



When approach motivation and behavioral inhibition collide: Behavior regulation through stimulus devaluation

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ABSTRACT

In the present article a theory is outlined that explains why and when behavioral inhibition alters stimulus evaluations. In addition, some initial evidence is presented that supports the theory. Specifically, results of three experiments show that refraining from responding to stimuli results in devaluation of these stimuli, but only when these stimuli are positive. These findings suggest automatic behavior-regulation, in terms of devaluation of positive stimuli, in situations in which environmental cues triggering approach (because of the positive valence of the stimulus) run counter to situational demands (cues that elicit behavioral inhibition). Relations of the present research to self-perception, cognitive dissonance, and psychological reactance are discussed.

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Introduction

The idea that pleasurable objects spontaneously elicit approach tendencies is ubiquitous in behavioral science. At the same time, it is relatively easy to think of situations in which approach of a pleasurable object is undesired because of situational constraints. In the present research, we theorize about the interplay between stimuli that trigger approach tendencies on the one hand, and environmental cues that instigate behavioral inhibition on the other, and we examine affective consequences of this interaction. We argue that in conflicting situations in which a stimulus is positive (e.g. you see a big glass of beer) while approach is undesirable (e.g. it is not yours) inhibition of the approach reaction will lead to devaluation of the positive stimulus. We tested this prediction in three experiments. Specifically, we tested whether behavioral inhibition elicited by a contextual cue in the presence of a positive stimulus results in devaluation of this stimulus.

Evaluative processes serve to guide behavior (Fazio & Towles-Schwen, 1999; Lang, 1995; Strack & Deutsch, 2004; Winkielman & Berridge, 2004). For instance, participants are more likely to be motivated to pursue a behavior when that behavior is linked to positive affect (Custers & Aarts, 2005). Furthermore, it is easier to physically approach something positive and avoid something negative than vice versa (Chen & Bargh, 1999; Solarz, 1960).

However, even though evaluation may constitute an efficient tool to guide behavior in many situations, it is not always suitable to act accordingly. Specifically, we often encounter situations that contain positive stimuli to which we should not respond because of situational constraints. The question we are concerned with is how we deal with these inherently conflicting circumstances.

Consistent with a number of theories we assume that the valence of stimuli is processed faster or more efficiently than other, non-affective characteristics of stimuli or situations (Anderson & Phelps, 2001; Damasio, 1994; de Gelder, 2006; LeDoux, 1996; Murphy & Zajonc, 1993; Zajonc, 1980). In addition, and in line with the research discussed above, we argue that, upon encountering a stimulus with positive valence, we get ready to respond. Before responding however, the demands of the situation are processed (de Gelder, 2006; LeDoux, 1996). These demands may be consistent (i.e. approach is desirable) or inconsistent (i.e. approach is undesirable) with the positive valence of a stimulus. In the latter case a response conflict arises. Because the desirability of a response concerning a stimulus will ultimately depend on situational constraints and not on the hedonic value of a stimulus, situational constraints will (in most cases) prevail in this conflict and direct behavior by inhibiting approach. The process just described can account for the fact that we do not immediately approach everything that is positive, but only do so when it is appropriate. But how do we proceed after the occurrence of such a response conflict? To prevent permanent freezing, approach, or continuous oscillation between an approach tendency and inhibiting the approach tendency, an addi-

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tional mechanism is required that explains how to move on after encountering such a response conflict.

One mechanism that could solve the response conflict between an approach tendency and subsequent behavioral inhibition, is that, whenever a response conflict arises, negative affect is spontaneously tagged to the approach eliciting stimulus. This negative affect would make the stimulus less desirable, and hence decrease the approach tendency. Support for this idea comes from work on goal priming effects. Specifically, research has shown that pairing an initially desired goal (e.g. socializing) with negative affect ensures that such a goal becomes less desirable and is less likely to elicit goal directed behavior (Aarts, Custers, & Holland, 2007). Thus, negative affect can serve as an inhibitory (or stop) signal to prevent an initially positive stimulus (or goal) from eliciting behavior. So, when behavioral inhibition directed at an approach eliciting stimulus would spontaneously lead to devaluation of this stimulus (i.e. by attaching a negativity tag to it), we would have a powerful mechanism for behavior regulation.

The question now arises whether behavioral inhibition can generate negative affect that can be attached to a positive stimulus. Although there is no direct evidence to this issue, this idea can be supported indirectly. Previous research has namely shown that upon presentation of negative stimuli, behavioral inhibition is instigated, suggesting a direct relation between negative affect and behavioral inhibition (Wilkowski & Robinson, 2006). Other research has shown that there are bi-directional relations between motor programs and evaluative processes. Particularly, research has shown that upon presentation of affective information related motor programs are activated (e.g. Chen & Bargh, 1999), and other research has shown that motor processes (e.g. flexing or extending the arm) can directly affect evaluations of stimuli that are presented during these motor movements (e.g. Cacioppo, Priester, & Berntson, 1993; for an overview see Neumann, Förster, & Strack, 2003). Combining these insights renders the possibility that behavioral inhibition can generate negative affect plausible.

Accordingly, we propose that whenever a response conflict arises between stimuli that trigger an approach reaction and cues that signal that approach is unwanted, behavioral inhibition and the stimuli interact, resulting in adaptive tuning of the valence of stimuli. We call this the Behavior Stimulus Interaction (BSI) theory. This tuning is the result of two interacting processes. More specifically, whenever a positive stimulus is encountered the approach system ensures that we get ready to respond. Because affective information is processed faster than other aspects of stimuli (see above) this approach tendency is always activated first. Next, the demands of the situation are processed. In circumstances where situational cues signal that approach towards the stimulus is unwanted, a response conflict is detected and the response will be inhibited. To solve this conflict then, the positive stimulus is devalued (i.e. negative affect is attached to it) to release the approach tendency, and tune its valence in line with the demands of the situation. As a result, the unwanted stimulus will be evaluated as less positive when it is subsequently encountered compared to a stimulus that did not give rise to a response conflict. (Of course, it may be that under some circumstances, e.g. when the stimulus becomes available again, the devaluation is cancelled.) The process just outlined may be functional because devaluation resulting from inhibition of the approach tendency ensures that a specific positive stimulus that first prompted a behavioral approach tendency will stop doing so, leaving room for other stimuli to take over guidance of behavior (Aarts et al., 2007).

It is important to note that BSI theory pertains to inhibition of approach behavior, and not to avoidance or withdrawal behavior. In accordance with several theories, we view approach

and avoidance as two distinct systems with separate neurological correlates and behavioral repertoires (e.g. Cacioppo, Gardner, & Berntson, 1997; Harmon-Jones, 2004; Lang, 1995; Sutton & Davidson, 1997). In the case of positive stimuli the default response tendency is approach, and behavioral inhibition is inconsistent with this tendency. However, in the case of negative stimuli the situation is less straightforward (Fanselow, 1994). More specifically, negatively valenced stimuli might elicit fight (an approach reaction; see Harmon-Jones, 2004), or avoidance behavior, in the form of flight, or behavioral inhibition (as in freezing; Wilkowski & Robinson, 2006). Consequently, the response tendency that is activated by a negative stimulus is not necessarily inconsistent with behavioral inhibition. Therefore, behavioral inhibition cannot serve the same basic tuning function as it does in the approach system. Hence, we do not expect that withholding a response towards a negative stimulus is sufficient to alter the evaluation of a negative stimulus. Finally, and more on a general level, it can be argued that attaching an affective tag to a stimulus is most effective in the case of positive stimuli, as it is easier to change evaluations of positive stimuli than of negative stimuli (cf. negativity bias; Cacioppo et al., 1997; Shook, Fazio, & Eiser, 2007).

In the present research we do not intend to study all implications of BSI theory, but we aim to test one specific hypothesis. Specifically, we aim to show that presentation of a positive stimulus together with a cue that signals that a response should be withheld, leads to devaluation of the positive stimulus. Furthermore, we expect that such inhibition induced devaluation occurs only with positive stimuli and not with neutral and negative stimuli, albeit for different reasons: In the case of neutral stimuli because there is no response tendency in the first place (and hence withholding a response requires no inhibition), and in the case of negative stimuli because behavioral inhibition is not necessarily inconsistent with negative stimuli, and negative stimuli are more resistant to affective tuning.

Overview of experiments

In all experiments participants first received a go/no-go task. Participants' task was to press the spacebar whenever a go cue was presented, and not to press the spacebar whenever a no-go cue was presented. We manipulated this task in such a way that some stimuli (pictures) were consistently paired with a go cue and other stimuli consistently with a no-go cue. After this task we asked participants to evaluate the stimuli that were consistently paired with a go cue (i.e. the go stimuli), stimuli that were consistently paired with a no-go cue (i.e. the no-go stimuli), and new stimuli that were not shown before. In Experiment 1, using highly positive pictures as stimuli, we hypothesized overall lower attractiveness ratings to no-go stimuli compared to both go and new stimuli. In Experiment 2, we used both highly positive and neutral pictures as stimuli in a within subjects design and hypothesized devaluation of positive no-go stimuli only. Finally, in Experiment 3, employing a between subjects design, we used highly positive and negative pictures and expected devaluation for positive no-go pictures only.

Experiment 1

Methods

Participants and design

Experiment 1 included 33 participants. In all experiments participants were students from Radboud University Nijmegen and received 1 euro (approximately \$1.40) for their participation. We

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