



Putting cognitive psychology to work: Improving decision-making in the medical encounter

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ABSTRACT

Empirical research in social psychology has provided robust support for the accuracy of the heuristics and biases approach to human judgment. This research, however, has not been systematically investigated regarding its potential applications for specific health care decision-makers. This paper makes the case for investigating the heuristics and biases approach in the patient–physician relationship and recommends strategic empirical research. It is argued that research will be valuable for particular decisions in the clinic and for examining and altering the background conditions of patient and physician decision-making.

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In a well known study, [Gigerenzer and Hoffrage \(1995\)](#) demonstrated that likelihoods described as frequency formats (as opposed to probability formats) led to more accurate judgments by naïve and expert decision-makers. These effects may be attributable to the difference between the need to apply Bayes Theorem for probabilities and the need to subtract and divide for frequencies. Regardless, Gigerenzer and Hoffrage's study demonstrated a predictable limit to naïve and expert judgment and developed a strategy to sidestep or overcome that limit.

Following Gigerenzer and Hoffrage's model of identifying a limit on human judgment and producing a means of addressing this limit, the aim of this essay is twofold: (1) defend the application of the heuristics and biases approach to medical practice, and (2) use the robust conclusions of existing cognitive and social psychology research to identify and resolve decision biases in medical care.

Defending the approach to medicine

The heuristics and biases approach is an empirically supported view in social psychology that human judgment

is governed by generally expedient heuristics (a flipped coin will come up heads half the time), that lead to predictable biases (people expect a flipped coin to land heads, then tails, then heads, then tails, etc.) ([Griffin & Tversky, 1992](#); [Tversky & Kahneman, 1974: 1125](#)). Research in this area has also identified certain strategies to avoid or limit the effect of such biases: multiple presentations of information ([Tversky & Kahneman, 1981](#)), cuing certain activities (e.g., considering an alternative outcome) ([Koriat, Lichtenstein, & Fischhoff, 1980](#)) or cuing certain mindsets (e.g., reminding decision-makers that all things fade with time) ([Igou, 2004](#); [Vaughn & Weary, 2003](#)).

Despite the robust demonstration of heuristics in decision-making and their attendant biases, the heuristics and biases approach has met with resistance. [Shafir and LeBoeuf \(2002: 500–501\)](#) identify three general strategies that have been used to challenge research that supports the heuristics and biases approach. Shafir and LeBoeuf give adequate rebuttals to these challenges that will not be reviewed here. There are, however, reasons to believe that the first two challenges are less significant for medical decisions than they might be for other decisions, and there are additional reasons to reject the third.

One set of challenges claims subjects misinterpret the task at hand: “participants’ responses, which are rational in light of their own construals of the task, are coded as

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irrational by experimenters who fail to appreciate the participants' construals of the decision" (Shafir & LeBoeuf, 2002: 503). In medical practice, however, misconstruals are unlikely. When a medical decision needs to be made, it is unlikely that the patient or the patient's family has a fundamentally different construal of the decision than the physician or other medical practitioner. In these situations, a decision needs to be made about a treatment or lifestyle that should be started, continued, stopped, and so on. Though there may be trenchant disagreements about which option should be chosen, there is little room for misunderstanding that a decision must be made about the treatment or lifestyle in question.

Others challenge the approach by arguing that the experiments make inappropriate demands on average decision-makers. That is, the problems are not presented to research subjects in formats conducive to good decisions. For the medical setting, however, this criticism highlights the need for additional research in these areas. If certain formats degrade the quality of decisions, identifying the features of these formats will be instrumental so that such formats may be avoided as much as possible in medical practice. When they cannot be avoided, other research is needed to address the predictable problems these formats produce. That the demands of decision-making may predictably outstrip the abilities of decision-makers increases the concern for bias in difficult circumstances.

Finally, some challenge the relevance of the heuristics and biases approach. Concerned that incentives are lacking in these studies, they worry that the hypothetical decisions of this research do not reflect real-world decision-making. As much as this suggestion challenges the conclusions of the research conducted in controlled environments, it indicates the need for field research, which will be discussed in more detail in the next section. Moreover, Arkes, Dawes, and Christensen (1986) show how incentives pervert decision-making: they can actually decrease the quality of judgments. This finding is particularly disturbing because medical decisions have substantial built-in health and well-being incentives. Other challengers claim the experiments are irrelevant because the experimenters' fail to require justifications and so limit the decision-maker's involvement. As will be discussed in the third part of the essay, however, requiring decision-makers to justify or explain does not improve judgment, but (once again) actually diminishes the quality of judgment.

Shafir and LeBoeuf (2002: 503–504) also mention a challenge regarding expertise, which, for obvious reasons, is a significant issue for the discussion of improving medical decision-making. Specifically, experts, some critics claim, are more interested in and more familiar with the subject matter, and so are less likely to make biased judgments. Several studies, however, show that experts are subject to biased decision-making as well (Arkes, Wortmann, Saville, & Harkness, 1981; Baumann, Deber, & Thompson, 1991; Gigerenzer & Hoffrage, 1995; Henrion & Fischhoff, 1986; Redelmeier & Tversky, 1990).

In her tidy argument for applying the heuristics and biases approach to medical practice, Hall (2002) also notes the effect of biases on expert decisions. Specifically, Hall recommends, as an ameliorative step, altering medical

education to make future physicians aware of both the predictable problems with judgment and the means to address these problems. Although this is an important recommendation, following it will not completely resolve the problem of bias in expert judgment. Awareness of a bias and increased cognitive efforts to avoid the known bias does not always debias a decision (Harkness, DeBono, & Borgida, 1985; Lerner & Tetlock, 1999; Petty & Cacioppo, 1984). Furthermore, in the final sections of this essay, discussion of statistical prediction rules and the fact that they often outperform the best experts will further illustrate that a reliance on expert judgment to shore up decision-making is misguided.

Chapman and Elstein (2000) also systematically review research regarding health and medical decision-making. They provide an excellent overview of specific areas, but their recommendations are constrained. As they acknowledge, their review is limited to controlled laboratory research. They note that further research is needed on clinical practice, patient outcomes, and potential debiasing strategies (2002: 204). In short, field research into biases and debiasing is needed. Without more systematic study of the cognitive biases in medical practice it will be difficult to have appropriate confidence that the heuristics and biases (so robustly illustrated in controlled settings) are present in medical practice. The earlier studies, though indicative, are not definitive. Moreover, identifying strategies to counteract these biases also requires systematic research. Accurately identifying the quality of the biases is important. It is also important to develop or identify effective techniques for eliminating or attenuating bias. An accurate diagnosis is beneficial, and an effective treatment plan even more so.

Biased and biasing explanations and imaginations

Koehler (1991) and Hirt and Markman (1995) among others, have noted the avalanche of empirical research showing that explanation and imagination tasks bias judgment. Subjects imagining a hypothesis to be true, or producing an explanation for why it is true, unjustifiably increase their confidence that said hypothesis is true (Anderson, Lepper, & Ross, 1980; Anderson & Sechler, 1986; Hirt & Sherman, 1985; Ross, Lepper, Strack, & Steinmetz, 1977). If the only difference is the imagination or explanation task, the likelihood that the hypothesis is true remains unchanged, so the subject's increase in confidence is uncalibrated (that is, unrelated to the actual likelihood). Imagination tasks also affect subjective probability judgments. Sherman, Cialdini, Schwartzmann, and Reynolds (1985) show that individuals tasked with thinking about a disease with difficult-to-imagine symptoms (e.g., a vague sense of disorientation, a malfunctioning nervous system, and an inflamed liver) consider themselves less likely to contract the disease than individuals tasked with merely reading about the same disease.

Koehler suggests that offering an explanation unjustifiably increases confidence because it changes the individual's perception of the problem, his or her interpretation of relevant evidence, and the search for additional information about the problem (Koehler, 1991: 510–511). This explanation has been supported by several later studies

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