

When Pooping Babies Become More Appealing: The Effects of Nonconscious Goal Pursuit on Experienced Emotions

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Abstract

In this report, we argue that the intensity of the emotions people experience is partly determined by the goals they nonconsciously pursue, and that this effect is functional in nature: Emotions are modulated in ways that may increase the probability of goal achievement. To test this hypothesis, we primed female participants with a motherhood goal and then measured their level of disgust in response to mildly disgusting pictures. Priming led to a reduction of disgust in response to goal-relevant stimuli (e.g., pictures of babies with runny noses) but not goal-irrelevant stimuli. This effect was moderated by the women's probability of conception, a proxy of their ability to pursue the motherhood goal.

Keywords

nonconscious goals, priming, emotion regulation, automatic emotion regulation, emotions, motivation, emotional control

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Imagine that during a dinner with the family of your new romantic partner, his or her little nephew generously hands you food right from his mouth. You are not excited, to say the least, yet you accept his repeated offers and take the processed food. Would your desire to impress the family affect how disgusted you felt—even if you were not consciously aware of this desire? We propose that if you nonconsciously desired to impress the family and believed that taking the child's food would help you achieve this goal, the disgust you would normally feel in taking the food would be mitigated. More generally, we suggest that the nature and intensity of experienced emotions are partly determined by people's nonconscious goals, and that this modulation of emotion is functional in nature: It serves to increase the probability of goal achievement.

Emotions and Goal Pursuit

Traditionally, emotions were seen as an obstacle to goal pursuit and self-control (Metcalf & Mischel, 1999). In recent years, however, this view has begun to change. For example, Carver and Scheier (1998) posited that some emotions function as feedback on progress. Other researchers have argued that emotions can directly influence behavior in ways that are compatible with the goals people pursue (e.g., Bechara, Damasio, Tranel, & Damasio, 1997; Frijda, 1986; Tamir, Mitchell, & Gross, 2008). Recently an instrumental view of emotions has been proposed (e.g., Tamir, 2009); according to this view,

under certain circumstances, people prefer one emotion over another because they believe that the preferred emotion will increase their likelihood of achieving a goal. Tamir, Chiu, and Gross (2007) found that this is the case even when people are not consciously aware of the association between the focal emotion and the goal. All of this work suggests that the modal view of goal pursuit and emotions is changing, and that, at least under certain circumstances, emotions may facilitate goal pursuits.

Nonconscious Goal Pursuits

The idea that goals can be activated and pursued nonconsciously has gained considerable empirical support in the past decade (for reviews, see Custers & Aarts, 2010; Fishbach & Ferguson, 2007). The lion's share of the work on nonconscious goal pursuit has focused on the effects of goal priming and ensuing goal pursuit on behavior (e.g., Aarts, Gollwitzer, & Hassin, 2004; Bargh, Gollwitzer, Lee-Chai, Barndollar, &

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Troetschel, 2001; Shah & Kruglanski, 2003). For example, participants primed with a cooperation goal showed signs of nonconscious goal conflict (Kleiman & Hassin, 2011) and exhibited more cooperative behavior in a common-resource dilemma than did participants not primed with such a goal (Bargh et al., 2001). Similarly, participants who were primed with an achievement goal subsequently performed better on word-search puzzles and tasks used to assess executive functions than did participants who were not primed (e.g., Hassin, Bargh, & Zimerman, 2009).

The Current Research

We propose that nonconscious goal pursuits can modulate the experience of emotions elicited by goal-relevant stimuli in ways that may increase the probability of goal achievement. The study we report in this article is an important extension of the research on emotions and goal pursuit and the research on nonconscious goal pursuit. We suggest that the nature of people's emotions depends on the goals they nonconsciously pursue. In other words, we propose a new determinant of emotions that, given the severe limitation in conscious resources, may be an important determinant of human phenomenology.

In our experiment, we investigated the functional role of nonconscious goal pursuit in emotional phenomenology. Two pioneering studies on nonconscious goal pursuit showed that directly priming emotion regulation leads to improved regulation (Mauss, Cook, & Gross, 2007; Williams, Bargh, Nocera, & Gray, 2009). These studies were the first to show that emotion regulation can be nonconsciously primed. However, the fact that the emotion-regulation system can be directly activated by priming does not necessarily mean that nonconscious goal pursuits can also influence the emotion-regulation system. Hence, these previous findings leave open the question of whether nonconscious goal pursuits that stand to benefit from emotion regulation can actually regulate emotions.

To test the effect of nonconscious goal pursuits on emotions, we primed female participants with a motherhood goal and assessed how disgusted they were in response to being shown mildly disgusting pictures that were either goal relevant (e.g., babies with runny noses) or goal irrelevant (e.g., food with bugs in it). It is not uncommon for mothers who are raising newborns to find themselves in mildly disgusting situations, but disgust in response to these situations may hamper the pursuit of a motherhood goal. Hence, we hypothesized that the subtle activation of a motherhood goal would decrease disgust in response to goal-relevant baby pictures, but not goal-irrelevant pictures.

For nonconscious goal pursuits to be fully functional and efficient, the effect of goal priming should be evident only when the goal is applicable (see Higgins, 1996). We assessed goal applicability by estimating participants' fertility. Degree of fertility has been previously found to affect various goal-related cognitions (e.g., preference for masculine men; Gangstad, Simpson, Cousins, Garver-Apgar, & Christensen,

2004). If, as we hypothesized, the effects of nonconscious goal pursuit on emotions are functional, then our priming manipulation should have a stronger effect on women in the fertile phase of their menstrual cycle than on women in the nonfertile phase of their menstrual cycle.

Method

Participants

Ninety female undergraduates at The Hebrew University (mean age = 22 years) participated in the experiment. Two participants who were pregnant, 3 who had irregular menstrual cycles, 9 who did not report the date of the onset of their last period, 30 who reported using birth control pills,¹ and 4 who left the experiment before it had ended were excluded from analyses.

Procedure

Participants were informed that the experimental session consisted of two ostensibly unrelated experiments (see, e.g., Bargh et al., 2001). They first completed a word-search task (goal priming) and then an emotion task. After completing both tasks, participants were thoroughly debriefed.

Goal priming. In the word-search task, participants searched for 13 target words embedded in a 10 × 10 array of letters (Bargh et al., 2001). In the goal-priming condition, the set of target words included 7 words that participants in a pilot test had rated as strongly associated with motherhood (*motherhood, kids, caring, family, feminine, giving, and responsibility*). In the control condition, these words were replaced by goal-neutral words (e.g., *carpet, diamond*).

Emotion task. Stimuli in the emotion task included 50 pictures drawn from the International Affective Picture System (Lang, Bradley, & Cuthbert, 1999) and various Internet sources. Goal-relevant stimuli were 15 pictures of babies that included elements that elicit mild disgust (e.g., runny noses, dirty diapers). Goal-irrelevant stimuli were 35 mildly disgusting pictures of things unrelated to babies (e.g., ugly animals, dirty toilets).

The pictures were presented to participants one at a time for 3 s each. After viewing each picture, participants were asked to rate the degree to which it elicited disgust, using a 9-point scale from 1, *not at all*, to 9, *to a great extent*.

Fertility, goal commitment, and awareness. Fertility was assessed using a standard 28-day model of female menstruation. On the basis of self-reports about the date of the onset of their previous menstrual cycle, participants were divided into high-fertility (Days 6–14) and low-fertility (Days 0–5 and 15–28) groups (e.g., Little, Jones, & Burriss, 2007; Penton-Voak et al., 1999). The mean number of days since the onset of menstruation for participants in the high-fertility group was

9.45 ($SD = 2.5$). Participants were also asked to report on whether they were using an oral contraceptive.

We assessed participants' goal commitment by giving them a list of goals and asking them to rate the degree to which each was important to them, relative to other goals. Ratings were made on a 9-point scale from 1, *not important at all*, to 9, *very important*. The critical goal, embedded in a list of unrelated goals, was "to establish a family."

Finally, we examined whether participants had any suspicion regarding the priming manipulation by asking them to speculate, in their own words, on "the purpose of the experiment."

Results

Awareness and explicit motivation

There were no significant differences in goal commitment between the two conditions, $t < 1$. Furthermore, none of the participants expressed suspicion regarding the priming manipulation or correctly guessed the nature of the experiment. To further examine the awareness of the participants, we reanalyzed the data using explicit goal commitment as a covariate, thereby partialing out the variance associated with conscious goal pursuit (see Kleiman & Hassin, 2011). This procedure did not change the pattern of the results. We therefore conclude that priming did not lead to noticeable phenomenological differences and that goal pursuit was largely nonconscious.

Experienced emotions

We analyzed the intensity of disgust using a repeated measures analysis of variance with priming condition (goal priming vs.

control) and fertility (high vs. low) as between-subjects factors and picture relevance (goal relevant vs. goal irrelevant) as a within-subjects factor. The analysis yielded a significant three-way interaction, $F(1, 36) = 5.35, p < .05, \eta^2 = .13$ (see Fig. 1). In the following paragraphs, we report separately the results for the goal-relevant stimuli and the goal-irrelevant stimuli.

As hypothesized, for the goal-relevant stimuli, we found a significant two-way interaction between fertility and priming condition, $F(1, 36) = 10.62, p < .002, \eta^2 = .23$. Crucially, in the high-fertility group, disgust was weaker among participants who were primed with a motherhood goal than among participants who were not primed, $t(36) = 2.66, p < .05, \eta^2 = .21$. Priming led to an increase in disgust in the low-fertility group, $t(36) = 1.9, p < .05, \eta^2 = .21$; this unhypothesized effect suggests that when a primed goal is inapplicable, negatively valenced goal-related content is viewed more negatively. The main effects of fertility and priming condition did not reach significance, $F_s < 1, \eta^2_s < .025$.²

As expected, we found a different pattern of results for the goal-irrelevant stimuli. In this case, disgust ratings were affected neither by priming condition nor by its interaction with fertility, $F_s < 1, \eta^2 < .015$.³ A significant effect of fertility emerged, $F(1, 36) = 4.45, p < .05, \eta^2 = .11$; participants in the low-fertility group tended to be more disgusted than participants in the high-fertility group. We had no hypotheses regarding this effect, and view it as matter for future research.

Note that even participants who had not been primed with the motherhood goal found goal-relevant stimuli less disgusting than goal-irrelevant stimuli ($M = 3.9, SD = 1.69$, and $M = 5.52, SD = 1.66$, respectively), $t(18) = 3.67, p < .005$. Thus, the effects of priming may have been related to the intensity of the emotional experience rather than to goal relevance. To address this alternative explanation, we divided the

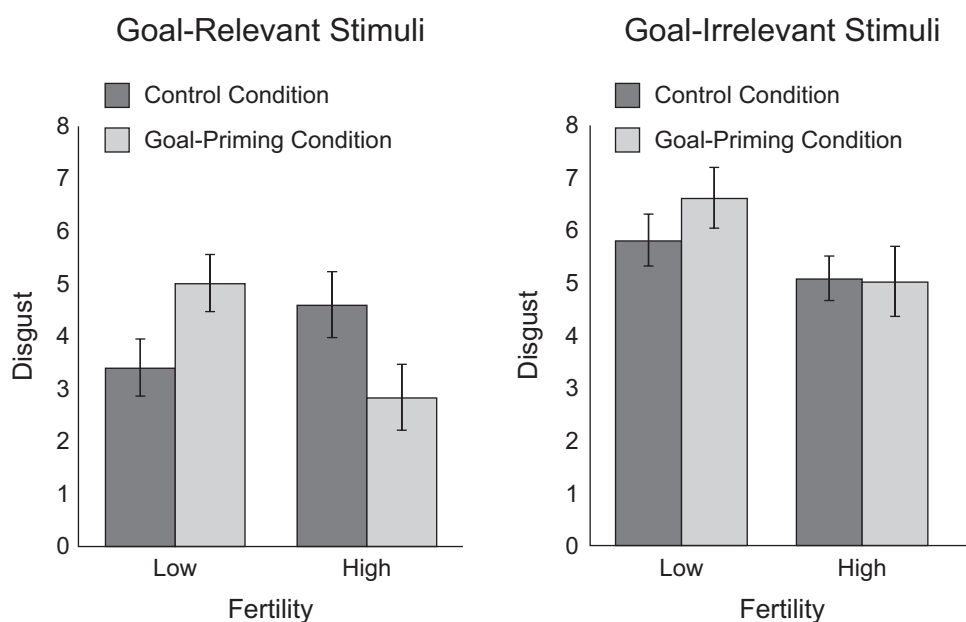


Fig. 1. Mean ratings of disgust in response to goal-relevant (left panel) and goal-irrelevant (right panel) stimuli as a function of priming condition and fertility. Error bars show standard errors of the mean.

goal-relevant stimuli into a set of low-intensity stimuli and a set of high-intensity stimuli (based on a median split of the ratings of the control group). We then examined the effect of fertility (high vs. low) and priming condition (goal priming vs. control) within each of these sets. We found significant interactions for both the low- and the high-intensity stimuli ($ps < .01$). The average disgust in reaction to the low-intensity stimuli was no different from the average disgust in response to the goal-irrelevant stimuli ($p = .15$). Our findings thus speak strongly against the alternative explanation suggested at the beginning of this paragraph.

Discussion

The type and intensity of emotions people experience and express play an important role in their ability to adapt. Most research on emotion regulation has focused on deliberate and direct processes, with participants being explicitly asked to modulate their emotions (see Gross, 1998, for a review). However, people can simultaneously pursue multiple goals, each with unique emotional demands. Given that consciousness has severely limited resources (Kahneman, 1973), an adaptive and efficient mechanism for emotion regulation should be able to operate automatically and flexibly, monitoring and modulating only those emotions that are associated with one's goals. Our findings suggest that such a mechanism exists: Nonconscious goal pursuits can modulate goal-relevant emotions, and they can do so without conscious awareness.

How do nonconscious goal pursuits affect emotional phenomenology? Two possible mechanisms have been proposed. Bargh (1990) and Kruglanski (1996) argued that nonconscious goal pursuits operate via established networks of mental associations. According to this account, goal priming might lead to decreased activation in phenomenological nodes in this network. Hassin et al. (2009), however, proposed that nonconscious goal pursuits can recruit working memory and executive functions. According to this account, the suppression of phenomenology by goals is more active and effortful than the process proposed by traditional theories of nonconscious goal pursuit. Given that our task required emotion regulation, we believe the model proposed by Hassin et al. is more feasible.

A core tenet of our argument is that for goal priming to work, goals must be applicable. But how does biological readiness to conceive translate into applicability of a cognitive goal? One possible answer is that the biological underpinnings of increased fertility translate into conscious phenomenology of fertility, thereby making motherhood an applicable goal. Alternatively, the biological bases may translate into implicit readiness to conceive, leaving no trace in phenomenology. We did not measure subjective fertility and know of no prior literature that addresses the correlations between phenomenology and biology in this realm. Hence, this question is left for future research.

The findings from our investigation of nonconscious goals and their effects on emotions not only extend the existing literature on nonconscious goal pursuit, but also suggest a novel

determinant of emotions. Learning which goals people non-consciously pursue may thus help to explain why people experience the emotions they do, and may allow for the prediction of their future emotional responses.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Notes

1. Excluding women taking oral contraceptives is customary in studies such as ours because birth control pills artificially raise hormone levels (e.g., Fleischman, Fessler, & Navarrete, 2010). It is important to note that including these women in the analyses did not change the pattern of the results.
2. Analyses in which we included all the women who were taking oral contraceptives in the low-fertility group yielded similar patterns of results: a significant interaction between fertility and priming condition for goal-relevant stimuli, $F(1, 64) = 4.2, p < .045$, but not for goal-irrelevant stimuli, $F < 1$.
3. Analyzing the data for each stimulus separately revealed a significant interaction between priming condition and fertility for 60% of the goal-relevant stimuli and none of the goal-irrelevant stimuli.

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