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# Thinking about Feeling

## The Nature and Significance of the Hot/Cold Empathy Gap

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad van doctor
aan de Universiteit van Amsterdam
op gezag van de Rector Magnificus
prof. Dr. J.W. Zwemmer
ten overstaan van een door het college voor promoties ingestelde
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Loran F. Nordgren
Geboren te Chicago, USA

Promotor: prof. dr. J. van der Pligt

Co-promotor: dr. F. van Harreveld

Faculteit der Maatschappij- en Gedragswetenschappen

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# CHAPTER 1

## *General Introduction*

The passions of man are rich in expression and profound in influence. From visceral drives like hunger and pain, to moods and emotions, our feelings (what we will refer to as "affect") influence nearly every aspect of human functioning (Cosmides & Tooby, 2000). This influence can be so profound that our actions "in the heat of the moment" may bear little resemblance to—and often stand in direct conflict with—our "typical" selves. Just consider how a hunger pang can corrupt the most committed dieter, or how a moment's rage can lead ordinary people to commit extraordinary crimes of passion.

Beyond the way affect can directly undermine good intentions, affect can disrupt decision-making in another important way: people systematically mispredict how affect will influence their behavior. This miscalculation takes two forms. On the one hand, when people are in the "throes of affect," they fail to appreciate what it will be like when they are no longer aroused. People who buy too much food while on an empty stomach make this error frequently. So too do inexperienced drinkers who, while recovering from their first hangover, incorrectly vow that they will "never drink again."

On the other hand, when people are not in a state of arousal, they likewise have great difficulty understanding what decisions they will make when they are subsequently gripped by affect. Consider this historical example. The romanticist poet Samuel Taylor Coleridge struggled for

much of his life with opium addiction. After coming down off a heavy night of opium use, Coleridge was known to hire porters who were under strict orders to physically prevent him from entering opium dens. This intervention proved too effective, however, and as his craving swelled he would hire a new set of porters to scare off those he had originally hired. Contemporary examples abound too. People engage in unplanned, risky sexual decisions when caught in "the heat of the moment;" cigarette smokers who insist they can quit smoking anytime often later find that they have significantly underestimated the burden of nicotine craving; pregnant women who intend to have a natural childbirth often end up requesting anesthesia once they experience the pain of labor; and people often back out of fear-arousing situations, such as a public speech, even though they previously imagined they could manage their fear.

As these examples illustrate, people often seem as if they have two selves: a "hot," emotional self and a "cold," non-emotional self that are strangers to the other's preferences, decisions, and behaviors. This phenomenon constitutes what Loewenstein (1996) has termed a hot/cold "empathy gap." The goal of the present dissertation has been to develop a comprehensive understanding of the nature and significance of the empathy gap. The ensuing chapters present experimental research that considers a number of issues related to the empathy gap. Chief among them are to examine the range of judgments that exhibit the empathy gap; understand the nature of this effect; and explore the social implications of the empathy gap.

In the current chapter I present an overview of the theory and research relevant to the discussion of the empathy gap, as well as outline the primary hypothesizes and findings of the empirical research from each

of the subsequent chapters. I begin here by first developing a working model of affect and then categorizing the variety of biases people exhibit when they make predictions about their feelings. I next describe the theoretical basis for the research in this dissertation. I end this chapter with a summary of the basic findings presented in the ensuing chapters.

## A Working Definition of Affect

Affect has been a source of enduring fascination for those interested in human behavior. There are countless definitions and theories of affect, and within these many perspectives there is disagreement over what constitutes affect. This ambiguity requires researchers to develop a working definition of affect.

Our use of the term affect is fairly conventional. In our usage affect is a general description that covers discrete emotions (e.g., anger, disgust, joy), moods (a diffuse positive or negative feeling), and visceral drives (e.g., hunger, pain, sexual arousal) (See Loewenstein, 1996 for a similar characterization of affect). Emotion and mood are the central components of nearly every theory of affect, whereas visceral drives are given much less consideration and by convention have an ambiguous relationship with emotion and mood. We classify them together because they share many important properties. This does not imply that we think they are identical. To be sure, emotions, moods, and visceral drives differ from each other in important ways. For example, emotions and moods are often differentiated by their specificity. Emotions are typically thought to be directed at a particular object or event. The source of someone's anger, joy, or disgust is usually unambiguous. Moods, on the other hand, seem to be more diffuse.

Nevertheless, emotions, moods, and visceral drives share a number of important properties. All forms of affect can be experienced as a subjective feeling, they motivate action, and they influence cognitive processes such as attention, information processing, and memory (Cosmides & Tooby, 2000). In our view, affects work to organize adaptive responses to critical situations faced in the evolutionary past. Thus affect provides us with goals and alerts us to situations that are crucial for survival. Emotions and moods seem to be particularly geared toward motivating responses to events that occur in the external environment (i.e., outside the body). For example, fear is triggered when we detect an impending threat in our environment. The experience of fear creates the goal of avoiding danger, enhances perception to help better identify the source of the danger, and readies the body for action (Lerner & Keltner, 2000).

Visceral drives, on the other hand, are generally geared toward identifying critical situations in the internal environment (i.e., inside the body) and direct behavior toward satisfying bodily needs (Loewenstein, 1996). For example, people experience hunger when they require nourishment, fatigue when sleep deprived, and thirst when dehydrated. Visceral drives not only signal a need but also motivate the satisfaction of this need, in the way that hunger motivates food consumption. Some types of visceral drives do not address basic human needs, but rather address acquired needs or desires—both natural and synthetic. For example, drug and gambling addiction creates strong motivation to satisfy a particular desire but are not essential for human functioning.

An important issue is whether to perceive affect as a constructive or destructive influence. Affect is without doubt necessary for proper human

function. As research on emotional-impairment demonstrates, people that lack affect have tremendous difficulty making good decisions (Damasio, 1994). Yet it is nevertheless true that affect can have a negative influence on people's decision-making. Affect is at the heart of most self-control dilemmas, for example. In our view, many of the problems that stem from affect are primarily due to the demands of contemporary society that were not present or were different from our evolutionary past. Hunger is a good example. In our evolutionary past, finding enough food to eat was a very significant challenge. On those occasions that food was plentiful, it would be important to consume more than was immediately necessary in order to better cope with occasions when food was difficult to come by. Hunger, therefore, motivates us to eat food high in caloric energy (i.e., fatty foods) and to consume more food than our present circumstance requires. Although hunger would have been at one time very effective in preventing starvation, in an environment where high-caloric food is extremely accessible, hunger can lead to obesity.

## The Biased Perception of Affect

Because affect can have such a tremendous influence on behavior, it is crucial to take affect into account when making decisions. People can do this in one of two ways. Either people anticipate how an event will impact their affective state (e.g., will having more money make me happy?), or people try to anticipate how an affective state will influence their decision-making (e.g., can I control my urge to drink?). Empirical evidence suggests that both forms of judgments suffer from systematic biases.

The process of estimating how an event will influence an affective state is generally referred to as affective forecasting. Most "life-decisions" involve, at least implicitly, affective forecasting. For instance, planning for a dream vacation is rife with predictions about how events will make us feel. The reason we take vacations to begin with is because we anticipate that it will make us feel happy, relaxed, exhilarated, etc. Even the specific holiday we choose involves affective forecasting—visiting an exotic city is exciting, whereas a tropical beach vacation emphasizes the wish for rest and relaxation. Likewise, having plastic surgery, playing the lottery, or switching careers are all largely (if not entirely) motivated by a calculation of what will make us happy.

Affective forecasting research is concerned with the *accuracy* of these kinds of judgments. As it turns out, people generally make considerable errors when predicting how events will influence their affective state. As in the above examples, much of the research on affective forecasting has focused on predictions about subjective well-being. Schkade and Kahneman (1997) asked students attending either a Californian or a Midwestern university to judge how living in the Midwest and California would influence their happiness. They found that students predicted large differences in happiness between the quality of life in California and the Midwest. Yet when these same students were asked to indicate how happy they were, there was no difference between students living in California and the Midwest.

This finding suggests that students overestimated how living in either location would influence their level of happiness, and is consistent with a number of studies demonstrating that people think that events will have a stronger affective impact then they in fact have. There seem to be

multiple reasons why people mispredict their feelings in this manner. One of the main reasons for errors in affective forecasting is due to a "focusing illusion" (Wilson, Wheatley, Meyers, Gilbert, & Axsom, 2000). When people imagine how an event will make them feel, they tend to focus only on the event itself and do not take into account the numerous other factors that might also impact their feelings. For example, how would you feel if your favorite sports team won the championship? You would feel happy, undoubtedly—but just how happy? When answering this question, people generally fail to take into account the countervailing factors that might dampen their happiness. A pressing deadline, a spat with your partner, or an upset stomach could mean that a championship victory is less elating than you expected it to be.

## The Empathy Gap

On other occasions people do not seek to predict how an event will make them feel, but rather they try and judge how their feelings will make them behave. Judgments like these take one of two forms: people in a hot state try to appreciate how they will behave in a cold state (referred to as a *hot-to-cold-empathy gap*), or people in a "cold" state try to appreciate how they will behave in a hot state (referred to as a *cold-to-hot-empathy gap*).

The hot-to-cold empathy gap describes the tendency for people in a hot state to underestimate the extent to which their decision-making is governed by affect. One consequence of this phenomenon is that people in a hot state generally overestimate the stability of their current preferences. I earlier recalled the advice to never shop for groceries on an empathy stomach. This is a classic example of a hot-to-cold empathy gap: hungry people fail to appreciate how their decision to order two servings of French fries is based not on what they are eventually going to want but rather

based on their momentary desire for food. As such, hungry shoppers fail to see that they will no longer value the second order of French fries once their hunger has subsided.

The cold-to-hot empathy gap describes the tendency for people in a cold state (i.e., not affectively aroused) to underestimate the motivational force of a future hot state. A good example of this sort of misprediction is when longtime smokers erroneously believe they "can quit anytime they want." In this situation, a smoker who does not currently have a strong craving for nicotine misjudges the burden of addiction.

There is a considerable amount of empirical evidence for the empathy gap. What is notable about this literature is that it is a phenomenon that occurs so widely. The empathy gap has been found across numerous affective states, in the context of a variety of judgments, and in various populations. We now turn to a representative selection of research on the empathy gap.

*Hunger*

Numerous studies have found that when people are satiated they tend to underestimate the influence hunger craving will have on their behavior. For example, Read and Van Leeuwen (1998) found that people who were hungry more accurately predicted future food choices than did people who were satiated. 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. Nisbett and Kanouse (1968) asked grocery shoppers to

rate when they last ate and to predict how much food they intended to purchase. They found that hungry shoppers (i.e., those who hadn't eaten for some time) were more likely to purchase more food than they had anticipated compared to shoppers who weren't hungry.

*Pain*

Earlier we presented the anecdote that pregnant women who before labor are determined to have a natural child birth often end up demanding anesthesia once childbirth begins. There is actual empirical evidence for this phenomenon. Christensen-Szalanski (1984) found that the majority of pregnant women who intended to go without anesthesia during childbirth reversed their decision once they went into labor—suggesting that they had initially underestimated the intensity of the pain of childbirth. Interestingly, women who already had children, and were thus familiar with the pain of childbirth, were just as likely to miscalculate their tolerance for pain.

*Fear*

In one of a series of studies on the fear of embarrassment, Van Boven, Loewenstein, and Dunning (2005) asked students in a class whether they would be willing in one week's time to perform an embarrassing mime in front of their classmates for a small amount of money. A week later students who indicated they would be willing to perform the mime were then given the opportunity to do so. Based on the empathy gap, they predicted that students would not be able to appreciate just how embarrassing it is to mime in front of one's classmates when the event is one full week away. In line with this prediction, they found that far fewer students were willing to actually perform the mime than had predicted they would one week prior to the event.

This study is important because it provides evidence that empathy gaps are not restricted to visceral drives. To our knowledge, this is the only published study to find the empathy gap outside of visceral states (our lab has initial evidence for disgust and anger-based empathy gaps). Thus, the claim that empathy gaps extend to other affective states is tentative and is an essential avenue for further research. An interesting possibility is that people experience empathy gaps for mood and emotion but, based on structural differences between these states and visceral drives, the nature of mood and emotion-based empathy gaps differ somewhat from visceral drive-based empathy gaps (see the footnote in the proceeding section on The Source of the Empathy Gap).

*Addiction*

Earlier we considered the example of smokers who erroneously believe they can quit smoking anytime they like. Lynch and Bonnie (1994) have found empirical support for this notion. They asked high school students who currently smoked whether they expected to be smoking five years later. Among occasional smokers (those who had less than one cigarette a day), only 15% predicted they would still be smoking in five years. Five years later, 43% of these students were still smoking. Among frequent smokers (those who smoked a pack a day), only 30% thought they would smoke five years later, while in fact over 70% continued to smoke.

Another study interested in drug addiction asked heroin users to indicate how much money they would be willing to pay for the heroin substitute Buprenorphine (Badger et al., 2007). They found that heroin addicts would value an extra dose of Buprenorphine more highly when they were craving heroin than when they were currently satiated. This

finding is used to explain why people so willingly take drugs they know to be addictive. If experienced heroin users continue to underestimate their craving, imagine how difficult it would be for a beginning drug user to fully appreciate the power of drug addiction.

## The Implications of the Empathy Gap

At its heart, the empathy gap represents a limitation of self-knowledge. Most of our life is spent in a relatively cold, non-aroused state. This means that as we go about our daily affairs, we have a very biased perception of our limitations and capabilities. This can have disastrous consequences. For instance, On December 8th 2006, an Amsterdam bus driver shot a motorist during an argument over who had the right of way. Interestingly, the bus driver did not have a prior record and those close to him did not characterize him as a violent man. After his arrest, the bus driver explained that he carried the gun for protection and had never imagined he would use it improperly.

This example captures one of the main pitfalls of the empathy gap: when people underestimate the power of impulse, they are often left vulnerable to its influence. Credit card companies seem to understand this all too well. For very many people, there is an impulsive aspect to shopping which requires emotional restraint. Perhaps the reason for the popularity of credits cards that offer rewards (e.g., air miles) in exchange for higher interest rates, is because people underestimate the temptation of impulse-buying, and thus erroneously expect themselves to make prudent financial decisions—reaping the rewards while avoiding the high-interest rate debt.

A final example deals with how empathy gaps impact career decisions. There is no shortage of corporate employees who accept a stress-filled working environment with a long commute and a 60-hour workweek. Nor is there a shortage of "employee burnout." Perhaps it is precisely because people underestimate the force of stress and fatigue that they are so willing to enter into jobs that are physically and psychologically unmanageable.

One fascinating aspect of the empathy gap is that it seems to be impervious to learning and experience. Much of the literature we reviewed demonstrated empathy gaps in a variety of commonplace situations. For instance, although we have all experienced hunger countless times, it appears that experience with hunger craving does little to mitigate the empathy gap. To understand this and other aspects of the empathy gap requires an understanding of the mechanisms behind the empathy gap. We turn to this issue in the proceeding section.

## The Source of the Empathy Gap

The reason people experience the empathy gap remains mostly an open question, and is one that is taken up throughout this dissertation. The perspective we adopted at the outset of this research, and have maintained throughout this process, was first put forward by Loewenstein (1996). He has argued that the empathy gap is due to a constrained memory for affective experiences. That is, though we can recall the circumstances that led to an affective state (e.g., I was hungry because I didn't eat all day) and recall the relative strength of an affective state (e.g., that was the most hungry I have ever been), we cannot freely bring forth the sensation of the affect (e.g., re-experience the prior hunger) (Robinson & Clore, 2002).

This explanation argues that it is only when we feel affect's influence that we can fully believe in its motivational force.

Another possible explanation is that empathy gaps are simply accessibility effects. Thus, like explanations of affective forecasting, people mispredict their feelings because they fail to take them into account. For example, while hiking with colleges in Italy, we discovered that we took much less water than we needed. I mentioned that this was a classic empathy gap effect—we underestimated the amount of water we needed because we were at the time hydrated, and thus could not appreciate how unpleasant dehydration would be. One colleague reasonably replied that it wasn't that we *could not* have appreciated its influence, but rather that no one thought about it—in other words, the notion was inaccessible. This explanation suggests that affective memories are constrained only in so far as they are not immediately accessible. According to this view, empathy gaps should evaporate when people are prompted to recall an affective state. The memory-constraint-based explanation, on the other hand, implies that the memory for affective experience is chronically inaccessible, such that even the intention to recall what it was like to be angry or in pain will be unattainable unless someone is in that state. These considerations are taken up throughout the present studies, particularly in Chapters 2 and 3.

## The Present Dissertation

The hot/cold empathy gap has been viewed as a phenomenon primarily relevant to the prediction of future behavior. This is not surprising. As our review of the literature has demonstrated, the empathy

gap effect provides considerable insight into how people think about future behavior. Yet I believe that the empathy gap effect has implications that extend far beyond judgments and decisions about the future. Thus, the aim of this dissertation has been to develop a comprehensive appreciation for the nature and significance of the hot/cold empathy gap.

The goal to establish the *nature* of the empathy gap is concerned with the mechanisms that drive this effect. One important question unanswered by existing research is whether empathy gaps are simply due to differences in the accessibility of information. For example, if people in a cold state are instructed to imagine what it is like to be in a hot state, does the empathy gap persist? Another issue is whether the empathy gap is state specific. That is, does being in one hot state (e.g., hungry) give you a better appreciation for what it is like to be in a different hot state (e.g., fatigued)? A final issue is whether the empathy gap effect is strictly dichotomous—hot versus cold—or whether the empathy gap exists across gradations of a particular affective state. In other words, does an empathy gap exist between being mildly hungry and being utterly famished?

The goal to establish the *significance* of the empathy gap is twofold. First, we attempted to extend the range of judgments that exhibit empathy gap effects. We know that the empathy gap influences people's beliefs about their future preferences. But what role, if any, does the empathy gap play in the way people interpret the past? Likewise, we know that the empathy gap influences preferences that directly pertain to an affective state, such as when hunger-state influences dietary decisions. Yet it remains to be seen whether the empathy gap influences more complex social and moral judgments that are less directly linked to an affective state. For example, quite a lot of deviant behavior is driven by affect (e.g.,

sexual misconduct). How might the empathy gap impact people's evaluation of deviant behavior? Affect is also involved in many self-control dilemmas. How might the empathy gap be relevant to people's self-control beliefs?

Second, we examined the social implications of the empathy gap. Until now, the ideas we have considered focus on how the empathy gap influences judgments and decisions. However, we argue that the empathy gap can help to explain a wide variety of perplexing social phenomena. In the ensuing chapters, for example, we use the empathy gap to explain such issues as why dieters continue to form unrealistic weight-loss goals in the face of repeated failures to lose weight; why students so often rely on "cramming" study strategies; and why, despite the fact that obesity has a strong and widely-acknowledged genetic basis, the obese remain one of the most heavily stigmatized groups.

The dissertation itself consists of twelve experiments that are presented in four empirical chapters. The majority of the experiments follow a similar format. In each experiment we manipulate participants' affective state, such that some participants are in a "hot," affectively-aroused state and other participants are in a "cold," non-aroused state. We then examine the judgments, decisions, and behavior of the people in these conditions.

The affective states manipulated in these experiments are all visceral drives. By "visceral drives" we mean those feeling states, such as hunger, thirst, pain, fatigue, and sexual arousal, which motivate basic biological requirements. Although I have subsequently demonstrated empathy gap effects with non-visceral drive states such as disgust and anger, the experiments presented here do not manipulate other types of

affective states. We focused on visceral drives for several reasons. First, the influence visceral drives have on human behavior has tremendous social consequences and, in our view, receives too little attention within the psychological sciences. Second, visceral drives are ideal affective states to use in experimentation. They are easy to manipulate; it is possible to manipulate visceral states at relatively high levels of intensity; and the manipulated states generally last longer than manipulated mood or emotion states (Rosenberg, 1998). Third, the procedure for inducing visceral drives is nearly identical to the way visceral drives naturally come about, and thereby maintains construct validity in the independent variables. To induce hunger, for example, participants were required to abstain from eating for an extended period of time and then were brought into contact with appetizing smells. Because of ethical constraints, the inducement of moods and emotions often bares little resemblance to the way these states are brought about naturally, and thus, in our view, raises concerns about the external validity of these experiments.

## Overview of the Empirical Chapters

We now present an overview of the empirical chapters. Each chapter represents an independent research article that has been published or is under review for publication. The overview aims to convey the "take-home message" from each chapter, thereby directing the reader's attention to the chapter(s) that may be of particular interest to them. Moreover, we hope that this summary will serve as a substitute for those readers who are interested in the dissertation but prefer a summary of the various empirical studies without having to go through detailed descriptions of methodological and statistical issues.

**Chapter 2 –** *Explanations of the inaccessible past.*

Chapter 2 examines how the empathy gap influences our interpretation of past behavior. Prior research on the empathy gap has been studied exclusively in the context of predicting *future* behavior, and it remains to be seen whether this effect extends to how people interpret the *past*. Whereas the empathy gap in the context of future behavior is concerned with forming predictions, the empathy gap in the context of past behavior is concerned with forming explanations or attributions. A cornerstone of social psychology has been that the attributions people make about past behavior are crucial to how they evaluate those past actions and is instrumental in shaping subsequent behavior (Kelley, 1973). Thus, the possibility of a hot/cold empathy gap for past behavior could offer considerable insight into how people come to explain the wide range of behaviors and decisions they make under the influence of affect.

Consider the following common situation. A smoker, who has been trying to quit for years, has successfully avoided having a cigarette for ten days. However, when she meets a friend at a favorite café, she develops an overwhelming urge to smoke and, in a moment of weakness, decides to have just one. Now that she has satisfied her craving, how might the smoker come to understand her actions in the moments afterwards? Does she attribute her failure to the force of her nicotine craving, and thus conclude she will have to manage her cravings better in the future? Or does she attribute her relapse to something else, such as a general lack of commitment.

This issue is at the heart of the research presented in Chapter 2. We found that when people were in a hot state (e.g., fatigued), they attributed

behavior primarily to visceral influences, whereas when people were in a cold state (e.g., non-fatigued), they underestimated the influence of visceral drives and instead attributed behavior primarily to other, non-visceral factors. This empathy gap was observed when people made attributions about the past behavior of themselves and others, and had consequences for people's satisfaction with their past performance. Those who attributed their poor performance to visceral factors were less dissatisfied than those who made dispositional attributions.

Another contribution of Chapter 2 is that we tested the strength of the empathy gap. We examined whether people could bridge the empathy gap if they were instructed to do so. To do this we encouraged participants in a cold state to make judgments *as if* they were in a hot state. The results reveal that the empathy gap is strong: participants could not correct for the biasing influence of their current visceral state even when instructed to do so. This finding rules out the possibility that an accessibility effect drives the empathy gap effect.

**Chapter 3 –** *Visceral states influence the evaluation of impulsive behavior*

Chapter 3 considers how the empathy gap influences people's evaluation of impulsive behavior. Impulsive behavior is a common source of stigma. Beliefs about drug addicts, problem gamblers, alcoholics, and the obese are overwhelmingly negative (Crandall, 1994). 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 and 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, are both widely acknowledged to have a strong genetic basis (Stunkard, et al., 1986).

We argue that the reason people often stigmatize impulsive behavior is because they fail to appreciate the motivational force of cravings for sex, drugs, food, etc. We argue that this overestimation leads people to stigmatize impulsive behavior because it creates the illusion that impulsive behavior is undertaken willingly and freely (and is thus blameworthy). In line with this reasoning, in four studies we 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 (hungry). This "empathy gap" effect was tested using three different visceral states—fatigue, hunger, and sexual arousal—and was found both when participants evaluated the impulsive behavior of others (Studies 3.1 & 3.2) and themselves (Study 3.3).

An additional contribution of Chapter 3 is that we address the issue of whether the empathy gap is state specific. That is, does being in one hot state (e.g., hungry) give you a better appreciation for what it is like to be in a different hot state (e.g., fatigued)? We found that being in a hot state only influences the evaluation of a corresponding impulsive behavior, as opposed to impulsive behavior in general.

**Chapter 4** – *A dynamic account of health cognitions*

Visceral states are a major impediment to healthy behavior. The research in Chapter 4 explored the notion that visceral states also influence people's health *beliefs*. In particular, we argue that visceral states influence people's perceptions of control over their own health behavior. Control perceptions are crucial to the initiation and maintenance of healthy

behavior (Bandura, 1986). For example, research has shown that self-efficacy (i.e., the belief that one can produce a desired effect) influences both weight-loss (Schwarzer & Renner, 2000) and smoking cessation (Borland, Owen, Hill, & Schofield, 1991). The hot/cold empathy gap effect, however, suggests that self-efficacy beliefs should vary with one's visceral state, such that people have higher self-efficacy when in a cold state than when in a hot state. Differences in self-efficacy beliefs should, in turn, influence health beliefs that are related to self-efficacy, such as future behavioral intentions (Bandura, 1982). For instance, if satiated dieters believe weight loss is easy to achieve, they should consequently intend to lose more weight compared to hungry dieters who perceive weight-loss to be difficult.

In line with this reasoning, we found that, in both the context of smoking and weight-loss, participants in a cold state had different health beliefs compared to participants in a hot state. For instance, we found that smokers who experienced cigarette craving had lower self-efficacy than did satiated smokers. Consequently, smokers who craved a cigarette had less intention to quit smoking in the future compared to satiated smokers.

We then replicated these results using dieters from a local weight-loss program. We found that hungry dieters had less self-efficacy than did satiated dieters. This difference led hungry dieters to form less ambitious future weight-loss goals and view prior weight-loss attempts with more satisfaction. Although most models of health behavior assume that health cognitions are relatively stable constructs (and many methodologies in health psychology rely heavily on this assumption), these findings reveal that health beliefs are more dynamic than previously assumed.

**Chapter 5** – *Inflated self-control beliefs discourage precaution against temptation*

An author once remarked that "although opportunity knocks just once, temptation leans on the doorbell." It is true that temptation is inescapable—we can all recall moments when we succumbed to hunger cravings despite plans to maintain a healthy diet, or slept in despite the intention to get an early start. Yet there are several strategies people can use to guard against temptation. For example, one common strategy is simply to try and avoid the source of the temptation (e.g., when dieters keep tempting foods out of the house).

Although temptation-deterrent strategies such as these can be effective in mitigating temptation and promoting self-control efforts, very little is known about the actual use of these strategies. We argue that whether people make use of temptation-deterrents will depend largely on their self-control beliefs. In other words, if people believe they can easily overcome temptation they will, as a result, take less preventative action and be more willing to expose themselves to temptation than if they believe themselves to be slaves to their desires.

Based on the empathy gap effect, we hypothesized that in most circumstances people are unrealistically confident of their capacity for self-control and, as a result, underutilize opportunities to guard against temptation. We tested these predictions using thee different impulsive states—fatigue, sexual arousal, and hunger. Findings confirm our predictions. In Study 5.3, for example, we examined how people's self-control beliefs influenced their ability to resist eating a tempting snack. We found that unless they were actively experiencing hunger, participants generally overestimated their capacity to control their hunger craving.

Consequently, when given the opportunity to earn money by selecting a snack that they had to resist eating for a week, hungry participants tended to choose a less favored snack whereas satiated participants generally chose their favored snack. This self-control precaution paid off, as hungry participants were more likely to earn money than were satiated participants.

## Concluding Remarks

The remainder of the dissertation consists of four empirical chapters and a final chapter that considers key findings, implications, and directions for future research. Each chapter was written independently of the others and thus the determined reader will find there is some overlap of content within each chapter. Although the components of each chapter are numbered into sections and sub-sections, this is done only to enable cross-referencing among the chapters, and does not imply an overarching framework. Because of this, the reader is encouraged to read the chapters by whim or interest, rather than in the order of their presentation.

# CHAPTER 2

## *Visceral Drives in Retrospect: Explanations about the Inaccessible Past*

*Based on Nordgren, van der Pligt, & van Harreveld (2006)*

Our bodies have a well-developed system that provides information about the well-being of the body and directs behavior toward satisfying our bodily needs. For example, we experience hunger when we require nourishment, thirst when dehydrated, and fatigue when sleep deprived. These visceral drives are a feature of daily experience and exert a substantial influence on behavior. This influence is acknowledged in the familiar wisdom that one should not buy groceries on an empty stomach, for example.

Yet despite our familiarity with visceral drives, we tend to underestimate their influence on behavior. Much anecdotal evidence reflects this point. People engage in unplanned, risky sexual decisions when caught in "the heat of the moment;" Women in labor are known to request anesthesia, though they had previously planned on having a natural birth; and cigarette smokers who insist they can quit smoking anytime often later find that they have significantly underestimated the discomfort of nicotine cravings.

Empirical studies in a number of domains confirm the tendency to underestimate the effect of visceral drives. Nisbett and Kanouse (1968) asked grocery shoppers to rate when they last ate and to predict how much food they intended to purchase. They found that hungry shoppers (i.e., those who hadn't eaten for some time) were more likely to purchase more food than they had anticipated compared to shoppers who weren't hungry. Read and Van Leeuwen (1998) found that people who are hungry more accurately predict future food choices than people who are satiated. 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 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 exhibited what Loewenstein (1996) has termed a "cold-to-hot empathy gap." People in a cold state (i.e., not hungry, not thirsty, or not sexually aroused) underestimate the influence of a future hot state (i.e., feeling hungry, thirsty, or sexually aroused). Loewenstein (1996) has argued that this underestimation of future visceral drives is due to our constrained memory for visceral experiences. That is,

though we can recall the circumstances that led to a visceral drive (e.g., I was hungry because I didn't eat all day) and recall the relative strength of a visceral drive (e.g., that was the most hungry I have ever been), we cannot freely bring forth the sensation of hunger itself.

To date, the hot/cold empathy gap has been studied exclusively in the context of predicting *future* behavior, and it remains to be seen whether this effect extends to how people interpret the *past*. This inattention is surprising for a number of reasons. Examining this effect in the context of past behavior provides a more rigorous test of the notion that the hot/cold empathy gap is due to the inability to freely recall visceral states. Unlike predicting future behavior, people make attributions about the influence of a past visceral drive having actually experienced the event, and thus make their attributions with the benefit of a concrete memory of the event and, in the form of the behavior that accompanies the visceral drive, a clear retrieval cue.

Moreover, whereas the cold-to-hot empathy gap in the context of future behavior leads to inaccurate predictions, the cold-to-hot empathy gap in the context of past behavior would lead to inaccurate attributions. The attributions people make about past behavior are crucial to how they evaluate those past actions and are instrumental in shaping subsequent behavior (Buchanan & Seligman, 1995). Thus, the possibility of a hot/cold empathy gap for past behavior could offer considerable insight into how people come to explain the wide range of behaviors and decisions they make under visceral influence.

Consider, for example, the circumstance of a dieter who, hungry from restricted portion sizes and low-fat meals, impulsively seeks out two of his favorite candy bars and eats them in quick succession. How might

the now satiated dieter come to understand his actions in the moments afterward? Does he conclude that his cravings are difficult to resist (particularly when candy bars are in reach) and realize that he will be more successful in the future if he tries to prevent his cravings (by increasing the number of meals per day and making chocolate less accessible, for example)? Or does he instead conclude that he failed because he lacks the willpower to maintain a successful diet?

This example is at the heart of the present research question: how does one's current visceral state affect the attributions one makes about the consequences of past visceral states? Our prediction is that when people are in a hot state (e.g., hungry), they will attribute behavior primarily to visceral influences, whereas when people are in a cold state (e.g., satiated), they will underestimate the influence of visceral drives and instead attribute behavior primarily to other, non-visceral factors.

We investigate these predictions in three studies. In the first two studies the same basic paradigm is used. Participants completed a fatiguing memory task, and afterwards read a vignette about a student who attributes his poor academic performance to fatigue. Participants then indicated what factors they felt contributed to the student's poor performance. In Study 2.3 participants estimated the influence a past hot state exerted on their *own* behavior.

## Study 2.1

Seventy-eight University of Amsterdam undergraduates participated. The study consisted of three between-subjects conditions: non-fatigue, moderate fatigue, and severe fatigue. To induce fatigue participants were asked to complete a strenuous memory task that lasted

for 10 minutes in the moderate fatigue condition and 20 minutes in the severe fatigue condition (the non-fatigue condition did not perform the memory task). The memory task consisted of 9-digit number strings that participants were asked to memorize. Each number string appeared for 11 seconds, after which participants were asked to "hold the numbers in their head" for seven seconds before finally being asked to type in the number string to the best of their ability. The moderate fatigue condition consisted of 20 memory trials and the severe fatigue condition consisted of 40 memory trials.

Afterwards, participants read a vignette about a student who studied for a test for less time than he had anticipated. He later attributes his behavior to fatigue, but his parents offer other explanations (e.g., lack of motivation). Participants are then asked to decide for themselves the extent to which fatigue and three dispositional factors (discipline, motivation, and willpower) influenced his performance. For each of these four factors responses were made on a 7-point scale from (1) *not at all influential* to (7) *extremely influential.*

Results and Discussion

The three dispositional attributions were combined into one scale (Cronbach's alpha = .84). Predictions follow the expected linear trend. Fatigue as an explanation for the student's poor performance was rated most influential in the severe fatigue condition ($M$ = 5.54; $SD$ = 1.20), followed by the moderate fatigue condition ($M$ = 4.82; $SD$ = 1.33), and was rated least influential in the non-fatigued condition ($M$ = 4.00; $SD$ = 1.06), $F(2,77) = 10.02$, $p_{rep} = .98$, $\eta^2 = .21$ (see Figure 2.1). It is interesting to note that this effect remains when only comparing the severe fatigue ($M$ = 5.54; $SD$ = 1.20) to the moderate fatigue condition ($M$ = 4.82; $SD$ =

1.33), $F(1,53) = 4.62$, $p_{rep} = .87$, $\eta^2 = .07$. This finding suggests that the influence current visceral states have on perceptions of another's past behavior is sensitive to the extremity of the current visceral state.

We next examined the prediction that non-fatigued participants would to a greater extent explain the student's poor performance in terms of dispositional influences compared to fatigued participants. As predicted, non-fatigued participants attributed the student's behavior to dispositional influences to a greater extent ($M = 4.78$; $SD = 1.03$) than the moderately fatigued condition ($M = 4.44$; $SD = 1.12$), and the severely fatigued condition ($M = 3.56$; $SD = 1.58$), $F(2,77) = 6.30$, $p_{rep} = .98$, $\eta^2 = .14$. As with ratings of fatigue, this effect was also obtained when comparing only the severe fatigue ($M = 3.56$; $SD = 1.58$) to the moderate fatigue condition ($M = 4.44$; $SD = 1.12$), $F(1,53) = 5.72$, $p_{rep} = .93$, $\eta^2 = .09$, confirming the role of extremity of the current visceral state.

Taken together these findings suggest that the extent to which people appreciate the influence of past visceral states depends largely upon their current visceral state. One potential criticism of this finding is that it can be explained by an accessibility effect; that is, for people who were put into a fatigued state, the concept of fatigue was made salient, which made it more likely to attribute the behavior to fatigue. This explanation seems unlikely as it cannot account for the extremity effects found in Study 2.1. If the accessibility of fatigue, rather than the sensation of the itself, drove these effects, then no differences should have been observed between participants in the moderate and severe fatigue conditions (where fatigue was in both cases accessible).

## Study 2.2

In Study 2.1 participants exhibited a hot/cold empathy gap. In Study 2.2 we tested the strength of this gap. We examined whether people could in fact become more empathetic of another's visceral state if they were instructed to do so. To do this we replicated Study 2.1 but this time made the link between the memory task and the vignette explicit and encouraged participants to make judgments *as if* they were in a different visceral state. Thus, people in a cold (hot) state were asked to rate the vignette as if they were in a hot (cold) state.

Although past research has shown that people can often adjust their attributions when motivated to do so (Regan & Totten, 1975; Schwarz, 2001), it generally requires that people become aware of the relevant situational influences (Gilbert & Malone, 1995). For example, if people realize that their judgments are being affected by the bad weather, they can correct for this influence (Schwarz & Clore, 1983). Visceral drives have two features that might make their past influence difficult to observe. As noted earlier, people have little to no ability to recall visceral sensations and these sensations are extremely transient: considerable pain, hunger, or thirst can be relieved entirely within a few moments. With this in mind, we predict that motivating participants to empathize with another's past visceral state would not affect the attribution pattern observed in Study 2.1.

### Method

One hundred and forty-eight University of Amsterdam undergraduates participated in a study that followed the same basic paradigm of Study 2.1. The study consisted of four conditions: non-fatigue

and fatigue (which were identical to the non-fatigue and severe fatigue conditions in Study 2.1), and non-fatigue empathetic and fatigue empathetic. These latter conditions required participants to make attributions as if there were in a different visceral state. In the non-fatigue empathetic condition, participants were reminded that the student from the vignette had attributed his performance to fatigue, and were asked to make attributions about the student's performance as if they were themselves fatigued. In the fatigue empathetic condition, participants were reminded that they had just completed a fatiguing memory task and were asked to not allow their own fatigue to affect their attribution ratings.

Results and Discussion

We examined the effects of visceral state (fatigue, no fatigue) and attribution perspective (empathy, non-empathy) on fatigue and dispositional attribution ratings. There was a main effect of fatigue on participants' fatigue attributions $F(1, 147) = 29{,}02$, $p_{rep} < .001$, $\eta^2 = .16$ and dispositional attributions $F(1, 147) = 38{,}43$, $p_{rep} = .98$, $\eta^2 = .21$, replicating the findings from Study 2.1.

We next examined whether the instruction to empathize with another's past visceral state would decrease the difference in attribution ratings observed in the control conditions. As predicted, there was no main effect of attributional perspective or interaction effect on these ratings (All $F$'s $< 1$). Even when instructed to take the biasing influence of their current visceral state into account, fatigued participants continued to attribute the student's performance to fatigue ($M = 5.08$; $SD = 1.32$) more than non-fatigued participants ($M = 4.05$; $SD = 1.28$), $F(1,72) = 11.29$, $p_{rep} = .98$, $\eta^2 = .13$. Likewise, non-fatigued participants continued to attribute the student's performance to dispositional factors ($M = 4.83$; $SD = .81$)

more than fatigued participants (M =3.88; *SD* = 1.27), $F(1,72) = 15.23$, $p_{rep} = .98$, $\eta^2 = .18$.

These results reveal that hot/cold empathy gaps are strong: participants could not correct for the biasing influence of their current visceral state even when instructed to do so. These findings have applied significance, as they suggest that efforts designed to help people overcome empathy gaps are likely to be unsuccessful. For example, warning a colleague who is tempted to engage in risky sexual behavior (say by starting up a relationship with a co-worker) that she will regret it in the morning will have very little impact on their judgment.

In addition, these findings further rule out the possibility that accessibility or demand effects drive the hot/cold empathy gap. In this study non-fatigued participants were asked to make attributions as if they were fatigued, making the potential influence of fatigue highly salient. Yet these participants still differed from fatigued participants in their attribution ratings.

## Study 2.3

The first two studies investigated how we perceive the influence a past visceral state exerted on another person's behavior. In Study 2.3 we examine how people perceive the influence a past visceral state exerted on their *own* behavior. Examining this effect in the context of one's own past behavior provides a more rigorous test of the hot/cold empathy gap, as people make attributions about an event they have actually experienced, and thus make their attributions with the benefit of a concrete memory of the event and a clear retrieval cue. Consistent with the previous studies, we expect participants to attribute their own past behavior primarily to

visceral drives when they are in a hot state, whereas we expect participants to attribute their own past behavior primarily to other, non-visceral factors when in a cold state.

This study also examines the consequences of these differential attribution ratings. The way people make attributions has enormous consequences for their well-being (Peterson, Seligman, & Vaillant, 1988), and making dispositional attributions for negative outcomes can have numerous psychologically and physically negative consequences (Buchanan & Seligman, 1995). With this in mind, we examined whether participants who attributed their performance to dispositional attributions would report less satisfaction with their performance than participants who attributed their performance to visceral factors.

## Method

Fifty-nine University of Amsterdam undergraduates completed the study individually. The study was divided into two parts. In the first part, participants performed a challenging memory test: in each trial participants had ten seconds to memorize a 12-digit number string. The test took approximately four minutes to complete. Forty of the participants performed the memory test under mildly painful conditions (i.e., keeping their non-dominant arm in a bucket of ice water approximately 5 degrees Celsius). This procedure is known as the cold pressure task and is the most common and well-validated way of inducing pain in the laboratory (Kelly & Cooper, 1998). A control condition ($n$ = 20) completed the memory test pain free (i.e., non-dominant arm in room temperature water). This enabled us to assess the objective effect of pain on the memory test.

Participants in the control condition were not included in the remainder of the study. Thus, the second part of the study only included the 40 participants who performed the cold pressure task. After completing the memory test, participants dried and warmed their hand with a towel and then completed a 10-minute filler task. Afterwards participants received false feedback on the memory test indicating that they had performed poorly (only recalling 30% of the digits correctly). Participants were then asked to indicate the extent to which the ice water and several dispositional factors influenced their performance on the memory test, and indicate how satisfied they were with their performance on the test. Crucially, half of the participants ($n$ = 20) made their attributions under mild pain (i.e., putting their arm back in the ice water) whereas the other participants ($n$ = 20) made their attributions under no pain (arm in room temperature water). This design thus consisted of three conditions: a control condition that only completed the memory task and did so pain-free; a pain attribution condition that conducted both the memory test and then made their attributions about their performance under pain; a pain-free attribution condition that performed under pain during the memory test but later made attributions about their performance pain-free.

## Results and Discussion

We first examined our assumption that the pain from the cold pressure task would hinder performance on the memory test. Memory scores reflect the mean number of digits participants remembered in the correct order. As predicted, participants who performed the memory test under pain scored significantly lower ($M$ = 5.54; $SD$ = 1.03) than participants who performed the test pain-free ($M$ = 6.40; $SD$ = 1.34), $F(1,57) = 10.14$, $p_{rep} = .98$, $\eta^2 = .15$.

We next examined whether participants would acknowledge the influence the pain had on their performance. As predicted, participants who made their attributions under pain attributed their performance to the cold water ($M$ = 5.40; $SD$ = 1.18) to a greater extent than participants who made their attributions pain-free ($M$ = 4.42; $SD$ = 1.22), $F(1,38) = 5.02$, $p_{rep} = .84$, $\eta^2 = .12$. Moreover, participants who made their attributions pain free attributed their performance to dispositional factors ($M$ = 4.53; $SD$ = .94) to a greater extent than participants who made their attributions under pain ($M$ = 3.81; $SD$ = 1.16), $F(1,39) = 4.69$, $p_{rep} = .87$, $\eta^2 = .11$ (See Figure 2.1). These findings demonstrate that visceral empathy gaps can occur even when people make attributions about their own behavior, and that they can develop very soon after the visceral drive is extinguished.

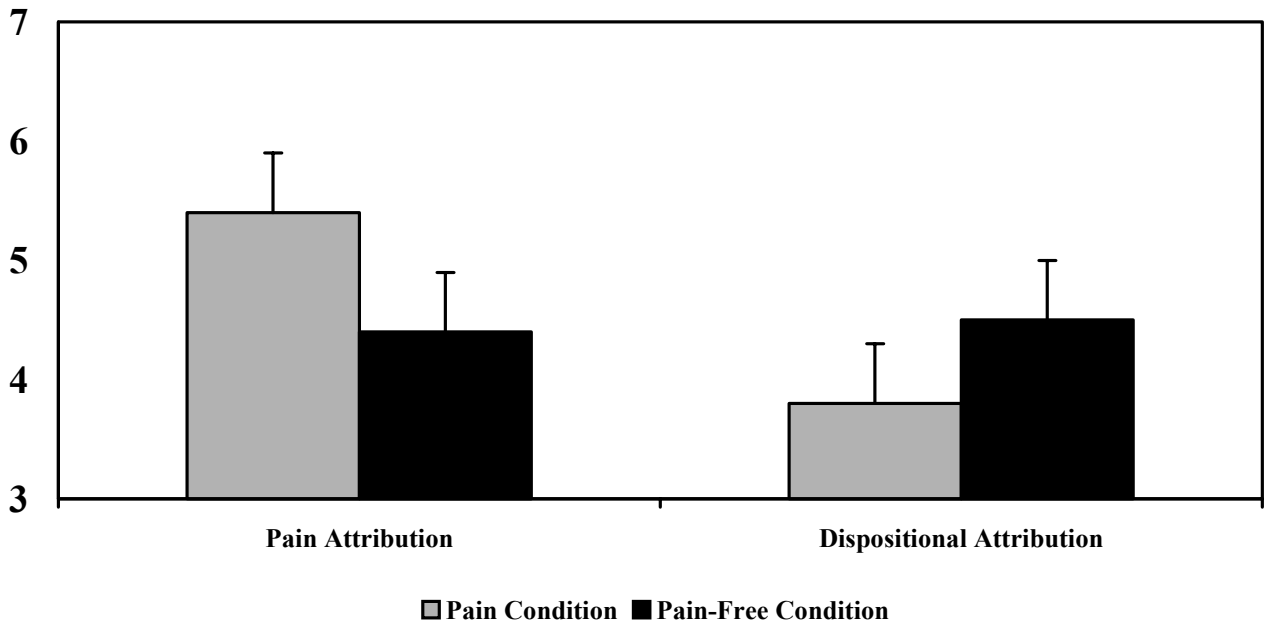


**Figure 2.1** - *Mean rating of pain and dispositional attributions by condition.*

Because people received negative feedback on the test, attributing their performance to the pain can be interpreted as "self-serving," whereas attributing their performance to dispositional factors can be interpreted as

"self-disserving." We next examined whether participants who attributed their performance to the cold water would report greater satisfaction with their performance than participants who attributed their performance to dispositional factors. As predicted, the more participants attributed their performance on the memory test to the pain, the more satisfied they were with their performance, $r$ (40) = .39, $p_{rep}$ = .95. We also found this effect across conditions. Participants who made their attributions pain-free (and thus explained their poor performance in terms of dispositional attributions) reported less satisfaction with their performance ($M$ =3.05; $SD$ = 1.01) than participants who made their attributions under pain ($M$ = 3.75; $SD$ = 1.14), $F(1,38) = 3.53$, $p_{rep} = .86$, $\eta^2 = .09$.

## General Discussion

Visceral drives impose an enormous influence on daily life. Yet as the present research demonstrates, people often have very little insight into the impact of past visceral drives. In fact, the extent to which people appreciate the influence of *past* visceral states depends largely upon their *current* visceral state. We found that when people were in a hot state, they attributed behavior primarily to visceral influences, whereas when people were in a cold state, they underestimated the influence of visceral drives and instead attributed behavior primarily to other, non-visceral factors.

This effect was also sensitive to the extremity of the visceral state, such that people in a moderately hot state (e.g., moderate fatigue) had difficulty appreciating the past influence of a more severe hot state (e.g., severe fatigue). This extremity effect has implications for how we evaluate behavior that is carried out during extreme visceral states. Even when we are experiencing mild-to-moderate visceral sensations—a moderate

amount of anger, for instance—it may be nearly impossible to fully appreciate the influence of a more extreme form of this state (in this case, full blown rage). Given that most of the time we are not in strong visceral states, it seems likely that our explanations of the effects of past visceral states are very often biased. These biased attribution patterns are of considerable consequence, as they can shape our understanding of the past and affect our sense of well-being. In support of this notion, in Study 2.3 participants who attributed their poor performance to visceral factors were more satisfied than participants who made dispositional attributions.

Loewenstein (1996) has argued that this hot/cold empathy gap is due to people's constrained memory for visceral experiences: because the sensory experience of a visceral drive cannot be freely recalled, the influence a visceral drive might have exerted remains highly inaccessible. The present studies provide more direct evidence for this notion. We found that participants could not correct for the biasing influence of their current visceral state when instructed to do so or when making attributions about their *own* past behavior, demonstrating that the hot/cold empathy gap is indeed difficult to overcome. This finding differs from the bulk of research on the stability of misattribution effects. Regan and Totten (1975) found that asking people to identify with another's situation resulted in more empathetic attributions. Likewise, simply making people aware of the incidental effects of mood on their attributions is enough for them to correct for moods biasing influence (Schwarz & Clore, 1983). One avenue for future research is to consider what aspects of mood and visceral states account for these differences.

A limitation of this study is that, although it clearly demonstrates that people's current visceral state largely shapes the attributions they

make about the past, the objective accuracy of these attributions remains unclear. Findings from research on the prediction of future visceral states has found that people in a hot state tend to be more accurate than people in a cold state in predicting the influence of future hot states. Although these findings might lend tentative support to the notion that people in a hot state make more accurate attributions about the influence of past hot states, it could well be the case that people in a hot state in fact overestimate the influence of past hot states. This account would be more in line with research on the focusing illusion (Schkade & Kahneman, 1998), which has found that people tend to overweigh the salient affective features of an event.

Imagine again the example of the satiated dieter who tries to make sense of his candy bar binge. The present research suggests that the satiated dieter, who only moments earlier could think of nothing else but satisfying his craving, is likely now to underestimate the influence hunger had on his behavior and instead explain his binge in terms of other factors, such as his insufficient motivation or inadequate social support. The dieter's mistaken attributions not only hinder his ability to learn the right lesson from the experience (i.e., that controlling hunger cravings is a key to dieting success) but also darken his assessment of his weight-loss efforts and perhaps reduce his hope for weight-loss in the future.

# CHAPTER 3

## *Evaluating Eve: Visceral States Influence the Evaluation of Impulsive Behavior*

*Based on Nordgren, van der Pligt, & van Harreveld (2007)*

The human body contains a finely tuned system that provides information about the state of the body and directs behavior toward satisfying bodily needs. For example, we experience hunger when we require nourishment, thirst when dehydrated and fatigue when 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.

Beside 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 he 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 percent of teachers believed that becoming obese is the worst thing that can happen to a person; 24 percent of nurses felt "repulsed" by obese persons; and parents provided less college support for their overweight 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, are both 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 of impulsive behavior. These factors would suggest that people might find it easier to empathize with impulsive behavior than it seems 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

Numerous studies have found that people often have tremendous difficulty estimating the influence 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/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 intended to purchase. They found that, compared to 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 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 non-visceral 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 (Ross, 1977; Gilbert & Malone, 1995). 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 his or her behavior. Instead, they may conclude that the colleague's affair is a sign of a serious character flaw.

Support for this reasoning comes 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. Afterwards, participants were asked to judge for themselves what factors they thought contributed to the student's performance. Crucially, prior to the study half of the participants were made fatigued through a strenuous mental exercise. They 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, non-fatigued 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 non-fatigued 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 (in)ability to appreciate the motivational force of cravings for food, drugs, sex, etc., 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 upon 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 people in a cold state. This prediction was tested using three visceral states that are frequent triggers of impulsive behavior—fatigue, hunger, and sexual arousal. In the studies 3.1 and 3.2 this prediction was tested in an interpersonal context—participants evaluated the impulsive behavior of others. However, because cravings are transient (even heavy drugs addicts are not in a constant state of craving), this prediction is relevant in an intrapersonal context as well. In study 3.3 participants evaluated an instance of their own past impulsive behavior. This study also examined the mechanism that drives this effect. We tested our prediction that people in a hot state perceive visceral states to be more difficult to overcome than participants in a cold state, and these differences in control mediate the effect of visceral state on the evaluation of impulsive behavior. In Study 3.4, we examined the boundaries of this effect by

testing whether being in a hot state influences only 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 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 Others in the Self" Scale). For each study we expected a hot/cold empathy gap effect, whereby participants in a hot state form more positive evaluations, feel more compassion and less contempt, and judge themselves to be more similar to an impulsive other than people in a cold state.

## Study 3.1

The goal of this first study was to examine whether people's perception of impulsive behavior depends upon 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, 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 participant who were themselves fatigued would have more favorable evaluations of the woman's behavior than 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 our inability to freely recall visceral experiences. That is, though we can recall the circumstances that led to a visceral drive (e.g., I was hungry because I didn't eat all day) and recall the relative strength of a visceral drive (e.g., that was the most hungry I have ever been), we cannot freely bring forth the sensation of hunger itself. In line with this thinking, we expected that reminding non-fatigued people of the influence of fatigue would not increase the favorability of their ratings.

To address these goals, this study contained three conditions: fatigue, non-fatigue, and imagined fatigue. The imagined fatigue condition was identical to the non-fatigue 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 both participants who were not fatigued and participants who tried to make judgments as if they were fatigued.

## Method

### *Participants*

One hundred and two students from the University of Amsterdam (37 male and 65 female) 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: fatigue, non-fatigue, or imagined fatigue condition. The fatigue manipulation was similar to that used in Nordgren, van der Pligt, and van Harreveld (2006). Participants were asked to complete a strenuous memory task that lasted for 20 minutes. The memory task consisted of 9-digit number strings that participants were asked to memorize. Each number string appeared for 11 seconds, after which participants were asked to "hold the numbers in their head" for seven seconds before finally being asked to type in the number string to the best of their ability. The fatigue 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 non-fatigue and imagined fatigue conditions performed a much milder version of the memory task—10 trials of three-digit number strings.

Afterwards, 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 five cents more than she has, and the cashier (who is an ethnic minority common to the Netherlands) refuses to allow the mother to buy the baby formula for five 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 make their judgments as if they too were fatigued.

*Materials*

*General evaluation.* The general evaluation questions assessed participants' attitudes toward the mother's behavior as well as 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.* Participants next 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 (or referred to here as compassion) (Batson, 1991), and what Rozin, Lowery, Imada, & 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 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.* Participant then 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 then asked to consider 1) "To what extent have you acted in a similar way in the

*past*?" 2) "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 (IOS) 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 ANOVA's 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 non-fatigue ($M$ = 3.34, $SD$ = 0.91) and 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 non-fatigued ($M$ = 2.02, $SD$ = 1.03) and imagined fatigue participants ($M$ = 2.11, $SD$ = 0.61), $t(99) = 3.53$, $p = .001$, $\eta^2 = .12$).

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

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 both participants in the non-fatigue ($M$ = 2.25, $SD$ = 1.25) and 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 participants who were not fatigued. Importantly, 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 (non-fatigued) 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 fatigue and non-fatigue 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 3.2

The goal of Study 3.2 was to replicate the findings from the first study using 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.

Study 3.1 relied on explicit, self-report measures. A second goal of the present study was to test whether these effects would emerge using 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 three minutes. After the video, participants evaluated the impulsive eater using the same measures used in Study 3.1. 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 satiated participants.

## Method

### *Participants*

Forty-nine students from the University of Amsterdam (14 male and 35 female) participated in the study for course credit.

### *Procedure*

Several days before the study, participants were randomly assigned to either the hungry or satiated condition. Participants in the hungry

condition were instructed not to eat for at least four hours 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 run individually in a private cubicle. Participants were told they were about to watch a video that depicts an everyday moment in someone's life. The goal of the video was to present participants with a situation in which someone eats impulsively; that is, 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 three minutes and thirty seconds). 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 3.1.

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 rather 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. Inter-rater reliability was high (.92) and disagreements were resolved through discussion. Data from four participants were lost (two from each condition) due to 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" (.91 alpha), "Emotion" (.89 alpha), and "Similarity to self" (.83 alpha) items were identical to those used in Study 3.1.

## 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 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 hunger condition evaluated the impulsive eater's behavior somewhat more positively ($M$ = 3.49, $SD$ = 0.86) than 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 contemptuous feelings for the impulsive eater ($M$ = 4.23, $SD$ = 1.06) than 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 compassionate feeling for the impulsive eater ($M$ = 3.30, $SD$ = 1.35) than 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 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 hunger condition displayed less negative facial expressions ($M$ = 2.20, $SD$ = 0.88) than satiated participants ($M$ = 2.76, $SD$ = 0.90), $F$ (1, 45) = 4.96, $p$ = .03, $\eta^2$ = .10.

These effects replicate Study 3.1 using a different visceral state. We found that hungry participants judged impulsive eating more favorably than 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 exist interview that participants understood the goal of the study, it may be that, for example, hungry participants to some extent sensed that they were suppose 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, gambler, drug addict, etc, 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 3.3**

In the first two studies we found that, across a variety of circumstances, people in a hot state evaluated impulsive behavior more favorably than people in a cold state. The goal of Study 3.3 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, van der Pligt, & van Harreveld, 2006). We argue that this underestimation leads people to stigmatize impulsive behavior because it creates the illusion that impulsive behavior is undertaken willing 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. Based on 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 3.3 we also examined whether this effect occurs when participants evaluate their own past behavior. We asked men to recall a past sexual behavior that they now regret, and 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 men who were not aroused.

## Method

*Participants*

Seventy-eight male students from the University of Amsterdam 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 three minutes to think up 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 still provide us some idea that they did have a specific sexual regret in mind. At the end of the three-minute description period, participants were asked whether they had indeed thought of and described a sexual regret. All men were able to think up a past sexual regret.

In part two of the design, participants were randomly assigned to either the sexual arousal or non-arousal condition. Participants in the sexual arousal condition watched a ten-minute erotic film, whereas participants in the non-aroused condition watched a ten-minute 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 ten minutes 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*). 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*) scales. The general evaluation questions assessed participants' attitudes toward their past sexually regrettable behavior using the same items used in Study 3.1. Unlike the previous two studies, however, global evaluations were not assessed. Cronbach's alpha was .88. The "Emotion" (.89 alpha), and "Similarity to self" (.82 alpha) items were identical to those used in Study 3.1.

## 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 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 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 men who were not aroused (*M* = 2.70, *SD* = 1.30), *F* (1, 77) = 7.98, $p = .006$, $\eta^2 = .09$), and had less contemptuous feelings (*M* = 2.56, *SD* = 0.67) than men who were not aroused (*M* = 3.13, *SD* = 0.81), *F* (1, 77) = 10.88, $p = .001$, $\eta^2 = .13$) (See Figure 3.1).

*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 men who were not aroused (*M* = 3.23, *SD* = 1.29), *F* (1, 77) = 8.70, $p = .004$, $\eta^2 = .10$).

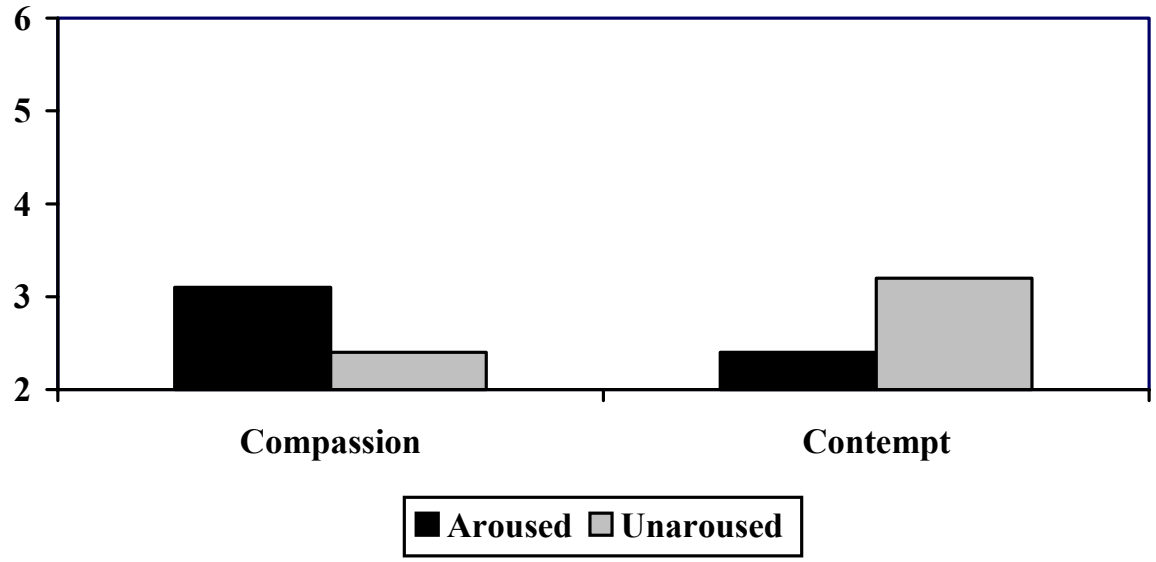


**Figure 3.1 -** *Mean rating of empathetic emotions (compassionate and contemptuous) by condition (sexually aroused and sexually non-aroused).*

*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 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 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 3.1 and 3.2 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 they conclude that men who are un-aroused are likely to underestimate the extent to which sexual arousal can influence their behavior. Study 3.3 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 3.4**

Study 3.4 sought to rule out an alternative explanation of the findings from the previous three studies. We have argued that 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 it is the arousal itself that 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). Afterwards, participants received either the hunger-based scenario and dependent measures used in Study 3.2 or the fatigue-based scenario and dependent measures used in Study 3.1. We predicted that hungry and fatigued participants would make favorable evaluations only for corresponding impulsive behavior. For example, we expected hungry participants who evaluated the binge eater to make more favorable evaluations than the control and, crucially, fatigued participants. Likewise, we expected fatigued participants to evaluate the fatigued mother (from Study 3.1) more favorably than both the control and hunger conditions.

## Method

### *Participants*

One hundred and forthy-nine students from the University of Amsterdam (54 male and 95 female) participated in the study for course credit.

### *Procedure*

Several days before the study, participants were randomly assigned to either the hunger, fatigue, or control condition. Participants in the hungry condition were instructed not to eat for at least four hours prior to participation in the study. Participants in the fatigue condition completed

the "severe fatigue" manipulation used in Study 3.1, and participants in the control condition did not receive a visceral-inducing manipulation.

Participants were run individually in a private cubicle. Participants were randomly assigned to either the fatigue scenario used in Study 3.1 or the hunger scenario used in Study 3.2. All aspects of these materials were identical to those used in first two studies.

*Materials*

The "General evaluation" (.89 alpha), "Emotion" (.90 alpha), and "Similarity to self" (.85 alpha) items were identical to those used in Study 3.1.

## 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 both participants in the hungry ($M$ = 2.25, $SD$ = 0.93) and 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 participants in the hungry ($M$ = 3.39, $SD$ = 1.10) and 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 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 fatigue condition also had less contemptuous feelings for the mother ($M$ = 2.78, $SD$ = 1.31) than participants in the hungry ($M$ = 3.32, $SD$ = 1.42) and 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 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 both participants in the fatigue ($M$ = 2.40, $SD$ = 0.80) and 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, $SD$ = .66) than participants in the fatigue ($M$ = 2.65, $SD$ = 1.01) and control conditions ($M$ = 2.85, $SD$ = 1.36), $t(61) = 3.51$, $p = .001$, $\eta^2 = .12$) (See Figure 3.2).

*Emotion.* Hungry participants also had more empathetic feelings for the binge eater ($M$ = 3.56, $SD$ = 1.02) than participants in the fatigue ($M$ = 2.87, $SD$ = 0.97) and 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 contemptuous feelings for the binge eater ($M$ = 4.04, $SD$ = 1.02) than participants in the fatigue ($M$ = 4.87, $SD$ = 1.37) and control conditions ($M$ = 4.85, $SD$ = 1.63), $t(61) = 2.32$, $p = .02$, $\eta^2 = .08$).

*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 participants in the fatigue ($M$ = 2.27, $SD$ = 0.95) and 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 importantly 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 only be the case 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. The present study aims 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, van der Pligt, & van Harreveld, 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 participants 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 participants in a cold state. Although participants in hot states consistently made more favorable evaluations than those in a cold state, it is noteworthy that the mean scores for hot participants' evaluations rarely reached beyond the mid-point 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 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 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 3.1 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

fatigue and imagined fatigue conditions. More importantly, 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 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 3.4 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 for fatigue-related impulsive behavior. Likewise, participants who were fatigued only made more favorable evaluations of fatigue-related impulsive.

Studies 3.1, 3.2 and 3.4 had participants evaluate the impulsive behavior of another person. In Study 3.3, we found that one's current visceral state can also influence evaluations for 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 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 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 3.3 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 they 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 into those people who work with, or make decisions about, impulsive behavior (social works, 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.

# CHAPTER 4

## *The Instability of Health Cognitions: Visceral States Influence Self-Efficacy and Related Health Beliefs*

*Based on Nordgren, van der Pligt, & van Harreveld (In Press)*

The modern lifestyle, with its sedentary jobs and super-sized portions, often does not make for a healthy lifestyle. Yet the principle obstacle for many types of health behavior is age-old: visceral drives, such as hunger, drug craving, or sexual arousal, make unhealthy behavior difficult to avoid. Visceral drives provide information about the state of the body and direct behavior toward satisfying bodily needs. Hunger, for example, is a visceral sensation that creates a desire for food consumption, particularly for food that is high in caloric energy (i.e., fatty foods). Therefore, for anyone who tries to reduce caloric intake, hunger makes food consumption a daily temptation that can undermine even the most determined plans to lose weight. Health researchers have long understood that visceral drives can be an impediment to healthy behavior, and have conducted extensive research on ways to dampen the corrupting influence of visceral states. Methadone, nicotine patches, and appetite suppressants, for instance, are all methods used to try and reduce the impulsive influence of particular visceral drives.

Although visceral drives have an undeniable influence on health behavior, empirical studies in a number of domains suggest that people often underestimate this influence (Loewenstein, 1996; Loewenstein, 2005). More specifically, when people are in a "cold," affectively neutral state they tend to underestimate the influence of "hot," affective states. For example, in a series of studies Nordgren, van der Pligt, and van Harreveld (2006) used visceral states to hinder participants' performance on a variety of tasks. Afterwards, they asked participants to indicate how various factors impacted their behavior. They found that when people were in a hot state (e.g., fatigued), they attributed their behavior primarily to the visceral influence, whereas when people were in a cold state (e.g., non-fatigued), they underestimated the influence of the visceral state and instead attributed behavior primarily to dispositional factors.

In a study designed to test the impact of drug craving on decision-making, heroin users were asked to indicate how much money they would be willing to pay for the heroin substitute Buprenorphine (Badger et al, in press). They found that heroin addicts would value an extra dose of Buprenorphine more highly when they were craving heroin than when they were currently satiated.

The "empathy gap" effect has also been shown to have important implications for people's perception of control. For example, Nordgren, van der Pligt, and van Harreveld (2007) conducted an experiment in which participants watched a video of a man who binge eats. Participants, half of whom were hungry and half of whom were satiated, were then asked to evaluate the man's (impulsive) behavior. They found that hungry participants made more favorable evaluations of the binge eater than satiated participants. This effect was found to be due to differences in

perceptions of control. Unlike hungry participants, satiated participants were under the illusion that hunger craving was easy to control, and therefore perceived binge eating to be undertaken freely (and thus blameworthy).

In the present study we examine whether visceral states similarly influence people's perceptions of control over their own health behavior. Control perceptions are crucial to the initiation and maintenance of healthy behavior (Bandura, 1986). For example, research has shown that self-efficacy (i.e., the belief that one can produce a desired effect) influences both weight-loss (Schwarzer & Renner, 2000) and smoking cessation (Borland, Owen, Hill, & Schofield, 1991).

On the basis of the hot-cold empathy gap literature we can form two hypotheses about the relationship between visceral states and self-efficacy beliefs. First, we predict that self-efficacy beliefs will vary with one's visceral state. For example, as a smoker's urge for nicotine shifts throughout the day between craving and satiation, we expect smokers' self-efficacy beliefs to fluctuate accordingly. Second, we predict that people will have higher self-efficacy beliefs when in a cold state than when in a hot state. Thus, a smoker should have more confidence that she can quit smoking when she is satiated than when she is craving nicotine.

Importantly, differences in self-efficacy beliefs should, in turn, influence health beliefs that are related to self-efficacy, such as future behavioral intentions (Bandura, 1982). For instance, if satiated dieters believe weight loss is easy to achieve, they should consequently intend to lose more weight compared to hungry dieters who perceive weight-loss to be difficult.

## The Present Studies

In two studies we examined the influence visceral states have on self-efficacy and related health beliefs. We tested this prediction in the context of weight-loss and smoking cessation. We expected that participants' self-efficacy beliefs would vary with their visceral state. More specifically, we expected that people in a hot state (i.e., experiencing hunger or cigarette craving) would have lower self-efficacy ratings than would participants in a cold state. Furthermore, we predicted that differences in self-efficacy would lead to differences in health beliefs related to self-efficacy, such as behavioral intentions.

## Study 4.1

The goal of this study was to examine the influence of cigarette craving on self-efficacy and related beliefs. We randomly assigned smokers to either a state of craving or satiation, and then asked them to evaluate how confident they were they could quit smoking (self-efficacy) and indicate their intention to quit smoking (quit intentions). We predicted that self-efficacy and quit intentions would be influenced by smokers' level of cigarette craving. Specifically, we predicted that satiated smokers would be more confident in their ability to quit smoking than would craving smokers, which, in turn, would lead satiated smokers to form more ambitious quit intentions compared to craving smokers.

### Method

*Participants*

Sixty-nine smokers (33 males and 36 female) participated for course credit or for money. Participants had to smoke more than five cigarettes per day in order to be eligible for participation. Participants,

who ranged from 18 to 51 years of age, were primarily students and employees of the University of Amsterdam.

*Procedure*

Smokers were recruited through sign-up sheets posted on campus. After signing-up for participation, smokers were contacted by phone several days before the experiment in order to receive condition assignment. Participants in the satiated condition were asked to smoke at least one cigarette no longer than fifteen minutes before the experiment. Participants in the craving condition were asked to abstain from smoking for at least two hours before the experiment. Participants from both conditions were also required to bring one of their own cigarettes with them to the laboratory.

Participants performed the experiment in a computer lab with individual cubicles. Participants in the craving condition began the experiment by watching a 10-minute video clip intended to induce cigarette craving. The clip, from the movie *Coffee and Cigarettes,* depicts a conversation between two people about their love of cigarettes. We chose this clip because during the conversation the people smoke continuously, and the camera is often focused tightly on the inhaling and exhaling of cigarette smoke. To further encourage cigarette-craving, smokers held one of their own (unlit) cigarettes in their mouth while they watched the film clip. Afterwards, participants filled out a short questionnaire about smoking cessation. Participants in the satiated condition did not watch the film clip and began directly with the smoking cessation questionnaire.

*Materials*

The questionnaire contained four sets of measures: smoking history, cigarette craving, self-efficacy beliefs, and intentions to quit smoking.

*Smoking history.* We assessed participants' smoking frequency by asking them to indicate "How many cigarettes do you smoke a day?" on a 1 (*less than 5*) to 5 (*more than 20*) point scale. We also assessed whether participants had attempted to quit smoking in the past by asking, "Have you ever attempted to quit smoking?" on a dichotomous "yes" or "no" scale. The two conditions did not statistically differ by either of these two items.

*Cigarette Craving.* We assessed participants' level of cigarette craving by asking them to indicate, "How much craving do you currently have for a cigarette" on a 1 (no *craving*) to 7 (*extreme craving*) point scale. To ensure that participants followed our instructions for condition assignment, we asked participants to report, "How long ago did you last smoke?" on a 1 (*less than a half-hour ago*) to 4 (*more than two hours ago*) scale.

*Self-Efficacy.* We assessed participants' confidence in their ability to quit smoking with three questions: (a) "I can easily quit smoking," (b) "I have control over my cigarette cravings," (c) "The impulse to smoke is difficult to resist" (reverse scored) ($\alpha = .87$). These items were measured on a 7-point scale ranging from *strongly disagree* to *strongly agree.*

*Quit Intentions.* We asked participants one question to assess their intention to quit smoking. "In three years I will no longer smoke cigarettes." This item was measured on a 7-point scale ranging from *strongly disagree* to *strongly agree.*

## Results and Discussion

*Manipulation Check.* Participants complied with the requirements for condition assignment, as smokers in the satiated condition reported have a cigarette more recently ($M$ = 1.08, $SD$ = 0.36) than smokers in the craving condition ($M$ = 3.47, $SD$ = 0.76), $F$ (1, 68) = 79.08, $p < .001$, $\eta^2$ = .81. The manipulation itself was successful as smokers in the craving condition reported experiencing more cigarette craving ($M$ = 5.50, $SD$ = 1.07) than smokers in the satiated condition ($M$ = 2.84, $SD$ = 1.36), $F$ (1, 68) = 79.08, $p < .001$, $\eta^2$ = .54.

*Smoking cessation beliefs.* As expected, smokers in the craving condition had less self-efficacy ($M$ = 3.04, $SD$ = .89) than smokers in the satiated condition ($M$ = 3.86, $SD$ = 1.25), $F$ (1, 68) = 9.34, $p$ = .003, $\eta^2$ = .12. Moreover, we found that smokers in the craving condition had less intention to quit smoking in three years time ($M$ = 4.46, $SD$ = 1.64) than did smokers in the satiated condition ($M$ = 5.27, $SD$ = 1.57), $F$ (1, 68) = 4.26, $p$ = .04, $\eta^2$ = .06 (see Figure 4.1).

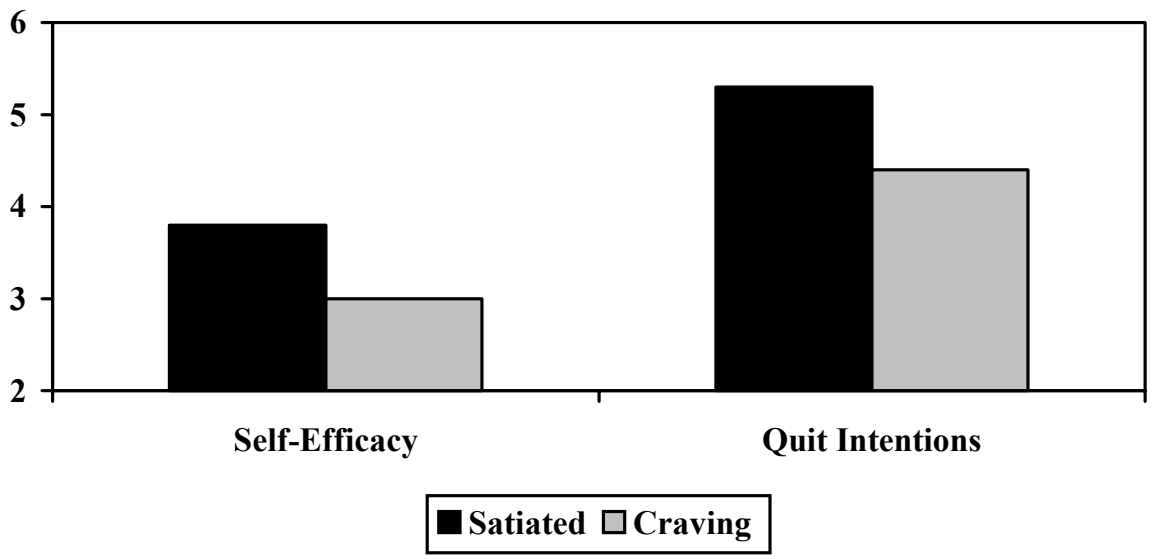


**Figure 4.1 -** *Mean self-efficacy and weight-loss intention ratings by condition (satiated and craved smokers).*

*The mediating role of self-efficacy.* We next examined our prediction that self-efficacy mediates the effect of craving state on quit intentions. The necessary conditions for mediation were first established: cigarette craving was negatively correlated with quit intentions, $r$ (68) = -.47, $p$ <.001; craving state was negatively correlated with self-efficacy, $r$ (68) = -.34, $p$ =.005; and self-efficacy was positively correlated with quit intentions, $r$ (68) = .54, $p$ <.001. As predicted, the correlation between craving state and quit intentions was significantly reduced when the mediating variable—self-efficacy—was statistically controlled, z = -3.02, $p$ = .003.

This study demonstrates that how smokers think about smoking is influenced by their momentary state of cigarette craving. In line with research on the hot-cold empathy gap, we found that, compared to satiated smokers, smokers who were craving cigarettes had less confidence in their ability to quit smoking. Differences in self-efficacy, in turn, led smokers who were craving cigarettes to have less intention to quit smoking compared to satiated smokers.

These findings add to a number of studies that have shown that visceral states can influence health beliefs (Ditto, Pizarro, Epstein, Jacobson, & MacDonald, 2006). For example, earlier research has found that sexual arousal influences people's risk perception of having unprotected sex (Blanton & Gerrard, 1997) and influences people's intentions to commit sexually aggressive acts (Loewenstein, Nagin, & Paternoster, 1997). Yet the findings from Study 4.1 are the first to demonstrate a link between visceral states and self-efficacy beliefs.

This study supports the idea that health beliefs are dynamic constructs. The widespread use of health cognitions as a way of predicting

subsequent behavior benefits from the assumption that health beliefs change little over time. Yet our findings suggest that two beliefs central to smoking cessations—self-efficacy and intentions to quit—vary with a smoker's state of craving.

A limitation of this study is that it focused on smoking cessation beliefs using a sample of smokers who were not necessarily trying to quit smoking. One possibility is that cigarette craving so readily influenced cessation beliefs because these beliefs were not well established. One of the goals of Study 4.2, therefore, was to replicate these effects in a sample that was actively engaged in behavioral change.

## Study 4.2

In Study 4.2 we sought to replicate the findings from the previous study in the context of another important health behavior—weight loss. To do that, we assessed the weight-loss beliefs of dieters from a commercial weight-loss program. Along the same lines as Study 4.1, we expected dieters' hunger state to influence their beliefs about the weight loss process. Specifically, we expected that hungry dieters would have less confidence in their ability to diet effectively than would satiated dieters. Furthermore, we predicted that differences in self-efficacy would not only influence weight-loss intentions (as in Study 4.1), but would also influence satisfaction with past behavior. We reasoned that a dieter who is self-confident should apply a more rigorous standard to interpret past weight-loss efforts. In other words, if dieting is perceived to be very easy, one should expect more from past weight-loss attempts than if dieting is perceived to be very difficult. Overall, we expected that satiated dieters would have higher self-efficacy than hungry dieters, which, in turn, would

lead satiated dieters to set more ambitious future weight-loss goals and be less satisfied with their past weight-loss efforts.

Lastly, we tested the notion that weight loss beliefs are sensitive to the degree of the hunger state. Previous research (Nordgren et al, 2006) has found that empathy gaps exist not only between cold and hot states, but also between hot and hotter states. In line with those findings, we expected to find differences not only between satiated and hungry dieters but also between dieters who were mildly and moderately hungry.

## Method

### *Participants and Procedure*

A pen-and-paper questionnaire was administered to 307 (297 women and 10 men) members of a commercial weight loss program. Dieters were asked to participate after they had been weighed and were waiting for the program to start. The age of the participants ranged from 21 to 79 years ($M$ = 43). Their mean height was 169 cm (ranging from 150 to 198, $SD$ = 7 cm), their mean weight was 85 kg (ranging from 55 to 157 kg, $SD$ = 15 kg). Their mean BMI was 29.7 kg/m$^2$ (ranging from 21.5 to 48.5, $SD$ = 4.8), which is just within the overweight range, bordering on obesity. In the previous week dieters lost an average of 5.16 metric ounces (ranging from a weight-gain of 29 ounces to a weight-loss of 38 ounces).

### ***Materials***

The questionnaire contained five components: hunger state, diet history, self-efficacy, weight-loss intentions, and satisfaction with past dieting performance.

*Hunger state.* We used two items to assess dieters current hunger state. Participants were asked to consider “How hungry are you right now?" on a 7-point scale from (1) *not at all hungry* to (7) *very hungry*, and

"At the moment, do you have less or more hunger than average?" on a 7-point scale from (1) *much less hunger* to (7) *much more hunger.* The two items were combined to form the current hunger index (α = .84). We used this scale to assign participant to hunger state categories. Participants with a score of two or less on the hunger state scale were labeled "satiated" (N = 89). Participants with a score on the hunger state scale in between 2 and 6 were labeled "mildly hungry" (N = 167), and participants with a score on the hunger state scale of 6 or higher were labeled "moderately hungry" (N = 51).

*Diet history.* We asked participants to indicate, "How long have you been on this particular diet?" on a 7-point scale from (1) *less than a week* to (7) *over two years.*

*Self-Efficacy.* The self-efficacy questions were developed to measure participants' confidence in their ability to lose weight. Self-efficacy was measured on a 7-point scale ranging from *strongly disagree* to *strongly agree* and contained the following four questions: (a) "I find it hard to stick to my diet," (reverse scored) (b) "I can easily control my appetite," (c) "I can resist tempting foods," and (d) "I am able to restrain myself." (α = .83)

*Satisfaction with past outcome.* We used two items to assess dieters' satisfaction with last week's diet outcome (α = .81). "I consider last week's outcome to be" (-3) *very bad* to (+3) *very good*, and: "I consider this outcome to be" (-3) *very disappointing* to (+3) *very satisfying.*

*Weight-loss intentions.* Finally, we asked dieters to indicate "How much weight do you plan to lose next week?" and dieters were given a space to fill in their weight loss intention. Participants indicated their weight-loss goals in metric ounces. Ten metric ounces are equivalent to

one kilogram. We then asked dieters to indicate, "How likely is it that you will attain your goal?" measured on a 7-point scale ranging from (1) *very unlikely* to (7) *very likely*.

Results and discussion

We predicted that dieters' weight-loss beliefs would differ with their momentary state of hunger. To test this prediction, we performed a series of ANOVA's with planned linear contrasts, examining whether, for example, satiated dieters (+1) had higher self-efficacy scores than mildly hungry dieters (0) and whether mildly hungry dieters would have higher self-efficacy scores than moderately hungry dieters (-1). Before testing these predictions, we first checked whether there were any background differences between the three groups. We found no differences between average weight, BMI, diet history, or previous week's weight-loss outcome.

*Self-Efficacy.* We first examined the prediction that satiated dieters would have great self-efficacy than would hungry dieters. Across conditions we found that satiated dieters ($M$ = 5.06, $SD$ = 1.40) were more confident in their ability to diet than were mildly hungry dieters ($M$ = 4.49, $SD$ = 1.46) and moderately hungry dieters ($M$ = 3.74, $SD$ = 1.11), $F$ (2, 306) = 13.82, $p < .001$, $\eta^2 = .08$. Individual means all significantly differed from each other. In all further analyses, individual means all differed from each other unless otherwise noted.

*Weight-loss intentions.* We asked dieters to indicate how much weight they intended to lose next week and indicate how likely it is that they would achieve their goal. As expected, satiated dieters intended to lose more weight in the next week of their diet ($M$ = 9.00 ounces, $SD$ = 4.30) than mildly hungry dieters ($M$ = 7.76 ounces, $SD$ = 3.84) and

moderately hungry dieters ($M$ = 5.70 ounces, $SD$ = 2.70), $F$ (2, 306) = 11.54, $p < .001$, $\eta^2 = .07$. Not only did satiated dieters intend to lose the most weight, satiated dieters were also more confident they would achieve their goal ($M$ = 5.78, $SD$ = 1.41) than were mildly hungry dieters ($M$ = 4.80, $SD$ = 1.68) and moderately hungry dieters ($M$ = 3.84, $SD$ = 1.65), $F$ (2, 306) = 24.71, $p < .001$, $\eta^2 = .14$ (See Figure 4.2).

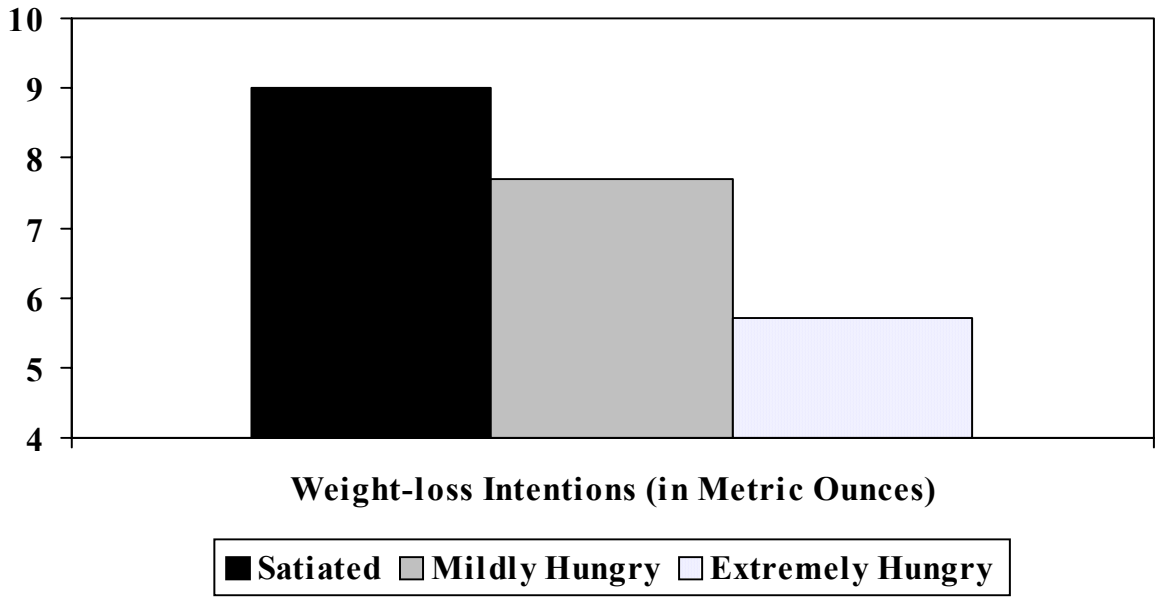


**Figure 4.2 -** *Mean rating of weight-loss goals by condition (satiated, mildly hungry, and extremely hungry dieters).*

In the previous week the dieters lost on average 5.16 ounces. We used last week's average weight outcome to make a rough approximation of how accurate or realistic dieters' weight-loss goals were for the following week (An instructor of the weight-loss program also confirmed that an average weight-loss of 5.16 ounces was typical for dieters in the program). Satiated dieters aimed to lose almost four ounces more than they had actually lost in the previous week ($M$ = 3.82), $t$ (83) = 8.10, $p < .001$, and mildly hungry dieters aimed to lose almost three ounces more than they had actually lost in the previous week ($M$ = 2.73), $t$ (165) = 9.16, $p < .001$. The weight-loss goals set by the moderately hunger dieters did not

statistically differ from their actual weight-loss outcomes in the previous week, $p$ = ns, suggesting that moderately hungry dieters set realistic weight-loss goals.

*Satisfaction with past performance.* We next examined the prediction that satiated dieters would be least satisfied with last week's weight loss outcome. As expected, we found that satiated dieters ($M$ = 2.91, $SD$ = 1.78) were less satisfied with last week's diet performance than were mildly hungry dieters ($M$ = 3.92, $SD$ = 1.42) and moderately hungry dieters ($M$ = 5.05, $SD$ = 1.21), $F$ (2, 305) = 32.74, $p < .001$, $\eta^2 = .18$.

*Mediating role of self-efficacy.* Finally, we examined whether self-efficacy carried the effect of hunger state on weight-loss intentions and satisfaction with prior weight-loss outcomes. The necessary conditions for mediation were first established: hunger was negatively correlated with the weight-loss intentions, $r$ (307) = -.42, $p < .001$, and was positively correlated with satisfaction with past outcomes $r$ (307) = .41, $p < .001$; hunger was negatively correlated with self-efficacy, $r$ (307) = -.29, $p < .001$; and self-efficacy was positively correlated with weight-loss intentions, $r$ (307) = .34, $p < .001$ and negatively correlated with satisfaction with past outcomes, $r$ (307) = -.23, $p < .001$. As predicted, the correlation between hunger state and weight-loss intentions was significantly reduced when self-efficacy was statistically controlled, z = -3.68, $p < .001$. Likewise, the correlation between hunger state and satisfaction with past weight-loss efforts was significantly reduced when self-efficacy was statistically controlled, z = 2.03, $p$ = .04.

This study replicates the finding that visceral states influence people's health beliefs. We found that an increase in hunger was associated with lower diet-efficacy. This difference, in turn, led to changes

in health beliefs about both past and future weight-loss attempts. We found that satiated dieters set higher (and more unrealistic) weight-loss goals and were less satisfied with prior weight-loss efforts than were hungry dieters.

## General Discussion

Visceral impulses such as hunger and drug craving have a well-known influence on health behavior. The present study explored the notion that visceral states also influence people's health *beliefs*. This prediction was based on the hot/cold empathy gap effect—the finding that people generally overestimate the amount of control they have over visceral states. In line with this finding, we found, in both the context of smoking and weight-loss, that participants in cold states had higher self-efficacy than did participants in hot states.

Moreover, we predicted that differences in self-efficacy would influence related health beliefs. This prediction was based on the idea that differences in self-efficacy would create different standards by which people set goals and evaluate their past efforts. In Study 4.1, for example, we found that satiated smokers set more ambitious smoking cessation goals than did craving smokers. In Study 4.2, we found that the more hungry a dieter was the more satisfied she was with her past weight-loss efforts. Likewise, we found that the more hungry a dieter was the less weight she intended to lose in the future and the less certain she was that she could attain her weight-loss goal.

An important contribution of these findings is that they reinforce the notion that health cognitions are dynamic constructs. The fact that primary health beliefs, such as weight loss goals and smoking cessation intentions, change throughout the day has implications for researchers who

rely on health cognitions to predict behavior. At the very least it would seem that researchers should include visceral states in their assessments and, in a longitudinal design, try to ensure that participants are assessed during similar visceral states (immediately after a meal, for example). Health researchers may take a further step and measure health cognitions while people are in a hot, visceral state. Although strong visceral states may be infrequent, in our view it is precisely these moments that provide crucial tests of people's ability to maintain their health plans. For example, it could well be that weight-loss beliefs in a hunger state serve as better predictors of future weight-loss outcomes than weight-loss beliefs formed in a satiated state.

The dynamic nature of health beliefs also provides new evidence for why healthy behavior can be so elusive. Research on self-control has shown that setting clear, stable standards is crucial for overcoming temptation (Baumeister & Heatherton, 1996). Setting stable standards is important because it allows for clear decision rules (e.g., I don't eat after 9pm). Stable standards also allow for better preparation and planning. That is, it is much easier to develop a weight loss program when the goal is clear and consistent (e.g., lose five pounds in 30 days) than if the goal is poorly defined and inconsistent. Yet our findings suggest that dieters' and smokers' goals fluctuate with their visceral states.

Research on a wide range of health behaviors has found that people have a tendency to set unrealistic health goals. Prior explanations for this effect have been rooted in motivational theories (e.g., setting and contemplating ambitious goals is pleasurable). Polivy and Herman (2000) for example argue that people set unrealistic goals in order to enjoy a sense of control. The present findings, however, suggest that unrealistic goals are

not only rooted in motivational reasoning but also in biased judgment—people enjoy a false sense of control and consequently set unrealistic goals.

This research also contributes to our understanding of self-efficacy. Self-efficacy is often regarded as an unqualified good for health behavior. The present study, however, seems to suggest that too much self-efficacy—or what might be thought of as overconfidence—can be problematic. We found that participants with the highest self-efficacy set the most unrealistic goals. Although there is some dispute over whether unrealistic goals are problematic or not, the consensus of evidence seems to suggest that unrealistic goals can be problematic (Foster, 1995; Brunnermeier et al, 1005). We also found that higher self-efficacy led to less satisfaction with previous weight-loss attempts. Many people spend quite a large portion of their life battling against unhealthy behavior. To view such sustained efforts with dissatisfaction would seem to have harmful consequences for personal well being, and may help to explain why dieters often develop lower self-esteem (Polivy, Heatherton, & Herman, 1988).

# Chapter 5

## *The Restraint Bias: inflated self-control beliefs discourage precaution against temptation*

Based on Nordgren, van der Pligt, and van Harreveld (Under Review)

Although most people in the world struggle to satisfy their basic needs, people in the developed world enjoy access to resources that extend far beyond basic necessity. With the luxury of excess, however, comes the temptation of indulgence and the need for self-control. The scope of this temptation is considerable, evidenced by the fact that the leading causes of death within the developed world, such as heart disease, cancer of the lung and liver, and diabetes, are to a large extent "afflictions of indulgence."

Most forms of temptation are rooted in biological drives. These visceral impulses, such as hunger, pain, fatigue, and sexual arousal, are highly adaptive mechanisms that provide information about the state of the body and motivate behavior toward satisfying bodily needs. For example, we experience hunger when we require nourishment, thirst when dehydrated, and fatigue when sleep deprived. Unfortunately, visceral drives often come into conflict with, and can ultimately undermine, long-term goals (Loewenstein, 1996). For example, people routinely 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.

Although temptation is inescapable, there are several strategies people can and do use to minimize its influence on their lives. Temptations become more irresistible when they are physically and temporally proximal (Ditto, Pizarro, Epstein, Jacobson, & MacDonald, 2006). Therefore, the most straightforward strategy to overcome temptation is to try and avoid the temptation itself. Dieters use this strategy when they keep tempting foods out of the house, for instance. Another common strategy is to block or diminish the visceral impulses that can undermine self-control. This strategy reflects the fact that a chocolate brownie is less tempting on a full than on an empty stomach. Methadone, nicotine patches, and appetite suppressants are all examples of such an approach. A final strategy to overcome temptation is to use rewards or punishments to encourage self-control. For example, a dieter may agree to pay a friend money if she fails to meet her weight-loss goal, or a smoker may promise to take a dream vacation if she is finally able to kick the habit.

Although temptation-deterrent strategies such as these can be effective in mitigating temptation and promoting self-control efforts, very little is known about when people actually use these strategies. In the present studies we argue that whether people make use of temptation-deterrents will depend largely on their self-control beliefs. We argue that if people believe they can easily overcome temptation they should then take less preventive action and be more willing to expose themselves to temptation than if they believe themselves to be slaves to their desires. Take the story of Odysseus and the sirens song. Odysseus believed he could not overcome the allure of the siren's song so he took drastic measures to avoid it all together—he put wax in his shipmates' ears and

had himself tied down to his ship's mast. Had Odysseus been confident he could overcome the siren's temptation, he likely would have taken less extreme precaution.

Students face a similar dilemma when deciding whether to install an entertainment system in their dorm rooms. DVD players and cable TVs might be welcomed entertainment, but they can also be a distraction from studying. Likewise, recovering drug and alcohol addicts must decide whether they can ever return to the people and places that once encouraged their addiction. We argue that people's decisions should largely reflect their self-control beliefs. The more confident people are that they can control their impulses, the more willing they should be to expose themselves to temptation.

The aim of the present study is to examine the nature and significance of people's self-control beliefs. In doing so we intend to determine how accurately people estimate their self-control capacities and test whether self-control beliefs influence the use of temptation-deterrent strategies. As a starting point for our predictions, we turn to research on the hot/cold empathy gap—the finding that people often have difficulty estimating the control they have over their impulses.

## The Hot/Cold Empathy Gap

Numerous studies have found that people often have tremendous difficulty estimating the influence impulsive states have on the behavior of themselves and others. Specifically, when people are in a visceral or "hot" state they tend to appreciate the influence of future hot states, whereas people in a neutral or "cold" state chronically underestimate the impact of 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 intended to purchase. They found that, compared to 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 assess beliefs about nicotine addiction, Lynch and Bonnie (1994) asked high school students who smoked whether they expected to still be smoking five years later. Among occasional smokers (those who had less than one cigarette a day), only 15% predicted they would still be smoking in five years. Five years later, 43% of these students were still smoking. Among frequent smokers (those who smoked a pack a day), only 30% thought they would smoke five years later, while in fact over 70% continued to smoked.

This effect also extends to the attributions people make about past behavior. In a series of studies, Nordgren, van der Pligt, and van Harreveld (2006) used impulsive states to hinder participants' performance on a variety of tasks. Afterwards, they asked participants to indicate how various factors impacted their behavior. They found that when people were in a hot state (e.g., fatigued), they attributed their behavior primarily to the impulsive influence, whereas when people were in a cold state (e.g.,

non-fatigued), they underestimated the influence of impulse and instead attributed behavior primarily to dispositional factors.

In each of these studies people exhibited what Loewenstein (1996) has termed a "cold-to-hot empathy gap," which refers to the tendency for people in a cold state (i.e., not experiencing hunger, anger, sexually aroused, etc.) to underestimate the influence of a future hot state (i.e., feeling hungry, angry, sexually aroused, etc.). Loewenstein (1996) has argued that the underestimation of visceral impulse is due to our constrained memory for visceral experience. That is, though we can recall the circumstances that led to a visceral drive (e.g., I was hungry because I didn't eat all day) and recall the relative strength of a visceral drive (e.g., that was the most hungry I have ever been), we cannot freely bring forth the sensation of visceral state itself.

On the basis of the hot/cold empathy gap effect we can form two primary predictions about the nature of self-control beliefs. First, we predict that visceral states (e.g., hunger, pain, fatigue, sexual arousal) should influence self-control beliefs, such that people in a cold state should overestimate their self-control capacity (i.e., exhibit a restraint bias), whereas people in a hot state should have a more realistic view of their self-control capacities. Second, we expect that differences in self-control beliefs should influence the perceived value of precautions against temptation, such that people in a hot state should adopt more precautionary measures compared to people in a cold state.

It is important to keep in mind that people are usually in a cold, non-aroused state. If confirmed, our predictions would therefore imply that people will generally exhibit a restraint bias, and as such will systematically underutilize opportunities to guard against temptation.

## The present studies

In three studies we examined how visceral impulses influenced self-control beliefs, and assessed how self-control beliefs, in turn, influence the use of temptation-deterrents. Each study follows a similar format. Participants were brought into an impulsive state (or not), estimated their capacity to control that impulsive state, and then were given the opportunity to make use of a temptation-deterrent. Study 5.1 focused on self-control-as-*persistence*—the prolonged engagement of unpleasant activities for the sake of long-term rewards. To do this we examined how fatigue influenced beliefs about mental endurance and examined how these beliefs ultimately influenced academic planning. Studies 5.2 and 5.3 focused on self-control-as-*resistance*—the avoidance of short-term pleasure that undermines long-term gain. Study 5.2 examined how sexual arousal influenced men's confidence in their ability to remain sexually abstinent. In Study 5.3 we examined how hunger influenced people's perceived and *actual* ability to avoid tempting food.

## Study 5.1

Study 5.1 tested our predictions in the context of self-control-as-persistence—the prolonged engagement of unpleasant activities for the sake of long-term rewards. The fatigue that accompanies prolonged periods of mental concentration (e.g., studying) provides a good illustration of this kind of self-control dilemma. The effort required for concentration is not a limitless resource. When mental resources are taxed, people experience fatigue (Cameron, 1973). Fatigue can be a problem for people who need to concentrate for long periods of time, such as when students "cram" for final exams. Effective studying, therefore, requires that

students either persevere through their fatigue or design a more balanced study schedule that provides ample time and thus avoids the need to cram.

We predicted that students generally overestimate their ability to overcome fatigue, and therefore do not sufficiently take fatigue into account when designing a study schedule. To test this prediction, we had college students perform a fatiguing or a non-fatiguing task. The students then estimated how much control they had over mental fatigue. Afterwards, the students were asked to design a study plan for the following semester. We predicted that fatigued students would believe that they had less control over mental fatigue than would non-fatigued students. As a result, we expected that fatigued students would take precautions against fatigue by designing a study plan that more evenly distributes the work throughout the semester rather than "cramming," or leaving the majority of work for the end of the semester.

## Method

### *Participants*

Seventy-two students from the University of Amsterdam (41 female and 31 male) participated for course credit.

### *Procedure*

Participants were randomly assigned to the fatigued or non-fatigued condition. To induce fatigue, the students performed a memory task that has been previously demonstrated to be fatigue-inducing (Nordgren et al., 2006). The memory task consisted of 9-digit number strings that participants were asked to memorize. Each number string appeared for 11 seconds, after which participants were asked to "hold the numbers in their head" for seven seconds before finally being asked to type in the number string to the best of their ability. For participants in the fatigued condition,

the memory task consisted of 30 trials. For participants in the non-fatigued condition, the memory task consisted of only five trials.

After the fatigue-inducing task, participants were asked to indicate their momentary state of fatigue and assess how much self-control they have over mental fatigue. Lastly, we asked participants to indicate how they intended to distribute their workload during the following semester.

*Materials*

*Fatigue state.* Participants were asked to indicate, "How fatiguing was the memory test?" on a 7-point scale from (1) *not at all fatiguing* to (7) *extremely fatiguing.*

*Self-control over fatigue.* We asked participants three questions to assess their beliefs in their ability to overcome mental fatigue. A) Mental fatigue is difficult to overcome. B) When I feel tired I find it difficult to concentrate. C) I have more control over mental fatigue than the average person. These questions were assessed on a 7-point scale from (1) *strongly disagree* to (7) *strongly agree* (alpha = .81).

*Intention to cram.* Participants were told, "Recent research on study skills has found that many University of Amsterdam students postpone most of their studying until the very end of the semester. For example, if a student studies for 40 total hours during the semester, they often spend more than 20 of those hours studying during the last week of the semester. We would like to know what percentage of time spent studying you intend to leave until the last week of *next* semester. Please indicate a score between "0" and "100" percent. A score of "0" percent means that you will do all of your studying before the last week of the semester; a score of "50" percent means that you will do half of your studying before the last week of the semester and half of your studying during the last week of the

semester; a score of "100" percent means that you will do all of your studying during the last week of the semester."

## Results and Discussion

*Manipulation check.* The manipulation was successful. Participants who performed the extended memory test were more fatigued ($M$ = 5.17, $SD$ = .92), than participants who performed the brief memory test ($M$ = 3.87, $SD$ = .90), $F(2, 72) = 41.84$, $p < .001$, $\eta^2 = .34$.

We predicted that fatigued participants would believe themselves to have less control over fatigue than would non-fatigued participants. Consequently, we expected fatigued participants to rely less on "cramming" when compared to non-fatigued participants. In line with this prediction, fatigued participants estimated that they had less self-control over mental fatigue ($M$ = 5.09, $SD$ = .77), than did non-fatigued participants ($M$ = 5.60, $SD$ = 0.77), $F(2, 72) = 8.17$, $p = .005$, $\eta^2 = .09$. We also found in general that the more fatigued participants were the less self-control they estimated they had ($r = -.40$, $p = .001$).

We next examined the prediction that differences in self-control beliefs would influence the intention to use a temptation-deterrent strategy, which in this case was the goal to avoid cramming during the upcoming semester. We found that fatigued participants intended to leave 52.68 percent ($SD$ = 1.32) of their studying to the final week of the semester, which is significantly less than non-fatigued participants, who intended to leave 59.38 percent ($SD$ = 1.50) of their total studying to the final week of the semester $F(2, 72) = 4.51$, $p = .04$, $\eta^2 = .05$. In support of this finding, we found that high self-control beliefs were associated with intentions to cram next semester ($r = .48$, $p = .001$). Although fatigue was correlated

with intentions to cram, ($r$ = -.34, $p$ = .005), we found that self-control beliefs fully mediated this relationship ($z$ = -2.70, $p$ = .005).

This study provides initial evidence for a restraint bias. Based on findings from the hot/cold empathy gap, we argue that people in a cold state overestimate their capacity for self-control. In support of this argument, we found that non-fatigued participants perceived their self-control over mental fatigue to be greater than fatigued participants. Inflated self-control beliefs, in turn, led to a greater reliance on cramming (i.e., leaving much of the studying to the last week of the semester). Given that people are generally not fatigued, this finding may partly explain why students so readily depend on "all-nighters" and "cramming." The remaining two studies seek to replicate these predictions using different visceral impulses in the context of a different self-control dilemma: self-control-as-resistance—the avoidance of short-term pleasure that undermines long-term gain.

## Study 5.2

The aim of this study was to examine the nature of men's beliefs about their ability to overcome sexual temptation, and examine how these beliefs influence the use of temptation-deterrent. Men watched either a sexually arousing or non-arousing video, and were then given the opportunity to take part in a (bogus) experiment involving sexual restraint. The experiment required men to avoid all sexual activity for three weeks in exchange for 500 euros. The temptation-deterrent in this study was the option of using a self-imposed cancellation fee as an incentive to help ensure they complete the three-week abstinence period.[1] In other words, a

participant could agree to pay a cancellation fee of 20 Euros, for instance, in order to help persuade himself to remain abstinent.

We predicted that men who were sexually aroused would perceive themselves to have less control over sexual impulse than would men who were not aroused. Based on this prediction, we expect that, compared to non-aroused men, sexually aroused men would select a greater punishment (i.e., a higher cancellation fee) in order to motivate their commitment to achieving three weeks of sexual abstinence.

## Method

### *Participants*

Sixty men from the University of Amsterdam participated for course credit. Six men indicated that they were not interested in participating in the experiment and were thus dropped from the study, leaving a total of 54 participants.

### *Procedure*

The study took place in individual cubicles. Participants in the sexual arousal condition watched a ten-minute erotic film, whereas participants in the non-aroused condition watched a ten-minute film depicting a runway fashion show. After the video participants were asked to indicate how sexually arousing they found the film.

Immediately afterwards, in what was ostensibly part of another study, participants were given a pamphlet about a large-scale research project being conducted at the University of Amsterdam about male fertility (the study was fictitious). Participants were told, “In two weeks time, scientists at the University of Amsterdam will be conducting research on male fertility and are looking for men to donate their sperm. To be eligible, participants must remain abstinent during the *three weeks before*

they provide a sperm sample. This means that if you want to participate in the study you would have to go three weeks without having sex or masturbating. Because of this inconvenience, participants will receive 500 Euros for their participation."

Participants were further informed that tests would detect whether participants complied with the three-week abstinence requirement. Participants were then told that, because in the past people have found it difficult to comply with the three-week abstinence period, the experiment required that all participants accept a self-imposed cancellation fee. That is, participants were required to indicate an amount of money they were willing to pay if they agreed to participate and then later failed to comply with the abstinence requirement—the payment ranged from 0 to 30 Euros. We explained that the payment was used to compensate the expense of cancellation and would help insure they complied with the abstinence requirement. We further explained that the payment was self-selected because we wanted to accommodate students with different financial means. After reading the pamphlet, participants were asked whether they wanted to participate in the study and answered questions about their self-control over sexual desire.

*Materials*

The questionnaire contained four sets of items: momentary state of sexual arousal, interest in participation, self-control over sexual desire, and cancellation fee.

*Sexual arousal.* 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 sexually arousing* to (7) *very sexually arousing*.

*Interest in participation.* We asked participants to mark either "yes" or "no" in response to the question, "Are you interested in participating in the study?" Participants that indicated "no" were removed from the sample.

*Self-control over sexual arousal.* To assess participant's perception of their self-control over sexual arousal, we asked the following three questions, "It is easy to control my sexual arousal; Sexual arousal is a powerful temptation; I have more control over sexual arousal than the average person" on a (1) *not at all agree* to (7) *completely agree* (Alpha is .79).

*Cancellation payment.* We told participants to "please select a fee you find appropriate (between 0-30 euros) to cover the expense costs should you decide to cancel."

## Results and Discussion

*Manipulation check.* The manipulation was successful. Men who watched the pornographic video reported higher sexual arousal ($M$ = 4.81, $SD$ = .83) than did men who watched the non-pornographic video ($M$ = 2.18, $SD$ = .72), $F(2, 54) = 201.02$, $p < .001$, $\eta^2 = .79$.

We predicted that sexual arousal would influence men's self-control beliefs. Specifically, we predicted that sexually aroused men would perceive themselves to have less self-control over their sexual arousal than would non-aroused men. In line with this prediction, we found that sexually aroused men indicated having less self-control over sexual desire ($M$ = 4.82, $SD$ = .78) than did non-aroused men ($M$ = 5.44, $SD$ = .62), $F(2, 54) = 10.34$, $p = .002$, $\eta^2 = .17$. Collapsing across condition, we found that the more aroused men were the less self-control they estimated they had ($r$ = -.47, $p$ = .001).

We next examined the prediction that differences in self-control beliefs would influence the intention to use a temptation-deterrent strategy, which, in this case, was a self-imposed monetary penalty. We found that sexually aroused men suggested a higher payment penalty for failure to comply with the three-week abstinence requirement ($M$ = 7.63 Euros, $SD$ = 2.48) than did non-aroused men ($M$ = 5.37 Euros, $SD$ = 2.74), $F(2, 54) = 10.04$, $p = .003$, $\eta^2 = .16$. Moreover, we found that the higher the estimated self-control, the less money the participants suggested paying as a penalty ($r = -.54$, $p = .001$). Although sexual aroused was correlated with the payment penalty ($r = .33$, $p = .01$), we found that self-control beliefs fully mediated this relationship ($z = 2.72$, $p = .006$).

In support of Study 5.1, Study 5.2 demonstrates a link between self-control beliefs and intention to use a temptation-deterrent. Central to our argument is that people generally have inflated self-control beliefs and consequently undervalue the need to guard against temptation. The findings for the first two studies, however, only demonstrate differences between people in cold and hot states. From this evidence alone we cannot establish the accuracy of people's estimates of self-control. In fact, it could be the case that, for example, sexually aroused men underestimated their self-control and thus took needless precaution. One objective of Study 5.3 therefore was to compare participants' self-control beliefs to actual responses to temptation in order to establish the accuracy of people's self-control beliefs. In doing so, Study 5.3 has the advantage of measuring actual behavior instead of behavioral intentions.

Another feature of the first two studies was that the utility of the temptation-deterrent was fairly apparent. In Study 5.2, for example, we explicitly told participants that a self-imposed cancellation fee would

motivate their intention to remain abstinent. A second objective of study 5.3 was to examine whether people are disposed to identify and make use of temptation-deterrents without being prompted to do so. Evidence from Trope and Fishbach (2005) found that in many situations people automatically guard against temptation. Based on this evidence, we expected that participants would take precautions against temptation even when the value of the temptation-deterrent was not made explicit.

## Study 5.3

In Study 5.3 we conducted a field experiment to test whether people's naturally occurring hunger state would influence hunger-related self-control beliefs and strategies designed to limit hunger-driven temptation. We set up a booth outside a cafeteria and approached potential participants as they entered (hungry) or exited (satiated) the cafeteria. The task required participants to rank seven snacks (e.g., candy bar) from least to most favorite. Afterwards, participants were asked to select one snack. Although participants were free to eat the snack anytime they wished, participants were informed that they would win four Euros (as well as the snack they chose) if they managed to return the snack (uneaten) after a week's time.

The optimal outcome in this study is that participants choose their favorite snack and return it in a week's time, thereby earning both the money and their favorite snack (albeit a week later). However, we expected that many people would find it difficult to refrain from eating the snack during the week, particularly if they chose a snack they found tempting. Therefore, we expected that many participants would choose a

less tempting snack in order to improve their chance of earning the money.[2]

This study had three specific predictions. First, we expected that hungry participants would perceive themselves to have less control over their hunger cravings than would satiated participants. Second, because of their diminished self-control beliefs, we expected that hungry participants would choose a less tempting snack than would satiated participants. Third, we expected that participants who choose less tempting snacks (i.e., hungry condition) would be more likely to return the snack one week later.

## Method

### *Participants*

Ninety-one people participated in the initial stages of the study. Twelve participants had no intention of returning the snack a week later. The most common reason for this was because they would not be in the area in a week's time. These twelve participants were given a snack, thanked, and were then removed from the sample. All analyses concern the seventy-nine participants (45 female and 34 male) who indicated an intention to return the snack a week later.

### *Procedure*

Potential participants were approached as they were entering or exiting a popular lunchtime cafeteria. Participants were presented with seven snacks (the snacks were presented on a table) and were asked to rank the snacks from least to most favorite. Once they ranked the snacks, participants were told the following: "We would now like you to select a snack. You can eat the snack anytime you like. However, if you return the snack to this location in one week, we will give you four euros (and you will get to keep the snack you chose)."

Participants then chose a snack and indicated whether they intended to return the snack for the money (participants who did not intend to return the snack were removed at this point from the remainder of the study). After having chosen a snack, participants answered a questionnaire that assessed their momentary hunger state and their hunger-related self-control beliefs. The snacks were tagged with stickers in order to ensure that any snacks returned a week later were in fact the original snacks.

*Materials*

The seven snacks were selected to vary in attractiveness. Therefore, we included healthy snacks such as a box of raisins, and we included unhealthy snacks like hard candy and chocolate bars. All the snacks were of a similar size and monetary value.

The questionnaire contained two sets of items: momentary hunger state and self-control beliefs over hunger craving.

*Momentary hunger state.* To assess hunger state, we asked participants to indicate, "How hungry are you right now?" on a (1) *not at all hungry* to (7) *very hungry*.

*Self-control over hunger craving.* To assess participants' beliefs about their self-control over hunger craving, we asked the following three questions, "It is easy to control my hunger craving; Hunger craving is difficult to overcome; I have more control over hunger craving than the average person" on a 1 (*not at all agree*) to 7 (*completely agree*) (alpha = .80).

## Results and Discussion

*Manipulation check.* Participants who were walking into the cafeteria (i.e., the hungry condition) indicated experiencing more hunger ($M$ = 4.88, $SD$ = .89) than did participants who were leaving the cafeteria

(i.e., the satiated condition) ($M$ = 2.43, $SD$ = 1.24), $F(2, 79) = 100.00$, $p$ = .001, $\eta^2 = .56$.

We first predicted that hungry state would influence participants' beliefs about their capacity to control their hunger cravings. We found that hungry participants had lower self-control beliefs ($M$ = 4.32, $SD$ = 1.00) than did satiated participants ($M$ = 4.91, $SD$ = 1.01), $F(2, 79) = 6.86$, $p$ = .01, $\eta^2 = .08$. Likewise, the more hungry participants were the lower their self-control beliefs ($r = -.42$, $p < .001$).

We next examined the snack participants chose. In line with our predictions, we found that hungry participants generally chose their second or third favorite snack ($M$ = 5.47, $SD$ = 1.13) whereas satiated participants tended to select their first or second favorite snack ($M$ = 6.21, $SD$ = .88), $F(2, 79) = 10.76$, $p = .002$, $\eta^2 = .12$. We argue that this effect was due to participants' self-control beliefs. In line with this view, we found that greater perceptions of self-control were associated with the selection of a more tempting snack ($r = .35$, $p = .002$). Although hunger was associated with snack selection ($r = -.33$, $p = .003$), this effect was mediated by self-control beliefs ($z = 1.88$, $p = .07$).

We next examined what factors influenced whether participants returned the snack. Of the 79 participants, forty-nine chose a favored snack (defined here as either their first or second most tempting snack), whereas 30 participants chose a non-favored snack (i.e., not their first or second favorite). A week later, 39 participants successfully returned the snack. As predicted, participants who returned the snack had lower self-control beliefs ($M$ = 4.39, $SD$ = 1.01) than participants that did not return the snack ($M$ = 4.87, $SD$ = .99), $F(2, 79) = 4.23$, $p = .04$, $\eta^2 = .05$. Likewise, we found that participants who returned the snack, chose a less

favored snack ($M$ = 5.51, $SD$ = 1.12) than participants that did not return the snack ($M$ = 6.20, $SD$ = .91), $F(2, 79) = 8.95$, $p = .004$, $\eta^2 = .10$ (see Figure 5.1).

We also found predicted differences by condition. Sixty percent of participants in the hungry condition successfully returned the snack, whereas 39% of participants in the satiated condition returned the snack, $X^2$ (2, 79) = 3.64, $p = .06$. Given that people are generally satiated, this finding suggests that people may often underutilize opportunities to guard against foods they would like to avoid.

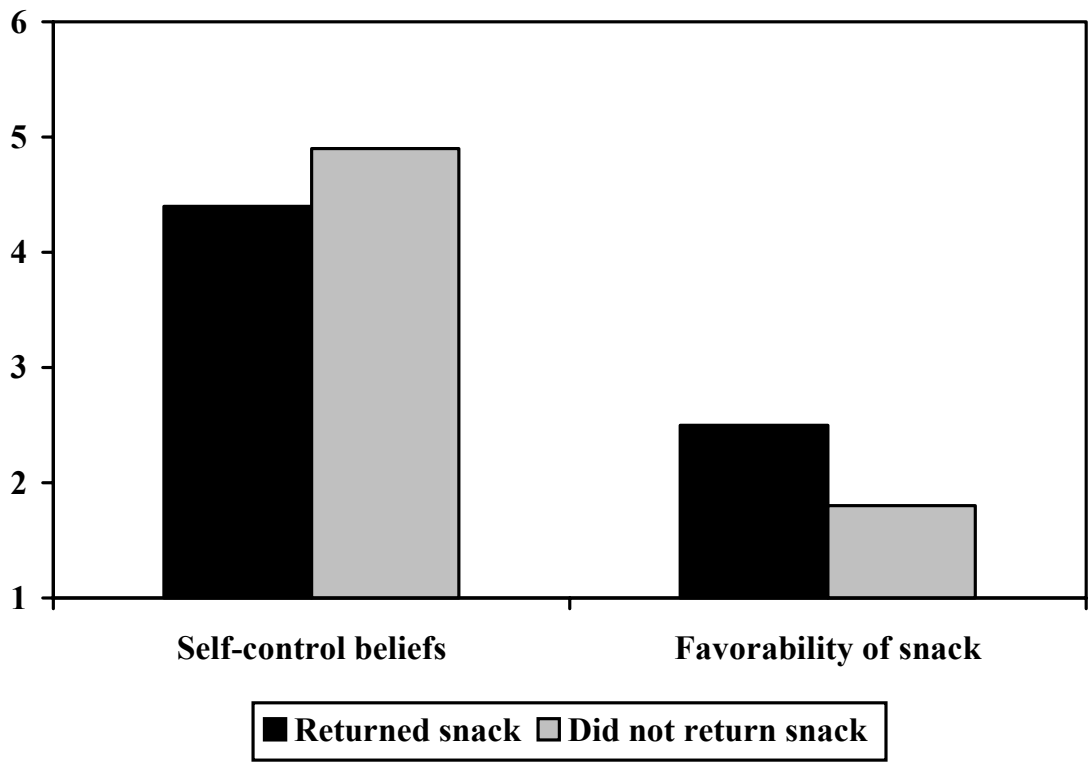


Figure 5.1 - *A comparison of self-control beliefs and favorability of chosen snack (higher scores equal more favored selection) by participants who did or did not return the snack.*

## General Discussion

The present studies examined the nature of self-control beliefs and the influence self-control beliefs have on self-regulation strategies. Research on the hot/cold empathy gap suggests that, unless they are in an impulsive state, people generally underestimate the influence impulsive states have on their behavior. Based on these findings, we hypothesized that people would generally exhibit a restraint bias—the tendency to overestimate one's capacity to control impulse-driven temptation. Furthermore, we predicted that self-control beliefs would have consequences for people's self-control strategies. We expected that inflated self-control beliefs would lead people to take fewer self-control precautions.

These predictions were confirmed. In Study 5.1 we found that fatigued participants perceived themselves to have less self-control over mental fatigue compared to non-fatigued participants. Fatigued participants, in turn, intended to rely less on fatigue-inducing study strategies than did non-fatigued participants.

In Study 5.2 men were asked to indicate how much money they would be willing to "put on the line" in order to facilitate their efforts to remain sexually abstinent for three weeks. We found that sexually aroused men believed that they had less self-control over their craving for sexual gratification than did men who were not aroused. Consequently, sexually aroused men took greater self-control precautions by intending to pay more money for failing to remain abstinent.

Study 5.3 directly addressed the accuracy of people's predictions. We found that hungry participants believed they had less self-control over

their hunger cravings when compared to satiated participants. Consequently, when given the opportunity to earn money by selecting a snack that they had to resist eating for a week, hungry participants chose a less tempting snack than did satiated participants. This self-control precaution paid off, as hungry participants were more likely to earn money than were satiated participants.

These findings may help to improve our understanding of addictive behavior. One nagging question for addiction researchers is why people so willingly initiate behavior they know it to be addictive. The present studies suggest that people who have never experienced addiction may be incapable of understanding its motivational force. In other words, people may be undeterred from the addictive nature of some illicit drugs simply because they believe they can overcome the addiction. In support of this view, a study that asked heroin users to indicate how much money they would be willing to pay for the heroin substitute Buprenorphine (Badger et al., in press), found that heroin addicts would value an extra dose of Buprenorphine more highly when they were craving heroin than when they were currently satiated. If experienced heroin users continue to underestimate their craving, imagine how difficult it would be for a beginning drug user to fully appreciate the power of drug addiction.

One implication of this research is that a greater sense of self-control can actually hinder self-control efforts. This position may at first glance seem strange. An overwhelming amount of research has found that the perception of control is beneficial (Scheier & Carver, 1993). Yet we argue that there can be too much of a good thing. At least in the case of self-control, the perception of control is best when it is realistic. In our studies participants in a cold state had an unrealistic perception of self-

control. This restraint bias discouraged people from taking preventive measures against temptation. On the other hand, we can imagine that an understated sense of self-control can also be harmful, though for different reasons. Perceiving oneself to have no self-control would likely hinder the motivation to initiate self-control efforts, for example. In our studies, however, even people in hot states maintained a sense of self-control (in all three studies average self-control scores never dropped below the mid-point of the scale), suggesting that self-control beliefs are not easily diminished.

This line of reasoning corresponds with research on the benefits of "optimal optimism" (Baumeister, 1989). For example, whereas we found that moderate self-control beliefs leave people better prepared to manage temptation, other work has found that realistic control beliefs can enhance "psychological preparedness," such as bracing oneself for a negative outcome (Shepperd, Findley-Klein, Kwavnick, Walker, & Perez, 2000). Similarly, Nordgren, van der Pligt, and van Harreveld (under review) found that exaggerated self-efficacy beliefs led dieters to be both dissatisfied with their previous weight-loss attempts and to form unrealistic future weight-loss goals.

Another contribution of the present studies has been to highlight the importance of self-control beliefs for self-regulation. The present studies found that being in a "hot" state benefited self-regulation efforts by creating more realistic self-control beliefs. Of course, hot states are fleeting and people spend most of their time in a cold state. Future research should examine alterative ways of shifting self-control beliefs. Some addiction programs already seem to understand the danger of inflated self-control beliefs and attempt to diminish them. Alcoholics

Anonymous is a good example. In their program, the first step to recover requires that an alcoholic "admits that I am powerless over alcohol," and accept that "once you are an alcoholic you are always an alcoholic." The key question is whether self-control beliefs can persist in cold states. That Alcoholic Anonymous meetings frequently revisit the notion of powerlessness over alcohol might suggest that as impulses diminish, people may begin to drift back toward the illusory belief that they can handle their cravings.

A writer once remarked that while "opportunity may knock only once, temptation leans on the doorbell." It is true that temptation is inescapable. Yet there are a number of precautions people can take to buffer temptation's influence. Unfortunately, it seems that the tendency to hold unrealistic self-control beliefs often causes people to pass up opportunities to deter temptation.

Footnote

1. The temptation-deterrent in this study was based on an experiment by Trope and Fishbach (2005). In that experiment they found that participants would use self-imposed penalties to help ensure that they would carry out a behavior that, in the short-term, they were reluctant to perform.

2. It is important to realize that the value of the money (4 Euros) far exceeded the monetary value of the snack ($M$ = 0.35 Euro cents). Therefore, if participants thought they would be unable to refrain from indulging in their favorite snack, the sensible decision was to "play for the money" instead of the snack.

# CHAPTER 6

## *Key Findings, Implications, and Directions for Future Research*

The preceding chapters provide a detailed look at the nature and significance of the hot/cold empathy gap. I conclude the dissertation by taking a broader view. This chapter highlights the key empirical findings from each chapter, examines the implications of these findings, and ends with suggestions for future research.

### A review of the key findings

The goal of this dissertation has been to advance our understanding of the hot/cold empathy gap effect. The bulk of the dissertation has dealt with the *significance* of the empathy gap. Perhaps the most important contribution of the dissertation is that it illustrates the breadth of the empathy gap's influence. Previous research has focused almost exclusively on the ways the empathy gap impacts the prediction of future behavior. Consequently, the empathy gap has generally been confined to research circles interested in judgment and decision-making, and has not been incorporated into the wider psychological arena in the way related phenomena, such affective forecasting, have been. When taken together, the findings reviewed below highlight the many ways that the empathy gap is central to social psychological thought and action.

*The significance of the empathy gap*

Although previous research has focused on how the empathy gap influences the prediction of *future* behavior, in Chapter 2 we found that the empathy gap impacted people's perception of the past. In three experiments we found that, compared to people in a hot state, people in a cold state underestimated the influence affect had on their past behavior. Instead, people in a cold state tended to over-emphasize the influence of non-affective factors, such as personality traits. This attribution pattern emerged when people judged the past behavior of both themselves and others. Attribution formation is a fundamental concept in social and clinical psychology, largely because the way one interprets the past critically shapes the way one perceives the present and future. Study 2.3 provided a glimpse of the power of attributions. In that experiment, participants in a hot state attributed their poor performance on a memory task to a situational factor—pain, whereas participants in a cold state attributed their poor performance to dispositional factors, such as poor concentration. The consequence for participants who attributed their poor performance to dispositional factors was that they later evaluated their performance less positively.

Chapter 3 explored how the empathy gap influences the evaluation of impulsive behavior. People often have very little tolerance for impulsive behavior. For instance, drug addiction, problem gambling, and alcoholism are strongly stigmatized. Chapter 3 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.

We reasoned that the tendency to underestimate the motivational force of cravings for sex, drugs, food, etc., leads people to condemn impulsive behavior because it provides the false impression that cravings are easy to control. In four experiments we 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 participants who were in a hot state (hungry). This empathy gap effect was tested using three different affective states—fatigue, hunger, and sexual arousal—and was found both when participants evaluated the impulsive behavior of others (Studies 3.1 & 3.2) and themselves (Study 3.3). Study 3.4 demonstrated that this pattern of results was due to divergent perceptions of the strength of the affective state itself.

Chapter 4 considers the implications the empathy gap holds for health behavior. Building off Study 3.4, which found that the empathy gap influenced perceptions of control, we reasoned that self-efficacy beliefs—beliefs that are crucial to most models of health behavior—would vary with one's affective state. In line with this reasoning, in Study 4.1 we found that smokers who were actively craving a cigarette perceived themselves to have less quit-efficacy than did satiated smokers. Likewise, in Study 4.2, we found that satiated dieters had higher diet-efficacy than mildly, or moderately hungry dieters.

Moreover, we predicted, and found, that differences in self-efficacy would influence related health beliefs. This prediction was based on the idea that differences in self-efficacy would create different standards by which people set goals and evaluate past efforts. In Study 4.1, for example, we found that satiated smokers set more ambitious smoking cessation goals than did craving smokers. In Study 4.2, hungry dieters

perceived past weight-loss efforts with more satisfaction, and intended to lose less weight in the future.

Chapter 5 consists of three experiments that examined the nature of self-control beliefs. Based on the empathy gap effect as well as evidence from the previous two chapters, we hypothesized that in most circumstances people are unrealistically confident of their capacity to control their affective impulses. We predicted that this "restraint bias" would consequently lead people to underutilize opportunities to guard against temptation. We tested these predictions using three different affective states—fatigue, sexual arousal, and hunger. Findings confirmed our predictions. In Study 5.1 we found that fatigued participants perceived themselves to have less self-control over mental fatigue when compared to non-fatigued participants. Fatigued participants, in turn, intended to rely less on fatigue-inducing study strategies than did non-fatigued participants.

In Study 5.2, men were asked to indicate how much money they would be willing to "put on the line" in order to facilitate their efforts to remain sexually abstinent for three weeks. We found that sexually aroused men believed that they had less self-control over their craving for sexual gratification than did men who were not aroused. Consequently, sexually aroused men took greater self-control precautions by intending to pay more money for failing to remain abstinent.

Study 5.3 directly addressed the accuracy of people's predictions. We found that hungry participants believed they had less self-control over their hunger cravings when compared to satiated participants. Consequently, when given the opportunity to earn money by selecting a snack that they had to resist eating for a week, hungry participants chose a less tempting snack than did satiated participants. This self-control

precaution paid off, as hungry participants were more likely to earn money than were satiated participants.

*The nature of the empathy gap*

Another goal of the dissertation was to gain a better understanding of the *nature* of the empathy gap itself. Although many questions remain, the empirical chapters have answered three important issues. The first issue concerns whether the empathy gap simply reflects an accessibility effect. In other words, do people in cold states underestimate the influence of hot states simply because they fail to take them into account when making a decision? We tested this issue directly, and the evidence suggests that the empathy gap is something beyond an accessibility effect. In Study 2.2 we asked participants in a cold state to make judgments *as if* they were in a hot state, thus rendering the affective state highly accessible. Despite this instruction, participants in a cold state continued to underestimate the influence of the affective state.

Another important issue unaddressed in previous research was whether the empathy gap is state specific. That is, does being in one affective state, say hunger, provide insight into another affective state, such as sexual arousal? We tested this issue directly by having participants in one affective state make judgments about another affective state. In Study 3.3 we found that hungry participants did not have any greater insight into the experience of fatigue than did participants in a non-affective state. Of course, fatigue and hunger are very different affective states, and the possibility remains that selecting two affect states that are more closely related would have produced a different result—a craved smoker may have greater insight into the experience of heroin craving than fatigue, for instance.

A third issue deals with whether the empathy gap is sensitive to the extremity of the affective state, such that people in a moderately hot state (e.g., moderate fatigue) have difficulty appreciating the influence of a more severe hot state (e.g., severe fatigue). In Chapters 2 and 4 we found that empathy gaps were sensitive to the extremity of the affective state. This extremity effect has implications for how we evaluate behavior that is carried out under extreme duress. Even when we are experiencing a mild-to-moderate affective state—a moderate amount of anger, for instance—it may be nearly impossible to fully appreciate the influence of a more extreme form of this state (in this case, full blown rage).

## Implications

The empathy gap effect has numerous implications for psychological theory, individual decision-making, and public policy. The goal of this section is not to cover the implications of the empathy gap itself. Several excellent reviews already exist (Loewenstein, 1996, Loewenstein, 2000). We will instead examine implications that stem directly from the present dissertation. This list is not exhaustive. The six themes we present below were chosen to reflect the diversity of insights afforded by this dissertation.

*The limits of perspective taking*

Perspective taking involves understanding the mental character—the thoughts, feelings, and intentions—of others and the social forces that shape and constrain other people's behavior. Human beings are, when compared to other animals, superior perspective takers. We perceive that others have a mind like our own, and we are often very good at identifying the thoughts and intentions of others. This dissertation suggests, however,

that our capacity to appreciate the *feelings* of others, as well as the feelings of our own past and future self, is constrained. It is not that we have no sense of how other people feel. We appreciate that drug addiction is aversive and that drug use is pleasurable. Our limitation lies in our inability to appreciate the *magnitude* of subjective experience. Dieters know that future hunger cravings will be an impediment to their weight-loss plans, but they fail to appreciate the extent to which hunger will motivate impulsive choice. The same is true when people in a state of arousal attempt to appreciate their future preferences. In the heat of the moment, people appreciate that sexual arousal distorts their decisions. But it is not until the moment passes that they appreciate the extent of this distortion.

This finding has important interpersonal implications. A recurring finding in empathy research is that the ability to appreciate another person's situation is crucial for fostering empathy (Eisenberg & Miller, 1987). In line with this position, in Chapter 3 we found that people generally experienced little compassion for impulsive behavior when they themselves were not in that state. The interpersonal implications are two-fold. First, it seems that people's capacity to empathize with others, or their empathetic accuracy, is constrained by an inability to fully appreciate how others feel. Second, it seems that exercises designed to enhance empathy by changing people's perspective may be less influential than is generally assumed. A common prescription for fostering empathy is to instruct people to take on another person's perspective, or "walk in their shoes." For example, a common training exercise companies use to demonstrate the menace of racial or sexual discrimination is to let their employees experience discrimination first hand in the confines of a role

play exercise. Our findings suggest that having people experience the discomfort of discrimination would be an effective way to changes people perception, but only for as long as the feeling of discomfort lasts.

*Perceptions of control guide self-control efforts*

Although perceived control is generally thought to be beneficial (Scheier & Carver, 1993), one implication of Chapter 5 is that an unrealistic perception of control can actually hinder self-control efforts. We repeatedly found that inflated perceptions of control discouraged people from taking preventive measures against temptation. This evidence supports research on the benefits of "optimal optimism" (Baumeister, 1989). For example, whereas we found that moderate self-control beliefs leave people better prepared to manage temptation, other work has found that realistic control beliefs can enhance "psychological preparedness" by bracing oneself for a negative outcome (Shepperd, Findley-Klein, Kwavnick, Walker, & Perez, 2000).

These findings may help us to understand a number of self-control problems, such as addictive behavior. Why is it that people willingly initiate behavior they know to be addictive? Even more puzzling, why do ex-addicts, who have previously succeeded in throwing off the yoke of their addiction, so often fall back into dependence? The present studies suggest that people who are not actively experiencing addiction—even if they have experienced it in the past—may be incapable of understanding its true motivational force, and thus may be undeterred by the threat of addiction because they (erroneously) believe they can handle their drug craving. In support of this view, a study that asked heroin users to indicate how much money they would be willing to pay for the heroin substitute Buprenorphine (Badger et al., in press), found that heroin addicts would

value an extra dose of Buprenorphine more highly when they were craving heroin than when they were currently satiated. If experienced heroin users continue to underestimate their craving, imagine how difficult it would be for a beginning drug user to fully appreciate the power of drug addiction.

In line with this view, it appears that some addiction programs already understand the danger of inflated self-control beliefs. Alcoholics Anonymous is a good example. In their program, the first step to recovery requires that an alcoholic "admits that I am powerless over alcohol," and accept that "once you are an alcoholic you are always an alcoholic." By diminishing the perception of control, Alcoholics Anonymous may help to prevent people from drifting back toward the illusory belief that they can handle their alcohol craving.

*The nature of affect-laden goals*

An interesting consequence of the empathy gap seems to be that goals that are connected to an affective state (e.g., weight-loss goals and hunger) fluctuate with that affective state. In Chapter 4, for example, we found that smokers' goals fluctuated with their craving for cigarettes. Likewise, throughout Chapter 5, participants' self control goals varied with a related affective state. This finding is important because research has linked inconsistent or poorly-defined goals with self control failure (Baumeister & Heatherton, 1996). Setting stable, well-defined goals is important because it allows for clear decision rules (e.g., I don't eat after 9pm). Stable standards also allow for better preparation and planning. That is, it is much easier to develop a weight loss program when the goal is clear and consistent (e.g., lose five pounds in 30 days) than if the goal is poorly defined and inconsistent.

Our research also provides an alternate explanation for the well-documented finding that people tend to set unrealistic goals. The kind of goals people set strongly influences subsequent performance (Brunnermeier et al, 2005), and the consensus of evidence suggests that unrealistic goals undermine performance (Foster, 1995). Prior explanations for this effect have been rooted in motivational (e.g., setting and contemplating ambitious goals is pleasurable) theories. Polivy and Herman (2000) for example argue that people set unrealistic goals because it feels good to imagine a better future. The present findings, however, suggest that unrealistic goals are not only rooted in motivational reasoning but also in biased judgment—people enjoy a false sense of control and consequently set unrealistic goals. In Chapter 4, for instance, we found that participants with the highest perception of control set the most unrealistic goals. A biased-judgment account of unrealistic goals is interesting because it offers a straightforward method for correcting inflated goals—changing perceptions of control may be an effective way to restrain goal setting.

*Theories of health behavior*

Although many psychological disciplines involve affect, health behavior is particularly tied to it, because affective states such as hunger, sexual arousal, and addiction can be a major, if not the principle, obstacle to healthy behavior. Theories of health behavior have traditionally tried to predict and explain health behavior on the basis of a set of beliefs, and in so doing have relied on the assumption that health beliefs are relatively stable. Yet we have consistently found that beliefs relevant to health behavior, such as self-efficacy and behavioral intentions, vary with one's affective state. From a theoretical perspective, this finding underscores the

role of affect in health behavior, and challenges conventional views of the nature and importance of health beliefs.

The fact that health beliefs change throughout the day also has implications for researchers who rely on health beliefs to predict behavior. At the very least it would seem that researchers should include affect in their assessments. Health researchers may take a further step and measure health beliefs while people are in a hot state. In our view, affectively-charged moments provide crucial tests of healthy decision-making. Capturing people's "hot" state of mind may provide considerable insight into their future health behavior. Taken together, our findings point to a more dynamic conception of health behavior—a view that represents both a theoretical and methodological challenge to conventional views of health behavior.

*Affect-as-information*

Our findings also raise questions about well-established findings from the *affect-as-information* literature (Schwarz & Clore, 1983). A well replicated finding in that literature is that while people will use their momentary feelings as input when making a decision, this influence can be discounted if people are made aware of their feelings. This finding is at odds with our evidence, which finds that people have great difficulty discounting their feelings.

How might we reconcile these findings? As of yet we have no firm views on this issue. One possibility is that the affect-as-information perspective misses a crucial dimension of affect—its motivational pull. In other words, affect does more than simply inform, it creates motivation. Hungry dieters do not coldly interpret their hunger cravings as evidence that they need to eat. Hungry dieters *want* to eat. One explanation for

these conflicting findings is that the affect-as-information studies have relied on manipulations that induce affect at very low levels of intensity, and at low levels of intensity affect carries little motivational force. This explanation is tentative and at this point we have no empirical support for this hypothesis.

*The empathy gap and the law*

The empathy gap also raises a number of issues for legal decision-making, for both the legislature and the courtroom. Chapter 3 described how the empathy gap colors perceptions of impulsive behavior. The inability to appreciate the motivational force of affect-driven impulse might influence a number of legislative decisions. Consider the issue of what form of addiction programs a government should support. If politicians perceive addicts to be in control of their behavior, they may form more punitive policies toward addiction and the crime that often stems from it (e.g., incarceration instead of treatment) than if they perceive addictions as victims of their situation.

The empathy gap may even influence the fundamental issue of what constitutes illegal action. Decisions about whether particular police and military interrogation techniques are deemed justifiable will largely depend on the perceived severity of such techniques. If people underestimate the severity of the pain and discomfort that stems from interrogation techniques (we elaborate on this issue later in the chapter), they may take a more permissive view of interrogation than if they appreciated the full gravity of such experiences.

The empathy gap also may influence decisions in the courtroom. Many criminal acts originate not in well calculated plans, but spring from impulse. Although defense lawyers are quick to depict a misdeed as a

"crime of passion" in hopes of swaying the jury, the court does not formally recognize crime of passion arguments as a *fully* mitigating defense strategy, as it does with insanity, but it can serve as a mitigating factor in sentencing decisions. The difficult question is to what extent should affect serve as a mitigating factor? Pedophiles and other sex offenders, for example, often acknowledge the depravity of their own actions, but insist that the impulses that they are burdened with are too strong to resist. Whether we grant leniency for affect-based crimes seems to hinge on our ideas about the power of affect and the boundaries of self-control. The greater the capacity for self-control, the greater the responsibility one has to enact restraint (this is presumably why we take a different view of a child's impulsive behavior). In Chapter 5 we advanced the notion that people generally overestimate their capacity for self-restraint. It stands to reason that when a judge and jury evaluate affect-driven crimes, the restraint bias will inform their judgments.

## Directions for future research

We conclude this chapter by considering a number of ideas for future research. One on-going line of research is using the restraint bias to try to develop a better understanding of senseless violence. Much violence is senseless in that the violence is not premeditated, but rather arises from an anger-driven impulse. Yet as Chapter 5 suggests, it seems that people have great difficulty foreseeing their true capacity for violence, and are thus often inadequately prepared to cope with anger's impulsive influence. For instance, in Chapter 1 we mentioned the case of the Amsterdam bus driver who shot a man after a heated, but trivial, dispute. According to his account, he never imagined he would use his handgun so recklessly. If he

had greater insight into his capacity for violence, he may never have had a gun in the first place.

Results from an initial experiment support the idea that people overestimate their capacity to control their anger. We asked participants to indicate the likelihood that they would react in a physically aggressive manner to a number of common, frustrating situations, such as when a neighbor plays music too loudly or when someone cuts in front of you in line. We found that participants who were induced with anger believed that there was a significantly greater likelihood of acting aggressively to those frustrating situations than did control participants. The next step for this research is to test the objective accuracy of these beliefs, and to test whether anger-control beliefs influence the use of precautions against aggressive behavior (e.g., limiting one's access to guns).

Another line of research—in collaboration with George Loewenstein—is beginning to explore how the empathy gap influences beliefs about torture. As we witnessed in Chapter 2, people generally underestimate pain's magnitude. This may be particularly true of pain-inducing techniques that are not graphic, and thus do not arouse strong emotional reactions. For example, three common "interrogation" techniques currently used in the United States involve sleep deprivation, having people stand in a fixed position for long periods of time, and keeping people in cells that are well above or below room temperature. Techniques such as these are not as immediately offensive as more graphic forms of torture. For example, in response to doubts about the moral acceptability of having prisoners stand for prolonged periods of time, former defense secretary Don Rumsfield pointed out that he himself often stood for eight hours a day, and thus did not see why this technique was

inappropriate for prisoners. Contrast this point of view with a well-known article about soviet interrogation techniques. "Another technique widely used is that of requiring the prisoner to stand throughout the interrogation session or to maintain some other physical position which becomes painful. This, like other features of the KGB procedure, is a form of physical torture in spite of the fact that the prisoners, and KGB officers alike, do not perceive it as such. Any fixed position which is maintained over a long period of time ultimately produces excruciating pain (Hinkle & Wolff, 1956)."

We plan to conduct a number of experiments that provide participants with brief exposure to legally sanctioned interrogation techniques and then have them make judgments about the moral acceptability of such practices. For example, in a study that ostensibly deals with physiological measurement, we might ask participants to stand still for a brief period of time (perhaps 30 minutes), and then, while they remain standing, have them evaluate fixed position techniques. We expect these participants will judge fixed position interrogation techniques to be less justifiable than will participants who are not.

Because the empathy gap undermines decision-making in numerous ways, perhaps the most pressing line of research will examine whether it is feasible to “bridge” the empathy gap. In other words, is there a way to provide the cold self with greater insight into the actions of the hot self (and vice versa)? One possibility might be to alter the very beliefs that affect influences. In numerous studies we have seen that affect can impact the perception of control. Directly altering the perception of control might attenuate the consequences of the empathy gap. For example, deflating one’s perception of control over hunger craving,

addiction, etc., might lead to less contemptuous evaluations of impulsive behavior.

The limitation of this empathy gap-bridging strategy is that it covers a single component of a multi-component phenomenon. Affect does more than shift beliefs; Affect creates motivation, modifies perception, changes physiology, etc. A more promising approach might be to instill the very idea that we underestimate the motivational force of our cravings. Even if people cannot appreciate the force of impulse, the knowledge that they cannot do so may help to reduce the empathy gap. Another interestingly approach is to move away from individual-based strategies, and focus instead on social or environment-based strategies. Such an approach would use environmental forces to delay decision-making in order to enable people to weight decisions in both cold and hot states. A good example is cooling-off periods. A cooling-off period is simply a rule that requires the decision-maker to delay the decision. Cooling-off periods are currently required for a number of irreversible medical procedures, such as abortions, sex-change operations, and end-of-life decisions. Cooling-off periods revolve around the notion that these procedures should only be performed if the patient demonstrates a consistent preference.

The challenge for future research is to decide how to best assess whether a preference is truly consistent. We know from previous research that medical preferences can fluctuate widely. For example, one insightful study on the will-to-live beliefs of terminally ill cancer patients (Chochinov, 1999) found that patients' preference to live or die can fluctuated widely throughout the day. One interesting idea is to use a sensitive and unobtrusive sampling method, such as experiential sampling,

to assess the stability of patients' preferences. Assessing patients' momentary preferences at dozens of points in time, might reveal the patient's true, or "meta-preference" (or lack there of), and would thus place health practitioners in a much better position to make a decision about the best course of treatment.

## Closing remarks

Affect has the capacity to change human behavior profoundly. Yet for all its transformative power, people consistently misunderstand its influence. When griped by affect, we fail to appreciate the extent to which affect guides our behavior. And when out of its grasp, we fail to appreciate just how transformative affect can be. In twelve experiments we have examined the nature and significance of the gap between the "cold" and "hot" self. Our findings demonstrate that the empathy gap creates diverse challenges for individual decision-making, interpersonal relationships, and public policy. It is our hope that the insights afforded by this dissertation will help to address these challenges.

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# Samenvatting

De voorgaande hoofdstukken geven een uitgebreid beeld van de aard en significantie van de *hot/cold empathy gap*. Ik sluit de dissertatie af met het innemen van een breder standpunt. Dit hoofdstuk begint met de voornaamste empirische bevindingen, waarna de implicaties van deze bevindingen worden bestudeerd. Tot slot worden suggesties voor toekomstig onderzoek besproken.

## Overzicht van de belangrijkste onderzoeksresultaten

Het doel van deze dissertatie was om meer inzicht te krijgen in de *hot/cold empathy gap*. Het grootste deel van de dissertatie richtte zich op de significantie van de *empathy gap*. De belangrijkste bijdrage van deze dissertatie is wellicht dat het de brede invloed van de *empathy gap* aantoont. Voorgaand onderzoek concentreerde zich bijna geheel op de wijze waarop de *empathy gap* toekomstig gedrag voorspelt. Als gevolg daarvan is de kennis over de *empathy gap* beperkt gebleven tot onderzoeksvelden die zich bezig houden met beoordelings- en besluitvormingsprocessen en is niet geïntegreerd in een breder psychologisch veld zoals gerelateerde verschijnselen als *affective forecasting* wel zijn. De hieronder besproken onderzoeksbevindingen benadrukken de centrale plaats die de *empathy gap* inneemt in sociaal-psychologisch denken en handelen.

*De significantie van de empathy gap*

Hoewel eerder onderzoek zich voornamelijk heeft gericht op de invloed van de *empathy gap* op het voorspellen van toekomstig gedrag, vonden wij in Hoofdstuk 2 dat de *empathy gap* ook invloed heeft op de wijze waarop mensen het verleden interpreteren. Uit drie onderzoeken kwam naar voren dat vergeleken met mensen in een affectieve staat, mensen in een neutrale staat de invloed van affect op hun gedrag in het verleden onderschatten. In plaats daarvan hadden mensen in een neutrale staat de neiging om de invloed van niet-affectieve factoren, zoals persoonlijkheidskenmerken, te benadrukken. Dit attributiepatroon werd zowel gevonden in beoordelingen van eigen gedrag als van het gedrag van anderen. Attributievorming is een fundamenteel concept in de sociale- en klinische psychologie, voornamelijk omdat de wijze waarop men het verleden interpreteert invloed heeft op de wijze waarop men het heden en de toekomst ziet. Hoofdstuk 2.3 gaf een voorproef van de kracht van attributies. In dit onderzoek attribueerden proefpersonen in een neutrale staat hun slechte prestatie op een geheugentaak aan dispositionele eigenschappen, zoals slechte concentratie, terwijl proefpersonen in een affectieve staat hun slechte resultaat attribueerden aan een situationele factor, namelijk pijn. Het gevolg van deze verschillende interpretaties van het verleden is dat proefpersonen die hun slechte resultaat attribueerden aan dispositionele factoren hun prestatie later minder positief beoordeelden.

In Hoofdstuk 3 onderzochten we hoe de *empathy gap* de evaluatie van impulsief gedrag beïnvloedt. Mensen hebben vaak weinig tolerantie voor impulsief gedrag. Zo zijn bijvoorbeeld drugsverslaving, gokken en alcoholisme sterk gestigmatiseerd. Hoofdstuk 3 had ten doel meer inzicht

te krijgen in de wijze waarop mensen impulsief gedrag beoordelen en waarom zo vaak op impulsief gedrag wordt neergekeken.

Wij voorspelden dat de neiging om de motivationele kracht van verlangens naar seks, drugs, eten, etc. te onderschatten, mensen ertoe leidt om impulsief gedrag te veroordelen, omdat het de valse impressie geeft dat deze verlangens makkelijk te controleren zijn. Uit vier onderzoeken kwam naar voren dat proefpersonen in een neutrale staat (bijvoorbeeld geen honger) minder positieve evaluaties van gerelateerd impulsief gedrag (impulsief eten) maakten dan proefpersonen die in een affectieve staat waren (hongerig). Deze *empathy gap* is onderzocht in drie verschillende affectieve staten, namelijk vermoeidheid, honger en seksuele opwinding, en werd zowel gevonden als proefpersonen het impulsieve gedrag van anderen (Onderzoeken 3.1 & 3.2) als van zichzelf (Onderzoek 3.3) beoordeelden. Onderzoek 3.4 toonde aan dat dit patroon het gevolg was van een verschil in opvattingen over de kracht van de affectieve staat zelf.

In Hoofdstuk 4 wordt ingegaan op de gevolgen die de *empathy gap* heeft voor gezondheidsgedrag. Naar aanleiding van Onderzoek 3.4, waaruit bleek dat de *empathy gap* invloed heeft op de percepties van controle, voorspelden wij dat opvattingen over *self-efficacy*, opvattingen die centraal staan in de meeste modellen van gezondheidsgedrag, zouden variëren met de affectieve staat van een persoon. In overeenstemming met met onze voorspelling kwam uit Onderzoek 4.1 naar voren dat proefpersonen die verlangden naar een sigaret zichzelf minder goed in staat achtten om te stoppen met roken dan proefpersonen die net hun rookbehoefte bevredigd hadden. Een vergelijkbaar resultaat werd gevonden in Onderzoek 4.2, waar voldane lijners een doeltreffendere afvalstrategie hadden dan lijnende proefpersonen met een mild hongergevoel.

Bovendien voorspelden en vonden we dat verschillen in *self-efficacy* invloed zouden hebben op gerelateerde opvattingen over gezondheid. Deze voorspelling was gebaseerd op het idee dat verschillen in *self-efficacy* tot verschillende standaarden zou leiden waarop mensen hun doelen zouden baseren en eerdere inspanningen zouden evalueren. Zo vonden wij in Onderzoek 4.1 bijvoorbeeld dat bevredigde rokers zichzelf meer ambitieuze doelen stelden met betrekking tot het stoppen met roken dan onbevredigde rokers. Uit Onderzoek 4.2 kwam naar voren dat hoe groter het hongergevoel van een lijnende proefpersoon was, hoe minder zij van plan was om af te vallen en er minder zeker van was of zij haar geplande doelstelling zou kunnen bereiken.

Hoofdstuk 5 bestaat uit drie onderzoeken naar de aard van opvattingen over zelf-controle. Naar aanleiding van het *empathy gap*-effect en de resultaten uit de voorgaande hoofdstukken, redeneerden wij dat in de meeste omstandigheden mensen onrealistisch veel vertrouwen hebben in hun vermogen om affectieve impulsen te controleren. Wij voorspelden dat deze zogenaamde *restraint bias* ertoe zou leiden dat mensen de mogelijkheden om zichzelf tegen verleiding te beschermen zouden onderbenutten. Wij onderzochten deze voorspellingen in drie verschillende affectieve staten; vermoeidheid, seksuele opwinding en honger. De resultaten bevestigden onze voorspellingen. Uit onderzoek 5.1 bleek dat vermoeide proefpersonen dachten minder controle te hebben over mentale vermoeidheid dan niet-vermoeide proefpersonen.

In Onderzoek 5.2 werden mannelijke proefpersonen gevraagd hoeveel geld zij bereid waren in te zetten om zich drie weken seksueel te onthouden. Seksueel opgewonden mannen bleken minder vertrouwen te hebben in hun vermogen om hun verlangen naar seksuele voldoening te

controleren dan mannen die niet opgewonden waren. Als gevolg hiervan namen seksueel opgewonden mannen meer zelf-controle maatregelen door meer geld op het spel te zetten voor als ze er niet in zouden slagen zich aan het voornemen van seksuele onthouding te houden.

Onderzoek 5.3 richtte zich op de accuraatheid van de voorspellingen van mensen. Hongerige proefpersonen bleken minder vertrouwen te hebben in hun vermogen tot controle over hun hongergevoel dan voldane proefpersonen. Dit leidde ertoe dat wanneer men de mogelijkheid kreeg om geld te verdienen door een snack te kiezen die men een week lang niet mocht nuttigen, dat hongerige proefpersonen minder verleidelijke snacks kozen dan voldane proefpersonen. Deze voorzorgsmaatregel bleek effectief, daar de hongerige proefpersonen over het algemeen meer geld verdienden dan de voldane proefpersonen.

*De aard van de empathy gap*

Een ander doel van deze dissertatie was om meer inzicht te krijgen in de aard van de *empathy gap* zelf. Hoewel nog veel vragen onbeantwoord zijn, zijn in de empirische hoofdstukken drie belangrijke kwesties aan de kaak gesteld. De eerste kwestie betreft of de *empathy gap* niet simpelweg een toegankelijkheidseffect is. Met andere woorden, onderschatten mensen in een neutrale staat de invloed van affectieve staten simpelweg omdat zij er geen rekening mee houden wanneer ze een besluit nemen? Wij hebben dit vraagstuk onderzocht en de resultaten geven aan dat de *empathy gap* meer is dan slechts een kwestie van toegankelijkheid. In Onderzoek 2.2 werden affectief neutrale proefpersonen gevraagd om te oordelen *alsof* zij in een affectieve staat waren, waardoor de affectieve staat toegankelijk werd gemaakt. Ondanks deze instructie bleven de affectief neutrale proefpersonen de invloed van de affectieve staat onderschatten.

Een andere belangrijke kwestie die niet in eerder onderzoek aan de kaak gesteld is, is of de *empathy gap* affect-specifiek is. Dat wil zeggen, heeft men als men in een bepaalde affectieve toestand is, zoals hongerig, meer inzicht in een andere affectieve staat, zoals seksuele opwinding? Dit hebben we getest door proefpersonen in een specifieke affectieve staat te laten oordelen over een andere affectieve staat. Uit Onderzoek 3.3 bleek dat hongerige proefpersonen geen groter inzicht hadden in het gevoel van vermoeidheid dan affectief neutrale proefpersonen. Vermoeidheid en honger zijn echter twee zeer verschillende affectieve staten en de mogelijkheid bestaat dat twee meer gerelateerde affectieve staten andere resultaten zouden hebben opgeleverd. Zo zou bijvoorbeeld een naar een sigaret verlangende roker mogelijk meer inzicht hebben in het verlangen naar heroïne dan in het gevoel van vermoeidheid.

Een derde kwestie betreft of de *empathy gap* gevoelig is voor de sterkte van de affectieve staat, zodat mensen in een matig sterke affectieve staat (bijvoorbeeld gemiddelde vermoeidheid) moeilijk inzicht hebben in de invloed die een sterke affectieve staat (bijvoorbeeld extreme vermoeidheid) in het verleden op hen heeft gehad. In Hoofdstukken 2 en 4 ondervonden we dat de *empathy gap* gevoelig is voor de sterkte van de affectieve staat. Dit extremiteiteffect heeft gevolgen voor hoe wij gedrag tijdens een sterk affectieve staat beoordelen. Zelfs als we een matig sterk affect ervaren, zoals een matig gevoel van boosheid, zou het wellicht bijna onmogelijk kunnen zijn om je in te leven in een meer extreme vorm van deze affectieve staat (zoals in dit geval blinde woede).

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