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Short Communication

Perceiving an exclusive cause of affect prevents misattribution

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ABSTRACT

Affect misattribution occurs when affective cues color subsequent unrelated evaluations. Research suggests that affect misattribution decreases when one is aware that affective cues are unrelated to the evaluation at hand. We propose that affect misattribution may even occur when one is aware that affective cues are irrelevant, as long as the source of these cues seems ambiguous. When source ambiguity exists, affective cues may freely influence upcoming unrelated evaluations. We examined this using an adapted affect misattribution procedure where pleasant and unpleasant responses served as affective cues that could influence later evaluations of unrelated targets. These affective cues were either perceived as reflecting a single source (i.e., a subliminal affective picture in Experiment 1; one's internal affective state in Experiment 2), or as reflecting two sources (i.e., both suggesting source ambiguity). Results show that misattribution of affect decreased when participants perceived affective cues as representing one source rather than two.

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1. Introduction

Evaluations of novel objects, people, or events often occur rapidly and spontaneously (Duckworth, Bargh, Garcia, & Chaiken, 2002). An intriguing question is what determines these rapid and spontaneous evaluations. Sometimes spontaneous evaluations of novel stimuli are determined by the characteristics these novel stimuli share with other, more familiar stimuli (Duckworth et al., 2002; Fazio, 2001; Ruys, Dijksterhuis, & Corneille, 2008). Often however, affective cues in the environment may also influence such evaluations (Murphy & Zajonc, 1993; Niedenthal, 1990; Payne, Cheng, Govorun, & Stewart, 2005; Schwarz & Clore, 1983). For example, we may get introduced to a new colleague right after receiving positive reviews on a manuscript. These positive reviews may influence our spontaneous evaluation of the new colleague. Awareness of the fact that a pleasant or unpleasant affective cue represents a prior, unrelated event plays a role in this respect and has been shown to reduce such misattribution (Lambie, 2007; Murphy & Zajonc, 1993; Schwarz & Clore, 1983, 1996; Tesser, 2000). A critical question, however, arises: Is it enough to be aware that an affective cue is irrelevant to the evaluation at hand, or is it important to perceive a specific source of an affective cue in order to prevent affect misattribution? The present research was designed to disentangle this, and to examine whether clear attribution of affect to an exclusive source is necessary to prevent affect misattribution.

Affect misattribution occurs when people mistake their affective response to a pleasant or unpleasant event for their reaction to a subsequent unrelated event, which influences their evaluations of this unrelated event (e.g., Dutton & Aron, 1974; Jones, Fazio, & Olson, 2009; Murphy & Zajonc, 1993; Payne et al., 2005; Schwarz & Clore, 1983). Accordingly, misattribution of affect is more likely to emerge when the target that one evaluates appears in spatial or temporal proximity to an affective

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stimulus, which leads to an evaluation of the target in line with the pleasantness of this affective stimulus. Among others, this mechanism is clearly demonstrated in the Affect Misattribution Procedure (AMP, Payne et al., 2005), where briefly presented, irrelevant pleasant or unpleasant pictures influence subsequent evaluations of unrelated Chinese symbols.

The effect of proximity on the occurrence of affect misattribution has led to the suggestion that affect misattribution is more likely when confusion exists about the actual source (i.e., the target or some other source) of an affective cue (Payne et al., 2005; Schwarz & Clore, 1996). Recent research directly testing this hypothesis indeed suggests that people tend to misattribute affect that is triggered by an affective prime to an unrelated target in case they perceive the source of affect as unclear (Oikawa, Aarts, & Oikawa, 2011). Specifically, when participants watched a pleasant or unpleasant picture just prior to evaluating an unrelated target, they mistakenly attributed the affective reaction that was triggered by the pleasant or unpleasant picture as resulting from the unrelated target and evaluated the target in line with the pleasantness of the prime. Crucially however, when participants could explicitly ascribe their affective reaction to the pleasant or unpleasant picture because they were asked to consciously evaluate the picture prior to evaluating a target, then affect misattribution no longer occurred. Oikawa and colleagues concluded that affect misattribution may only emerge when the source of an affective cue seems ambiguous.

An alternative way to interpret these results, however, is that conscious evaluations of the pleasant or unpleasant pictures increased awareness in the participants that the affective cues were unrelated to the neutral targets. This alternative explanation is consistent with the view on affect misattribution that was originally advanced by Schwarz and Clore (1983) to explain their classic finding that rainy weather causing negative feelings no longer influenced participants' reported happiness and life satisfaction when their attention was drawn to the rainy weather. They proposed that being aware that one's feelings are unrelated to the judgment at hand is crucial for the reduction of affect misattribution. Specifically, affect misattribution no longer occurred when participants realized that their momentary negative feelings resulting from the bad weather, were irrelevant for judging happiness and life satisfaction (Schwarz & Clore, 1983). Similarly, the studies by Oikawa and colleagues (2011) may have increased participants' awareness that the affective cues were unrelated to the target, as well as the likelihood that they perceived a specific source of these cues. Thus, in these studies two potential preconditions of affect misattribution are confounded.

Therefore the question remains to be answered whether conscious awareness of the fact that affective cues are irrelevant because they reflect another source, is sufficient to reduce affect misattribution to an unrelated target event. Sometimes one may be aware that an affective cue is irrelevant or unrelated, but the exact source of this affective cue seems unclear (Bechara, Damasio, Tranel, & Damasio, 1997; Gawronski & Bodenhausen, 2007; Lieberman, Ochsner, Gilbert, & Schacter, 2001). Indeed, affective cues may arise from multiple sources (Berkowitz, 2000; Schwarz & Clore, 1996): They can reflect one's internal affective state signaling momentary fluctuations in hormonal processes (Aarts & Van Honk, 2009) or interoceptive changes in the body, for example resulting from warmth, thirst, or distension of the bladder (Craig, 2009). In addition to this often short-lived dynamic activation in the internal affective system, affective cues may reflect an affective reaction that is triggered by an external event such as an unexpected sound, a pleasant picture, or an electric shock (Rolls, 2008) or more elaborate cognitive appraisals of an external emotional event (e.g., Frijda, 1988; Lazarus, 1991; Scherer, 1984). Affective cues may also represent observations or simulations of one's own behavior (Bem, 1967; Bosse, Jonker, & Treur, 2008; Kelley, 1967; Laird, 1974; Niedenthal, 2007). For example, producing a smile and observing it in the mirror is likely to elicit pleasant affect.

Considering that conscious awareness of a pleasant or unpleasant affective cue is likely to trigger cognitions about its cause (Bohner, Bless, Schwarz, & Strack, 1988; Kelley, 1973; Weiner, 1985) and that affective cues can represent multiple sources, we propose that the source of affective cues may often be perceived of as ambiguous. The source of an affective cue may even seem ambiguous when one explicitly provides a pleasant or unpleasant response before one encounters a subsequent event, and thus one is aware that one's affective response is unrelated to the evaluation of the subsequent event. We thus suggest that affect misattribution may even emerge when knowing that an affective cue represents another source, unrelated to the target, as long as there are multiple potential sources of the affective cue and the affective cue remains free-floating and unattributed. In other words, when one is not sure where affect comes from or belongs to, affect may be more readily carried over to other unrelated objects (cf., assimilation, Förster, Liberman, & Kuschel, 2008; Schwarz & Bless, 1992). If, however, an affective cue can be attributed to a specific or concrete source (e.g., one's internal affective state, or a clearly specified external event), and therefore it is clear where it comes from, affect misattribution to other unrelated objects should cease.

The goal of the present research, then, was to investigate the role of perceived source ambiguity of affective cues while keeping constant awareness of the irrelevance of affective cues to the evaluation at hand. To this end, we adapted the affect misattribution procedure (Payne et al., 2005), a paradigm wherein affect misattribution typically occurs between affective cues triggered by pleasant or unpleasant pictures presented as primes, and evaluations of neutral Chinese symbols used as unrelated targets. Importantly, affect misattribution emerges in this paradigm even when participants are instructed to rely on their feelings and to ignore the pleasant or unpleasant pictures when they evaluate neutral targets (Payne et al., 2005). We argue that this instruction is likely to increase the salience of multiple, internal and external sources of affect (i.e., their internal affective state, as well as the pleasant and unpleasant pictures used as primes), which amplifies the perceived ambiguity of the source of affect. As a consequence, affect cannot be clearly attributed to one specific source, and misattribution becomes more likely.

In order to test our hypothesis that perceived source ambiguity plays a crucial role in the emergence of affect misattribution, we conducted two experiments using an adapted version of the affect misattribution paradigm. In this adapted misattribution paradigm spontaneous affective responses served as affective cues and Chinese symbols served as unrelated targets. In the experiments, we systematically controlled the perceived ambiguity of the source of participants' affective responses: Participants in the multiple source condition learned that their affective responses may reflect two sources, namely their internal affective state and a subliminally presented pleasant or unpleasant picture. In the single source condition, however, participants learned that their affective responses reflect one exclusive source. They were told that their affective responses either reflect a subliminally presented pleasant or unpleasant picture (Experiment 1), or that they reflect their internal affective state (Experiment 2). We expected that reducing the perceived ambiguity of the source of participants' affective responses by emphasizing one exclusive source would decrease affect misattribution compared to when their affective responses could result from multiple sources.

2. Experiment 1

Participants were told that they would be presented with several sequences of events, each consisting of a pleasant or unpleasant subliminal picture and an unrelated Chinese symbol. They were asked to provide a pleasant or unpleasant response each time a subliminal picture was presented and to indicate the pleasantness of the Chinese symbol that was presented subsequently. Some participants were instructed that the source of each affective response was a pleasant or unpleasant subliminal picture (single source and thus unambiguous), while other participants were told that each affective response resulted from either a pleasant or unpleasant subliminal picture or their internal affective state (multiple sources and thus ambiguous). Importantly, no pleasant or unpleasant subliminal pictures were actually presented, so that participants' affective responses were not affected by the presentation of affective stimuli in either condition. We expected however, that the act of providing a pleasant or unpleasant response itself would serve as an affective cue (Bem, 1967; De Houwer, 2003; Niedenthal, 2007) that could be misattributed (or not) to the unrelated target. Central to our hypothesis, we predicted that affect misattribution from participants' pleasant or unpleasant responses to their evaluations of unrelated Chinese symbols would occur, but only when the source of their affective responses was perceived as ambiguous.

2.1. Method

Forty-nine undergraduates (33 women and 16 men between 18 and 26 years of age [$M = 20.47$, $SD = 2.09$]) participated. They were randomly assigned to the single or multiple source condition. Participants were instructed that they would be exposed to several sequences of events consisting of a subliminal affective picture (sometimes pleasant, sometimes unpleasant) and a briefly presented Chinese symbol. The subliminal affective pictures would be presented so quickly that they could not be consciously perceived. The Chinese symbols would be presented briefly, but long enough to be consciously perceived. As mentioned above, unbeknownst to the participants, no subliminal pictures were actually presented.

Participants in the *single source* condition learned that we were interested in their affective responses in reaction to unconsciously presented pleasant or unpleasant pictures. They were asked to provide a pleasant or unpleasant response each time a picture purportedly had been flashed. The instruction thus suggested that each time a subliminal pleasant or unpleasant picture was presented, this picture was the exclusive source of participants' affective response. Participants in the *multiple source* condition were additionally explained that their affective responses not only reflected their reaction to the subliminal pleasant or unpleasant picture, but could also be influenced by the momentary fluctuations of their own, internal affective state. Thus, the instruction in the multiple source condition suggested that both their internal affective state and a subliminal pleasant or unpleasant picture were sources of their affective responses.

In the task, participants' spontaneous pleasant and unpleasant responses thus served as affective cues and the Chinese symbols served as unrelated targets. In each sequence, a flashing square appeared on the screen to create the impression that a subliminal pleasant or unpleasant picture was presented. Then, participants immediately responded pleasant or unpleasant and, once a Chinese symbol appeared on the screen, whether they liked or disliked the Chinese symbol that was presented. Importantly, as in the original affect misattribution paradigm (Payne et al., 2005) participants were told to ignore their preceding affective responses, and to merely evaluate the pleasantness of the presented symbol.

Specifically, on each of 10 practice trials and 24 experimental trials a flashing square appeared for 150 ms, followed by "mask 1" for 1350 ms, a Chinese symbol for 150 ms, and "mask 2" for 1350 ms. Participants provided a pleasant or unpleasant response during mask 1 and evaluated the Chinese symbol during mask 2. Both types of responses were on dichotomous scales. Importantly, no subliminal pleasant or unpleasant pictures were presented in both conditions.

2.2. Results and discussion

The proportion of pleasant responses in reaction to the flashing square revealed no effect of condition ($M_{single} = .49$, $SD = .17$; $M_{multiple} = .47$, $SD = .13$; $F < 1$), showing that participants were equally likely to respond pleasant or unpleasant in the single and multiple source conditions.

To examine our hypothesis that affect misattribution to evaluations of unrelated events is more likely when one perceives multiple potential sources of an affective cue, we conducted a 2 (condition: single, multiple) between-participants \times 2 (affective response: pleasant, unpleasant) within-participants ANOVA on the proportion of pleasantly evaluated Chinese symbols. This revealed a main effect of affective response, $F(1,47) = 7.07, p < .011, \eta_p^2 = .13$. Importantly, however, this effect was qualified by the expected condition by affective response interaction, $F(1,47) = 4.82, p < .033, \eta_p^2 = .09$. As Fig. 1 illustrates, in the single source condition participants' affective response did not influence the proportion of pleasantly evaluated Chinese symbols ($F < 1$), whereas in the multiple source condition participants' affective response did influence this proportion: Participants more often evaluated unrelated Chinese symbols pleasantly after indicating pleasant rather than unpleasant in response to the flashing square, $F(1,26) = 15.36, p < .001, \eta_p^2 = .37$.

The results show that affect misattribution emerged when participants perceived their spontaneous affective responses as arising from multiple sources (i.e., a subliminal pleasant or unpleasant picture and their internal affective state). However, when the instruction suggested one exclusive, external source of participants' affective responses (a subliminal pleasant or unpleasant picture), affect misattribution no longer occurred.

3. Experiment 2

To increase our evidence for the crucial role of perceived source ambiguity, we conceptually replicated Experiment 1, now removing the perceived external source of affect (i.e., the subliminal pleasant or unpleasant pictures) and focusing on the internal affective state as a single source of affect. Again, we expected affect misattribution to occur only in the multiple source condition, where participants perceived both their internal affective state and subliminal pleasant or unpleasant pictures as sources of affect, and not in the single source condition, where participants assumed their affective responses to arise merely from momentary fluctuations in their internal affective state.

In the task, participants each time provided a pleasant or unpleasant response and then indicated the pleasantness of a Chinese symbol. Similar to Experiment 1, we expected that the act of providing a pleasant or unpleasant response would serve as an affective cue (Bem, 1967; De Houwer, 2003; Niedenthal, 2007) that could be misattributed (or not) to the unrelated target. Beforehand, participants were explained that we were interested in their ability to monitor the momentary fluctuations of their internal affective state. Some participants learned that the only source of their pleasant or unpleasant responses was their internal affective state (single source and thus unambiguous). Other participants learned that pleasant and unpleasant pictures would be unconsciously presented and that both these subliminal pictures and their internal affective state could determine their pleasant or unpleasant responses (multiple sources and thus ambiguous). As in Experiment 1, no pleasant or unpleasant subliminal pictures were actually presented, so that participants' affective responses were not affected by the presentation of pleasant or unpleasant stimuli in either condition.

To test whether participants would indeed indicate momentary fluctuations of affect in this paradigm, and whether our experimental set-up was effective in manipulating the perceived ambiguity of the source of participants' affective responses, we first conducted a pilot study.

3.1. Method

3.1.1. Pilot study

Thirty-two undergraduates (18 women and 14 men, between 18 and 28 years of age [$M = 21.54, SD = 3.06$]) learned that we examined momentary fluctuations in people's affective states. Participants were asked to indicate their sense of pleasantness

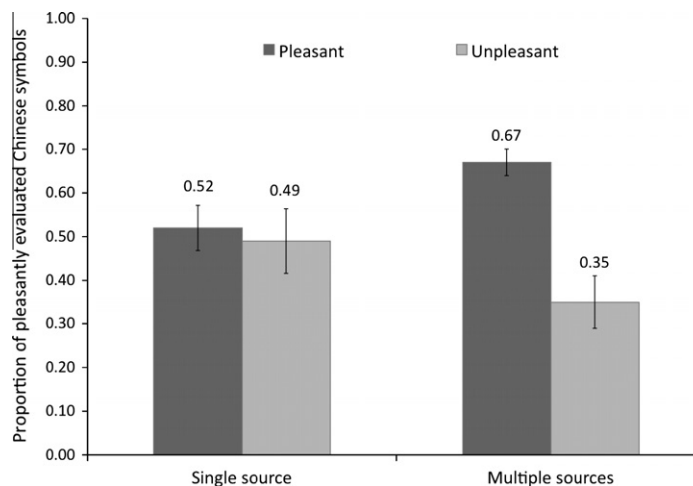


Fig. 1. Proportion and error bars of pleasantly evaluated Chinese symbols as a function of affective response and source ambiguity (Experiment 1).

or unpleasantness each time they received a signal (i.e., a flashing square). They were told that such fluctuations in affect can come and go quickly and they were asked to assess their current, relative sense of pleasantness or unpleasantness each time the signal was presented (see for a similar analysis of the occurrence of short-lived fluctuations of affect, e.g., Van Dillen, Heslenfeld, & Koole, 2009). Thus, participants were encouraged to produce approximately 50% pleasant and 50% unpleasant responses throughout the task while paying close attention to their spontaneous experiences of affect on a moment-to-moment basis.

In the unambiguous, *single source* condition, participants were told that their internal state would cause momentary fluctuations in affect and that they have to try to rely on their internal affective system for providing a pleasant or unpleasant response. Thus, the instruction suggested that their internal affective state was the only source of their affective responses. In the ambiguous, *multiple source* condition, however, participants learned that both fluctuations in their own internal affective state and a subliminal pleasant or unpleasant picture could influence their affective responses. The sometimes pleasant, sometimes unpleasant subliminal picture was supposedly hidden in the flashing square. The instruction thus suggested that their internal affective state *and* a subliminal affective picture were potential sources of their pleasant and unpleasant responses.

Before starting with 24 experimental trials, participants performed 10 practice trials to familiarize themselves with the task. In each trial (ITI = 1.5 s), a flashing square appeared for 150 ms, followed by a pattern mask. Crucially, no subliminal pictures were included in the flashing squares. Each time a flashing square appeared on the screen, participants dichotomously responded as quickly as possible with the pleasant or unpleasant key.

Following this task, participants were probed about the ambiguity of the source of their affective responses. As expected, participants were more clear about what caused their affective responses in the single ($M = 5.31$, $SD = 2.12$) than in the multiple source condition ($M = 2.75$, $SD = 1.95$), $F(1, 30) = 12.66$, $p < .001$. Also, no effect of condition appeared on the proportion of pleasant responses ($M_{single} = .51$, $SD = .08$; $M_{multiple} = .50$, $SD = .10$), $F < 1$. Thus, participants were able to comply with our instructions to provide pleasant and unpleasant responses supposedly reflecting fluctuations in their affective state. Importantly, introducing single versus multiple potential sources reliably manipulated the perceived ambiguity of the source of participants' affective responses, while keeping the number of pleasant and unpleasant responses equal across conditions.

3.1.2. Participants, design, and procedure

In the main experiment, 83 undergraduates (48 women and 35 men, between 18 and 27 years of age [$M = 20.52$, $SD = 1.98$]) participated, who were randomly assigned to the single or multiple source condition. The instructions were identical to the pilot study, while the procedure was identical to Experiment 1.

In the task, participants' pleasant and unpleasant responses served as affective cues and Chinese symbols served as unrelated targets. In each sequence, a flashing square appeared on the screen. Then, participants immediately provided a pleasant or unpleasant response and, once a Chinese symbol appeared on the screen, whether they liked or disliked the Chinese symbol that was presented. Both types of responses were dichotomous. As in Experiment 1, participants were told to ignore their prior affective responses when evaluating a subsequently presented Chinese symbol, and to merely evaluate the pleasantness of the symbol.

3.2. Results and discussion

The proportions of pleasant responses provided in reaction to the flashing square again revealed no effect of condition ($M_{single} = .53$, $SD = .13$; $M_{multiple} = .49$, $SD = .12$; $F < 1$), showing that participants responded pleasant or unpleasant equally often in the single and multiple source conditions.

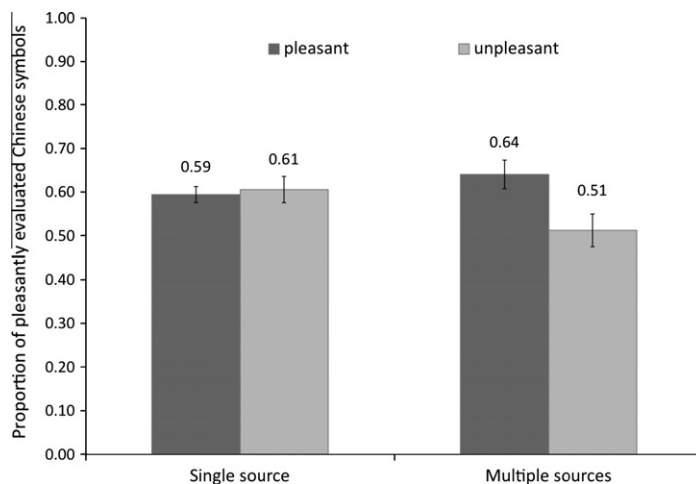


Fig. 2. Proportion and error bars of pleasantly evaluated Chinese symbols as a function of affective response and source ambiguity (Experiment 2).

To examine our hypothesis we then conducted a 2 (condition: single, multiple) between-participants \times 2 (affective response: pleasant, unpleasant) within-participants ANOVA on the proportion of pleasantly evaluated Chinese symbols. As predicted, an affective response by condition interaction emerged, $F(1, 81) = 4.73$, $p < .033$, $\eta_p^2 = .05$. Fig. 2 illustrates that in the single source condition participants' affective response did not affect the proportion of positively evaluated Chinese symbols, $F < 1$. In the multiple source condition participants' affective response did affect this proportion: Participants more often evaluated Chinese symbols pleasantly after responding pleasant rather than unpleasant, $F(1, 81) = 5.52$, $p < .024$, $\eta_p^2 = .12$.

Our results replicate and extend the findings of Experiment 1, showing that affect misattribution emerged for participants who perceived the source of their affective responses as ambiguous (i.e., arising from multiple potential sources), and did not emerge for participants who perceived the source of their affective responses as unambiguous (i.e., arising from a single source).

4. Conclusion

Two experiments show that perceiving a specific source of an affective cue is crucial to reduce affect misattribution: Only when participants viewed affective cues as unambiguous because they believed there was a single, exclusive source of their affect (i.e., a subliminal pleasant or unpleasant picture in Experiment 1 or their internal affective state in Experiment 2) did providing an affective response reduce affect misattribution to subsequent evaluations of unrelated targets. Affect misattribution did emerge, however, even when people perceived their affective response as irrelevant and caused by another source than the target, as long as they viewed the source of affect as ambiguous.

The present findings go beyond previous research on affect misattribution: Whereas previous research seemed to imply that no affect misattribution occurred when participants were aware that affective cues were unrelated to the evaluation at hand (e.g., Murphy & Zajonc, 1993; Oikawa et al., 2011; Schwarz & Clore, 1983), in these studies participants may have perceived one exclusive source of these irrelevant affective cues. In the classic Schwarz and Clore study (1983), for example, participants may have perceived the bad weather as the single source of their negative feelings. Our research goes one step further and systematically disentangles the role of being aware that an affective cue is unrelated to the evaluation at hand, and the role of perceiving the source of the affective cue as ambiguous.

More generally put, our results indicate that it is not always enough to realize that an affective cue is unrelated to the target to be evaluated. One needs to perceive affective cues as reflecting an exclusive source in order to clearly attribute the otherwise free-floating affective cues, and thus to prevent their misattribution to subsequent unrelated targets. In other words, our results imply that affective cues that are not clearly dedicated to a specific and concrete source have the capacity to perpetuate and linger on and thus color evaluations of unrelated events (cf., assimilation Förster et al., 2008; Schwarz & Bless, 1992). This raises the question of how specific the source has to be in order for source ambiguity effects to cease. We suggest the answer to this question is in the eye of the beholder. Objectively, the single and multiple source conditions in the present experiment were identical. It was the mere suggestion of multiple, potential sources of affective responses that critically determined the emergence of affect misattribution. Thus, what seems important for the emergence of affect misattribution is to subjectively experience the source of an affective cue as ambiguous.

The idea that awareness of the specific source of affective cues helps to prevent misattribution of these affective cues to a subsequent unrelated event is consistent with recent research on attention and emotion regulation (Hooper, Davies, Davies, & McHugh, 2011; Lieberman et al., 2007; Nielsen & Kaszniak, 2006; Nyklíček & Kuijpers, 2008; Papiés, Barsalou, & Custers, in press; Wadlinger & Isaacowitz, 2011). Research examining the effects of mindfulness training on coping with spider fear showed for example that focusing one's attention on the source of one's emotions (i.e., a mindfulness instruction) improved emotion regulation (Hooper et al., 2011). In particular, when participants focused their attention on a spider that was sitting underneath a glass, they were more likely to approach the spider and show reduced feelings of anxiety than when they suppressed their thoughts or did not focus their attention on the spider. In a similar vein, facing one's (negative) emotional reactions by putting them into words (i.e., affect labeling) may reduce one's unwanted emotional reactions (Lieberman et al., 2007). Thus, ascribing one's affect to an exclusive cause can be regarded as emotionally intelligent behavior (Goleman, 1995; Salovey & Mayer, 1990) for two reasons: Perceiving a specific source of one's affect not only helps to reduce unwanted emotions and to overcome one's fears, but also prevents attributing one's affect to a wrong source.

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