setting function of the second learning context should emerge, regardless of whether evaluative information is presented in a blocked manner or in an interspersed manner.

Method

Participants and design. One hundred undergraduates (78 women, 22 men) participated for research credit. The experiment consisted of a 2 Presentation Mode (blocked vs. interspersed) $\times$ 2 Valence Order (first information positive vs. first information negative) $\times$ 2 Valence-Context Match (positive-yellow, negative-blue vs. positive-blue, negative-yellow) $\times$ 3 Context During Measurement (yellow vs. blue vs. white) mixed-model design, with the first three factors varying between subjects and the last one varying within subjects.

Procedures and measures. The evaluative learning task was largely identical to the one used in Experiment 1, the only difference being that context salience was manipulated by means of blocked presentations, versus interspersed presentations, instead of a preceding priming task. Half the participants were shown the positive and negative statements and their respective contexts in a randomly interspersed fashion. The remaining half received the statements with the same blocked presentation that was used in Experiment 1. The particular mapping of valence (positive vs. negative) and background color (yellow vs. blue) was counterbalanced across participants. As a measure of automatic evaluations, we used the same AMP as in Experiment 1.

Results

Main analyses. Scores of automatic evaluation were aggregated according to the procedures described in Experiment 1. To

obtain a common reference point for the coding of valence order in the two presentation mode conditions (i.e., blocked vs. interspersed), we used the valence of the very first learning trial to determine whether the initial information about Bob was positive or negative. Effects on automatic evaluations were analyzed with a 2 Presentation Mode (blocked vs. interspersed) $\times$ 2 Valence Order (first information positive vs. first information negative) $\times$ 3 Context During Measurement (first vs. second vs. novel) mixed-model ANOVA, with the first two variables as between-subjects factors and the third variable varying within subjects. This analysis revealed a significant two-way interaction of valence order and context during measurement, $F(2, 192) = 32.11, p < .001, \eta_p^2 = .251$, which was qualified by the predicted three-way interaction of valence order, context during measurement, and presentation mode, $F(2, 192) = 4.51, p = .01, \eta_p^2 = .045$. To specify the three-way interaction in terms of the present hypotheses, we conducted separate 2 Presentation Mode $\times$ 2 Valence Order ANOVAs for each of the three contexts during the measurement of automatic evaluations.

For automatic evaluations in the context presented first (see Figure 2, left panel), a significant main effect of valence order indicated that participants showed more favorable evaluations of Bob when the first information about Bob was positive than when it was negative, $F(1, 96) = 16.80, p < .001, \eta_p^2 = .149$. This finding reflects the notion of ABA renewal, such that automatic evaluations in the first learning context reflected the valence of the first information despite the acquisition of evaluatively opposite information in a different context. There was no significant main or interaction effect of presentation mode ($F_s < 1.27, p_s > .26$), confirming our prediction that ABA renewal effects should occur regardless of the context salience implied by blocked, versus interspersed, presentations.

For automatic evaluations in the context presented second (see Figure 2, middle panel), a significant main effect of valence order indicated that participants showed more favorable evaluations of Bob when the first information about Bob was negative than when it was positive, $F(1, 96) = 17.27, p < .001, \eta_p^2 = .153$. This finding reflects the notion of occasion setting, such that automatic

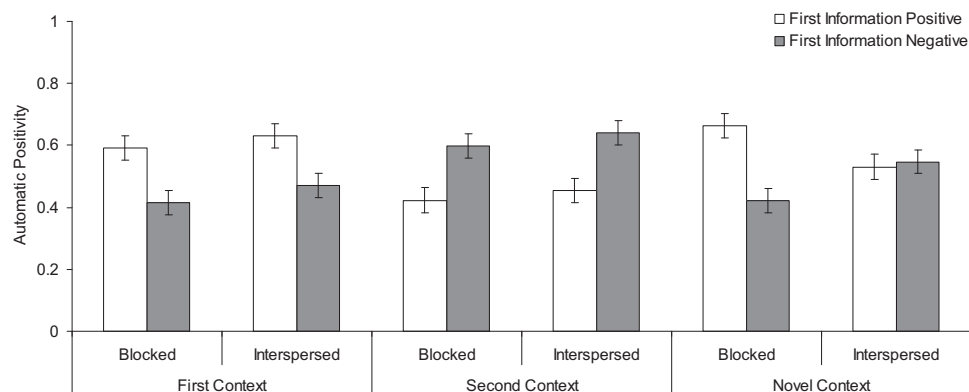


Figure 2. Automatic evaluations as a function of first learned valence (first information positive vs. first information negative), presentation mode of positive and negative information (blocked vs. interspersed), and context during the measurement of automatic evaluations (first context vs. second context vs. novel context) in Experiment 2 (error bars depict standard errors).

evaluations in the second learning context were dominated by the valence of the information acquired in that context. Again, there was no significant main or interaction effect of presentation mode (all F s < 1, all p s > .39) confirming our prediction that the occasion setting function of the second context should be independent of the context salience implied by blocked, versus interspersed, presentations.

Automatic evaluations in the novel context revealed a significant main effect of valence order, $F(1, 96) = 8.61, p = .004, \eta_p^2 = .082$, and, more important for the current predictions, a significant two-way interaction of presentation mode and valence order, $F(1, 96) = 11.18, p = .001, \eta_p^2 = .104$ (see Figure 2, right panel). When evaluative information about Bob was presented in a blocked manner, automatic evaluations in novel contexts were more favorable when the first statement about Bob was positive than when it was negative, $F(1, 51) = 27.20, p < .001, \eta_p^2 = .348$. This finding reflects the notion of ABC renewal, such that automatic evaluations in the novel context were dominated by the valence of the first information about the target. If, however, evaluative information was presented in an interspersed manner, ABC renewal effects disappeared, such that automatic evaluations did not differ as a function of the valence of the first learned information, $F(1, 45) = 0.06, p = .80, \eta_p^2 = .001$. This result confirms our prediction that ABC renewal effects should be attenuated when context salience is enhanced by means of interspersed presentations.

Supplementary analyses. To investigate whether the obtained pattern of results is unique to the target individual, Bob, we submitted automatic evaluations of unknown individuals to the same 2 Presentation Mode $\times$ 2 Valence Order $\times$ 3 Context During Measurement ANOVA. This analysis revealed a significant two-way interaction of presentation mode and valence order, $F(1, 96) = 5.56, p = .02, \eta_p^2 = .055$, showing that evaluations of unknown individuals reflected the valence of the first information when evaluative information about Bob was presented in a blocked manner ($M = .65$ vs. $M = .52$, respectively), $F(1, 51) = 5.76, p = .02, \eta_p^2 = .101$, but not when it was interspersed ($M = .57$ vs. $M = .61$, respectively), $F(1, 45) = 0.76, p = .39, \eta_p^2 = .017$. In addition, there was a significant two-way interaction of context during measurement and presentation mode, $F(2, 192) = 3.25, p = .04, \eta_p^2 = .033$. When evaluative information about Bob was presented in a blocked manner, automatic evaluations of unknown individuals tended to be less favorable in the first context, compared with the second context and the novel context ($M_{\text{first}} = .55; M_{\text{second}} = .60; M_{\text{novel}} = .61$), $F(1, 102) = 2.95, p = .06, \eta_p^2 = .055$. In contrast, when evaluative information about Bob was presented in an interspersed manner, automatic evaluations of unknown individuals did not significantly differ as a function of the context ($M_{\text{first}} = .61; M_{\text{second}} = .57; M_{\text{novel}} = .58$), $F(1, 90) = 0.84, p = .43, \eta_p^2 = .018$. It is important that the critical three-way interaction of presentation mode, valence order, and context during measurement was not statistically significant, $F(2, 192) = 0.19, p = .82, \eta_p^2 = .002$. No other main effect or interaction effect reached statistical significance (F s < 1.57, p s > .21). Again, none of these effects corresponds to the predictions of the evaluative binding account, which implies that contexts that were salient during encoding become directly associated with a corresponding evaluative response. However, the current results are consistent with the notion of occasion setting, which implies that automatic evaluations of the target individual, Bob, are modulated by the

presence, versus absence, of the second context. As in Experiment 1, however, it should be noted that this conclusion is based on the interpretation of a null effect and should therefore be treated with caution.

Discussion

Results from Experiment 2 replicate the basic findings of Experiment 1, showing that ABC renewal, but not ABA renewal and the occasion setting function of the second context, is attenuated when context salience is high in both learning contexts. With the valence of the first trial used as a common reference point and blocked, versus interspersed, presentations used to manipulate context salience, automatic evaluations in novel contexts reflected the valence of the initial information when positive and negative information was presented in a blocked manner (low context salience) but not when it was interspersed (high context salience). In contrast, automatic evaluations in the initial learning context reflected the valence of the first information, regardless of the presentation mode. In a similar vein, automatic evaluations in the subsequent learning context reflected the valence of the information that was learned in that context, regardless of the presentation mode.

Experiment 3

Our main goal in Experiment 3 was to test the prediction that both ABA and ABC renewal should be eliminated when attention to context cues is reduced during the encoding of expectancy-violating counterattitudinal information. In the current study, we manipulated attention to context cues during the second learning episode by presenting counterattitudinal information either in a single context (high context salience) or in multiple contexts (low context salience). The rationale underlying this manipulation is that learning counterattitudinal information in multiple contexts signals that the newly learned valence of the target is context independent, which should reduce attention to the context. As a result, the newly acquired counterattitudinal information should be integrated into the original context-free representation, which should eliminate context effects altogether. That is, automatic evaluations should reflect the average or sum of all available information about the target, regardless of whether the target is encountered in the initial learning context, Context A, a novel context, Context C, or the subsequent context(s), Context B, in which counterattitudinal information was acquired.

Method

Participants and design. Ninety-two female undergraduates participated for research credit. The experiment consisted of a 2 Valence Order (positive–negative vs. negative–positive) $\times$ 2 Context Order (yellow–blue vs. blue–yellow) $\times$ 2 Number of Contexts During Second Learning Block (single vs. multiple) $\times$ 3 Context During Measurement (yellow vs. blue vs. white) $\times$ 2 Time of Measurement (after first learning block vs. after second learning block) mixed-model design, with the first three factors varying between subjects and the last two varying within subjects.

Procedures and measures. The evaluative learning task was very similar to the one used in Experiment 1, with a few notable

differences. In the first learning block, participants saw either 50 positive or 50 negative statements about Bob that were presented either against a yellow or a blue background. In the second learning block, participants were presented with 50 statements of the opposite valence. In the single context condition, the information of the second block was consistently presented against a single background color that differed from the color presented in the first learning block. That is, counterattitudinal information in the second block was presented against a blue background when the background in the first block was yellow. Conversely, counterattitudinal information in the second block was presented against a yellow background when the background in the first block was blue. In the multiple contexts condition, the background in the second block varied on a trial-by-trial basis, using the backgrounds of the single context condition (i.e., yellow or blue) plus four additional backgrounds that differed from the one in the first learning block (i.e., green, orange, brown, red). Each of the five backgrounds was presented 10 times over the course of the learning block.

Automatic evaluations were again assessed with an AMP (Payne et al., 2005) that included a total of 180 trials. Sixty trials presented the picture of Bob against different backgrounds as prime stimulus; 60 trials presented pictures of four unknown individuals against different backgrounds as primes; and 60 trials presented the backgrounds alone as primes. To ensure comparability of the AMP across the single context condition, versus multiple contexts conditions, we used the two background colors of the single context condition (i.e., yellow, blue) as relevant target contexts for both the single context condition and the multiple contexts conditions. As the novel context, we chose the same white background used in Experiments 1 and 2. Taken together, this setup implies 20 trials for each of the nine prime categories implied by the manipulation of prime object (i.e., Bob, unknown person, no person) and background (i.e., yellow, blue, white). As the current predictions involve a full attenuation of renewal effects and occasion setting in the multiple contexts condition, automatic evaluations were assessed twice: once after the first learning block and once after the second learning block. The additional assessment of automatic evaluations after the first learning block was necessary to confirm that participants indeed formed a representation of Bob during the first learning block in the multiple contexts condition, which then changed as a result of the counterattitudinal information presented in the second block.

Results

Main analyses. AMP scores of automatic evaluations were aggregated according to the procedures in Experiment 1. Submitted to a 2 Valence Order (positive–negative vs. negative–positive) $\times$ 2 Number of Contexts During Second Learning Block (single vs. multiple) $\times$ 3 Context During Measurement: (first context vs. second context vs. novel context) $\times$ 2 Time of Measurement (after first learning block vs. after second learning block) mixed-model ANOVA, these scores revealed a significant main effect of valence order, $F(1, 88) = 17.94, p < .001, \eta_p^2 = .169$, a significant two-way interaction of valence order and time of measurement, $F(1, 88) = 22.96, p < .001, \eta_p^2 = .207$, a significant two-way interaction of context during measurement and valence order, $F(2, 176) = 5.48, p = .005, \eta_p^2 = .059$, a significant

three-way interaction of context during measurement, valence order, and number of contexts, $F(2, 176) = 7.81, p = .001, \eta_p^2 = .081$, a significant three-way interaction of context during measurement, valence order, and time of measurement, $F(2, 176) = 11.47, p < .001, \eta_p^2 = .115$, and most important for the present investigation, a significant four-way interaction of context during measurement, valence order, number of contexts, and time of measurement, $F(2, 176) = 6.62, p = .002, \eta_p^2 = .070$. To specify this interaction in terms of the current hypotheses, we conducted separate 2 Valence Order $\times$ 2 Number of Contexts During Second Learning Block $\times$ 3 Context During Measurement mixed-model ANOVAs for automatic evaluations after the first learning block and the second learning block, respectively.

Automatic evaluations after the first learning block (see Figure 3, upper panel) revealed only a significant main effect of valence order, indicating that automatic evaluations were more favorable when the first information about Bob was positive than when it was negative, $F(1, 88) = 40.66, p < .001, \eta_p^2 = .316$. No other main effect or interaction reached statistical significance ($F_s < 1.59, p_s > .20$). This main effect confirms that participants indeed formed an evaluative representation of Bob during the first learning block, which is essential to interpret the predicted attenuation of renewal effects and occasion setting after the second learning block in the multiple contexts condition.

Automatic evaluations after the second learning block revealed a significant two-way interaction of context during measurement and valence order, $F(2, 176) = 12.22, p < .001, \eta_p^2 = .122$, and more important for the present investigation, a significant three-way interaction of context during measurement, valence order, and number of contexts, $F(2, 176) = 10.83, p < .001, \eta_p^2 = .110$ (see Figure 3, lower panel). To specify this interaction in terms of the current hypotheses, we conducted separate 2 Valence Order $\times$ 3 Context During Measurement ANOVAs for the single context condition versus multiple contexts conditions.

When counterattitudinal information was learned in a single context, automatic evaluations after the second learning block revealed a significant two-way interaction of valence order and context during measurement, $F(2, 88) = 15.79, p < .001, \eta_p^2 = .264$. In line with the notion of ABA renewal, automatic evaluations in the first context were more favorable when the first information was positive than when it was negative, $F(1, 44) = 4.03, p = .05, \eta_p^2 = .084$. Moreover, in line with the notion of ABC renewal, automatic evaluations in the novel context were more favorable when the first information was positive than when it was negative, $F(1, 44) = 8.97, p = .004, \eta_p^2 = .169$. Finally, in line with the occasion setting function of the second learning context, automatic evaluations in the second context showed the opposite effect, such that automatic evaluations were more favorable when the first information was negative than when it was positive, $F(1, 44) = 10.38, p = .002, \eta_p^2 = .191$.

When counterattitudinal information was learned in multiple contexts, the ANOVA did not show any significant main or interaction effects of valence order and context during measurement ($F_s < 1, p_s > .42$). In other words, context effects were eliminated altogether, such that automatic evaluations of the target individual, Bob, reflected the average or sum of the acquired information, regardless of whether the target was encountered in the context of the first learning block, the context of the second learning block, or a novel context. This result is consistent with our prediction that

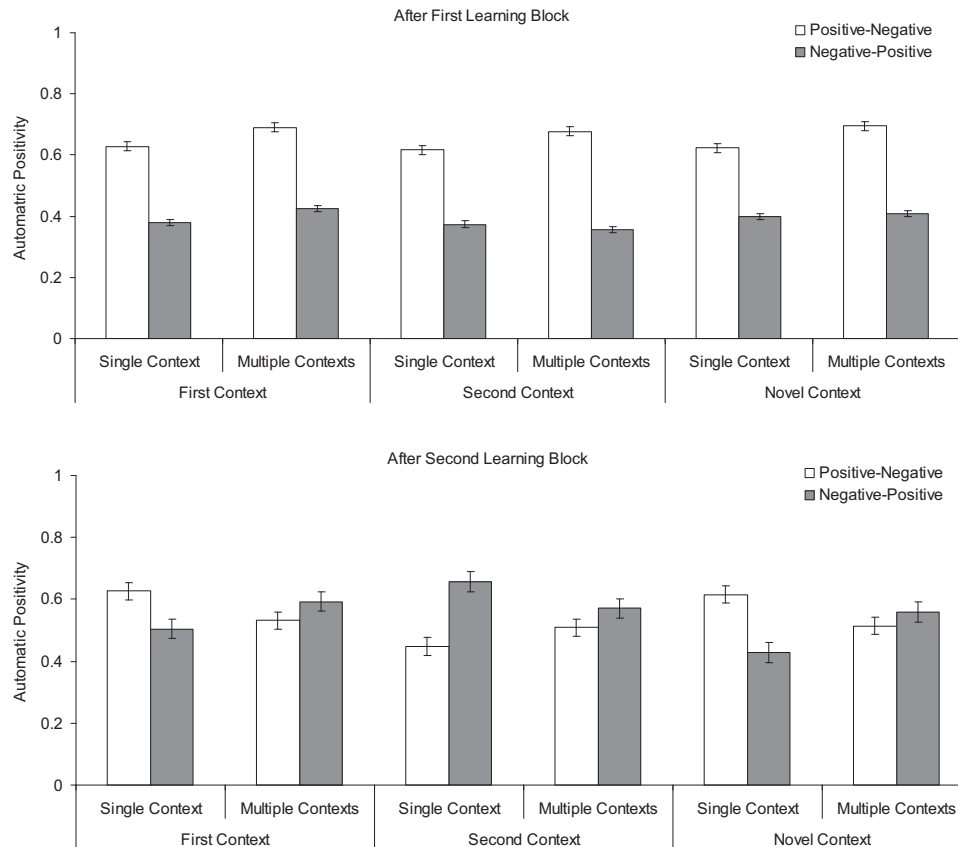


Figure 3. Automatic evaluations as a function of valence order (positive–negative vs. negative–positive), number of contexts in the second learning block (single context vs. multiple contexts), context during the measurement of automatic evaluations (first context vs. second context vs. novel context), and time of measurement (after first learning block vs. after second learning block) in Experiment 3 (error bars depict standard errors).

learning of counterattitudinal information in multiple contexts should eliminate both ABA and ABC renewal as well as the occasion setting function of context cues during the learning of counterattitudinal information.

Supplementary analyses. To test whether these effects are unique to the target individual, Bob, automatic evaluations of unknown individuals were again submitted to the same 2 Valence Order $\times$ 2 Number of Contexts During Second Learning Block $\times$ 3 Context During Measurement $\times$ 2 Time of Measurement mixed-model ANOVA. This analysis revealed a marginally significant main effect of time of measurement, $F(1, 88) = 3.32$, $p = .07$, $\eta_p^2 = .036$, indicating that automatic evaluations of unknown individuals tended to be more favorable after the second learning block than after the first learning block ($M = .56$ vs. $M = .52$, respectively). In addition, there was a significant main effect of context, $F(2, 176) = 3.40$, $p = .04$, $\eta_p^2 = .037$, indicating that automatic evaluations of unknown individuals were less favorable in the second context, compared with the first and the novel context ($M_{\text{first}} = .54$; $M_{\text{second}} = .51$; $M_{\text{novel}} = .55$). The critical four-way interaction was not statistically significant, $F(2, 176) = 0.50$, $p = .61$, $\eta_p^2 = .006$. No other main or interaction effect reached statistical significance ($F_s < 2.29$, $p_s > .13$).

Automatic evaluations of the backgrounds alone (i.e., without any person) revealed a significant two-way interaction between valence order and time of measurement, $F(1, 88) = 6.18$, $p = .01$, $\eta_p^2 = .066$, showing a tendency for less favorable evaluations after the first learning block than after the second learning block when the first information was positive ($M = .58$ vs. $M = .64$, respectively), $F(1, 45) = 3.65$, $p = .06$, $\eta_p^2 = .075$, and a nonsignificant tendency in the opposite direction when the first information was negative ($M = .62$ vs. $M = .58$, respectively), $F(1, 43) = 2.58$, $p = .12$, $\eta_p^2 = .057$. In addition, there was a marginally significant two-way interaction of context during measurement and number of contexts, $F(2, 176) = 3.02$, $p = .05$, $\eta_p^2 = .033$. Whereas automatic evaluations of the three contexts did not differ in the multiple contexts condition ($M_{\text{first}} = .60$; $M_{\text{second}} = .60$; $M_{\text{novel}} = .62$), $F(1, 88) = 0.52$, $p = .60$, $\eta_p^2 = .012$, automatic evaluations in the single context condition were more favorable for the first context, compared with the second context and the novel context ($M_{\text{first}} = .64$; $M_{\text{second}} = .57$; $M_{\text{novel}} = .59$), $F(1, 88) = 3.27$, $p = .04$, $\eta_p^2 = .069$. The critical four-way interaction was not statistically significant, $F(2, 176) = 1.45$, $p = .24$, $\eta_p^2 = .016$. No other main or interaction effect reached statistical significance ($F_s < 2.13$, $p_s > .14$).

Taken together, none of these effects corresponds to the predictions implied by the evaluative binding account. According to this account, automatic evaluations of the second context (either alone or in the presence of other unknown individuals) should elicit an evaluative response in line with the information learned in that context, but only when counterattitudinal information in the second learning block was acquired in a single context. Yet, the absence of such effects is consistent with the notion of occasion setting, according to which automatic evaluations of the target individual, Bob, are modulated by the presence, versus absence, of the second context in the single context condition (Bouton, 1994). However, these conclusions are again based on a null effect and should therefore be treated with caution.

Discussion

The results of Experiment 3 provide further evidence for the usefulness of our account in understanding the generalization versus contextualization of automatic evaluations. Drawing on the assumption that learning counterattitudinal information in multiple contexts may signal a particular valence of the target object independent of the context, we argue that exposure to counterattitudinal information across multiple contexts should reduce attention to these contexts, thereby promoting an integration of this information in the original, context-free representation. As a single context-free representation should not give any priority to particular information as a function of the context, automatic evaluations should reflect the average or sum of all available information, regardless of the context. Consistent with these assumptions, in Experiment 3, we replicated the obtained effects of ABA renewal, ABC renewal, and occasion setting when counterattitudinal information was learned in a single context. If, however, counterattitudinal information was learned in multiple contexts, automatic evaluations reflected neutral (or ambivalent) evaluations, regardless of whether the target was encountered in the initial learning context, Context A, in a novel context, Context C, or in one of the subsequent contexts, Context B, in which counterattitudinal information had been acquired.

A possible objection against this interpretation is that the multiple contexts condition involved a smaller number of learning trials for counterattitudinal information against the background color that was later used as the second context in the measurement of automatic evaluations (i.e., 10 learning trials in the multiple contexts condition, compared with 50 learning trials in the single context condition). Thus, reduced effects in the multiple contexts condition may be due to insufficient learning rather than reduced attention to the context. Even though insufficient learning may explain the reduction of the occasion setting function of the second learning context, it does not explain the predicted elimination of ABA and ABC renewal. To the contrary, both ABA and ABC renewal should have been stronger (rather than attenuated) in the multiple contexts condition if learning in the second context was insufficient. Hence, the more parsimonious explanation for the full pattern of results is that attention to the context was generally reduced in the multiple contexts condition, thereby promoting an integration of the counterattitudinal information in the original context-free representation.

Experiment 4

A central assumption of our account is that the formation of contextualized, versus context-free, representations depends on perceivers' attention to context cues during the encoding of evaluative information. For the evidence presented thus far, it seems theoretically plausible that attention to context cues was enhanced once a predictive relationship between context and valence became salient. For instance, exposure to expectancy-violating counterattitudinal information may trigger a search for contextual cues that explain the deviation from the expected valence (Roese & Sherman, 2007). In the current studies, positive information always appeared against one background and negative information against another background, which implies that the new background during the presentation of counterattitudinal information explains the deviation from the expected valence. Thus, it is possible that background color became salient as a contextual cue because of the objective contingency between background color and valence, which in turn should promote an integration of the background color in a contextualized representation.

Alternatively, it is possible that objective contingencies between context and valence are not necessary for the formation of contextualized representations. Preliminary evidence for this idea is provided by research on AAB renewal (see Bouton, 2004). In a typical AAB design, participants first learn a particular response to a given target object in Context A, after which they learn a different response to the same target, also in Context A. Responses are then measured in a novel context, Context B. AAB renewal refers to the phenomenon in which the target object evokes the response acquired during the first learning episode when it is encountered in a novel context, Context B, even though the subsequent learning experience may effectively determine responses in the original learning context, Context A. Despite less evidence for AAB than for ABA and ABC renewal (Bouton, 2004), AAB renewal has been obtained in rats after extinction of conditioned responses in Pavlovian conditioning (e.g., Bouton & Ricker, 1994; Tamai & Nakajima, 2000). To our knowledge, there are no published studies that have tested the emergence of AAB renewal in human learning.

An important feature of the AAB design is that the two learning episodes occur in the same context and, therefore, do not imply any contingency between context and valence. Thus, if objective context-valence contingencies are necessary for the formation of contextualized representations, consecutive exposure to conflicting information in the same Context A, should lead to an integration of that information in a single, context-free representation. As a result, automatic evaluations should reflect the valence of all information, regardless of whether they are assessed in the original learning context, Context A, or in a novel context, Context B. Alternatively, and in line with the notion of AAB renewal, the mere presence of expectancy-violating counterattitudinal information may be sufficient to enhance attention to the context, which may produce contextualized representations even when the context as such is not a valid cue for the prediction of valence.

In the current study, we propose that exposure to expectancy-violating counterattitudinal information increases attention to momentarily available contextual cues, regardless of whether these cues are predictive of the valence of the target object (Bouton, 2010). After all, enhanced attention to contextual cues has to

precede any inferences about their predictive value. Hence, momentarily available cues may be integrated in a contextualized representation, even if they do not show any contingency with valence. To the extent that attention to the context is low during the encoding of initial information about an object, consecutive exposure to evaluatively incongruent information in the same learning Context A, should therefore produce (a) a context-free representation that includes the object and the initially acquired information and (b) a contextualized representation that includes the object, the subsequently acquired, counterattitudinal information, and the learning Context A as an occasion setter. Hence, if the target is encountered in the original learning Context A, the contextualized representation should be activated, leading to automatic evaluations in line with the subsequently acquired, counterattitudinal information. If, however, the target is encountered in a novel Context B, the original, context-free representation should be activated, leading to automatic evaluations in line with the initially acquired information (AAB renewal).

In addition, we tested whether the emergence of AAB renewal is limited to conditions of low context salience during the first learning episode, as predicted by our representational account. Specifically, we assumed that enhanced attention to the context during the encoding of initial information about the object promotes the integration of all information in a single, contextualized representation, which in turn should attenuate AAB renewal. Such a finding would correspond to the elimination of ABC renewal in Experiments 1 and 2, in which renewal effects in novel contexts disappeared when context salience during the encoding of initial information was enhanced.

To test these assumptions, participants were presented with either positive or negative information about a target individual, Bob, against a particular background color (e.g., yellow). In a second block, participants were presented with evaluative information of the opposite valence, which was presented against the same background color. Afterward, all participants completed an AMP (Payne et al., 2005) to assess automatic evaluations of Bob against the background color of the two learning blocks (e.g., yellow) and a novel background color that has not been part of the learning task (e.g., blue). Context salience during the first learning block was manipulated with the same context priming task used in Experiment 1.

Method

Participants and design. One-hundred and twenty-eight undergraduates (81 women, 47 men) participated for research credit. The experiment consisted of a 2 Primed Context Salience (low vs. high) $\times$ 2 Valence Order (positive-negative vs. negative-positive) $\times$ 2 Context During Learning (yellow vs. blue) $\times$ 2 Context During Measurement (yellow vs. blue) mixed-model design, with the first three factors varying between subjects and the last one varying within subjects. Data from 2 participants who reported knowing the meaning of the Chinese ideographs used in the AMP were excluded from the analyses.

Procedures and measures. The context priming task was identical to the one used in Experiment 1. The evaluative learning task was also identical to the one used in Experiment 1, the only difference being that the background color was the same during the two learning blocks. Half the participants were shown the positive

and negative statements about Bob against a yellow background; the remaining half were shown the same information against a blue background. Automatic evaluations were again assessed with Payne et al.'s (2005) AMP. The AMP was almost identical to the one used in Experiment 1, the only difference being that we limited the background colors during the presentation of the primes to yellow and blue. Thus, for participants who saw the evaluative statements about Bob against a yellow background, the yellow background represented the learning context and the blue background represented the novel context. Conversely, for participants who saw the evaluative statements about Bob against a blue background, the yellow background represented the novel context and the blue background represented the learning context. The AMP included a total of 80 trials, with 20 trials for each of the four prime categories (i.e., Bob-yellow, Bob-blue, unknown-yellow, unknown-blue).

Results

Main analyses. The data were aggregated according to the procedures outlined in Experiment 1. The resulting scores were submitted to a 2 Primed Context Salience (low vs. high) $\times$ 2 Valence Order (positive-negative vs. negative-positive) $\times$ 2 Context During Measurement (learning context vs. novel context) mixed-model ANOVA, with the first two variables as between-subjects factors and the third variable varying within-subjects. This analysis revealed a significant two-way interaction of valence order and context during measurement, $F(1, 122) = 12.31$, $p = .001$, $\eta_p^2 = .092$, which was qualified by the predicted three-way interaction of valence order, context during measurement, and primed context salience, $F(1, 122) = 3.95$, $p < .05$, $\eta_p^2 = .031$. To specify this three-way interaction in terms of our hypotheses, we conducted separate 2 Primed Context Salience $\times$ 2 Valence Order ANOVAs for each of the two contexts during the measurement of automatic evaluations.

For automatic evaluations in the original learning context (see Figure 4, left panel), the analysis revealed only a significant main effect of valence order, $F(1, 122) = 5.50$, $p = .02$, $\eta_p^2 = .043$. Specifically, participants showed more favorable evaluations of Bob when they first saw negative information and then saw positive information about Bob than when they first saw positive information and then saw negative information. It is important that the two-way interaction of primed context salience and valence order was not statistically significant, $F(1, 122) = 0.03$, $p = .87$, $\eta_p^2 < .001$. These results indicate that the counterattitudinal information in the second learning block effectively determined automatic evaluations in the original learning context, and this influence was independent of whether context salience during the first learning block was high or low. These results correspond to the occasion setting function of the second learning context in Experiments 1 and 2, which remained intact when context salience was enhanced during the encoding of initial information.

For automatic evaluations in the novel context (see Figure 4, right panel), the analysis revealed a significant two-way interaction of valence order and primed context salience, $F(1, 122) = 4.00$, $p < .05$, $\eta_p^2 = .032$. When context salience during the first learning block was low, participants showed more favorable evaluations when the first information about Bob was positive than when it was negative, $F(1, 39) = 7.19$, $p = .01$, $\eta_p^2 = .156$. This pattern

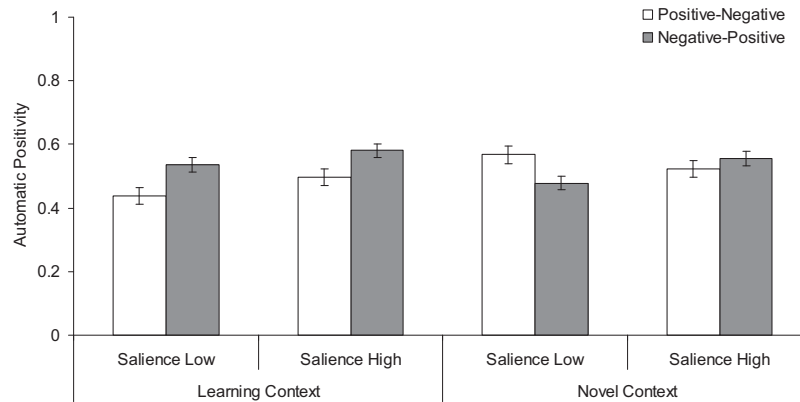


Figure 4. Automatic evaluations as a function of valence order (positive–negative vs. negative–positive), priming of context salience before the first learning episode (salience low vs. salience high), and context during the measurement of automatic evaluations (learning context vs. novel context) in Experiment 4 (error bars depict standard errors).

reflects the notion of AAB renewal, such that automatic evaluations in a novel context reflected the valence of the initially acquired information, even though automatic evaluations in the original learning context were effectively determined by the subsequently acquired, counterattitudinal information. As predicted, however, AAB renewal was limited to conditions in which context salience during the first learning block was low. When context salience during the first learning block was high, AAB renewal effects disappeared, such that automatic evaluations did not differ as a function of the valence of the information during the first learning block, $F(1, 83) = 0.72$, $p = .40$, $\eta_p^2 = .009$.

Supplementary analyses. To investigate whether these effects are unique to the target individual, Bob, automatic evaluations of unknown individuals were submitted to the same 2 Primed Context Salience $\times$ 2 Valence Order $\times$ 2 Context During Measurement ANOVA. This analysis revealed a marginally significant two-way interaction of context salience and context during measurement, $F(1, 122) = 2.84$, $p = .09$, $\eta_p^2 = .023$, indicating that automatic evaluations of unknown individuals tended to be more favorable in the learning context, compared with the novel context, when context salience was high ($M = .56$ vs. $M = .52$, respectively), $F(1, 83) = 4.41$, $p = .04$, $\eta_p^2 = .050$, but not when it was low ($M = .52$ vs. $M = .53$, respectively), $F(1, 39) = 0.35$, $p = .56$, $\eta_p^2 = .009$. The critical three-way interaction was not statistically significant, $F(1, 122) = 0.40$, $p = .53$, $\eta_p^2 = .003$. No other main or interaction effect reached statistical significance ($F_s < 1.52$, $p_s > .22$). Again, none of these effects corresponds to the notion of evaluative binding, according to which the learning context should become directly associated with the valence of the second learning block. However, the results are consistent with the assumption that automatic evaluations of the target individual, Bob, are modulated by the occasion setting function of the second context (Bouton, 1994). Note, however, that this conclusion is again based on the interpretation of a null effect and should therefore be treated with caution.

Discussion

By providing the first evidence for AAB renewal in human evaluative learning, Experiment 4 indicates that objective contin-

gencies between valence and contextual cues are not required for the formation of contextualized representations. In line with the notion of AAB renewal, automatic evaluations of a target person reflected the valence of initially acquired information about that person when participants learned evaluatively incongruent information in the same Context A and were then exposed to that person in another Context B. However, consistent with our predictions, AAB renewal emerged only when context salience during the initial learning episode was low, not when it was high. Moreover, automatic evaluations in the original learning context were consistent with the valence of the most recently acquired information, irrespective of context salience. These results indicate that the proposed learning mechanisms can produce context-dependent automatic evaluations even if there is no contingency between valence and context during learning. Similar to attentional interpretations of illusory correlation effects (e.g., Hamilton & Gifford, 1976), we argue that exposure to expectancy-violating counterattitudinal information enhances attention to momentarily available context cues, and this increase may occur regardless of whether these cues do or do not have a predictive relationship with the valence of the target (for related evidence, see Risen, Gilovich, & Dunning, 2007). As a result, these cues will be integrated in a contextualized representation even if there is no objective contingency between valence and context.

General Discussion

Our main goal in the present research was to test a representational account of generalization versus contextualization effects in evaluative learning that specifies the conditions under which automatic evaluations reflect (a) initially acquired information, (b) subsequently acquired, counterattitudinal information, or a (c) mixture of both. Inspired by contemporary models of animal learning (e.g., Bouton, 2010; Rosas & Callejas-Aguilera, 2007), the main proposition of this account is that the formation of contextualized representations, versus context-free representations, depends on perceivers' attention to momentarily available context cues during the encoding of evaluative information. Given that attention to context cues is typically low during the encoding of initial information about a target object but is enhanced by exposure to expectancy-violating counterattitudinal in-

formation, initial experiences tend to be stored in context-free representations, whereas counterattitudinal experiences are usually stored in contextualized representations. As a result, automatic evaluations should reflect the valence of counterattitudinal information only in the context in which this information was learned (occasion setting). However, automatic evaluations should reflect the valence of initial experiences when the target is encountered either in the initial learning context (ABA renewal) or in a novel context (ABC renewal). The current studies support these assumptions, further showing that (a) the impact of initial experiences was reduced for automatic evaluations in novel contexts, but not in the initial learning context, when context salience during the encoding of initial information was enhanced (Experiments 1 and 2); (b) context effects were eliminated altogether when context salience during the encoding of counterattitudinal information was reduced (Experiment 3); and (c) enhanced attention to contextual cues during the encoding of counterattitudinal information produced context-dependent automatic evaluations even when there was no objective contingency between valence and contextual cues (Experiment 4).

Despite the consistency of these findings with our predictions, one may object that none of the current studies included a direct measure of attention as the critical mediator between our experimental manipulations and the observed outcomes, which makes some of our theoretical claims speculative. Even though we agree that a direct measure of attention to context cues would have been helpful to bolster our theoretical interpretation, it is important to note that our predictions were directly derived from our representational account and that these predictions involved novel, rather complex patterns that seem difficult to explain by means of a single, alternative account. In addition, it is worth noting that our assumptions about the role of attention are in line with recent theorizing about renewal effects and occasion setting in animal learning (e.g., Bouton, 2010; Rosas & Callejas-Aguilera, 2007). Nevertheless, future research would be helpful to provide more direct evidence for the proposed role of attentional processes.

Implications for Automatic Evaluation

By specifying the conditions under which automatic evaluations reflect the valence of (a) initially acquired information, (b) subsequently acquired, counterattitudinal information, or (c) a mixture of both, the present research fills an important theoretical gap in the literature on automatic evaluation. A common finding in this literature is that the same object can elicit different automatic evaluations, depending on the context in which it is encountered (e.g., Barden et al., 2004; Roefs et al., 2006; Rudman & Lee, 2002; Wittenbrink et al., 2001). Such context effects are usually explained by the particular associations that are activated in response to the object, such that the same object is assumed to activate different mental associations as a function of momentarily available context cues (for a review, see Gawronski & Sritharan, 2010). However, this explanation may be criticized as circular as long as it does not specify the conditions under which different contexts activate the same or different associations in response to the same stimulus. Our representational account includes precise assumptions about these conditions, and the predictions implied by these assumptions gained strong support in the current studies.

Considering that these predictions imply various conditions under which automatic evaluations should reflect either initially or recently

acquired information, the current research also contributes to the large body of research on primacy and recency effects in attitude formation. Previous studies have shown that the emergence of primacy effects, versus recency effects, depends on a variety of factors, including the degree of cognitive elaboration (e.g., Haugtvedt & Wegener, 1994), chunked versus unchunked presentation formats (e.g., Petty, Tormala, Hawkins, & Wegener, 2001), and the delay between information acquisition and measurement of evaluations (e.g., Webster, Richter, & Kruglanski, 1996). Even though all of these studies were concerned with controlled evaluations rather than automatic evaluations, the current findings add to this literature by showing that automatic evaluations may show either primacy or recency effects depending on (a) perceivers' attention to momentarily available context cues during encoding and (b) the presence, versus absence, of these cues during measurement. The most significant example in this regard is the pattern of results obtained in Experiment 4, in which evaluatively incongruent information was consecutively learned within the same context. In this study, automatic evaluations showed a recency effect when they were assessed in the original learning context but showed a primacy effect when they were assessed in a novel context. Moreover, when attention to the context was enhanced prior to the encoding of initial information, automatic evaluations still showed a recency effect in the original learning context, whereas the obtained primacy effect in the novel context disappeared. Thus, future research on primacy and recency effects may benefit from a consideration of the role of context cues and attentional processes during the encoding of evaluative information. In addition, it would be useful to investigate commonalities and differences between automatic and controlled evaluations and their respective susceptibility to primacy and recency effects under different conditions.

Implications for Learning Theory

In addition to the implications for automatic evaluations, our results provide the first integrative report of ABA, ABC, and AAB renewal in human evaluative learning, supporting the assumption that the results of previous animal studies generalize to humans. Thus, the present results clearly demonstrate the usefulness of animal models for understanding basic processes of evaluative learning in humans. Conversely, the current research contributes to our theoretical understanding of renewal effects by showing that attentional processes play a significant role for the emergence of ABA, ABC, and AAB renewal. On the basis of animal studies, Bouton (1994) proposed the occasion-setting model of renewal in which it is proposed that (a) the second-learned informational value of a target stimulus is signaled by the context in which it was acquired and (b) the signaling capacity of a context cue is independent of its own direct informational value. These two assumptions are most convincingly supported by the AAB renewal effect in Experiment 4. Even when there is no context switch between the two learning episodes, the first-learned information controls the evaluative reactions to the target stimulus in a novel test context, Context B. This means that even when the context cannot acquire informational relevance that would discriminate between the two learning episodes, the second-learned information nevertheless becomes signaled by that context.

The occasion-setting model of renewal describes how contexts are involved in the memory representations of second-learned information, but it does not explain why they become involved. Although Bouton (1994) argued that the context comes into play to disambiguate between the two meanings of the target stimulus, it is difficult to

see how this would work in the AAB renewal effect in which Context A cannot help to disambiguate the valence of the target. The model that we put forward in the current research suggests a different way that contexts may become involved: through changes in the attention to the context (see also Bouton, 2010). In line with this account, our data show that both ABC and AAB renewal were eliminated when attention to contextual cues was enhanced prior to the first learning experience. Arguably, enhanced attention to the context during initial learning promoted the integration of the context in the memory representation of the first learned information, such that it can no longer control evaluative responses in novel contexts. This result suggests that in the typical renewal effect, attention to contextual cues is enhanced by the experience of expectancy-violating information during the second learning episode. Expectancy violation enhances attention to the context, which leads to an integration of that context in a contextualized representation. In fact, when attention to the context was reduced during the encoding of expectancy-violating counterattitudinal information in Experiment 3, context effects on automatic evaluations were eliminated altogether. These results are consistent with previous research on expectancy violation (Roese & Sherman, 2007) and models of associative learning that attribute a critical role to attention (e.g., Pearce & Hall, 1980; see also Rosas & Callejas-Aguilera, 2007).

Implications for Intervention

The present findings also have important implications for interventions that aim at reducing or eliminating undesired evaluative responses. Such interventions may include attempts to reduce prejudice in social psychology (e.g., Rudman, Ashmore, & Gary, 2001), treatment of phobias in clinical psychology (e.g., Teachman & Woody, 2003), or training programs to combat addictions (e.g., Wiers et al., 2006). Even though the learning paradigm used in the present studies was rather "cold" and explicit in the sense that it used abstract, verbal descriptions instead of personal experiences with "hot" affective connotation (e.g., Hardwick & Lipp, 2000; Vansteenwegen et al., 2005), the identified boundary conditions of renewal effects may provide useful information for improving the effectiveness of current interventions. The most important aspect in this regard is the effectiveness of treatments in multiple contexts. Whereas some researchers found that treatments in multiple contexts can prevent relapse (e.g., Gunter, Denniston, & Miller, 1998; Vansteenwegen et al., 2007), other findings suggest that treatments in multiple contexts do not necessarily prevent the emergence of renewal effects (e.g., Bouton, García-Gutiérrez, Zilski, & Moody, 2006). From the perspective of our representational account, one could argue that the effectiveness of any kind of treatment (e.g., extinction, counterconditioning) depends on whether the newly acquired information is integrated into a context-free representation. Because exposure to counterattitudinal information may have a general tendency to enhance attention to contextual cues (Roese & Sherman, 2007), it may be difficult to achieve a context-free representation by means of treatments in a single context. Exposure to counterattitudinal information across multiple contexts may be more effective in this regard because repeated exposure to the same counterattitudinal information in different contexts may reduce attention to the context, thereby promoting the integration of this information in a context-free representation (see Experiment 3). In other words, the crucial factor that determines whether treatments in multiple contexts can prevent relapse is whether attention to these

contexts is indeed reduced over the course of the treatment. To the degree that the contexts are unusual and inherently salient, it might be difficult to reduce attention to these contexts, which in turn may undermine the effectiveness of the treatment. If, however, attention to the context can be reduced by treatments in multiple contexts, the likelihood for renewal effects should be strongly reduced. Future research may help to clarify the role of attentional processes in the emergence of renewal effects after exposure to counterattitudinal information in multiple contexts.

Open Questions and Future Directions

Despite the consistency of the current findings with our account, there are a number of open questions that deserve further scrutiny in future research. An initial question concerns potential inconsistencies with earlier studies that have failed to obtain evidence for context-dependent modulations in evaluative learning (e.g., Baeyens et al., 1996, 1998). Even though we can only speculate about the causes of these differences, there are a number of procedural aspects that may account for the obtained discrepancies. In our view, the most noteworthy difference is that in earlier studies, researchers who failed to obtain evidence for context effects in evaluative learning used self-report measures of controlled evaluations (e.g., Baeyens et al., 1996, 1998), whereas in our studies, we used a sequential priming measure of automatic evaluations. Thus, it seems possible that context effects in evaluative learning are more likely for automatic than for controlled evaluations. This speculation is consistent with research showing similar context effects on other measures of automatic evaluation, such as startle eye blink (e.g., Hardwick & Lipp, 2000).

Even though the focus on automatic evaluations in the present research was primarily inspired by the current debate surrounding the context dependency of automatic evaluations (Gawronski & Sritharan, 2010), it is an interesting question under which conditions our results may generalize to self-reported, controlled evaluations. One possibility is that the presence, versus absence, of an occasion setting context cue influences which information comes to mind most rapidly upon encountering the target object. With increasing delays, however, perceivers may additionally retrieve other information from memory, including information that has been learned in other contexts (cf. Cunningham, Zelazo, Packer, & Van Bavel, 2007; Wojnowicz, Ferguson, Dale, & Spivey, 2009). In this case, the emergence of context effects on controlled evaluations should depend on the weight that is given to the two kinds of information in the course of making a controlled evaluative judgment. To the extent that perceivers give more weight to information that comes to mind easily, compared with information that requires cognitive effort to be retrieved from memory (Schwarz et al., 1991), the current findings may well generalize to controlled evaluations. However, if less accessible information is given equal weight in an integrated judgment that combines all available information, regardless of how rapidly it comes to mind, the context effects obtained for automatic evaluations in the present studies may not generalize to controlled evaluations.

A related question is why initially formed, context-free representations are not contextualized retrospectively once counterattitudinal information is encountered in a different context. After all, it seems possible that perceivers realize that the context of the first learning episode was different when the counterattitudinal information of the second learning episode is encountered in a different context. On the basis of our representational account, we consider such retrospective

contextualization as unlikely, at least for automatic evaluations. In line with the animal models that inspired the present research (Bouton, 2004), our model attributes a central role to encoding-related processes. Specifically, we assume that attention to context cues during the encoding of evaluative information determines whether this information is stored in a contextualized representation or context-free representation (Rosas & Callejas-Aguilera, 2007). It is important that once a context-free representation has been formed, any subsequent information that discounts the generality of this representation can only be added to memory, but it is unlikely to erase the existing, generalized representation (Bouton, 2004, 2010). Hence, when perceivers are faced with counterattitudinal information in a different context, enhanced attention to the context can influence only the encoding of the new, counterattitudinal information; it cannot retrospectively change the representation of information that has already been encoded (for related findings, see Gregg et al., 2006; Wyer, 2010). As a result, automatic evaluations in novel contexts or the original learning context will continue to be determined by the original, context-free representation. Nevertheless, it is certainly possible that perceivers integrate their retrospective insights about the context of initial experiences in controlled evaluative judgments.

Another important question concerns the processes underlying neutral evaluations in novel contexts when context salience during the first learning episode was high (Experiments 1, 2, 4) and when context salience during the second learning episode was low (Experiment 3). From an analytic perspective, such neutral responses may reflect either indifference (i.e., no evaluation at all) or ambivalence (i.e., simultaneous positive and negative evaluation; see Cacioppo & Berntson, 1994). Unfortunately, the AMP used in our studies is not suitable to distinguish between these two possibilities, as it assesses evaluations along a single positive–negative continuum. Even though the AMP seems superior compared with other kinds of sequential priming tasks in terms of its reliability (e.g., Gawronski, Cunningham, LeBel, & Deutsch, *in press*), there are alternative priming tasks that allow a separate assessment of positive and negative responses within the same task (e.g., Fazio et al., 1995). In line with the possibility that the neutral evaluations obtained in our studies reflect ambivalent responses rather than indifference, previous research has shown that the same object can simultaneously activate both positive and negative responses (e.g., de Liver, van der Pligt, & Wigboldus, 2007; Petty et al., 2006). Applied to the present research, the distinction between indifferent evaluations and ambivalent evaluations seems particularly important when comparing cases in which context salience during the first learning episode was high and cases in which context salience during the second learning episode was low. Whereas the former case was assumed to produce two contextualized representations, the latter case was assumed to result in a single context-free representation. Even though it seems reasonable to assume that both positive and negative information becomes activated in novel contexts if this information is integrated in a single, context-free representation (implying an ambivalent response), the situation is more ambiguous when positive and negative information is integrated in two contextualized representations.

One possibility is that both contextualized representations get activated to the same extent, thereby producing an ambivalent response. However, another possibility is that neither of the two contextualized representations gets activated, implying indifference rather than an ambivalent response. In fact, the latter case seems closer to the notion of occasion setting, according to which

the presence versus absence of an occasion setting context cue determines whether a corresponding contextualized representation will be activated. Thus, if neither of the two occasion setters is present (as it is the case for novel contexts), it seems possible that neither of the two contextualized representations will be activated, thereby preventing the experience of ambivalence. Future research with measures that allow a separate assessment of positive and negative responses would be helpful to provide deeper insights into the nature of neutral evaluations in novel contexts when (a) context salience was high during the encoding of initial information or (b) context salience was low during the encoding of subsequent, counterattitudinal information.

A final question concerns the generalization versus contextualization of automatic evaluations in different cultures. There is a large body of cross-cultural research showing that people from Eastern, collectivist cultures tend to pay more attention to the contexts of objects and events, compared with people from Western, individualist cultures (e.g., Masuda & Nisbett, 2001). The current findings imply the interesting possibility that automatic evaluations in Easterners and Westerners may not necessarily differ in terms of their general context sensitivity. Yet, Easterners and Westerners may differ in their susceptibility to ABC renewal. Specifically, individuals from Eastern, collectivist cultures may pay more attention to contextual cues in general and, therefore, form contextualized representations similar to the ones obtained in the current studies when context salience during the first learning episode was high. In contrast, individuals from Western, individualist cultures may pay attention to context cues only after exposure to expectancy-violating counterattitudinal information but not during the encoding of initial information. If these assumptions are accurate, individuals from both Eastern and Western cultures should show the same ABA renewal effects demonstrated in Experiments 1 and 2. In addition, they should show the same occasion setting function of the second learning context, implying a contextual modulation of automatic evaluations for both Easterners and Westerners. However, Easterners should be less likely to show ABC renewal, given that the formation of two contextualized representations should lead to neutral evaluations in novel contexts. Future research comparing the emergence of ABA renewal, ABC renewal, and occasion setting in Eastern collectivist and Western individualist cultures may provide deeper insights into the generalization versus contextualization of automatic evaluations across cultures.

Conclusion

Recently, researchers in various areas of psychology have become interested in the dynamic processes underlying automatic evaluations, showing that automatic evaluations can be highly rigid and difficult to change, highly malleable and easy to change, and highly context dependent. Addressing these disparate findings, we proposed a representational account of generalization versus contextualization effects in evaluative learning. This account not only explains when and why automatic evaluations are sensitive or insensitive to counterattitudinal information and when and why automatic evaluations are context dependent or context independent; it also includes novel predictions about the role of attentional processes for the emergence of renewal effects and occasion setting in evaluative learning, which have been confirmed in the present studies. By moving beyond mere demonstrations of context effects to studying the learning mechanisms that give rise to automatic evaluations, the current research

provides deeper insights into their malleability versus rigidity, which have important implications for any area in which automatic evaluations play a significant role.

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