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## Emotions in Economic Theory and Economic Behavior

By GEORGE LOEWENSTEIN\*

When Jeremy Bentham (1789) first proposed the construct of utility, emotions figured prominently in his theory. Because Bentham viewed utility as the net sum of positive over negative emotions, he devoted a substantial part of his treatise on utility to a discussion of the determinants and nature of emotions. When neoclassical economists later constructed their new approach to economics upon the foundation of utility, however, they rapidly became disillusioned with utility's psychological underpinnings and sought to expunge the utility construct of its emotional content. This process culminated in the development of ordinal utility and the theory of revealed preference which construed utility as an index of preference rather than of happiness.

The last few decades, however, have witnessed a small revival of interest in emotions among economists (see Jon Elster, 1998) and a quite dramatic burst of research on emotions by psychologists. Psychologists have made tremendous strides in understanding a wide range of issues relating to emotion, including the role of emotion in decision-making (e.g., Antonio R. Damasio, 1994), the neural bases of emotion (e.g., Jann Panksepp, 1998), and the interaction of cognition and emotion (e.g., Robert B. Zajonc, 1980).

Although the growing interest in emotion by economists and psychologists has coincided, the two groups have generally focused on different

emotions. Economists have turned their attention to anticipated emotions, emotions such as regret and disappointment (e.g., Graham Loomes and Robert Sugden, 1982) which are not experienced at the time of decision-making, but are expected to be experienced in the future. Psychologists, in contrast, have mainly studied *immediate emotions*, emotions that are experienced at the time of decision-making. Such immediate emotion and, more broadly, a wide range of *visceral factors* (Loewenstein, 1996) underpin daily functioning but also often propel behavior in directions that are different from that dictated by a weighing of the long-term costs and benefits of disparate actions. In this paper, I consider why economists too might want to pay heed to immediate emotions.

### I. Visceral Factors: Definition and Significance

Visceral factors refer to a wide range of negative emotions (e.g., anger, fear), drive states (e.g., hunger, thirst, sexual desire), and feeling states (e.g., pain), that grab people's attention and motivate them to engage in specific behaviors.<sup>1</sup> Like conventional preferences, they determine the trade-offs that people make between different goods and activities; hunger, for example, increases one's preference for food. The very hallmark of preferences, however, is their consistency and short-term stability (Amartya Sen, 1973). Visceral factors, in contrast, can alter desires rapidly because they themselves are affected by changing internal bodily states and external stimuli.

Historically, visceral factors or "passions" have been viewed as a destructive force in hu-

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<sup>1</sup> I restrict attention to negative emotions because their effects resemble those of drive states such as hunger and feeling states such as pain. The effects of positive emotions are more subtle and complex.

man behavior. Despite their ability to wreak havoc, however, visceral factors serve essential functions. Deficiency in any visceral factor decreases an individual's quality of life, chances of survival, or likelihood of reproducing. People who do not experience hunger do not eat, those who lack pain receptors accidentally mutilate themselves, and even subtle emotional deficits can have dramatically negative consequences for functioning (Timothy D. Wilson and Jonathan W. Schooler, 1991; Damasio, 1994). Indeed, it is probably not an overstatement to say that visceral factors are more basic to daily functioning than the higher-level cognitive processes that are often assumed to underlie decision-making. The human capacity for high-level cognition, as manifested most dramatically in language and consciousness, is unique, but we share emotions and other visceral factors with a wide range of other animals. These other animals function perfectly adequately; they even conform to many of the usual "laws" of economic behavior (John Kagel et al., 1995).

Although visceral factors also play an essential (probably the dominant) role in human behavior, people's introspections about the causes of their own behavior lead them to underappreciate the influence of visceral factors and to exaggerate the importance of higher-level cognitive processes. Numerous studies have employed diverse methods to show that people tend to interpret their own behavior as the result of deliberative decision-making even when this is not the case (for a recent review, see Daniel M. Wegner and T. Wheatley [1999]).

Visceral factors have also traditionally been seen as an erratic and unpredictable influence on behavior, but again the popular view distorts reality. Certainly, as highlighted above, feelings fluctuate, often rapidly. Their changeability should not be confused, however, with unpredictability. In fact, both the determinants of visceral factors and their influence on behavior are highly systematic, whereas cognitive deliberations, which are commonly seen as the source of stability in behavior, are a major source of unpredictability. Thus, cocaine-addicted rats that are given free access to cocaine simply self-administer the drug repeatedly until they collapse from exhaustion or die. The behavior of human addicts is far more complex than rodents' because human drug-takers cog-

nitively deliberate the long-term consequences of drug-taking. They binge, go "cold turkey," relapse, and engage in elaborate self-control strategies and self-deception. As Roy F. Baumeister and Kristin L. Sommer (1997 p. 77) write, "consciousness is not an essential mediator of human behavior because behavior can occur in elaborate, lawful, and predictable patterns without consciousness. Instead, ... the function of consciousness is precisely the opposite: it overrides those lawful and predictable patterns."

## II. Effects of Visceral Factors

Perhaps put off by their perceived unpredictability, economists have only rarely incorporated visceral factors into their models of human behavior (for an exception, see David Laibson [1999]). In fact, visceral effects can be modeled as an instance of state-dependent preferences. Visceral factors motivate people to engage in specific behaviors through the combined application of a carrot and a stick. The "carrot" heightens the pleasure associated with activities that mitigate the visceral factor. Food, for example, tastes better when one is hungry (which motivates one to eat), and almost anything that will warm a body feels pleasurable when one is cold (Michel Cabanac, 1979). Given a utility function  $u(c, s)$ , in which  $c$  is a vector of consumption activities and  $s$  is a vector designating the individual's configuration of visceral states, the carrot can be represented by  $\partial^2 u(c_i, s_j) / \partial c_i \partial s_j \geq 0$ , where  $i$  and  $j$  refer to specific pairs of consumption activities and visceral states (e.g., eating and hunger, aggression and anger, etc.).<sup>2</sup> The pain of the "stick" torments an individual when visceral factors go unsatisfied and makes him feel progressively worse as visceral factors intensify:  $\partial u(c^0, s) / \partial s < 0$ , where  $c^0$  represents a null level of consumption (e.g., not eating).<sup>3</sup> These twin effects raise the marginal utility of goods and activities that can mitigate

<sup>2</sup> Visceral factors also *suppress* the marginal utility of certain goods and activities.

<sup>3</sup> This negative impact on utility is another identifying feature of visceral factors; in contrast, the direct hedonic impact of a nonviscerally induced change in preferences (e.g., from preferring apples to oranges) is typically ambiguous.

the visceral factor and, thus, their marginal rate of substitution relative to: (i) other goods and activities, (ii) delayed consumption, and (iii) consumption by other people. Frank H. Gawin's (1991 p. 1581) account of addiction to cocaine nicely illustrates all three regularities: "Virtually all thoughts are focused on cocaine ... ; nourishment, sleep, money, loved ones, responsibility, and survival lose all significance."

Despite the strong pull of visceral factors on human behavior, economists may have good reason to approach them with caution. At least two complications prevent economists from treating visceral factors as an uncomplicated cause of changing marginal utilities and modeling them in a straightforward fashion as state-dependent preferences. First, visceral factors often drive people to behave in ways that they view as contrary to their own self-interest. For example, when not in the grip of road-rage, most people recognize that it is not in their interest to assault a fellow driver who annoys them. Indeed, even at the moment of acting (e.g., when succumbing to the impetus of road rage), people often know that they are not acting in their own self-interest. Second, people tend to underestimate the impact of visceral factors on their own current and future behavior.

These complications arise precisely because visceral factors are so effectual (indeed, excessively so). They function biologically to grab the attention needed to ensure that certain critical actions are performed. Moreover, they are designed to function with minimal or with no higher-level cognitive mediation (Joseph LeDoux, 1996). For this reason, immediate visceral factors can have an enormous influence on behavior in the absence of cognitive deliberations. They can even override such deliberations. As visceral factors intensify, they often produce a split between what one feels driven or compelled to do (based on the direct effect of visceral factors) and what one feels is best to do (based on an analysis of the expected consequences of one's actions). At lower intensities, such divergences are experienced as intrapersonal conflicts, feelings that one should or should not take certain actions, accompanied by urges to do the opposite (e.g., Thomas Schelling, 1984). At higher intensities, visceral factors progressively seize command over behavior, causing people to experience themselves as being "out of

control." When behavior is driven by intense visceral factors, it stretches the meaning of the term to say that people are making "decisions."

Aware of their sometimes destructive influence, people attempt to resist the impact of future visceral factors on their behavior. Such resistance often fails because people also underestimate the influence of future visceral factors, even as they take precautions against possible future states. Underestimation results, in part, from wishful thinking (a bias that makes one believe that what one wants to be true is true) and, in part, from poor memory for past visceral states (Daniel Read and Loewenstein, 1998). Because they cannot remember what visceral states felt like in the past, people underestimate their influence in the future.

Underestimation is most severe when people are not currently in a visceral state. When in a "cold" state (i.e., not hungry, angry, in pain, etc.), it is difficult to imagine what it would feel like to be in a "hot" state or to imagine how one might behave in such a state. Likewise, when in a "hot" state (i.e., craving, angry, jealous, sad, etc.) people have difficulty imagining themselves in a cold state and thus miscalculate the speed with which such a state will dissipate. Research has empirically demonstrated these "hot-cold empathy gaps" (the misjudgments that occur between different visceral states) for hunger, thirst, sexual arousal, anxiety, curiosity, and pain. For example, in a study that focused on sex (Loewenstein et al., 1997), male college students who were sexually aroused from viewing photographs of nude women reported a substantially higher likelihood that they would behave aggressively on a date than nonaroused control subjects. Details of this study and many others can be found in Loewenstein and David Schkade (1999) and Dunning et al. (2000) (which also reports results from experimental markets in which the hot-cold empathy gap caused subjects to lose money).

The combination of the underappreciation of future visceral states and the hot-cold empathy gap can be mathematically represented as a slightly more general form of what Ted O'Donoghue, Matthew Rabin, and I (Loewenstein et al., 1999a) label "projection bias." Economic rationality entails maximizing the utility of consumption at different points in time, taking account of whatever configuration of visceral states

will be present at those times (although, as discussed below, people can take actions that affect their own future states):

$$u(c_0, c_1, \dots, c_T; s_0, s_1, \dots, s_T) = \sum_{t=0}^T u(c_t, s_t).$$

Underappreciation of future visceral factors, and the hot–cold empathy gap, can be represented by the assumption that the individual instead maximizes

$$\begin{aligned} \tilde{u}(c_0, c_1, \dots, c_T; s_0, s_1, \dots, s_T) \\ = u(c_0, s_0) + \sum_{t=1}^T \tilde{u}(c_t, s_t) \end{aligned}$$

where  $\tilde{u}(c_t, s_t)$  represents a compromise among (i) the actual utility function that will prevail at time  $t$ ; (ii) the utility function that would prevail in the absence of elevated visceral factors (capturing the underappreciation of future visceral factors), and (iii) the individual's current utility function based on the configuration of visceral states that he/she is currently experiencing (capturing the hot–cold empathy gap). Such a formulation predicts that (i) raising the level of a future visceral factor (with certainty) will have a smaller impact on planned behavior than raising the level of the same visceral factor in the present, and (ii) raising the level of a present and future visceral factor, in parallel, will lead to an increase in impatience for goods that can mitigate the visceral factor. For example, raising the level of immediate and future hunger in parallel should produce an increase in impatience for food. In Loewenstein et al. (1999a), we draw out implications of projection bias for a variety of economic behaviors, including labor–leisure trade-offs, consumption of addictive substances, and status-seeking. In addition, we show that if consumers exhibit projection bias, “cooling off periods,” during which consumers can costlessly change their minds about purchases, can improve welfare. In a different paper (Loewenstein, 1999), I discuss implications for addiction.

In summary, first, elevated visceral factors often influence people's immediate behavior

more than they think is normatively justified, either beforehand or afterward (when they are not in an elevated visceral state), or even sometimes at the moment of acting. Second, people tend to underestimate the impact of future visceral factors on their own behavior. People are powerfully influenced by their own immediate hunger, sexual desires, pains, and discomforts but do not generally anticipate the magnitude of these influences when they will occur in the future.

Visceral factors, therefore, pose significant problems for decision-makers who would like to maximize their own utility. On the one hand, it would clearly be suboptimal to make decisions that ignore visceral factors. Visceral factors do affect the marginal utility of different activities: eating is more pleasurable when one is hungry, and sex is more pleasurable when one is aroused. On the other hand, it would also be inadvisable always to treat viscally influenced preferences on a par with nonvisceral preferences, because people often view them as a destructive influence. Clearly, welfare maximization lies somewhere between the two extremes of making decisions that ignore visceral factors and treating visceral influences as no different from any other influence on tastes.

### III. Consequences for Economic Behavior

Visceral factors are transient, but the behaviors they produce have long-lasting and important consequences both for individuals and society. In part because visceral influences cause people to take extreme actions, and in part because important decisions induce powerful emotions in decision-makers, many of life's most important decisions are made under the influence of intense visceral states.

Although visceral factors influence all domains of behavior, three general categories of behavior are of special relevance to economics. First, people's bargaining behavior is powerfully colored by emotions such as anger, fear, and embarrassment.<sup>4</sup> The feeling of injustice

<sup>4</sup> Embarrassment can be such a powerful force that, it is commonly reported, people who choke on their food in restaurants often go to the restroom (and die) rather than subjecting themselves to the embarrassment of asking for assistance.

that people experience when they believe they have been treated unfairly, or preexisting anger toward the people they are negotiating with, often causes them to act contrary to their own economic interests. In the classic pattern of all visceral factors, angry negotiators become obsessed with causing pain to the other side, impatient to impose that pain (and relatively indifferent to the long-term consequences of doing so), and selfish (i.e., unconcerned about collateral damage to other parties). The cold-hot empathy gap exacerbates the problems caused by emotions because people in a cool state underestimate the intensity of emotions they will experience in the future. As a result, during happy times (e.g., before a marriage or business partnership goes sour), they fail to work out agreements, such as prenuptial agreements or arrangements about how to dissolve business partnerships, that could help to reduce the mutual destructiveness that often characterizes such breakups.

Second, visceral factors play a critical role in intertemporal choice (Loewenstein, 1996). Visceral factors lead people who otherwise display "normal" decision-making behavior to behave in ways that give the appearance of extreme discounting of the future.<sup>5</sup> In the grip of "road rage," suburban mothers in Alabama shoot each other over a trivial misunderstanding; politicians and business leaders become entangled in sex scandals that destroy their careers; people who have everything to gain from an attractive appearance fail to adhere to their diets. In fact many, if not most, self-control problems involve visceral factors, and likewise, almost all visceral factors are associated with self-control problems: hunger and dieting, sadness and impulsive suicide, anger and violence, sexual desire and sex crimes, fear and panic, and so on. The effect of visceral factors may help to explain inconsistencies in concern for the future over time and across activities. Surveys of economic behavior generally observe very low correlations between the different intertemporal trade-offs made by the same individual; people who

refrain from smoking or can control anger are only marginally likelier to save for retirement or even to floss their teeth than are smokers or people with explosive tempers (see e.g., Victor Fuchs, 1982). Emotions also play an important role in savings behavior. As Drazen Prelec and I (1998) argue, people are deterred from buying a fancy dinner as much by the immediate pain of paying for it (they could not enjoy it) as by a calculation of the future consumption that they must relinquish because of the dinner's expense. Understanding the emotions people experience at the time of consuming, or deferring consumption, is critical for understanding and predicting the intertemporal trade-offs they make.

Decision-making under risk and uncertainty is the third domain of economic behavior in which visceral factors play an important role. People's cognitive evaluations of risks often diverge from their emotional reactions to those risks; people fear things that they recognize, at a cognitive level, to be benign, and do not fear things that they realize are objectively threatening. These divergences occur because the determinants of fear are different from the determinants of cognitive evaluations of riskiness. Thus, for example, fear tends to increase over time as a particular risk becomes temporally imminent, even when cognitive appraisals of risk remain unchanged, which produces the well-known phenomenon of "chickening out" as the "moment of truth" draws near. Another cause of such divergences is that people (and other animals) are evolutionarily prepared to be afraid of certain types of hazards but not others (see e.g., Arne Öhman, 1986). Taking account of the effect of immediate emotions on risky behavior can help to explain a wide range of otherwise anomalous risk-taking phenomena, such as the occurrence of simultaneous gambling and insurance purchase (and why people purchase certain types of insurance and not others), gender and age differences in risk-taking, sexually risky behavior, and divergence between the public's and experts' assessments of environmental risks (Loewenstein et al., 1999b).

People are not passive victims of their passions, however. Visceral factors depend in predictable ways on the situations that people get into, and consciousness allows people to antic-

<sup>5</sup> Visceral factors do not always produce short-sighted decision-making. Feelings of anxiety about the future can also promote far-sighted behaviors such as saving for retirement.

ipate these effects and exploit them strategically. Thus, hunger increases as a function of how long it has been since one last ate and is also augmented by the presence of tempting food or the sight of others eating. Aware of these effects, people take actions to manipulate their own visceral states. On the one hand, they avoid temptations that could lead to short-sighted behavior. On the other hand, they seek to augment visceral factors so as to enhance the pleasure of later satisfying them (e.g., fasting to heighten the pleasure of a fancy meal).<sup>6</sup> All of these decisions, however, are distorted by the human tendency to underestimate the influence of future visceral factors. Thus, recovering addicts do not protect themselves sufficiently from situations that are likely to initiate a relapse because they underestimate their own vulnerability, or college students go on a date with a false expectation of their own likelihood of practicing safe sex or of just saying no.

#### IV. Concluding Comments

Economists have not explicitly denied the existence and significance of visceral factors but have traditionally left them out of their analyses, whether because their influence is perceived as transient and hence unimportant, or because they are seen as too unpredictable and complex to be amenable to formal modeling. I have attempted to show that both of these assumptions are false. Visceral factors have important, but often underappreciated, consequences for behavior. Moreover, both the determinants of visceral factors and their impact on behavior are not only systematic, but amenable to formal modeling. Economic models that ignore visceral factors approach predictive accuracy only when applied to behavior characterized by low levels of visceral factors. To predict or make sense of viscerally driven behavior, it is necessary to incorporate visceral factors into models of economic behavior.

<sup>6</sup> People also attempt to manipulate visceral factors by exercising control over their own thoughts (e.g., trying to reason themselves out of their anger or trying to induce dread with vivid and emotion-evoking mental images of the negative consequences of succumbing to temptation).

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