

# Selective attention biases of people with depression: Positive and negative priming of depression-related information

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## Abstract

Selective attention biases are believed to be one of the cognitive vulnerabilities to depression. This study examined two types of attention biases, namely attention facilitation and attention disinhibition, towards mood-congruent words in 40 clinically depressed outpatients and 40 never-depressed healthy controls. Measures were differential reaction time towards neutral and depressive words in the positive and negative priming paradigms that were used to assess attention facilitation and attention disinhibition, respectively. Results showed that the depressed group exhibited enhanced attention facilitation to depressive words relative to neutral words, whereas the control group did not. The differential reduction of reaction time of the depressed group to the previously presented depressive words relative to the previously presented neutral words was greater than that in the control group. On the other hand, both groups showed similar attention disinhibition to depressive words relative to neutral words. The differential increase in reaction time to previously ignored depressive words relative to the previously ignored neutral words was similar in both groups. The above results suggest that major depressive disorder is characterized by attention facilitation by mood-congruent information, but inhibition difficulties in attention to depression-related information is not specific to depressive disorder.

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## 1. Introduction

Selective attention biases may be associated with the vulnerability to developing emotional disturbances (MacLeod et al., 2002). Attention biases involve the disproportionate influence of a preceding stimulus on the processing of the subsequent stimulus. There are

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at least two types of such attention biases: attention disinhibition, which is the difficulty with inhibiting or disengaging attention from the captured stimulus; and attention facilitation, which means that attention to a subsequent stimulus is facilitated once a stimulus has been deliberately attended to. Concerning attention disinhibition, [Bradley et al. \(1997\)](#) suggested that the form of attention bias exhibited by people with depression involves difficulties in disengaging their attention from a negatively valenced stimulus once the stimulus has become the focus of attention. Indeed, people with major depressive disorder were found to be impaired in their performance on tasks of attention inhibition or disengagement, such as an affective shifting task ([Murphy et al., 1999](#)) and an affective negative priming task ([Goeleven et al., 2006](#); [Gotlib et al., 2005](#); [Joormann, 2004](#)), but inconsistently impaired on the emotional Stroop task ([Williams et al., 1997](#)). Concerning attention facilitation in people with depression, the processing of subsequent negatively valenced information was found to be facilitated by preceding negative information in solving anagrams of depression-related words ([Rinck and Becker, 2005](#)), and in the speed and rate of endorsement of subsequent negative trait adjectives ([Power et al., 1996](#)), although people with depression were not found to judge neutral targets that followed as more unpleasant when negative stimuli had been presented ([Koschack et al., 2003](#)).

Despite the diversity of the methods listed above, priming is one of the major cognitive psychology paradigms to examine the effect of preceding stimuli on the processing of subsequent stimuli. In the priming paradigm, the negative priming effect is the slowdown in reaction time to a target stimulus that is either the same as or related to a distracting stimulus that has been ignored on an immediately preceding trial ([Gamboz et al., 2002](#); [Milliken et al., 1998](#)). On the other hand, the positive priming effect or repetition priming effect is the facilitation of the processing of a stimulus or a related stimulus on repeated presentations relative to the initial presentation of the stimulus ([Simons et al., 2003](#)). A typical priming model involves two consecutive displays: the first one is the prime while the subsequent one is the probe ([Tipper, 1985](#)). Two stimuli are presented in each display, one above the other, such that the two stimuli are interleaved. The two stimuli are different in terms of specific features; for example, one is printed red and the other green. Then, throughout the whole experiment, the stimuli in red are always the targets, while the stimuli in green are always the distracters, both in the prime and the probe displays. The participants are asked to identify the red stimuli as quickly and as accurately as

possible. The relations between the prime stimuli and the probe targets define the conditions of interest. In the control condition, both the prime target and the distracter are different from the probe target. In the ignored repetition condition, the prime distracter has the same identity as, or is related to, the probe target. In the attended repetition condition, the prime target has the same identity as, or is related to, the probe target. The negative priming effect is the prolongation of the processing time to the probe targets in the ignored repetition condition, which according to [Tipper \(2001\)](#), measures the inhibition of the ignored stimuli, because the target cues the retrieval of the prior processing trial in which the same stimulus has been ignored, so that the inhibition of that stimulus is reinstated or retrieved. This inhibition results in the slowdown of reaction time to this stimulus, and hence, the negative priming effect. On the other hand, the positive priming effect is the shortening of the processing time to the probe targets in the attended repetition condition, relative to the control condition. [Neely \(1991\)](#) proposed that the prime target automatically activates the related cognitive representation or develops expectancies regarding the recognition of the probe targets, thus resulting in a faster reaction time to the probe target. A disproportionate facilitation of reaction time can then be considered, resulting from an attention bias toward the target information.

Attempts to employ a negative affective priming task (NAP; [Goeleven et al., 2006](#); [Gotlib et al., 2005](#); [Joormann, 2004](#)), modified from the traditional negative priming task, to look into the attention inhibition of negative information by people with depression, have yielded mixed results. In NAP, the stimulus valence is supposed to be responsible for the priming effect, and so the relations between the prime stimuli and the probe target differ in terms of the congruence of the valence, but not necessarily in terms of the semantic identity of the stimuli. For example, [Joormann \(2004\)](#) found that dysphoric participants and participants with a history of major depressive episodes failed to show any negative priming effect in affective evaluation and self-referenced judgment of negative words, although they did show the negative priming effect on positive words. In another study, [Goeleven et al. \(2006\)](#) found that participants with major depressive disorders showed a reduction of the negative priming effect on valence judgment of negative facial expressions relative to never-depressed participants. However, [Gotlib et al. \(2005\)](#) found that dysphoric participants demonstrated a stronger negative priming effect in naming negative words, relative to neutral words, than non-dysphoric participants. Differences in the methodologies used in these studies, particularly when the conditions of

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