

Evaluating Eve: Visceral States Influence the Evaluation of Impulsive Behavior

Loran F. Nordgren, Joop van der Pligt, and Frenk van Harreveld
University of Amsterdam

Impulsive behavior is a common source of stigma. The authors argue that people often stigmatize impulsive behavior because they fail to appreciate the influence visceral impulses have on behavior. Because people tend to underestimate the motivational force of cravings for sex, drugs, food, and so forth, they are prone to stigmatize those who act on these impulses. In line with this reasoning, in 4 studies, the authors found that participants who were in a cold state (e.g., not hungry) made less favorable evaluations of a related impulsive behavior (impulsive eating) than did participants who were in a hot state (e.g., hungry). This empathy gap effect was tested with 3 different visceral states—fatigue, hunger, and sexual arousal—and was found both when participants evaluated others' impulsive behavior (Studies 1 & 2) and when participants evaluated their own impulsive behavior (Study 3). Study 3 also demonstrated that the empathy gap effect is due to different perceptions of the strength of the visceral state itself. Finally, Study 4 revealed that this effect is state specific: Hungry people, for example, evaluated only hunger-driven impulses, and not other forms of impulse, more favorably.

Keywords: affect, self-control, impulsive behavior, stigma, empathy

The human body contains a finely tuned system that provides information about the state of the body and that directs behavior toward satisfying bodily needs. For example, people experience hunger when they require nourishment, thirst when they are dehydrated, and fatigue when they are sleep deprived. Visceral states such as these are a feature of daily experience and exert a substantial influence on behavior.

Unfortunately, the influence visceral states exert on our behavior is often in conflict with, and can ultimately undermine, our intentions. People eat cake when they want to lose weight, sleep in when they intend to get an early start, and continue to smoke cigarettes despite their resolution to quit. These are examples of impulsive behavior, as they reflect actions that serve short-term cravings at the cost of long-term goals.

Besides the adverse health consequences of impulsive behavior, such actions often have equally adverse social consequences. Most religious and moral doctrines require people to resist their impulses and punish those who fail to do so. Eve was condemned for eating the forbidden fruit, and Aesop's grasshopper starved because it spent the summer in idle indulgence. Today, impulsive behavior remains a common source of stigma (Crocker, Major, & Steele, 1998). Beliefs about drug addicts, problem gamblers, and alcoholics are overwhelmingly negative (Crandall, 1994). This is perhaps most evident in the case of obesity. Puhl and Brownell (2001) examined discrimination toward obese people in the areas of employment, education, and health care. They found that 28%

of teachers believed that becoming obese is the worst thing that can happen to a person; 24% of nurses felt repulsed by obese persons; and parents provided less college support for their overweight children than for their thin children.

Although it is clear that impulsive behavior is stigmatized, it is less clear why this is the case. After all, impulsive behavior is extremely common—the majority of people will at some point in their lives struggle with obesity or drug addiction. In addition, there is ample evidence that impulsive behavior is as much a product of situational factors as it is a consequence of personal choice—both obesity and alcoholism, for example, have been widely acknowledged to have a strong genetic basis (Stunkard et al., 1986). Along these lines, the medical community has adopted the concept of impulsiveness as an illness as opposed to impulsiveness as a moral failing (Crisp & Gelder, 2000)—in effect decreasing the personal responsibility for impulsive behavior. These factors would suggest that people might find it easier to empathize with impulsive behavior than it seems that they generally do. So why, then, are people so prone to stigmatize impulsive behavior? In our view, people's tendency to stigmatize those who act on their impulses is fundamentally linked with the visceral states that drive impulsive behavior.

Emotional Perspective Taking

In numerous studies, it has been found that people often have tremendous difficulty estimating the influence that visceral states have on the behavior of themselves or others. Specifically, when people are in a visceral or *hot* state, they tend to appreciate the influence of future or past hot states, whereas people in a neutral or *cold* state chronically underestimate the impact of past and future hot states (Loewenstein, 1996).

For example, Nisbett and Kanouse (1968) asked grocery shoppers to rate when they last ate and to predict how much food they

Loran F. Nordgren, Joop van der Pligt, and Frenk van Harreveld, Department of Social Psychology, University of Amsterdam, Amsterdam.

Correspondence concerning this article should be addressed to Loran F. Nordgren, Department of Social Psychology, Universiteit van Amsterdam, Roetersstraat 15, 1018 WB Amsterdam, the Netherlands. E-mail: l.f.nordgren@uva.nl

intended to purchase. They found that, compared with satiated shoppers, hungry shoppers tended to purchase more food than they had anticipated. In another study, people were asked how they would feel if they were lost in the forest without food or water (Van Boven & Loewenstein, 2003). People reported their reactions immediately before or after vigorous exercise. Those who had yet to exercise reported wishing they had brought additional food, whereas people who had exercised, and thus were presumably dehydrated, reported wishing they had brought additional water. In a study designed to test the impact of sexual drive, men were shown pornography and were asked to estimate the likelihood that they would engage in sexually aggressive behavior (Loewenstein, Nagin, & Paternoster, 1997). In line with the previous studies, men who were sexually aroused predicted that they would be more likely to engage in sexually aggressive behavior than men who were not aroused. In each of these studies, people in a cold state (i.e., not hungry, not thirsty, or not sexually aroused) underestimated the influence of a future hot state (i.e., feeling hungry, thirsty, or sexually aroused), whereas people in a hot state made more accurate predictions about the influence of future hot states.

This general finding has important implications for how people might evaluate failed impulse control. A recurring finding in empathy research is that the ability to appreciate another person's situation is crucial for fostering empathy (Eisenberg & Miller, 1987). Along these lines, we argue that if people cannot appreciate the considerable power of impulse, they will likely explain impulsive behavior in terms of some other nonvisceral cause. Given what we know from attribution research, such an explanation is likely to emphasize stable personality characteristics, such as a deficit of self-discipline (Gilbert & Malone, 1995; Ross, 1977). For example, in hearing of a colleague who has had an affair, people will, unless aroused themselves, be unable to appreciate the motivational force of sexual arousal and will not realize how that impulse would have guided their behavior. Instead, they may conclude that the colleague's affair is a sign of a serious character flaw.

Support for this reasoning came from a study by Nordgren, van der Pligt, and van Harreveld (2006), in which participants read a vignette about a student who attributed his poor performance on an academic test to a visceral state—fatigue. Afterward, participants were asked to judge for themselves what factors they thought contributed to the student's performance. Crucially, prior to the study, half the participants were made fatigued through a strenuous mental exercise. Nordgren et al. (2006) found that participants who made their attributions in a cold state (i.e., not fatigued) underestimated the influence of fatigue on the student's performance relative to participants who made their attributions in a fatigued state. Instead, nonfatigued participants explained the student's performance in terms of stable, internal attributions, such as motivation and study skills.

One potential implication of this finding is that if nonfatigued participants have difficulty appreciating the influence of fatigue, they may have little tolerance for those who fail to regulate their fatigue-driven behavior. That study, however, had no clear evaluative component. As such, it remains to be seen whether the inability or ability to appreciate the motivational force of cravings for food, drugs, sex, and so forth impacts people's evaluations of impulsive behavior. This issue is taken up in the present studies.

The Present Studies

In four studies, we examined the idea that how people evaluate instances of failed impulse control depends on their own current visceral state. Specifically, we predicted that people who were in a hot state (e.g., hungry) would evaluate impulsive behavior (e.g., binge eating) more favorably than would people who were in a cold state. This prediction was tested with three visceral states that are frequent triggers of impulsive behavior—fatigue, hunger, and sexual arousal. In the first two studies, this prediction was tested in an interpersonal context—participants evaluated the impulsive behavior of others. However, because cravings are transient (even heavily using drug addicts are not in a constant state of craving), this prediction is relevant in an intrapersonal context as well. In Study 3, participants evaluated an instance of their own past impulsive behavior. In this study, the mechanism that drives this effect was also examined. We tested our predictions that people in a hot state would perceive visceral states to be more difficult to overcome than would participants in a cold state and that these differences in control would mediate the effect of visceral state on the evaluation of impulsive behavior. In Study 4, we examined the boundaries of this effect by testing whether being in a hot state only influences evaluations of behavior driven by a corresponding impulse (e.g., hungry and impulsive eating) or whether being in one hot state impacts one's perceptions of behavior driven by other visceral states (e.g., hungry and sexual arousal).

Each study follows a similar format. Participants were brought into a visceral state (or not), read about or viewed an instance in which someone acted impulsively, and then evaluated that impulsive behavior. To capture the kind of stigma that is often associated with impulsive behavior, we used three sets of measures to evaluate impulsive behavior—general evaluations, emotions (i.e., compassion and contempt), and similarity ratings (e.g., the Inclusion of Other in the Self Scale; Aron, Aron, & Smollan, 1992). For each study, we expected a hot–cold empathy gap effect, whereby participants in a hot state would form more positive evaluations, feel more compassion and less contempt, and judge themselves to be more similar to an impulsive other than would people in a cold state.

Study 1

The goal of this first study was to examine whether people's perception of impulsive behavior depends on their current visceral state. We tested this notion in the context of fatigue-induced aggression. Fatigue is a very common visceral state, which is also a frequent trigger of aggressive behavior (Grandley, Dicktor, & Sin, 2004). Participants read a vignette about a very fatigued woman who resorts to racial slurs during a disagreement with another person. We expected participants to find this behavior unacceptable. However, we predicted that participants who were themselves fatigued would have more favorable evaluations of the woman's behavior than would people who were not fatigued.

An additional goal of this study was to test the strength of this effect. Loewenstein (1996) has argued that people in a cold state have great difficulty appreciating what it is like to be in a hot state. Even the motivation to accurately estimate the influence of past or future hot states does little to correct their estimates (Nordgren et al., 2006). This is thought to be due to the inability to freely recall

visceral experiences. That is, though people can recall the circumstances that led to a visceral drive (e.g., I was hungry because I did not eat all day) and recall the relative strength of a visceral drive (e.g., That was the hungriest I have ever been), they cannot freely bring forth the sensation of hunger itself. In line with this thinking, we expected that reminding nonfatigued people of the influence of fatigue would not increase the favorability of their ratings.

To address these goals, this study contained three conditions: fatigued, nonfatigued, and imagined fatigue. The imagined fatigue condition was identical to the nonfatigued condition, except that participants in the imagined fatigue condition were instructed to make their evaluations as if they were themselves fatigued. We predicted that fatigued participants would have more favorable evaluations of fatigue-induced, impulsive behavior than would both participants who were not fatigued and participants who tried to make judgments as if they were fatigued.

Method

Participants

The participants were 102 students from the University of Amsterdam (37 men and 65 women) who participated in the study for course credit.

Procedure

Participants performed the study on the computer in individual computer cubicles. Participants were randomly assigned to one of three conditions: fatigued, nonfatigued, or imagined fatigue. The fatigue manipulation was similar to that used in Nordgren et al. (2006). Participants were asked to complete a strenuous memory task that lasted for 20 min. The memory task consisted of nine-digit number strings that participants were asked to memorize. Each number string appeared for 11 s, after which participants were asked to “hold the numbers in their head” for 7 s before they were finally asked to type in the number string to the best of their ability. The fatigued condition consisted of 40 memory trials. To ensure that performing the task itself would not influence participants’ subsequent judgments (as opposed to the fatigue the task was intended to induce), participants in the nonfatigued and the imagined fatigue conditions performed a much milder version of the memory task—10 trials of three-digit number strings.

Afterward, and in an ostensibly unrelated study, participants in each condition read a vignette about a mother who, after staying awake for most of the night to care for her teething baby, travels to the grocery store the next morning to buy baby formula. At the checkout counter, she learns that the baby formula costs 5 cents more than she has, and the cashier (who is of an ethnic minority common to the Netherlands) refuses to allow the mother to buy the baby formula for 5 cents less than its store price. The mother becomes very agitated and directs several racial slurs (e.g., go back to your own country) at the cashier before leaving the store empty-handed. After reading the vignette, participants were asked to evaluate the mother and her behavior toward the cashier. Participants in the imagined fatigue condition were instructed, prior to making their evaluations, to try to imagine how it would feel to be fatigued like the mother and to make their judgments as if they, too, were fatigued.

Materials

General evaluation. The general evaluation questions assessed participants’ attitudes toward the mother’s behavior and the mother generally. Specifically, participants were asked, “How would you evaluate the mother?” and “How would you evaluate the mother’s actions toward the cashier?” For each question, participants made ratings on four evaluative dimensions (*good, bad; positive, negative; like, dislike; and desirable, undesirable*) on a 7-point scale. Cronbach’s alpha was .87 and .89, respectively.

Emotions. Next, participants indicated the extent to which they experienced specific emotional reactions to the mother. We assessed both positive and negative emotions in the form of empathy (referred to here as compassion; Batson, 1991) and what Rozin, Lowery, Imada, and Haidt (1999) refer to as other-critical moral emotions (which we will refer to as contempt). For both sets of items, we asked participants, “When you think about the mother, to what extent do you feel . . . ?” The three empathy items were sympathy, warmth, and compassion (Cronbach’s alpha was .90). The three contempt items were anger, disgust, and contempt (Cronbach’s alpha was .92). These sets of adjectives have been used in previous research to measure empathy and contempt, respectively (Batson, 1991; Rozin et al., 1999). Responses were made on a 7-point scale from 1 (*not at all*) to 7 (*extremely*).

Similarity to self. Then, participant rated three items that reflected how similar they believed they were to the mother. These items related specifically to the mother’s interaction with the cashier. Participants were directed to think about the mother’s actions toward the cashier and were then asked to consider the following: (a) “To what extent have you acted in a similar way in the *past*?” and (b) “How likely are you to act in a similar way in the *future*?” Responses to these two questions were made on a 7-point scale from 1 (*never*) to 7 (*very often*). The third item consisted of an Inclusion of Other in the Self Scale (Aron, Aron, & Smollan, 1992), which is a single-item, pictorial measure used to assess interpersonal similarity. The scale is made up of seven circles that vary in the extent to which they overlap. Participants were instructed to mark the pair of circles that best reflect how similar they are to the mother (Cronbach’s alpha was .82).

Results and Discussion

To test our predictions, we performed a series of analyses of variance with planned contrasts, examining whether fatigued participants (2) made more favorable evaluations than participants who were not fatigued (−1) or participants who made their rating as if they were fatigued (−1).

General Evaluation

As predicted, participants who were fatigued evaluated the mother more positively ($M = 3.90, SD = 0.99$) than both participants in the nonfatigued ($M = 3.34, SD = 0.91$) and the imagined fatigue conditions ($M = 3.31, SD = 0.97$), $t(99) = 2.88, p = .005, \eta^2 = .07$. In addition, participants who were fatigued evaluated the mother’s behavior more positively ($M = 2.73, SD = 0.95$) than did nonfatigued ($M = 2.02, SD = 1.03$) and imagined fatigue participants ($M = 2.11, SD = 0.61$), $t(99) = 3.53, p = .001, \eta^2 = .12$ (see Figure 1).

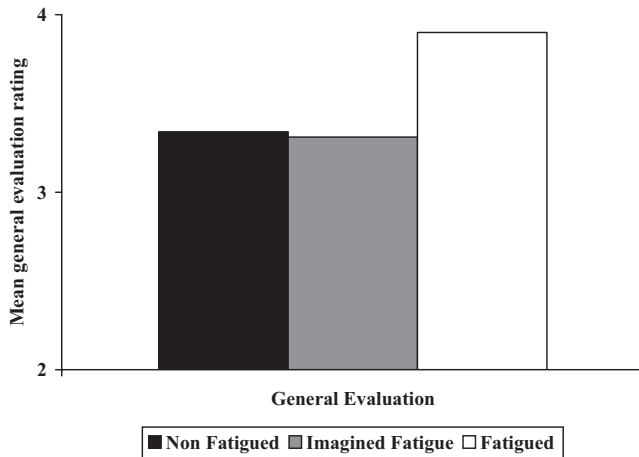


Figure 1. Study 1: Mean general evaluation rating by condition.

Emotions

Likewise, fatigued participants had more compassionate feelings for the mother ($M = 4.35$, $SD = 1.16$) than did participants in the nonfatigued ($M = 3.66$, $SD = 1.16$) and the imagined fatigue conditions ($M = 3.88$, $SD = 1.02$), $t(99) = 2.55$, $p = .01$, $\eta^2 = .07$. Moreover, participants in the fatigued condition had less contemptuous feelings for the mother ($M = 2.74$, $SD = 1.39$) than did participants in the nonfatigued ($M = 3.41$, $SD = 1.29$) and the imagined fatigue conditions ($M = 3.37$, $SD = 0.98$), $t(99) = 2.50$, $p = .01$, $\eta^2 = .06$.

Similarity to Self

Lastly, we found that fatigued participants perceived themselves to be more similar to the mother ($M = 3.00$, $SD = 1.30$) than did participants in both the nonfatigued ($M = 2.25$, $SD = 1.25$) and the imagined fatigue conditions ($M = 2.33$, $SD = 1.07$), $t(99) = 3.21$, $p = .001$, $\eta^2 = .09$.

These findings suggest that people's evaluation of fatigue-induced aggression can depend in part on their current visceral state. We found that participants who were fatigued evaluated fatigue-induced aggressive behavior more positively than did participants who were not fatigued. It is important to note that this effect was also found for participants who were reminded to take the aggressor's fatigue into account when making their evaluation. This finding has two important implications. First, it demonstrates the strength of the observed effect between the hot (fatigued) and cold (nonfatigued) conditions. Thus, reminding someone to take account of the motivational force driving an impulsive behavior may do very little to change his or her evaluation of that behavior.

Second, the imagined fatigue condition also helps to rule out the possibility that an accessibility effect is responsible for the differences observed between the fatigued and the nonfatigued conditions. Participants in the imagined fatigue condition made their evaluations as if they were fatigued, making the potential influence of fatigue highly salient. Yet these participants still differed from fatigued participants in their evaluations.

Study 2

The goal in Study 2 was to replicate the findings from the first study with a different visceral state—hunger. The feeling of hunger is a cue that signals the body's need for nourishment. Although there is nothing impulsive about acting on this feeling, people are required to restrain their hunger cravings. Restraint can involve the amount of food eaten, the pace and manner with which the food is eaten, and even the type of food that is eaten. For example, someone who eats an extra-large, fast-food meal at a hurried pace is likely to be seen as an impulsive eater.

In Study 1, we relied on explicit, self-report measures. Another goal in the present study was to test whether these effects would emerge with an implicit, behavioral measure. To do this, we had participants view a short video of a man who eats impulsively—he eats four cheeseburgers in 3 min. After the video, participants evaluated the impulsive eater, using the same measures used in Study 1. In addition to these measures, we also (discreetly) recorded participants' facial expressions while they were watching the video and coded the extent of negative facial expressions participants displayed during the video. In line with the previous study, we predicted that hungry participants would generate more favorable evaluations of the impulsive eater and display less negative facial expressions during the presentation of the video than would satiated participants.

Method

Participants

The participants were 49 students from the University of Amsterdam (14 men and 35 women) who participated in the study for course credit.

Procedure

Several days before the study, participants were randomly assigned to either the hungry or the satiated condition. Participants in the hungry condition were instructed not to eat for at least 4 hr prior to participation in the study. To further induce hunger, a bag of freshly popped popcorn was placed (out of view) in the cubicle where participants performed the study. Participants in the satiated condition were instructed to eat a full meal within an hour of participation in the study. Popcorn aroma was not included in this condition.

Participants were tested individually in a private cubicle. Participants were told they were about to watch a video that depicts an everyday moment in someone's life. Our goal with the video was to present participants with a situation in which someone eats impulsively; that is, to depict someone who eats (normatively) too much unhealthy food too quickly. The video begins with a man sitting alone at a table with a bag of fast food. The man faces the camera directly for the duration of the video but does not acknowledge being videotaped. The man mutters, "I am starving," takes four cheeseburgers and a large soda out of the fast-food bag, and finishes the meal very quickly (he finishes the four cheeseburgers and the large soda in 3 min and 30 s). His manner of eating is also of poor etiquette, as the man takes very large bites and gets some food on his face. Afterward, participants were asked to evaluate

the man in the video. The questions were an adapted version of those used in Study 1.

While watching the video, participants' facial expressions were discreetly recorded. Two experimenters (blind to condition assignment) later coded these facial expressions. An initial preview of the facial expressions revealed that positive facial expressions were rarely exhibited. Expressions seemed to range from neutral to negative. For each participant, therefore, we coded for the intensity of his or her negative facial expressions throughout the video, on a 1 (*not at all negative*) to 5 (*very negative*) scale. Interrater reliability was high (.92) and disagreements were resolved through discussion. Data from 4 participants were lost (2 from each condition) because of equipment failure, leaving a total of 45 participants.

Materials

We assessed how hungry participants were by asking them to indicate, "How hungry are you?" on a 1 (*not at all hungry*) to 7 (*very hungry*) scale. The general evaluation ($\alpha = .91$), emotion ($\alpha = .89$), and similarity to self ($\alpha = .83$) items were identical to those used in Study 1.

Results and Discussion

Manipulation Check

We first examined whether the manipulation was effective. As expected, participants in the hungry condition reported being more hungry ($M = 5.69$, $SD = 1.12$) than participants in the satiated condition ($M = 2.82$, $SD = 1.23$), $F(1, 49) = 72.67$, $p < .001$, $\eta^2 = .60$.

General Evaluation

As predicted, participants who were hungry evaluated the impulsive eater more positively ($M = 3.35$, $SD = 0.93$) than did satiated participants ($M = 2.79$, $SD = 0.90$), $F(1, 49) = 4.48$, $p = .04$, $\eta^2 = .09$. And although not reliable, there was a trend difference in the expected direction for participants' evaluation of the impulsive eater's behavior. Participants in the hungry condition evaluated the impulsive eater's behavior somewhat more positively ($M = 3.49$, $SD = 0.86$) than did participants in the satiated condition ($M = 3.13$, $SD = 0.88$), $F(1, 49) = 2.04$, $p = .16$, $\eta^2 = .04$.

Emotion

Likewise, hungry participants had less contempt for the impulsive eater ($M = 4.23$, $SD = 1.06$) than did satiated participants ($M = 4.96$, $SD = 1.34$), $F(1, 49) = 4.41$, $p = .04$, $\eta^2 = .09$. We also found a trend in ratings for compassionate feelings. Participants in the hungry condition had somewhat more compassion for the impulsive eater ($M = 3.30$, $SD = 1.35$) than did participants in the satiated condition ($M = 2.73$, $SD = 0.92$), $F(1, 49) = 2.68$, $p = .10$, $\eta^2 = .05$.

Similarity to Self

We also found that hungry participants perceived themselves to be more similar to the impulsive eater ($M = 2.97$, $SD = 1.23$) than

did satiated participants ($M = 2.23$, $SD = 1.31$), $F(1, 49) = 4.02$, $p = .05$, $\eta^2 = .08$.

Facial Expressions

Finally, we analyzed participants' negative facial expressions. As predicted, we found that participants in the hungry condition displayed less negative facial expressions ($M = 2.20$, $SD = 0.88$) than did satiated participants ($M = 2.76$, $SD = 0.90$), $F(1, 45) = 4.96$, $p = .03$, $\eta^2 = .10$.

These effects replicate Study 1 with a different visceral state. We found that hungry participants judged impulsive eating more favorably than did satiated participants. That this effect was found not only with self-report measures but also with an implicit, behavioral measure offers a number of insights. First, it helps to ensure that the difference in empathy ratings observed between the two conditions was not due to demand characteristics. Although there was no indication during the exit interview that participants understood the goal of the study, it may be that, for example, hungry participants to some extent sensed that they were supposed to empathize with the impulsive eater. Finding this difference at the implicit level further excludes this alternative explanation.

Second, that it was an overt, behavioral measure suggests that people may often display their contempt for impulsive behavior. In this case, the effect related to facial expression, but it is possible that other overt behavior, such as interpersonal distance, is influenced as well. If the impulsive eater, the gambler, the drug addict, or the like is well aware of other people's contempt for his or her behavior, this may further enhance the sense of stigma associated with impulsive behavior.

Study 3

In the first two studies, we found that, across a variety of circumstances, people in a hot state evaluated impulsive behavior more favorably than did people in a cold state. The goal of Study 3 was to examine the process that drives this effect. Prior research has found that when people are in a cold state they generally do not appreciate the motivational force of impulsive states (Nordgren et al., 2006). We argue that this underestimation leads people to stigmatize impulsive behavior because it creates the illusion that impulsive behavior is undertaken willingly and freely (and thus blameworthy). Alternatively, we argue that because people in a hot state can appreciate the temptation that such states provide, they are less compelled to stigmatize impulsive behavior. On the basis of this reasoning, we hypothesized that perceptions of control over visceral states (i.e., to what extent is it possible to control your craving for sex, drugs, etc.) should mediate the effect visceral states have on the evaluation of impulsive behavior.

In the first two studies, we assessed the evaluation of impulsive behavior in an interpersonal context. In Study 3, we also examined whether this effect occurs when participants evaluated their own past behavior. We asked men to recall a past sexual behavior that they now regret, and we then tested whether their evaluation of their own past sexually regrettable behavior was influenced by their current state of sexual arousal. We predicted that men who were sexually aroused would judge their own past sexually regrettable behavior more favorably than would men who were not aroused.

Method

Participants

Participants were 78 male students from the University of Amsterdam who participated in the study for course credit.

Procedure

This study consisted of three parts. In part one of the design, participants were asked to describe a sexual act that they performed in the past and now regret. Participants were given 3 min to think of and describe a sexually regrettable behavior. Participants were told that if they did not want to describe the behavior explicitly, they should then write out some innocuous feature of the event, such as “that time in the park.” This was done to enable participants to feel comfortable selecting any behavior that they wanted but to still provide us some idea that they did have a specific sexual regret in mind. At the end of the 3-min description period, participants were asked whether they had indeed thought of and described a sexual regret. All men were able to think of a past sexual regret.

In part two of the design, participants were randomly assigned to either the sexual arousal or nonarousal condition. Participants in the sexual arousal condition watched a 10-min erotic film, whereas participants in the nonaroused condition watched a 10-min film depicting a runway fashion show. After the video, participants were asked to indicate how sexually arousing they found the film.

In the final part of the design, participants were presented with the description of the sexually regrettable behavior that they had described roughly 10 min earlier. Participants were then asked to evaluate their past sexual regret using a modified version of the dependent measures used in the previous two studies.

Materials

To assess whether the video induced sexual arousal, we asked participants to indicate, “How sexually arousing did you find the video?” on a 1 (*not at all arousing*) to 7 (*very sexually arousing*) scale. We asked two questions to assess participants’ perception of control over sexual impulse. “It is very difficult to overcome sexual temptation” (reverse scored) and “Sexual arousal has very little influence on my behavior” were both assessed on a 1 (*completely disagree*) to 7 (*completely agree*) scale. The general evaluation questions assessed participants’ attitudes toward their past sexually regrettable behavior with the same items used in Study 1. Unlike the previous two studies, however, global evaluations were not assessed. Cronbach’s alpha was .88. The emotion ($\alpha = .89$) and similarity to self ($\alpha = .82$) items were identical to those used in Study 1.

Results and Discussion

Manipulation Check

The manipulation was successful. Men who watched the pornography video were more sexually aroused ($M = 4.70$, $SD = 0.80$) than were the men who watched the runway model video ($M = 3.40$, $SD = 0.76$), $F(1, 77) = 53.64$, $p < .001$, $\eta^2 = .41$.

General Evaluation

As predicted, men who were sexually aroused evaluated their past sexually regrettable behavior more positively ($M = 3.87$, $SD = 1.00$) than did men who were not aroused ($M = 3.06$, $SD = 1.06$), $F(1, 77) = 11.46$, $p < .001$, $\eta^2 = .13$.

Emotions

Likewise, men who were sexually aroused had more compassionate feelings for their past behavior ($M = 3.47$, $SD = 1.01$) than did men who were not aroused ($M = 2.70$, $SD = 1.30$), $F(1, 77) = 7.98$, $p = .006$, $\eta^2 = .09$, and they had less contempt ($M = 2.56$, $SD = 0.67$) than did men who were not aroused ($M = 3.13$, $SD = 0.81$), $F(1, 77) = 10.88$, $p = .001$, $\eta^2 = .13$ (see Figure 2).

Similarity to Self

Lastly, we found that men who were sexually aroused rated their present sexual behavior to be more similar to their past sexually regrettable behavior ($M = 4.10$, $SD = 1.28$) than did men who were not aroused ($M = 3.23$, $SD = 1.29$), $F(1, 77) = 8.70$, $p = .004$, $\eta^2 = .10$.

Mediating Role of Perceived Control

We found that men who were sexually aroused indicated that they had less control over their sexual urges ($M = 4.01$, $SD = 0.81$) than did men who were not aroused ($M = 4.70$, $SD = 0.84$), $F(1, 77) = 13.23$, $p < .001$, $\eta^2 = .15$. We next examined our prediction that perceived control mediates the effect of sexual arousal on the evaluation of sexually regrettable behavior. We focused our analysis on the general evaluation items. The pattern of results was similar for the emotion and the similarity to self items (though only contemptuous emotions produced a reliable effect). The necessary conditions for mediation were first established: Sexual arousal was positively correlated with the general evaluation of the sexually regrettable behavior, $r(78) = .41$, $p < .001$; sexual arousal was negatively correlated with perceived control over sexual arousal, $r(78) = -.46$, $p < .001$; and perceived

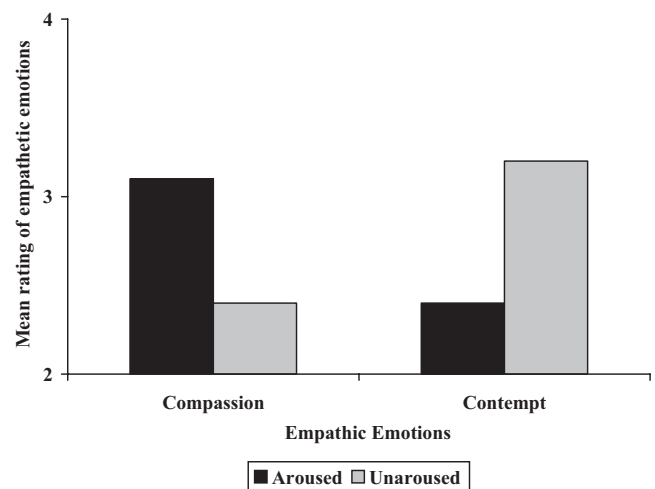


Figure 2. Study 3: Mean rating of empathetic emotions by condition.

control over sexual arousal was negatively correlated with the evaluation of sexually regrettable behavior, $r(78) = -.39, p < .001$. As predicted, the correlation between sexual arousal and the evaluation of sexually regrettable behavior was significantly reduced when the mediating variable—perceived control over sexual arousal—was statistically controlled, $z = 2.00, p = .05$.

The observed mediated relationship gives support to our explanation for the influence visceral state has on the evaluation of impulsive behavior. We found that men who were not sexually aroused believed that they had more control over their sexual impulses than did men who were sexually aroused. And as predicted, these different beliefs accounted for the influence of sexual arousal on the evaluation of impulsive behavior.

This study also extends the findings from Studies 1 and 2 by demonstrating that current visceral states can also influence the empathy one has for his or her own past impulsive behavior. In a study by Ariely and Loewenstein (2005), men were asked to report their willingness to engage in morally questionable behavior in order to achieve sexual gratification. They found that sexually aroused men reported being more willing to engage in unethical sexual behavior and reported being less likely to protect themselves against unwanted pregnancy or sexually transmitted disease. From these findings, Ariely and Loewenstein concluded that men who are unaroused are likely to underestimate the extent to which sexual arousal can influence their behavior. Study 3 demonstrates another implication of this underestimation: When men are unable to appreciate the motivational force of sexual craving, they are prone to view their past, impulsive action with less tolerance than when they are (again) sexually aroused.

Study 4

In Study 4, we sought to rule out an alternative explanation of the findings from the previous three studies. We have argued that the hot–cold empathy gap effect is due to the enhanced emotional perspective taking of people in a hot state. However, an alternative explanation is that being in a hot state does not enhance emotional perspective taking but rather that the arousal itself influences the judgment. For example, being in a hot state may alter perception or information processing (Schwarz, 2002) or influence reliance on stereotypes (Wigboldus, Sherman, Franzese, & van Knippenberg, 2004), and these differences may account for the observed effects.

One way to rule out this alternative explanation, and to build support for our own, is to examine the specificity of the effect. If being in one hot state (e.g., hunger) influences the evaluation of unrelated impulsive behavior (e.g., fatigue-induced aggression), then it would suggest that the effect may be due to changes in information processing brought on by the hot state. If, however, being in one hot state only influences evaluations of a corresponding impulsive behavior (e.g., hunger and binge eating), it would support our perspective-taking based explanation, as it would suggest that we can empathize with impulsive behavior only when we feel the same way the impulsive person feels.

To test this idea, we assigned participants to one of three visceral states: hunger, fatigue, or control (i.e., a cold state). Afterward, participants received either the hunger-based scenario and dependent measures used in Study 2 or the fatigue-based scenario and dependent measures used in Study 1. We predicted that hungry and fatigued participants would make favorable eval-

uations only for corresponding impulsive behavior. For example, we expected that hungry participants who evaluated the binge eater would make more favorable evaluations than would the control and, crucially, fatigued participants. Likewise, we expected that fatigued participants would evaluate the fatigued mother (from Study 1) more favorably than would participants in both the control and the hungry conditions.

Method

Participants

Participants were 149 students from the University of Amsterdam (54 men and 95 women) who participated in the study for course credit.

Procedure

Several days before the study, participants were randomly assigned to either the hungry condition, the fatigued condition, or the control condition. Participants in the hungry condition were instructed not to eat for at least 4 hr prior to participation in the study. Participants in the fatigued condition completed the severe fatigue manipulation used in Study 1, and participants in the control condition did not receive a visceral-inducing manipulation.

Participants were tested individually in a private cubicle. Participants were randomly assigned to either the fatigue scenario used in Study 1 or to the hunger scenario used in Study 2. All aspects of these materials were identical to those used in first two studies.

Materials

The general evaluation ($\alpha = .89$), emotion ($\alpha = .90$), and similarity to self ($\alpha = .85$) items were identical to those used in Study 1.

Results and Discussion

Fatigue-Based Scenario

General evaluations. As predicted, participants who were fatigued evaluated the fatigued mother more positively ($M = 2.82, SD = 0.95$) than did participants in both the hungry ($M = 2.25, SD = 0.93$) and the control conditions ($M = 2.13, SD = 0.96$), $t(74) = 2.76, p = .007, \eta^2 = .09$. In addition, fatigued participants evaluated the mother's behavior more positively ($M = 4.04, SD = 1.06$) than did participants in the hungry ($M = 3.39, SD = 1.10$) and the control conditions ($M = 3.27, SD = 1.06$), $t(74) = 2.62, p = .01, \eta^2 = .09$.

Emotion. Likewise, fatigued participants had more empathetic feelings for the mother ($M = 5.13, SD = 1.24$) than did participants in the hungry ($M = 4.51, SD = 1.13$) and control conditions ($M = 4.34, SD = 1.26$), $t(74) = 2.39, p = .02, \eta^2 = .08$. Participants in the fatigued condition also had less contempt for the mother ($M = 2.78, SD = 1.31$) than did participants in the hungry ($M = 3.32, SD = 1.42$) and the control conditions ($M = 3.65, SD = 1.12$), $t(74) = 2.21, p = .03, \eta^2 = .07$.

Similarity to self. Lastly, we found that fatigued participants perceived themselves to be more similar to the mother ($M = 3.70$,

$SD = 1.17$) than did participants in the hungry ($M = 3.06$, $SD = 1.20$) and control conditions ($M = 2.91$, $SD = 1.07$), $t(74) = 2.56$, $p = .01$, $\eta^2 = .08$.

Hunger-Based Scenario

General evaluations. As predicted, participants who were hungry evaluated the binge eater more positively ($M = 3.10$, $SD = 0.95$) than did participants in both the fatigued ($M = 2.40$, $SD = 0.80$) and the control conditions ($M = 2.58$, $SD = 1.18$), $t(61) = 2.28$, $p = .03$, $\eta^2 = .08$. In addition, participants who were hungry evaluated the binge eater's behavior more positively ($M = 3.71$, $SD = 0.66$) than did participants in the fatigued ($M = 2.65$, $SD = 1.01$) and the control conditions ($M = 2.85$, $SD = 1.36$), $t(61) = 3.51$, $p = .001$, $\eta^2 = .12$.

Emotion. Hungry participants also had more empathetic feelings for the binge eater ($M = 3.56$, $SD = 1.02$) than did participants in the fatigued ($M = 2.87$, $SD = 0.97$) and the control conditions ($M = 2.78$, $SD = 1.32$), $t(61) = 2.52$, $p = .02$, $\eta^2 = .10$. And although not reliably different, participants in the hungry condition had less contempt for the binge eater ($M = 4.04$, $SD = 1.02$) than did participants in the fatigued ($M = 4.87$, $SD = 1.37$) and the control conditions ($M = 4.85$, $SD = 1.63$), $t(61) = 2.32$, $p = .02$, $\eta^2 = .08$ (see Figure 3).

Similarity to self. Lastly, we found that hungry participants perceived themselves to be more similar to the binge eater ($M = 3.00$, $SD = 1.08$) than did participants in the fatigued ($M = 2.27$, $SD = 0.95$) and the control conditions ($M = 2.41$, $SD = 1.08$), $t(61) = 2.40$, $p = .02$, $\eta^2 = .09$.

These findings suggest that being in a hot state only influences the evaluation of corresponding impulsive behavior, as opposed to impulsive behavior in general. This finding is significant in its own right because it helps to establish the boundaries of this effect. More important, these findings also provide a better understanding of the hot–cold empathy gap effects observed throughout these studies. We argue that the stigma surrounding impulsive behavior is ultimately due to the constrained perspective taking of people in a cold state. The specificity effect observed in this study supports

this explanation by demonstrating that simply feeling aroused does not lessen the stigma of impulsive behavior. Rather, this seems to be the case only when people experience the same impulse-evoking visceral state.

General Discussion

People often have very little tolerance for impulsive behavior. Just as Eve was condemned when she ate the forbidden fruit, impulsive behaviors such as drug addiction, problem gambling, and alcoholism remain strongly stigmatized today. In this study, we aimed to improve our understanding of the process by which people evaluate impulsive behavior—and explain why it is that impulsive behavior is so often viewed contemptuously.

Past research has shown that people generally underestimate the influence cravings have on behavior (Loewenstein, 1996; Nordgren et al., 2006). For example, people who are satiated tend to underestimate the influence hunger has had on past dietary decisions. In this study, we examined whether the tendency to underestimate the influence of visceral states has implications for people's evaluations of impulsive behavior. Because people in cold states have difficulty appreciating the motivational force of craving, we expected that people in a cold state would form decidedly negative evaluations of those who act on their impulses.

This expectation was confirmed. In four studies, we found that people who were in a hot state evaluated impulsive behavior more favorably than did participants who were in a cold state. Specifically, participants in a hot state formed more positive evaluations, felt less contempt and more empathy, and perceived themselves to be more similar to an impulsive other than did participants in a cold state. Although participants in hot states consistently made more favorable evaluations than did those in a cold state, it is noteworthy that the mean scores for hot participants' evaluations rarely reached beyond the midpoint of the scale and were thus not overtly favorable. In this way, it may be more accurate to describe hot participants, evaluations as less negative than those of cold participants. In other words, it is not that participants who were in a hot state actively liked those who acted on their impulses but rather that they did not judge the behavior as negatively as did those in a cold state. We believe that the clearly unfavorable evaluations made by participants in a cold state reflects the kind of stigma that is so often associated with impulsive behavior.

In Study 1, this general effect was extended by instructing participants in a cold state to make their ratings as if they were in a hot state. We found that participants could not take on a hot perspective when instructed to do so. This finding helps to rule out an accessibility effect as an alternate explanation for this finding. If the accessibility of fatigue, rather than the sensation of fatigue itself, drove these effects, then no differences should have been observed between participants in the fatigued and imagined fatigue conditions. More important, this finding also has applied significance, as it suggests that efforts designed to help people become more aware of the influence of a visceral state will be unsuccessful. For example, reminding a friend who is critical of your impulsive eating that hunger cravings are difficult to overcome, would seem to have little impact on the friend's judgment.

We argue that the effect observed in these studies is due to the constraints of cold perspective taking. Because people are generally unable to appreciate the motivational force of states that they

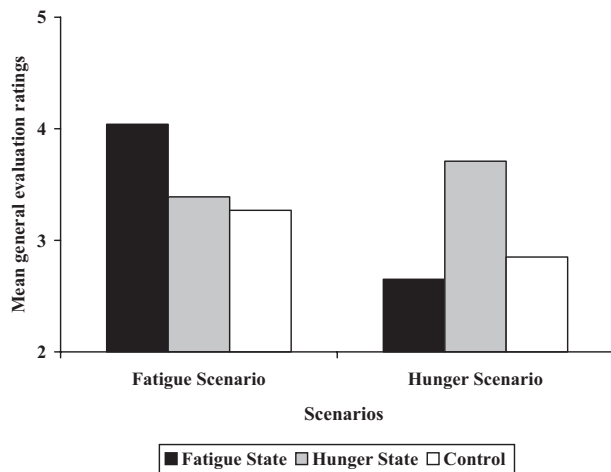


Figure 3. Study 4: Mean general evaluation ratings of the hunger and the fatigue scenarios by condition.

are not currently in, people in a cold state have difficulty empathizing with those who act on their impulses. An alternative explanation is that being in a hot state does not enhance emotional perspective taking but rather it is the arousal itself that influences the judgment. For example, being in a hot state may alter perception or information processing (e.g., narrowed attention), and these differences may account for the observed effects. To rule out this alternate explanation and to strengthen our emotional perspective-taking claims, we examined whether being in one hot state (e.g., hunger) would lead to more favorable evaluations of impulsive behavior generally, or whether being in a hot state would only influence evaluations of corresponding impulses. In line with our emotional perspective-taking explanation, the results of Study 4 demonstrate that the effect is state specific. We found that participants who were hungry only made more favorable evaluations of hunger-related impulsive behavior and not of fatigue-related impulsive behavior. Likewise, participants who were fatigued only made more favorable evaluations of fatigue-related impulsive behavior.

In Studies 1, 2, and 4, we had participants evaluate the impulsive behavior of another person. In Study 3, we found that one's current visceral state can also influence evaluations of one's own past behavior. In that study, men who were not sexually aroused had less empathy for their own past sexually regrettable behavior than did men who were aroused. As this study concerns men's regret over what may often have been sexually inappropriate behavior, the reader may find this effect somewhat comforting. However, if we take this effect out of the context of sexual impropriety and put it in the context of impulsive eating, for example, it may lead to different conclusions. Because people are, throughout the day, relatively satiated, dieters may often form rather negative evaluations about their past diet failures. The results of Study 3 might therefore help to explain why obese people tend to feel personally responsible for their predicament (Crocker, Cornwell, & Major, 1993), believe the discrimination they encounter is justified (Crocker & Major, 1994), and tend to discriminate against other obese people as much as normal weight people (Crandall, 1994).

The hot-cold empathy gap effect is also interesting in light of research on stigma and self-control. Denying one's impulses requires self-control, and impulsive behavior is often due to momentary impairments of self-control (Baumeister, Heatherton, & Tice, 1994). Interestingly, feeling stigmatized can impair self-control. A series of studies by Inzlicht, McKay, and Aronson (2006) found that feeling stigmatized depletes self-control resources, which, in turn, leads to more impulsive behavior. In light of these findings, it seems plausible that impulsive behavior and stigma can form a downward spiral effect. People who act impulsively are stigmatized (by both themselves and others); the stress of feeling stigmatized impairs self-control efforts, leaving people less able to overcome future impulses. Subsequent impulsive behavior leads to more, and perhaps more pronounced, feelings of stigma, and so on.

Future research should explore strategies that ease the stigma of impulsive behavior. One novel approach to reducing the stigma of impulsive behavior might be to have people evaluate their impulsive behavior while they are in a hot state. The present study suggests that this would, at least while they are in that hot state, foster a more compassionate view of impulsive behavior. The crucial question is whether there are ways for people to maintain the compassion afforded by the hot state once they return to a cold

state. Perhaps this can be achieved by having people reflect and commit to their evaluations (e.g., writing down or verbalizing their views) or by having people take notice of their own impulsive behavior while they are in a hot state.

Such an approach aims to lessen the stigma of impulse behavior by bridging the gap between hot and cold perspectives. We think a more promising approach might be to instill the very idea that people cannot appreciate the motivational force of cravings in those people who work with, or make decisions about, impulsive behavior (social workers, drug addiction counselors, police officers, etc.) Even if people cannot appreciate the force of impulse, the knowledge that they cannot do so may help people to form a more compassionate view of impulsive behavior. For example, the extraordinary visceral states military personnel sometimes experience during combat surely helps to produce the extraordinary brutality military personnel occasionally display. Although we do not believe that acting on impulse absolves responsibility, simply realizing that one cannot readily appreciate what it is like to be in a hot state might help to soften the stigma that usually accompanies impulsive behavior.

References

- Ariely, D., & Loewenstein, G. (2005). The heat of the moment: The effect of sexual arousal on sexual decision making. *Journal of Behavioral Decision Making*, *18*, 1–12.
- Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of Other in the Self Scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology*, *63*, 596–612.
- Batson, C. D. (1991). *The altruism question: Toward a social-psychological answer*. Hillsdale, NJ: Erlbaum.
- Baumeister, R. F., Heatherton, T. F., Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation*. San Diego, CA: Academic Press.
- Crandall, C. S. (1994). Prejudice against fat people: Ideology and self-interest. *Journal of Personality and Social Psychology*, *66*, 882–894.
- Crisp, A., H., & Gelder, M., G. (2000). Stigmatisation of people with mental illnesses. *The British Journal of Psychiatry*, *177*, 4–7.
- Crocker, J., Cornwell, B., & Major, B. (1993). The stigma of overweight: The affective consequences of attributional ambiguity. *Journal of Personality and Social Psychology*, *64*, 60–70.
- Crocker, J., & Major, B. (1994). Reactions to stigma: The moderating role of justifications. In M. P. Zanna & P. Herman (Eds.), *The Ontario symposium: The psychology of prejudice* (Vol. 7, pp. 289–314). Hillsdale, NJ: Erlbaum.
- Crocker, J., Major, B., & Steele, C. (1998). Social stigma. In D. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (4th ed., Vol. 2, pp. 504–553). New York: McGraw-Hill.
- Eisenberg, N., & Miller, P. A. (1987). The relation of empathy to prosocial and related behaviors. *Psychological Bulletin*, *101*, 91–119.
- Gilbert, D. T., & Malone, P. S. (1995). The correspondence bias. *Psychological Bulletin*, *117*, 21–38.
- Grandley, A., A., Dickter, D., N., & Sin, H., P. (2004). The customer is not always right: Customer aggression and emotion regulation of service employees. *Journal of Organizational Behavior*, *25*, 397–418.
- Inzlicht, M., McKay, L., & Aronson, J. (2006). Stigma as ego depletion. How being the target of prejudice affects self-control. *Psychological Science*, *17*, 262–269.
- Loewenstein, G. (1996). Out of control: Visceral influences on behavior. *Organizational Behavior and Human Decision Processes*, *65*, 272–292.
- Loewenstein, G., Nagin, D., & Paternoster, R. (1997). The effect of sexual arousal on predictions of sexual forcefulness. *Journal of Crime and Delinquency*, *32*, 443–473.

- Nisbett, R. E., & Kanouse, D. E. (1968, August–September). *Obesity, hunger, and supermarket shopping behavior*. Paper presented at the 76th Annual Convention of the American Psychological Association, San Francisco, CA.
- Nordgren, L. F., van der Pligt, J., & van Harreveld, F. (2006). Visceral drives in retrospect: Explanations about the inaccessible past. *Psychological Science, 17*, 635–640.
- Puhl, R., & Brownell, K. D. (2001). Bias, discrimination, and obesity. *Obesity Research, 9*, 788–805.
- Ross, L. (1977). The intuitive psychologist and his shortcomings: Distortions in the attribution process. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 10, pp. 173–220). New York: Academic Press.
- Rozin, P., Lowery, L., Imada, S., & Haidt, J. (1999). The CAD triad hypothesis: A mapping between three moral emotions (contempt, anger, disgust) and three moral codes (community, autonomy, divinity). *Journal of Personality and Social Psychology, 76*, 574–586.
- Schwarz, N. (2002). Situated cognition and the wisdom of feelings: Cognitive tuning. In L. Feldman Barrett & P. Salovey (Eds.), *The wisdom in feelings* (pp. 144–166). New York: Guilford Press.
- Stunkard, A. J., Sorenson, T. I. A., Hanis, C., Teasdale, T. W., Chakraborty, R., Schull, W. H., & Shulsinger, F. (1986). An adoption study of human obesity. *New England Journal of Medicine, 314*, 193–198.
- Van Boven, L., & Loewenstein, G. (2003). Social projection of transient drive states. *Personality and Social Psychology Bulletin, 29*, 1159–1168.
- Wigboldus, D. H. J., Sherman, J. W., Franzese, H. L., & van Knippenberg, A. (2004). Capacity and comprehension: Spontaneous stereotyping under cognitive load. *Social Cognition, 22*, 292–309.

Received March 18, 2006

Revision received November 22, 2006

Accepted December 3, 2006 ■