

Projection Bias in Medical Decision Making

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Like many academics, I often face the decision of whether to accept an invitation to present at a conference or university, often in a distant state or another country. In such cases, I try to base my decision on ben-

efits and costs, such as what I expect to get out of the trip, how busy I expect to be, whether it will interfere with family commitments, and so on. How I feel at the exact moment when I make the decision should not

matter. But it does. If I'm already on a trip when the invitation arrives, my decision often depends on how tired I am. If I'm jetlagged in another country, I'm likely to reject an invitation for travel that involves crossing time zones or even for a conference near home if it seems likely to require effort. Yet, if fresh and rested, I probably would accept those same invitations. The same rule holds when I'm at home; in a good mood and feeling energetic, the prospect of travel seems pleasurable; in a funk or tired, the same trip looms onerously. I know that my immediate feelings should have no impact on the decision, and I try to correct for them, but not, I believe, with much success.

Unfortunately, many of the choices we face, and almost all of the important ones, bear some resemblance to this situation. In daily life, people are buffeted by ever-changing situations that affect their preferences. We feel hungrier the longer it's been since we ate. We like to wear warm clothes more when it's cold outside. We feel exhilarated because a paper was just accepted or dismayed because it was rejected. These changing preferences serve important functions, such as making sure that we don't starve or freeze. Yet, many of the consequences of the decisions we make will unfold when we are in a situation that is different from our current one. Our immediate preferences are normatively irrelevant to such decisions, or at least no more relevant than our preferences an hour or day earlier. Thus, whether I agree to give a talk in California next fall should not depend on whether I am currently jetlagged in Europe. But, it is very difficult to put our current preferences aside; our immediate situation "contaminates" decisions in a nonnormative fashion.¹ Ted O'Donoghue, Matthew Rabin, and I² refer to this phenomenon as "projection bias" because we, in effect, project our current preferences onto points in the future when they should be irrelevant.*

*Projection bias is actually a more general phenomenon that refers to our tendency to project onto the future not only affective states but any state that influences preferences

Received 27 August 2004 from the Department of Social and Decision Sciences, Carnegie Mellon University, Pittsburgh, Pennsylvania. Revision accepted for publication 2 December 2004

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DOI: 10.1177/0272989X04273799

An important special case of projection bias occurs when the states that influence one's preferences are *affective* states, such as anger, sadness, hunger, or pain. There is considerable research showing that such affective states have a large influence on people's preferences and, furthermore, that when in one affective state, people have trouble appreciating how they would feel, or predicting what their preferences would be, in a different affective state. In a series of papers, I have referred to this phenomenon as a "hot-cold empathy gap." This empathy gap is especially pronounced when people in an emotionally "cool" state attempt to imagine their feelings or behavior in a "hot" state, but it also occurs when people in hot states attempt to imagine their feelings or predict their behavior in cold states, or when people in one emotional state make the same judgments for themselves in a different emotional state.

After discussing some features of projection bias, then reviewing some evidence for its existence, I explore its diverse ramifications for medical decision making. The failure to accurately predict one's own future preferences undermines the quality of many types of decisions, but it creates special problems for medical decisions. Many health-relevant decisions, such as whether to smoke, dieting choices, and testing and treatment decisions, 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, which can have a dramatic effect on the preferences experienced at one time or the other. Moreover, for many medical decisions, the decision maker is different from the person impacted by the decision, as occurs when a physician who is not in pain prescribes pain medication for a patient who is in pain.

VARIETIES OF PROJECTION BIAS

Projection bias can be modeled in simple decision-theoretic terms. If s_0 refers to one's current affective state, s_t refers to one's state at the time when one is attempting to predict one's behavior, and $u(x, s)$ is the utility (value) of taking action x given an affective state s , then the true value of taking the action at time t will be $u(x, s_t)$. In other words, the value of x_t depends on the configuration of states experienced by the individual at time t . However, if one projects one's current affective state onto the future, then one's actual estimate will be influenced in a nonnormative fashion by one's current affective state. If one partially projects one's current

preferences onto the future, then one's predicted preference for x will lie between the correct value—what it actually will be in the future—and the value of x to us now given our current affective state s_0 . That is,

$$E_0[u(x_t, s_t/s_0)] = \alpha u(x, s_0) + (1 - \alpha)u(x, s_t), \quad (1)$$

where α indicates the degree of projection. At one extreme, when $\alpha = 0$, then people predict their own preferences accurately; at the opposite extreme, when $\alpha = 1$, they simply assume that their future preferences will be identical to their current preferences.

Projection bias is well illustrated by the phenomenon of shopping on an empty stomach. Normatively, how hungry one is when one enters the supermarket should not affect the amount of food one buys for the next several days, but several studies support the folk-wisdom that shopping on an empty stomach leads to overshopping.^{3,4} Read and van Leeuwen⁵ conducted a study involving hunger that illustrates the specific pattern predicted by projection bias especially well. They approached office workers and asked them to choose between healthy and unhealthy snacks (i.e., fruit and junk food) that they would receive in 1 week at a time when they could be expected to be hungry (late in the afternoon) or not hungry (immediately after lunch). Subjects made the choice either when they were hungry (late in the afternoon) or not hungry (immediately after lunch). In terms of equation (1), hunger at the time they made their choice is s_0 , and their expected level of hunger at the time when they are to receive the snack is s_t . Normatively, snack choices should have been affected by their anticipated hunger at the time when they were to receive the snack, s_t , and not by their current hunger, s_0 . However, in fact, snack choice was affected by both their anticipated level of hunger and by their current level of hunger. Specifically, as projection bias predicts, both current and anticipated hunger caused people to opt for the unhealthy snacks. Moreover, underlining the fact that the influence of their current hunger was not normatively justifiable, a large fraction of participants who chose a healthy snack when they were not hungry that would be received at a time when they would be hungry changed their minds when the time of snack delivery actually arrived, and ultimately requested an unhealthy snack.

In another clever study that illustrates that projection bias occurs in real economic decisions outside of the laboratory, Conlin, O'Donoghue, and Vogelsang, using data on catalog orders from a large outdoor-apparel company, found not only that people were more likely to order warm winter clothes on especially cold days but also that they were more likely to subsequently re-

turn clothes that they had ordered on such days. The latter finding, again, shows that projection bias really is a bias.

Projection bias doesn't only come into play with respect to the future. One can project one's current feelings onto the past, as happens in the infamous "morning after" syndrome in which a sober, unaroused individual recalls the previous night's behavior with disbelief, or in the common tendency for depressed people to report that they feel as if they have always been depressed. Equation (1) can be applied to such retrospective projection bias by simply allowing the subscript t to assume negative values.

Projection bias also occurs interpersonally. Thus, for example, if you are not currently craving a drug, the reckless, immoral behavior of someone who is craving a drug is likely to appear incomprehensible, and one would be likely to judge that individual more harshly than might be deserved. Again, equation (1) can easily be applied to interpersonal projection bias if we designate the subscript 0 to refer to oneself and t to refer to another person.

SOME EVIDENCE

Beyond the evidence already reviewed, projection bias has been demonstrated in a wide range of domains.² Here I describe some of the research findings that are most relevant to medical decision making. Many, but not all, of these tend to involve affective states and so are also instances of hot-cold empathy gaps. However, in this article, I refer to them using the more general, projection bias label (for a review of overlapping results, which focuses on hot-cold empathy gaps, see Reference 6).

Addiction. In one recent study, addicts receiving buprenorphine (BUP; a methadone-like maintenance drug) treatment chose between getting an extra dose of BUP versus different money amounts (e.g., \$10 versus an extra dose; \$20 versus an extra dose, etc.).⁷ In the most interesting conditions, 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 they are currently feeling should be irrelevant to the choice they make for themselves 5 days later. However, based on the phenomenon of projection bias, we predicted that addicts who were currently craving would better appreciate

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

	Before Exercising (Not Thirsty)	After Exercising (Thirsty)	Significance of Difference
Thirst mentioned before hunger in essay	19%	50%	$P < 0.05$
Thirst more unpleasant for hikers	57%	88%	$P < 0.02$
Hikers would regret more not packing water	52%	92%	$P < 0.01$
Thirst more unpleasant for self	61%	92%	$P < 0.02$
Oneself would regret more not packing water	61%	88%	$P < 0.05$

the force of their future craving, and hence would value the BUP more highly than would addicts who were not currently craving. The prediction was confirmed; craving addicts valued BUP 5 days later at a median value of \$60, whereas for nonconforming addicts the median valuation for noncraving addicts was \$35.

As we discuss in the article, this finding has important implications for our understanding of addiction. One of the most basic questions concerning addiction is why people take addictive drugs in the 1st place, when the adverse consequences of addiction should be evident—particularly to those who are at greatest risk. The phenomenon of projection bias provides one possible account of this paradox.⁸ It suggests that someone who is not currently craving drugs will not be able to appreciate the grip that such craving could have over their behavior. If addicts 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 has never experienced drug craving can come at all close to imagining what it is like?

Thirst. In a study focusing on thirst, Leaf VanBoven and I 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.⁹ 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. The other half did so right after exercising, when they were likely to be hot and thirsty. The survey asked them to

Imagine that three 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 three 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, "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, thirst, and how warm they were, each on a 1–10 scale.

If participants are subject to projection bias, then those who are themselves thirsty, because they have just exercised, should 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 projection bias when it comes to thirst, a 2nd purpose of the study was to shed new light on the phenomenon of interpersonal perspective-taking. A considerable amount of research has examined people's predictions of others' behavior. Most of this research on "social perspective-taking" 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 many other studies, we have consistently found that the major source of error in interpersonal perspective-taking arises from people's mispredictions of themselves. When people attempt to predict the behavior of another person in a different situation from their own, we find, they first attempt to predict how they would behave in that situation and then adjust for perceived differences between themselves and the person whose behavior they are attempting to predict. Because they mispredict their own behavior, due to projection bias, they then mispredict the behavior of others. Consistent with such an account, a structural equation model of people's predictions of their own feelings 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 pre-

dictions of self, which were powerfully influenced by a nonnormative factor—namely, the individual's current level of exercise-induced thirst.

Pain. Both of the studies just discussed tested for prospective (and interpersonal) projection bias. In contrast, a study by Daniel Read and I tested for retrospective bias with respect to pain.¹⁰ We 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 3rd group had never experienced the pain. Consistent with projection bias, 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 can't remember their own pain when they aren't 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 the following passage from the epic *Crossing the Wasteland*, which tells the story of the 1st unassisted crossing of the Antarctic continent¹¹:

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 didn't really Pain is a problem that cannot be shared.

Fear. Finally, Leaf VanBoven, Ned Welch, David Dunning, and I have conducted a series of studies focusing on fear.¹² 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 \$2.00. When the appointed day arrives, a week later, they are asked again if they are willing to mime. Projection bias predicts that students will not "get in touch" with their fear of embarrassment unless they are experiencing immediate fear from an imminent performance, 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 we can diminish the difference be-

tween anticipated and actual performing by showing students an emotionally arousing movie before they make their initial decision, which lowers their willingness to perform. We have observed similar overestimation of willingness to mime when people are asked not about miming 1 week later but, rather, a hypothetical question about whether they would mime that does not actually commit them to doing so; much like miming 1 week later, being asked, hypothetically, to mime does not seem to put people in touch with the feelings they have when the potential is real. We have also found that people mispredicted not only their own desire to mime but also that of their classmates, and, much as in the thirst study discussed earlier, that people mispredict other people's willingness to perform when and because they mispredict their own willingness to perform.¹³

In sum, projection bias has been documented for drug craving, thirst, pain, and fear. Other studies have examined projection bias for a variety of other affective states.^{3,14}

CONSEQUENCES OF PROJECTION BIAS FOR MEDICAL DECISION MAKING

As already noted, many medical decisions involve intense affective states such as fear and anxiety, pain and discomfort, as well as situational and environmental factors, such as being in a hospital setting, that are likely to powerfully affect people's preferences. Moreover, there is often a mismatch between the affective state and environment of the person making the decision and that of the person who will be affected, which is precisely the situation in which projection bias is likely to arise. In some cases, the mismatch occurs between persons. For example, a doctor who is not experiencing fear or pain makes decisions on behalf of, or provides advice to, a patient who is experiencing 1 or both of these states. In such cases, projection bias means that the doctor is likely to underappreciate the patients' misery and is likely to make very different decisions from the patients even if he or she has the goal of respecting the patients' wishes. In other cases, the mismatch occurs within the same person at different points in time. For example, a patient who is in a state of extreme fear or anxiety due to receiving an adverse test result might need to make important treatment decisions with consequences that will apply long after the patient has calmed down. Or, somewhat the opposite, a young adult who is in an affectively neutral state because the prospect of sickness is remote, might make health decisions—for example, to smoke, not exercise,

or eat unhealthy foods—that are likely to have highly affective consequences at a later point in time.

Depression provides an excellent example both of projection bias and of its consequences for medical decision making. Numerous writers on depression have described a loss of perspective that fits the projection bias and, more specifically, the hot-cold empathy gap pattern. Solomon, for example, in a treatise on depression titled "Anatomy of Melancholy" writes that "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."¹⁵ In a similar vein, JJ Mann comments that "when a person is depressed, they have a problem imagining ever getting better."¹⁶ He then adds, describing what seems to be a different form of projection bias, "When they're well, they can't imagine getting sick again."

Life support. Projection bias with respect to depression has implications for medical decision making. For example, many medical decisions, including decisions to end one's life by refusing treatment or life support, are likely to be made when a patient is in a state of acute pain, misery, and depression. Projection bias will cause people in this situation to both exaggerate how long they have felt bad and how long they are likely to continue to feel bad. Projecting their current feelings of misery onto both past and future, patients are likely to have a much more negative view of their own situation than might be warranted. Consistent with such an account, Chochinov ran a study with 168 cancer patients receiving end-of-life care, each of whom rated themselves twice a day on pain, nausea, appetite, activity, drowsiness, sense of well-being, depression, anxiety, and will to live.¹⁷ Over 12-h periods, patients' will to live fluctuated dramatically—often by 30% or more, and these fluctuations were highly correlated 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 projection bias predicts, weighed their immediate feelings very heavily when assessing their own will to live.

Such a lack of stable long-term perspective suggests that patients may not always be in the best position to make decisions that have long-term consequences such as, most dramatically, to remove life support. Perhaps patients should only be allowed to take such measures when they have expressed a consistent desire to do so over a period of time that is sufficiently long that they will have naturally experienced a range of affective states. And perhaps, when patients are in a state of pain or discomfort that is unlikely to last, physicians

who are themselves not in pain may make decisions that are more in line with their long-term interests than the patients would make for themselves.

Adherence. Whereas projection bias can result in excessive reactions to pain and misery at moments when they are being experienced, it also predicts insufficient reactions to the same feelings when they are not currently being experienced. Projection bias, therefore, is likely to pose problems when it comes to people testing for, or taking preventative measures to avoid, conditions that don't cause immediate fear. It is also likely to pose a problem when it comes to adherence to drug regimens for conditions with intermittent symptoms. In the manner of the proverbial character who suffers in his leaking house when it rains but decides to enjoy the weather (instead of fixing his roof) when the sun is out, people who are not directly experiencing symptoms may underappreciate the benefits of treatment. Indeed, Scott and Pope studied individuals diagnosed with manic depressive disorder and found that fully half of the group of 98 patients who were taking mood-stabilizing drugs such as lithium failed to stick with their drug regimen.¹⁸ The researchers posited that, when in the manic phase, patients couldn't remember what it was like to be depressed and stopped taking the medication.

Medication for pain. Medication for pain is another domain in which projection bias is likely to play a role. 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, projection bias predicts that physicians will 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.¹⁹ Thus, for example, Bernabei and others conducted a large-scale study of treatment of pain in elderly patients with cancer who were cared for in nursing homes.²⁰ 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.

End-of-life care. Projection bias has diverse implications for a variety of issues that arise in connection with end-of-life care. One such issue is the extent to which our society should take "heroic measures" to prolong people's lives. Many people, including physicians who administer end-of-life care, express a distaste for heroic measures. For example, in one study, 0% of radiotherapists, 6% of oncologists, and only 10% of healthy per-

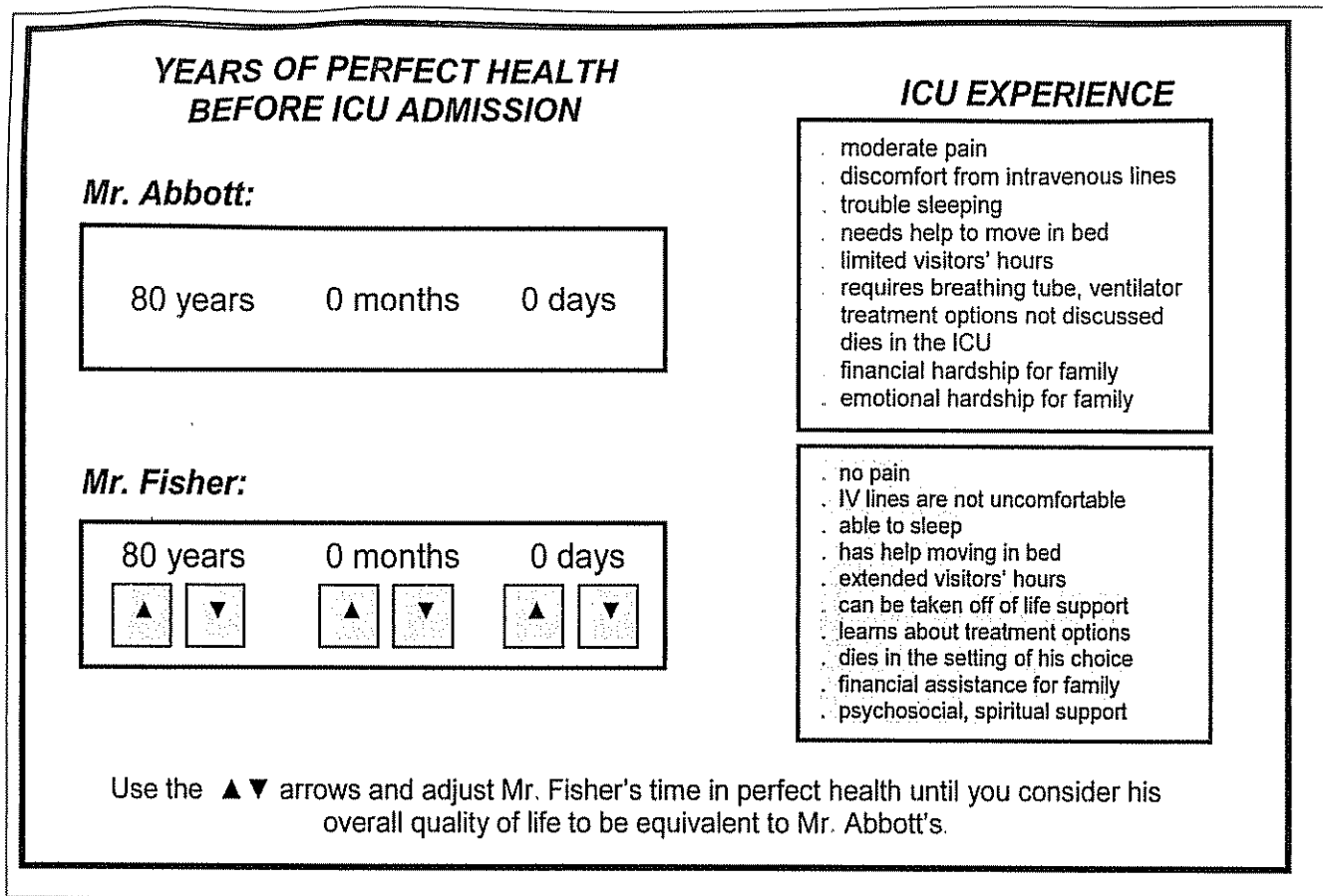


Figure 1 Facsimile of computer screen²²

sons said that they would accept a grueling course of chemotherapy for 3 extra months of life.²¹ However, when current cancer patients were asked the same question, a full 42% stated that they would accept the chemotherapy for the extra months of life. Much like the students 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.

In another study yielding a similar result, Bryce and others created a computerized elicitation method for assessing people's willingness to trade off length of life for a higher quality of death.²² Respondents from a general population sample ($n = 104$) recruited in Pittsburgh, Pennsylvania, were presented with scenarios involving 2 men, Mr. Abbott who lived 80 years and spent the last month of his life dying in misery in the ICU 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 2 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—more evidence that longevity becomes more important as one begins to face one's mortality.

These findings have important implications for a variety of interventions, such as advanced directives and patient surrogates, that have been proposed to better satisfy the treatment preferences of patients who are unable to directly express them. Although these interventions are popular, none has been found to be particularly effective.²³ Thus, for example, Ditto and others

found that although patients generally perceived advanced directives to improve surrogates' understanding of their life-support wishes, in actuality they did not improve the accuracy of surrogates' predictions.^{*24} And Druley and others found that "neither greater professional experience, nor longer relationship with a patient improved the accuracy of physician's predictions [of those patients' treatment preferences]"²⁵ (p 469). Perhaps projection bias contributes to this lack of success. If healthy people can't predict their own preferences once they are sick, then the whole basis of advanced directives and living wills is undermined.²⁶ And, if healthy people can't predict the preferences they will have when they are sick, what's the likelihood that they can predict the preferences of others who are sick? Supportive of such skepticism are 2 studies conducted by Fagerlin and coauthors in which surrogates predicted whether a close other would want treatment such as cardiopulmonary resuscitation in a variety of hypothetical end-of-life medical scenarios and stated their own preferences for treatment in the same scenarios.²⁷ Based on results from both studies, the authors concluded that "surrogate predictions more closely resembled surrogates' own treatment wishes than they did the wishes of the individual they were trying to predict" (p 166)

Physician training. A common observation that emerges in conversations with physicians, from movies (e.g., *The Doctor*) and books (e.g., *A Taste of My Own Medicine: When the Doctor Is the Patient, One Hundred Days: My Unexpected Journey from Doctor to Patient*, and *My Own Medicine, A Doctor's Life as a Patient*),²⁸⁻³¹ is that they don't truly understand the feelings of their patients—their pain, fear, feelings of helplessness, and perhaps most important their perceptions of their physician—until they, or a close relative of theirs, becomes a patient. One of the most basic features of human emotion is that we tend to adapt to ongoing or repeated situations. Such adaptation is often cited as a major cause of immorality because the abnormal (e.g., slaughtering innocent victims) can seem normal after an amazingly small number of exposures. Physicians are, likewise, likely to rapidly adapt to, and hence not respond very strongly to, sights, smells, and human plights that would induce powerful emotions in those who were not used to them. Such adaptation is

probably necessary for physicians to do their job, but it has a downside; empathy is likely to be 1 of the emotions that atrophies over time.

Too much empathy might be a bad thing, but too little is probably bad as well, because empathy could potentially serve as a signal to physicians about how patients feel and what they care about. As already noted, studies that have examined decisions made by physicians on behalf of patients find that even those who know their patients well have little insight into those patients' preferences. Is there any way around this problem short of infecting them with a serious illness so they can experience what it's like to be a patient firsthand? Even that, obviously ridiculous, idea probably wouldn't work. Much as the drug addicts forgot about the misery of craving the moment it ended, it is quite likely that physicians would rapidly lose any insights they gained from such an experience. Watching emotion-inducing movies that provide the patient's perspective might also help, but again for only a short period. Unfortunately, I don't have an answer to this question, but it does seem like an important one. I assume that I'm not alone in often feeling dehumanized in my encounters with physicians and hospitals.

CONCLUSIONS

As reviewed in this article, projection bias has diverse consequences for medical decision making. The inability of healthy people to imagine what it would be like to be sick undermines their motivation to take simple preventive measures, such as flossing, taking an aspirin every day, avoiding unhealthy foods, and so on. Across persons, it can decrease physicians' sympathy for those they treat, leading among other problems to insufficient treatment for pain. In the opposite direction, because projection bias causes people to exaggerate the longevity of whatever they are feeling in the present, it increases their willingness to take actions with long-term consequences on the basis of short-term preferences. This is especially problematic in the medical domain due to the dramatic but often transient preference-shifts that medical conditions and medical care often arouse.

By raising questions about the quality of patient decision making, projection, the phenomenon of bias inevitably raises issues about the benefits of the movement, now fully in swing, toward giving patients greater say in the decisions surrounding their own health care. Patient autonomy is a wonderful thing if it means implementing choices that meet patients' long-term preferences, but if patients change their prefer-

*In other research, Coppola and others did find that advanced 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.²³

ences from moment to moment, then decisions are likely to have a large arbitrary component.

It could be argued that the solution is to simply give patients ample time to make a decision, when this is possible. Ideally, contemplating a decision over a long period of time should provide patients with alternative perspectives that can inform their decisions. But the diversity of perspectives that such a delay permits may end up just overwhelming patients, causing decision paralysis, and resulting in a choice of whatever option happens to be preferred when the deadline for making the decision arrives.

But reverting to the older practice of having physicians make important decisions for the patient suffers from its own projection bias-induced problem—namely, that physicians are also subject to projection bias, which may be especially acute because they have adapted so fully to the miseries experienced by patients.

Perhaps the best solution is to present patients with a default option that is informed by decision analysis and which incorporates the short- and long-term feelings elicited from people who have chosen different options in the past.^{*32,33} Those who have idiosyncratic reasons for preferring alternative options would be permitted to do so (see Camerer, Issacharoff, Loewenstein, O'Donoghue, and Rabin for a discussion of a class of "asymmetrically paternalistic" policies that guide decision making but permit free choice).³⁴ There is ample research showing that patients will be powerfully attracted to such default options, and the existence of a default would be likely to decrease recrimination, including self-recrimination, by patients and their families when there is a negative outcome.

The existence of projection bias also raises questions about the possibility for truly "informed" consent. Informed consent is designed to ensure that patients are fully aware of the potential consequences of the options they face. However, the phenomenon of projection bias suggests that patients' understanding of those consequences will be powerfully influenced by their current state. Fortunately, although we may not be very good at making decisions in the 1st place (in part due to projection bias), we are awfully good at adapting to their consequences and justifying whatever we did as best.

*However, if some patients die from the procedure, then measuring their values will be impossible, which will greatly complicate the task

ACKNOWLEDGMENTS

I thank Cindy Bryce, Angela Fagerlin, and Peter Ubel for helpful comments, and Ted O'Donoghue and Matthew Rabin for their collaboration on the work that this article is based on.

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