

Hot–Cold Empathy Gaps and Medical Decision Making

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Prior research has shown that people mispredict their own behavior and preferences across affective states. When people are in an affectively “cold” state, they fail to fully appreciate how “hot” states will affect their own preferences and behavior. When in hot states, they underestimate the influence of those states and, as a result, overestimate the stability of their current preferences. The same biases apply interpersonally; for example, people who are not affectively aroused underappreciate the impact of hot states on other people’s behavior. After reviewing research documenting such intrapersonal and interpersonal hot–cold empathy gaps, this article examines their consequences for medical, and specifically cancer-related, decision making, showing, for example, that hot–cold empathy gaps can lead healthy persons to expose themselves excessively to health risks and can cause health care providers to undertreat patients for pain.

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Affect has the capacity to transform us, as human beings, profoundly; in different affective states, it is almost as if we are different people.¹ Affect influences virtually every aspect of human functioning: perception, attention, inference, learning, memory, goal choice, physiology, reflexes, self-concept, and so on. Indeed, it has been argued that the very function of affect is to orchestrate a comprehensive response to critical situations that were faced repeatedly in the evolutionary past (Cosmides & Tooby, 2000).

The dramatic transformations wrought by affect have important consequences for decision making. The foundation of decision theory is that people attempt to satisfy their long-term preferences, but people often behave myopically under the influence of affect, maximizing short-term gratification with inadequate attention to long-term consequences (Baumeister, Heatherton, & Tice, 1994; Loewenstein, 1996). Affect is clearly an essential input into decision making (e.g., Damasio, 1994), but it can also cause people to lose control of their own behavior, rendering decision making—that is, the deliberate weighing of costs and benefits—largely irrelevant.

Beyond the role that it plays in self-destructive behavior, affect complicates decision making in another way. Perhaps exactly because it has such far-reaching effects, people have difficulty predicting what they will want and how they will behave in affective states that are different from their current state (see, e.g., Wilson & Brekke, 1994; Wilson & Gilbert, 2003). Such intrapersonal “hot–cold empathy gaps” (see, e.g., Loewenstein, 1999; Van Boven & Loewenstein, 2003) take two generic forms:

1. “Hot-to-cold” empathy gaps: People who are in “hot” states tend to underappreciate the extent to which their preferences and

behavioral inclinations are influenced by their affective state; they typically believe that they are behaving more dispassionately than they actually are. Underestimating the influence of transient affect, in turn, causes people to overestimate the stability of their own current preferences. Both of these errors increase people’s willingness to act on their own short-term affect-driven preferences. Thus, for example, crimes of passion may occur in part because people underappreciate the extent to which their behavior is driven by momentary affect, and by the interrelated failure to anticipate the extent to which they would “cool off” if they were to delay taking action.

2. “Cold-to-hot” empathy gaps: When people are not affectively aroused, on the other hand, they have little appreciation for their own feelings and behavior in hot states. When one is not hungry, afraid, or in pain, for example, it is difficult to imagine what it would feel like to experience one of these states, or to fully appreciate the motivational power such states could have over one’s own behavior. Such cold-to-hot empathy gaps have diverse consequences for decision making, such as impeding efforts at self-control: Because people who are in “cold” states tend to underestimate the motivational force of their own future hot states, they often fail to take measures to avoid situations that will induce such states, or to prepare to deal with those that are inevitable.

Besides the hot-to-cold versus cold-to-hot dichotomy, hot–cold empathy gaps can be classified according to whether they occur prospectively, retrospectively, or interpersonally. *Prospective* gaps occur when people try to predict their own future behavior in an affective state different from the one they are in. Overshopping for

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¹ My use of the term *affect* is somewhat different from the common definition that emphasizes subjective feelings. *Affect*, as I use the term, can occur below the threshold of conscious awareness (LeDoux, 1996; Winkielman, Berridge, & Wilbarger, 2005). It includes not only emotions such as anger and fear but also drive states such as hunger and motivational states such as physical pain, discomfort (e.g., nausea), and drug craving. All affects have “valence”; they are either positive or negative (or both), and most affects play some role in motivation.

groceries on an empty stomach is a paradigmatic example. *Retrospective* empathy gaps occur when people recall their own behavior when they were in a different affective state. The "morning after" syndrome in which, after an evening's debauchery, one wonders, "Who was that person who did all those things the night before?" illustrates the concept. Finally, *interpersonal* hot-cold empathy gaps occur when one predicts, or tries to make sense of, the behavior of another person who is in an affective state that is different from one's own. Failing to adequately clothe a child one is carrying around on a wintry day would be an example of such an interpersonal gap; because one is hot from the exertion, it is difficult to imagine one's child being cold.

After reviewing some of the studies of hot-cold empathy gaps that seem most relevant to medical decision making, I discuss implications of hot-cold empathy gaps for medical, including cancer-related, decision making. Although hot-cold empathy gaps complicate all decision making, they create special problems for medical decisions. Many health-relevant decisions, such as whether to smoke, what to eat, and whether to get tested or treated for medical conditions, have long-term consequences and so, ideally, should be made on the basis of long-term preferences. However, many also involve intense affect, either at the time of the decision or at the time when consequences are experienced, creating a potential mismatch between the affect experienced at the time of the decision and that associated with the consequences of the decision. Moreover, for many medical decisions, the decision maker or advice giver is different from the person impacted by the decision, in which case the potential for affective mismatch is especially great.

Prior Research on Hot-Cold Empathy Gaps

Addiction

In one recent study designed to test for hot-cold empathy gaps (Giordano et al., 2004), heroin-addicted individuals receiving buprenorphine (BUP; a methadone-like maintenance drug) treatment chose between getting an extra dose of BUP versus different money amounts (e.g., \$10 vs. an extra dose, \$20 vs. an extra dose). They were told that they would receive their preferred item from one of these pairs when they came in for treatment 5 days later. The critical experimental manipulation involved whether they made this choice when they were currently deprived—right before receiving their current dose of BUP—or right after, when they could be expected to be satiated.

Clearly, how an individual with an addiction is currently feeling should be irrelevant to the choice that individual makes for himself or herself 5 days later. However, based on the empathy gap concept, Giordano et al. (2004) predicted that participants who were currently experiencing craving would better appreciate the force of their future craving, and hence would value the BUP more highly, than would participants who were not currently experiencing craving. The prediction was confirmed; participants who were experiencing craving valued BUP 5 days later at a median value of \$60, whereas the median valuation of participants who were not currently experiencing craving was \$35.

As Giordano et al. (2004) discussed, this finding has important implications for understanding addiction. One of the most basic questions concerning addiction is why people take addictive drugs

in the first place, when the adverse consequences of addiction should be evident, particularly to those who are at greatest risk. The hot-cold empathy gap concept provides one possible explanation for this paradox (see Loewenstein, 1999); it suggests that it is virtually impossible for someone who is not craving a drug—even an individual with an addiction who is likely to have experienced intense craving states hundreds or thousands of times—to understand the grip that such craving could have over his or her behavior.

Thirst

In a study focusing on thirst, Leaf Van Boven and I (Van Boven & Loewenstein, 2003) asked visitors to a private gym whether they were planning a vigorous cardiovascular workout, and, if so, if they were willing to complete a short survey. Half of the 47 who assented were asked to complete the survey immediately before exercising, when they could be expected to not be particularly thirsty, and the other half did so right after exercising, when they were likely to be hot and thirsty. The survey asked them to do the following:

Imagine that 3 vacationers in Colorado this past August embarked on a short, 6 mile hike. . . . As the day wore on, they realized that they were hopelessly lost. . . . Worse, because they had packed lightly for a short hike, they had not carried much in the way of food or water. . . .

In the space below, please take the perspective of one of the 3 hikers and describe your situation—how you got into it, how you feel now, both physically and mentally, and what you are hoping will happen.

Participants were then asked the following questions: "Which do you think is most *unpleasant* for the lost hikers, their hunger or thirst?" "Which do you think the hikers *regretted* not packing more, water or food?" "If you were in the hikers' shoes, which would be most *unpleasant* to you?" And "if you were in the hikers' shoes, which do you think you would *regret* not packing?" Finally, they were asked to rate their hunger, their thirst, and how warm they were, each on 1–10 scales.

On the basis of the hot-cold empathy gap idea, we predicted that respondents who were themselves thirsty, because they had just exercised, would be more likely to be thinking of water and hence to mention thirst first in their essay and, more important, to rate thirst as more aversive to the hikers and to themselves in the hikers' shoes. As is evident in Table 1, these predictions were borne out.

In addition to demonstrating hot-cold empathy gaps for thirst, a second purpose of the study was to shed new light on interpersonal perspective taking. A considerable amount of research has examined people's predictions of others' behavior. Most of this research has implicitly assumed that the major source of error in such predictions is the tendency to either underestimate or overestimate differences between oneself and others—referred to, respectively, as *false consensus* and *false uniqueness*. In the thirst study just described, however, as well as in many other studies, my colleagues and I have consistently found that the major source of error in interpersonal perspective taking arises from people's mispredictions about themselves. When people attempt to predict the behavior of another person in a different situation from their own, they first attempt to predict how they would behave in that situation, and then they adjust for perceived differences between them-

Table 1
Effects of Participants' Own Thirst on Empathy for Others' Thirst

| Variable | Time of response | |
|---|------------------------------------|-------------------------------|
| | Before exercising (not thirsty) | After exercising (thirsty) |
| Mentioned thirst before hunger in essay (%) | 19 | 50 |
| Thirst more unpleasant for hikers (%) | 57 | 88 |
| Hikers would regret not packing water more than not packing food (%) | 52 | 92 |
| Thirst more unpleasant for self (%) | 61 | 92 |
| Oneself would regret not packing water more than not packing food (%) | 61 | 88 |

Note. All differences between conditions were significant at the $p < .05$ level.

selves and the person whose behavior they are attempting to predict. Because they mispredict their own behavior, as a result of hot-cold empathy gaps, they then mispredict the behavior of others. Consistent with such an account, a structural equation model of people's predictions of their own and the hikers' feelings revealed that predictions of the hikers were entirely based on predictions of self. Predictions of the hikers were biased, therefore, because they were based on predictions of self, which were powerfully influenced by a nonnormative factor—namely, the individual's current level of exercise-induced thirst.

Pain

The studies of addiction and thirst tested for prospective (and interpersonal) hot-cold empathy gaps. In contrast, a study by Read and Loewenstein (1999) tested for retrospective hot-cold empathy gaps with respect to pain. The authors elicited participants' willingness to accept monetary compensation for enduring pain (putting their hand in cold water) 1 week later. Some participants were randomly assigned to experience a sample of the pain moments before they made the decision; others had experienced a sample of the pain 1 week earlier, and yet a third group had never experienced the pain. Consistent with a cold-to-hot empathy gap, those who had experienced a sample of the pain a week earlier demanded lower compensation to experience it again a week later than those who had just experienced it, and those who had never experienced it at all demanded the lowest compensation of all. If people cannot remember their own pain when they are not in pain, as this study suggests, how likely is it that they can empathize with others' pain? Indeed, there is considerable anecdotal evidence that such empathy is limited, such as is illustrated in the following passage from the epic *Shadows on the Wasteland* (Stroud, 1993), about the first unassisted crossing of the Antarctic continent:

Ran's foot was much worse. Ever since the graft had broken down it had been getting worse and a deep ulcer was now eroding his forefoot. In the mornings it gave him hell, particularly when we had just started, and although he would generally steel himself and say nothing, occasionally even he would have to say something about the pain—try to share a part of it. I could do nothing but reassure him that I understood, though I did not really. Pain is a problem that cannot be shared. (p. 109)

Fear

Leaf Van Boven, David Dunning, Ned Welch, and I have conducted a series of studies focusing on fear (e.g., Van Boven,

Loewenstein, Welch, & Dunning, 2004). In a paradigmatic experiment, we ask students taking a class whether they would be willing to mime in front of the class 1 week later for a payment of \$2. When the appointed day arrives, a week later, they are asked again if they are willing to mime. On the basis of the cold-to-hot empathy gap, we predicted that students would not "get in touch with" their fear of embarrassment unless the event was imminent and, hence, that they would be likely to volunteer to mime for \$2 a week later but would "chicken out" when the moment of truth arrived. In several studies, we have observed exactly this pattern and have also found that the difference between anticipated and actual performing is diminished by showing students an emotionally arousing movie before they make their initial decision, which decreases their willingness to perform. We have observed similar overestimation of willingness to mime when, rather than being asked about miming 1 week later, people are asked a hypothetical question about whether they would mime that does not actually commit them to doing so. Much like the prospect of miming 1 week later, being asked, hypothetically, to mime does not seem to put people in touch with the feelings they have when the prospect of miming is real. Moreover, paralleling the results from the thirst study, people mispredict not only their own desire to mime but also that of their classmates (Van Boven, Loewenstein, & Dunning, 2004).

In sum, hot-cold empathy gaps have been documented for drug craving, thirst, pain, and fear. Other studies have examined hot-cold empathy gaps for a variety of other affective states, including hunger and curiosity (Read & van Leeuwen, 1998; see Loewenstein & Schkade, 1999, for a review).

Consequences of Hot-Cold Empathy Gaps for Medical Decision Making

As already noted, many medical decisions involve intense affective states such as fear and anxiety, pain and discomfort, and diverse other moods and emotions. In some cases, these emotions arise at the time of decision making but are unlikely to persist over time, which is the situation in which hot-to-cold empathy gaps are likely to come into play. In other situations, the decision maker is in a cold state, but the consequences of the decision are likely to be hot, which are the conditions in which cold-to-hot empathy gaps occur. In what follows, I discuss examples of each of these situations.

Hot-to-Cold Empathy Gaps

Medical decisions are often made when people are in a negative affective state as a result of having received adverse news, being in pain or discomfort, or being stressed as a result of having to make difficult decisions between unattractive alternatives. Hot-to-cold empathy gaps will cause people in this situation to both underestimate the extent to which these states are influencing their behavior and to overestimate how long they will continue to experience their current feelings and preferences. Both of these errors will encourage patients to make long-term decisions on the basis of their, often transient, current feelings.

A situation in which hot-to-cold empathy gaps may come into play and lead to suboptimal decision making involves prostate cancer. For a long time it has been known that the surgical treatment of localized prostate cancer, while highly intrusive, does not produce systematic mortality benefits. However, this has not stopped very large numbers of men who received a positive biopsy from opting for surgery. Once they get the news that they have the cancer, apparently, many men prefer intrusive treatment over the ongoing fear and anxiety that they believe they would experience if they were to take the more conservative approach of "watchful waiting." It is likely, however, that these decisions are distorted by the fear and anxiety that these men experience as a result of obtaining the seemingly bad news. Men are often told their biopsy results in the surgeon's office ("You have cancer") and then asked, before they have had time to digest the news, to decide whether they want surgery.² People tend to overreact to risks that are new and unfamiliar, as illustrated by the extreme public reactions to severe acute respiratory syndrome and anthrax, and to underreact to familiar risks, such as that associated with driving. After men live with the risk of prostate cancer for some time, therefore, it is likely that the intensity of the fear would diminish. Six months after receiving a test result, men might be in a better position to make a decision about treatment that is not distorted by acute momentary fears.

Another important situation in which hot-to-cold empathy gaps may play an important role is in end-of-life care. Chochinov (1999) conducted a study with 168 cancer patients receiving end-of-life care, who rated themselves twice a day on pain, nausea, appetite, activity, drowsiness, sense of well-being, depression, anxiety, and will to live. Over 12-hr periods, patients' will to live fluctuated dramatically—often by 30% or more—and this correlated highly with other negative feelings. Patients, it seems, did not base their will to live on a long-run average of their health and happiness, but, as hot-to-cold empathy gaps would predict, weighed their immediate feelings very heavily when assessing their own will to live.

These findings have important ramifications for the debate over patient autonomy. The Patient Self-Determination Act of 1990 mandates that patients should play an active role in deciding what kind of care they receive. However, if something as fundamental as the will to live fluctuates over time in response to the patient's momentary state of mind, it seems reasonable to question whether patients who are given great scope for decision making are really likely to make coherent decisions that satisfy their fundamental preferences.

In situations characterized by dramatic fluctuations in patient preferences, perhaps there should be some minimum period of

deliberation during which patients can experience a range of affective states before they make decisions with lasting or irreversible consequences. Moreover, for certain types of controversial choices, it may be appropriate to select a default option that is chosen unless the patient maintains a preference for the alternative over an extended period (see Camerer, Issacharoff, Loewenstein, O'Donoghue, & Rabin, 2003, for an overview of, and rationale for, a variety of similar policies). For example, when it comes to prostate cancer, especially for older men with limited life expectancy, the default should probably be watchful waiting (or to not perform screening in the first place). Similarly, as is already the case for sex-change surgery, elective cosmetic surgery could be restricted to those who exhibit a consistent desire for it. And, given the findings of Chochinov (1999), perhaps life support should only be terminated when a patient (or his or her family) has made an unwavering decision to do so over a period of time that is sufficient to ensure that they will have experienced a range of affective states.

Cold-to-Hot Empathy Gaps

As just discussed, hot-to-cold empathy gaps come into play when people make decisions while in affective states that are unlikely to last. In other cases, however, people who are in relatively cold affective states make decisions that could potentially lead to highly affective consequences. For example, young adults, for whom the prospect of sickness is remote, make myriad decisions that could affect their long-term health—for example, whether to smoke cigarettes, how much to exercise, and what and how much to eat. The cold-to-hot empathy gap—the failure to empathize with future affective states—will cause decision makers to underweight such consequences. As the 88-year-old playwright Arthur Miller commented (quoting jazz pianist Eubie Blake), "If I had known I was going to live this long, I would have taken better care of myself" (D. Solomon, 2004, p. 65).³

The finding, discussed above, that individuals with a drug addiction cannot appreciate the intensity of drug craving, except when they are actually feeling it, has important implications for the behavior of those who are not addicted to drugs, particularly adolescents. If even individuals with an addiction cannot appreciate their own craving when they are not in a craving state, as this study suggests, how likely is it that, for example, a teenager who

² Moreover, the surgeon often has a financial interest in recommending surgery. One study (Fowler et al., 2000) that at least hints at the effects of such incentives found that, whereas 93% of urologists believed that radical prostatectomy was the best treatment option for a man with moderately differentiated, clinically localized prostate cancer, 72% of radiation oncologists believed that surgery and external beam radiotherapy were equivalent treatments. For most tumor grades and prostate-specific antigen levels, both specialty groups were much more likely to recommend the treatment in their specialty than the other treatment. Neither group favored watchful waiting, except for men with life expectancies of less than 10 years and cancers with a very favorable prognosis.

³ Cold-to-hot empathy gaps have some potentially positive consequences. For example, if one could imagine the fear of public speaking ahead of time, maybe one would not commit to doing it, which could have negative career consequences. And, if doctors were too empathic, they might find it difficult to operate or to provide dispassionate advice.

has never experienced a drug craving can imagine what it is like to crave a cigarette? This finding may help to explain the diverse (but not particularly surprising) finding that youths tend to underestimate their risk of becoming addicted to cigarettes. For example, the University of Michigan's *Monitoring the Future* longitudinal study (Johnston, O'Malley, & Bachman, 1993) found that among respondents who were occasional smokers (less than one cigarette per day), only 15% predicted that they might be smoking in 5 years, but 5 years later 43% were, in fact, smoking (see Slovic, 2001, for a review of the evidence on this point).

These results, however, probably understate the extremity of the problem, because initial decisions to smoke are likely to be distorted not only by an imperfect understanding of the addictiveness of cigarettes but also by an underappreciation for the miseries associated with the health consequences of smoking. This is a dimension of risk that has not been captured in the debate over whether teenagers overestimate or underestimate the health risks associated with smoking. That is, even if teenagers overestimate the probability of contracting cancer from smoking (see, e.g., Viscusi, 1992), which is questionable (see Slovic, 2001), they could still fail to appreciate, at an affective level, just how miserable it is to have cancer.

Another illustration of the potential consequences of cold-to-hot empathy gaps for medical decision making arises in treatment for bipolar disorder. Numerous writers have described a loss of perspective associated with depression that is reminiscent of a hot-cold empathy gap. When patients are depressed, they experience a loss of perspective that fits the hot-to-cold empathy gap pattern. As A. Solomon (1998) wrote in a treatise on depression, "When you are depressed, the past and the future are absorbed entirely by the present. You can neither remember feeling better nor imagine that you will feel better" (p. 49). However, the flip side of the same coin is that when those same individuals are not currently depressed, they often forget what it feels like to be depressed. J. J. Mann, for example (cited in Ezzell, 2003), commented, with regard to patients with bipolar disorder, that "when they're well, they can't imagine getting sick again" (p. 49).

The latter phenomenon may help to address the low rates at which patients with bipolar disorder adhere to recommended drug regimens. Scott and Pope (2002) studied individuals diagnosed with bipolar disorder and found that half of those who were taking mood-stabilizing drugs such as lithium did not stick to their drug regimen. The researchers' explanation for the problem could be described as a kind of cold-to-hot empathy gap: When the patients were depressed, they tended to take their medication, but when they were experiencing the manic phase, they could not remember what it was like to be depressed and stopped taking their medication.

The cold-to-hot empathy gap is probably at least partly responsible for numerous cases of nonadherence to drug regimens. For example, patients with high blood pressure are notorious for not taking their medications, and cold-to-hot empathy gaps may shed light on the reasons why. Not only is it difficult for patients to understand that they are sick when they "feel fine," but, feeling healthy, they are unlikely to have any appreciation for how bad a stroke could be. In the manner of the proverbial character who suffers in a leaking house when it rains but makes hay (instead of fixing the roof) when the sun is out, people may have a hard time

motivating themselves to take medications or treatments for medical conditions when they are not directly experiencing symptoms.

Interpersonal Empathy Gaps

In medical decision making, not only intrapersonal empathy gaps but also interpersonal empathy gaps often come into play. For example, physicians who medicate for pain are generally in a cold, pain-free state, treating patients who are in a hot state of pain. In such a situation, the cold-to-hot interpersonal empathy gap implies that physicians should underappreciate their patients' pain and hence undermedicate it. Indeed, despite periodic entreaties in medical journals to improve pain control, there is considerable evidence that inadequate pain management persists (e.g., Cleeland, 1998). Thus, for example, Bernabei et al. (1998) conducted a large-scale study of the treatment of pain in older patients with cancer who are cared for in nursing homes. The researchers found that 38% of nursing home residents with cancer complained of, or showed evidence of, daily pain and that 26% of patients with daily pain received no analgesics. More generally, cold-to-hot interpersonal empathy gaps may help to explain common instances of physician callousness toward patients, such as delivering bad news in an offhand or otherwise thoughtless fashion.

Disturbingly, given the growing consensus that society spends too much on end-of-life care, interpersonal cold-to-hot empathy gaps may also lead to insufficient measures taken to prolong life. Many people, including physicians who administer end-of-life care, express distaste for heroic measures. For example, in one study (Slevin et al., 1990), 0% of radiotherapists, 6% of oncologists, and only 10% of healthy persons said that they would accept a grueling course of chemotherapy for 3 extra months of life. However, when patients who currently had cancer were asked the same question, a full 42% stated that they would accept the chemotherapy for the extra months of life.

In another study yielding a similar result, Bryce et al. (2004) created a computerized elicitation method for assessing people's willingness to trade off length of life for a higher quality of death. Respondents from a general population sample ($n = 104$) recruited in Pittsburgh, Pennsylvania, were presented with scenarios involving two men, Mr. Abbott, who lived 80 years and spent the last month of his life dying in misery in the intensive care unit, and Mr. Fisher, who died in a higher quality fashion on several dimensions (see Figure 1). They were asked to adjust Mr. Fisher's length of life, presumably downward, to the point where they judged that the two men had equivalent qualities of life, overall.

Respondents were willing to trade off a surprisingly large amount of life—approximately 7 months, on average—for a high quality of death, but exactly how much they were willing to sacrifice depended on how old they were. Respondents who were younger than age 40 were willing to sacrifice 62.4 weeks, on average, of life expectancy for a higher quality of death, whereas those who were 40 years old or older were only willing to sacrifice 10.5 weeks. Much like the students in the study described earlier, who were willing to embarrass themselves as long as it would happen next week, people seem to have a cavalier attitude toward their own demise—until they actually face it.

These findings have important implications for a variety of interventions, such as advance directives and patient surrogates, that have been proposed to better satisfy the treatment preferences

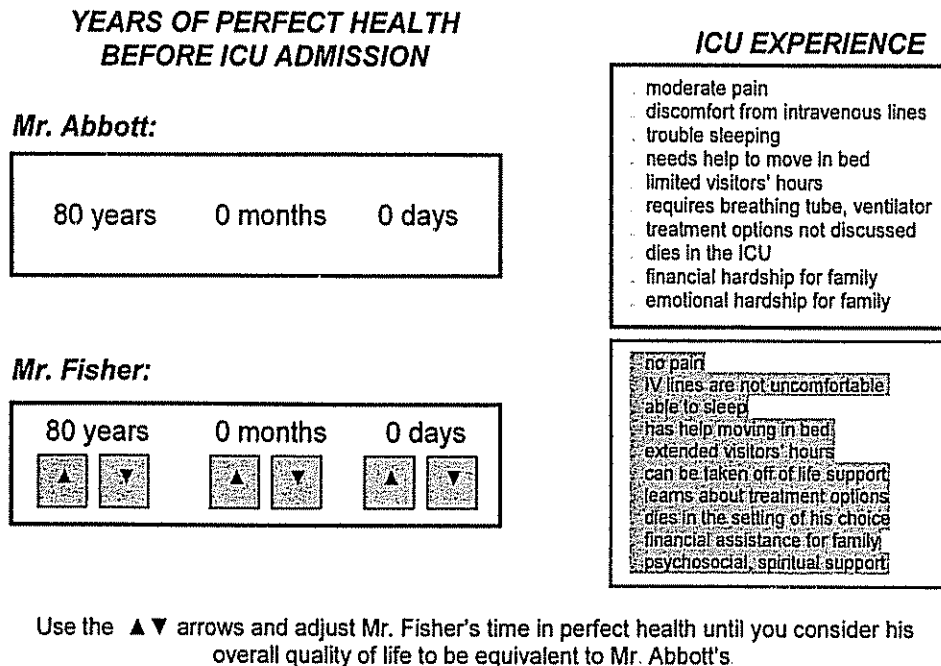


Figure 1. Facsimile of computer screen used in the Bryce et al. (2004; see also Bryce, Angus, & Loewenstein, 2003) study to obtain data on people's willingness to trade off length of life for a higher quality of death. ICU = intensive care unit. IV = intravenous. From "Assessing the Value of 'Quality of Death,'" by C. L. Bryce, D. Angus, and G. Loewenstein, 2003, *Society for Medical Decision Making Newsletter*, 15(3), p. 6. Copyright 2003 by the Society for Medical Decision Making. Reprinted with permission.

of patients who are unable to directly express them. As Ditto and Hawkins (2005) pointed out,

When healthy individuals state preferences for the use of life-sustaining medical treatment in living wills, they are really making *predictions* about their future preferences. Although all judgments about the future are necessarily hypothetical, people may find it particularly difficult to predict what choices they might make in severely impaired health states. (p. S66)

Despite the popularity of advance directives, they have not been found to be particularly effective. Thus, for example, Ditto et al. (2001) found that although patients generally perceived advance directives to improve surrogates' understanding of their life-support wishes, in actuality they did not improve the accuracy of surrogates' predictions.⁴ And Druley et al. (1993) found that "neither greater professional experience, nor longer relationship with a patient improved the accuracy of physicians' predictions [of those patients' treatment preferences]" (p. 469). Hot-cold empathy gaps may contribute to these problems associated with advance directives and surrogation. If healthy people cannot predict their own preferences once they are sick, then the whole basis of advance directives and living wills is undermined (see Fagerlin & Schneider, 2004).

Conclusions

Hot-cold empathy gaps have diverse consequences for medical decision making. Cold-to-hot prospective empathy gaps can contribute to the much lamented failure of patients to adopt healthy

lifestyles, to take simple preventive measures such as taking a multivitamin, and to get routine medical tests. Cold-to-hot interpersonal empathy gaps decrease sympathy for sick persons and cause doctors to administer too little pain medication. Hot-to-cold prospective and retrospective empathy gaps increase people's willingness to take actions with long-term consequences on the basis of the transient affective states that medical conditions and medical care often arouse.

As the earlier discussion of end-of-life care suggests, cold-hot empathy gaps raise important ethical issues for medical decision making. If people cannot predict what they will want when they are in a different affective state, how can they be relied upon to make decisions that are in their own long-term interest? And, if they cannot be relied upon to make self-interested decisions, the whole rationale for patient autonomy is called into question. Who is in a position to make better decisions with long-term consequences, a patient who is in extreme pain that will dissipate over time, or a physician who is in a pain-free state that is more representative of the patient's own long-run feelings? Both have a bias, albeit running in opposing directions. And what about a patient who, never having had a colostomy, finds the very idea of one personally revolting? Is this patient, or a physician who deals

⁴ In other research, Coppola, Ditto, Danks, and Smucker (2001) did find that advance directives improved the substituted judgments (judgments made on behalf of patients) of hospital-based emergency and critical care physicians who had no prior experience with the patients, but not those of either primary care physicians or family surrogates.

with colostomies on a regular basis, more likely to make the right decision? On the one hand, the patient is likely to exaggerate the misery of the colostomy. On the other hand, a physician who deals with colostomies on a regular basis is unlikely to appreciate, or put much weight on, the patient's qualms. Is there any way to approach an optimal decision in such circumstances?

Although neither party may be able to provide an unbiased decision, there may be some situations in which the usual assumption that patients are in the best position to make decisions should be questioned. Specifically, patients, and possibly their families, may not be in the best position to make decisions when they are in affectively aroused states that are unlikely to last. In such situations, the more dispassionate perspective of a physician may provide a more stable basis for decision making and lead to decisions that are more consistent with the long-term interests of the patient.

Physicians, or public health experts, may also be in a superior position to make decisions, or at least provide incentives to influence individuals' decisions, when people who are in cold states make decisions with potentially hot remote consequences. This is especially true of young decision makers, who have accumulated less life experience and are less likely to have learned to pay adequate attention to the delayed consequences of their decisions. Who, for example, is in a better position to appreciate the horrors of lung cancer, a physician who deals with the disease, or an adolescent who has had no exposure to it or, possibly, any other deadly health condition?

The really difficult quandaries arise in situations such as that observed in end-of-life care when people request heroic measures for themselves that they had previously indicated they did not want and that health providers are united in viewing as excessive. In such situations, both parties are likely to be biased in different directions, and there are no guidelines for assessing who is more biased or whose perspective should prevail. The situation is further complicated by the fact that heroic measures tend to be costly, creating the types of tradeoffs between health and money that people feel uncomfortable making (Beattie & Barlas, 2001; Calabresi & Bobbitt, 1978).

The notion of hot-cold empathy gaps points to limitations in the notion of informed consent. People may be able to understand what different treatments and procedures entail at an abstract cognitive level, but if they are unable to truly imagine the emotions associated with those states—if they project their current emotionality, or lack thereof, onto their future self—can they really imagine the relevant outcomes in any meaningful sense? Can they truly provide informed consent? Although existing research has highlighted the inadequacy of decisions made by surrogates, to the extent that one's affective state will be different when making decisions and experiencing the consequences of those decisions, exactly the same problems may apply to the decisions one makes for oneself.

References

- Baumeister, R. F., Heatherton, T. F., & Tice, D. M. (1994). *Losing control: How and why people fail at self-regulation*. San Diego, CA: Academic Press.
- Beattie, J., & Barlas, S. (2001). Predicting perceived differences in tradeoff difficulty. In E. U. Weber, J. Baron, & G. Loomes (Eds.), *Conflict and tradeoffs in decision making* (pp. 25–64). New York: Cambridge University Press.
- Bernabei, R., Gambassi, G., Lapane, K., Landi, F., Gatsonis, C., Dunlop, R., et al. (1998). Management of pain in elderly patients with cancer. SAGE Study Group. Systematic assessment of geriatric drug use via epidemiology. *Journal of the American Medical Association*, 279, 1877–1882.
- Bryce, C., Angus, D., & Loewenstein, G. (2003). Assessing the value of "quality of death." *Society for Medical Decision Making Newsletter*, 15(3), 6.
- Bryce, C. L., Loewenstein, G., Arnold, R. M., Schooler, J., Wax, R. S., & Angus, D. C. (2004). Quality of death: Assessing the importance placed on end-of-life treatment in the intensive-care unit. *Medical Care*, 42, 423–431.
- Calabresi, G., & Bobbitt, P. (1978). *Tragic choices*. New York: Norton.
- Camerer, C., Issacharoff, S., Loewenstein, G., O'Donoghue, T., & Rabin, M. (2003). Regulation for conservatives: Behavioral economics and the case for "asymmetric paternalism." *University of Pennsylvania Law Review*, 1151, 1211–1254.
- Chochinov, H. M. (1999). Will to live in the terminally ill. *The Lancet*, 354, 816–819.
- Cleeland, C. S. (1998). Undertreatment of cancer pain in elderly patients. *Journal of the American Medical Association*, 279, 1914–1915.
- Coppola, K. M., Ditto, P. H., Danks, J. H., & Smucker, W. D. (2001). Accuracy of primary care and hospital-based physicians' predictions of elderly outpatients' treatment preferences with and without advanced directives. *Archives of Internal Medicine*, 161, 431–440.
- Cosmides, L., & Tooby, J. (2000). Evolutionary psychology and the emotions. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of emotions* (2nd ed., pp. 91–115). New York: Guilford Press.
- Damasio, A. R. (1994). *Descartes' error: Emotion, reason, and the human brain*. New York: Putnam.
- Ditto, P. H., Danks, J. H., Smucker, W. D., Bookwala, J., Coppola, K. M., Dresser, R., et al. (2001). Advance directives as acts of communication: A randomized controlled trial. *Archives of Internal Medicine*, 161, 421–430.
- Ditto, P. H., & Hawkins, N. A. (2005). Advanced directives and cancer decision making near the end of life. *Health Psychology*, 24(Suppl. 4), S63–S70.
- Druley, J. A., Ditto, P. H., Moore, K. A., Danks, J. H., Townsend, A., & Smucker, W. D. (1993). Physicians' predictions of elderly outpatients' preferences for life-sustaining treatment. *Journal of Family Practice*, 37, 469–475.
- Ezzell, C. (2003, February). Why? The neuroscience of suicide—Brain chemistry might explain why some people impulsively choose to end their lives. *Scientific American*, 28, 44–51.
- Fagerlin, A., & Schneider, C. E. (2004). Enough. The failure of the living will. *Hastings Center Report*, 34(2), 30–42.
- Fowler, F. J., McNaughton Collins, M., Albertsen, P. C., Zietman, A., Elliott, D. B., & Barry, M. J. (2000). Comparison of recommendations by urologists and radiation oncologists for treatment of clinically localized prostate cancer. *Journal of the American Medical Association*, 283, 3217–3222.
- Giordano, L. A., Bickel, W. K., Loewenstein, G., Jacobs, E. A., Badger, G. J., & Marsch, L. A. (2004). *Mild opioid deprivation and delay to consequences affect how opioid-dependent outpatients value an extra maintenance dose of buprenorphine*. Pittsburgh, PA: Carnegie Mellon University, Department of Social and Decision Sciences.
- Johnston, L., O'Malley, P., & Bachman, J. (1993). *National survey results of drug use from the Monitoring the Future study* (NIH Publication No. 93–3598). Rockville, MD: National Institute on Drug Abuse.
- LeDoux, J. (1996). *The emotional brain*. New York: Simon & Schuster.
- Loewenstein, G. (1996). Out of control: Visceral influences on behavior. *Organizational Behavior and Human Decision Processes*, 65, 272–292.

- Loewenstein, G. (1999). A visceral account of addiction. In J. Elster & O. J. Skog (Eds.), *Getting hooked: Rationality and addiction* (pp. 235–264). Cambridge, England: Cambridge University Press.
- Loewenstein, G., & Schkade, D. (1999). Wouldn't it be nice? Predicting future feelings. In D. Kahneman, E. Diener, & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 85–105). New York: Russell Sage Foundation.
- Patient Self-Determination Act of 1990, Pub. L. No. 101–508, 4206, 4751, of the Omnibus Reconciliation Act of 1990.
- Read, D., & Loewenstein, G. (1999). Enduring pain for money: Decisions based on the perception of memory of pain. *Journal of Behavioral Decision Making*, 12, 1–17.
- Read, D., & van Leeuwen, B. (1998). Predicting hunger: The effects of appetite and delay on choice. *Organizational Behavior and Human Decision Processes*, 76, 189–205.
- Scott, J. P., & Pope, M. (2002). Nonadherence with mood stabilizers: Prevalence and predictors. *Journal of Clinical Psychiatry*, 63, 384–390.
- Slevin, M. L., Stubbs, L., Plant, H. J., Wilson, P., Gregory, W. M., Armes, P. J., & Downer, S. M. (1990). Attitudes to chemotherapy: Comparing views of patients with cancer with those of doctors, nurses, and general public. *British Medical Journal*, 300, 1458–1460.
- Slovic, P. (2001). Cigarette smokers: Rational actors or rational fools? In P. Slovic (Ed.), *Smoking: Risk, perception, and policy* (pp. 97–124). Thousand Oaks, CA: Sage.
- Solomon, A. (1998, January 12). Anatomy of melancholy. *The New Yorker*, 73, 46–61.
- Solomon, D. (2004, September 19). Goodbye Norma Jean. *The New York Times Magazine*, pp. 63–65.
- Stroud, M. (1993). *Shadows on the wasteland: Crossing Antarctica with Ranulph Fiennes*. Woodstock, NY: Overlook Press.
- Van Boven, L., & Loewenstein, G. (2003). Social projection of transient visceral feelings. *Personality and Social Psychology Bulletin*, 29, 1159–1168.
- Van Boven, L., Loewenstein, G., & Dunning, D. (2004). *The illusion of courage in social predictions: Underestimating the impact of fear of embarrassment on other people*. Pittsburgh, PA: Carnegie Mellon University, Department of Social and Decision Sciences.
- Van Boven, L., Loewenstein, G., Welch, N., & Dunning, D. (2004). *The illusion of courage: Underestimating the impact of fear of embarrassment on the self*. Pittsburgh, PA: Carnegie Mellon University, Department of Social and Decision Sciences.
- Viscusi, W. K. (1992). *Smoking: Making the risky decision*. New York: Oxford University Press.
- Wilson, T. D., & Brekke, N. (1994). Mental contamination and mental correction: Unwanted influences on judgments and evaluations. *Psychological Bulletin*, 116, 117–142.
- Wilson, T. D., & Gilbert, D. T. (2003). Affective forecasting. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 35, pp. 345–411). New York: Elsevier.
- Winkielman, P., Berridge, K. C., & Wilbarger, J. (2005). Unconscious affective reactions to masked happy versus angry faces influence consumption behavior and judgments of value. *Personality and Social Psychology Bulletin*, 31, 121–135.