See also Confidence Intervals; Cost-Effectiveness Analysis; Decision Trees: Sensitivity Analysis, Basic and Probabilistic; Managing Variability and Uncertainty; Marginal or Incremental Analysis, Cost-Effectiveness Ratio

Further Readings

Briggs, A. H., & Fenn, P. (1998). Confidence intervals or surfaces? Uncertainty on the cost-effectiveness plane. *Health Economics, 7,* 723–740.

Fenwick, E., Claxton, K., & Sculpher, M. (2001). Representing uncertainty: The role of cost-effectiveness acceptability curves. *Health Economics, 10,* 779–787.

Fenwick, E., O'Brien, B., & Briggs, A. (2004). Cost-effectiveness acceptability curves: Facts, fallacies and frequently asked questions. *Health Economics, 13,* 405–415.

Van Hout, B. A., Al, M. J., Gordon, G. S., & Rutten, F. F. H. (1994). Costs, effects and c/e-ratios alongside a clinical trial. *Health Economics, 3,* 309–319.

Accountability

Accountability refers to the implicit or explicit expectation that one may be called on to justify one's beliefs, feelings, and actions to others. Although most theories of decision making have conveniently assumed that decision makers act as isolated individuals, decision makers, including those in the field of medicine, seldom think and act free from social influences.

Decision making in the field of medicine is fraught with complex, conflicting pressures from various parties, including patients, physicians, hospitals, health policy makers, and insurers, that promote distinct and often competing objectives, such as maximizing life expectancy versus optimizing quality of life, or weighing quality of treatment against economic constraints. Therefore, to best structure accountability relationships and ultimately to improve the quality of decisions in the medical setting, careful analysis of accountability is warranted.

This entry reviews findings from empirical research that addresses the impact of many types of accountability on decision making and attempts to identify the conditions under which accountability will improve decision making.

Many Kinds of Accountability

It is intuitive to think that accountability will breed hard thinking and that thinking harder will translate to thinking better. But according to reviews of the accountability literature, accountability promotes self-critical and effortful thinking only under certain conditions.

Different types of accountability can be distinguished based on the specific nature of justification an individual is expected to provide for his or her decisions: To whom is he or she accountable, for what, and according to what ground rules must he or she justify his or her decisions? For example, a decision maker may be accountable to an audience with known versus unknown views, to authority figures whom the decision maker may perceive as legitimate or illegitimate, and for either the outcome or the process of the decision.

Based on their review of the accountability literature, Jennifer Lerner and Phillip Tetlock reported that decision makers engage in more careful thinking only when they learn prior to forming any opinions about the decision that they will be accountable to an audience (a) whose views are unknown, (b) who is interested in accuracy, (c) who is more interested in processes rather than outcomes, (d) who is reasonably well informed, and (e) who has a legitimate reason for probing the reasons behind decisions. Therefore, simply leading decision makers to expect to justify their decisions to others is insufficient to promote thorough decision making. Instead, organizations and authorities must methodically tailor accountability structures to promote more careful thought processes.

Will Accountability Improve Decision Making?

Although making a decision maker accountable to an unknown audience before the decision is made promotes more careful thought processes, employing this specific kind of accountability by no means ensures improved decision making. Rather, the effects of accountability depend on the types of decisions and the cognitive processes involved, resulting

in some improved decisions, some unchanged decisions, and some degraded decisions.

When Accountability Improves Decision Making

Predecisional accountability to an unknown audience improves decision making to the extent that suboptimal decisions would—under default conditions—result from lack of effort and self-critical attention to the decision process. In other words, as long as improvements in decision making require only greater attention to the information provided, and not acquisition of special skills or training in formal decision rules, the concentrated thinking motivated by accountability pressure will result in thinking better. For example, research has shown that accountable decision makers with a heightened awareness of decision processes made better decisions, specifically, by reducing the tendency for happiness from an unrelated event to elicit heuristic, stereotypic judgments; by reducing blind commitment to a prior course of action in an effort to recoup sunk costs; and by decreasing the likelihood of mindlessly rating a conjunctive event (e.g., shy librarian) as more likely than a simple event (e.g., librarian).

When Accountability Has No Effect on Decision Making

Predecisional accountability to an unknown audience has no effect on decision making if knowledge of formal decision rules (e.g., Bayes's theorem, expected utility theory) that cannot be acquired through increased attention to the decision process is critical for improvements on decision tasks. For instance, accountability had no effect on insensitivity to base rate information; even with increased awareness of their decision process, decision makers often failed to adjust their probability estimates for the frequency of a specific event in some relevant population. As an example, when asked to estimate the probability of a woman having breast cancer given a positive mammogram with 90% sensitivity and 93% specificity, most participants failed to take the base rate of breast cancer in the woman's age group (.8%) into account even when it was clearly provided to them, no matter how hard they were pressured to think.

When Accountability Degrades Decision Making

Predecisional accountability to an unknown audience can actually degrade decision making when certain decision-making biases result from using normatively proscribed information or when the option that appears easiest to justify also happens to be a biased option. For example, increased effort in accountable decision makers led them to increase integration of nondiagnostic information into predictions and resulted in dilution of critical diagnostic information.

Decomposing Accountability

To fully understand how accountability influences a given decision context, it is worth recognizing that even the simplest form of accountability necessarily implicates several empirically distinguishable subphenomena: (a) *the mere presence of another person* (decision makers expect that another person will observe their performance), (b) *identifiability* (decision makers expect that what they say or do will be linked to them personally), (c) *evaluation* (decision makers expect that their performance will be assessed by another person according to some normative ground rules and with some implied consequences), and (d) *reason giving* (decision makers expect that they must give reasons for what they say or do). More research is needed to clarify how these phenomena might affect the impact of accountability.

Accountability and Medical Decision Making

Assuming that accountability is a social panacea, people propose accountability as a solution to all sorts of problems. However, research has documented that accountability is not a singular phenomenon that solves every problem. Only highly specialized forms of accountability will elicit increased cognitive effort in decision makers. More cognitive effort is not always beneficial and sometimes makes matters even worse. Moreover, accountability inherently implicates empirically distinguishable subphenomena, which may or may not influence decision makers in a consistent direction. Accountability as a whole is a complex construct that interacts with individual characteristics of the decision maker and properties of the

decision-making environment to produce an array of effects. Decision makers and their superiors should carefully research the decision environment and decision task to use accountability pressure to advantage in medical decision making.

Seunghee Han and Jennifer S. Lerner

See also Bias; Cognitive Psychology and Processes; Decision Quality; Judgment; Social Factors

Further Readings

Lerner, J. S., & Tetlock, P. E. (1999). Accounting for the effects of accountability. *Psychological Bulletin, 125,* 255–275.

Lerner, J. S., & Tetlock, P. E. (2003). Bridging individual, interpersonal, and institutional approaches to judgment and choice: The impact of accountability on cognitive bias. In S. Schneider & J. Shanteau (Eds.), *Emerging perspectives on judgment and decision making* (pp. 431–457). Cambridge, UK: Cambridge University Press.

Tetlock, P. E. (1999). Accountability theory: Mixing properties of human agents with properties of social systems. In J. Levine, L. Thompson, & D. Messick (Eds.), *Shared cognition in organizations: The management of knowledge* (pp. 117–137). Hillsdale, NJ: Erlbaum.

Advance Directives and End-of-Life Decision Making

Advance directives are oral or written statements given by competent individuals regarding the medical treatment they would like to receive should an incapacitating injury or illness preclude their ability to make or express their own decisions. They are most often used to make decisions when a person is near the end of life, and difficult choices must be made about the use or withdrawal of life-sustaining medical treatment.

Rapid advances in medical technology over the past several decades have made end-of-life decision making an increasingly important and complex challenge for patients, their families, and healthcare professionals. Advance directives play a role in many end-of-life decisions, and their use is encouraged by medical professionals and supported by state and federal law. This entry describes the main types of advance directives, their social and legal history, some of their limitations as aids to effective end-of-life decision making, and some strategies suggested for addressing these limitations.

Types of Advance Directives

There are two primary types of advance directives. *Instructional advance directives*, also known as living wills, contain instructions about the type of life-sustaining treatment an individual would like to receive should he or she become incapacitated. Such instructions can range from legal documents prepared with the help of an attorney to verbal statements made to a family member or a physician. They can be general and express values and goals that the individual feels should guide medical care (e.g., emphasize quality over quantity of life) or relevant religious values. Or they can be specific and carefully delineate particular medical treatments to be used or withheld in particular medical conditions. Most often, instructional directives express a desire to withhold aggressive life-sustaining treatments, but they can also be used to request such treatments. In addition, they can specify preferences regarding pain management, organ donation, or dying at home as opposed to in a hospital.

Proxy advance directives designate another person as a surrogate decision maker, or a proxy, for the patient should he or she become incapacitated. Proxy directives are also known as *durable powers of attorney for healthcare* and *surrogate appointments*. The surrogate decision maker is usually a spouse or another close family member. Proxy directives convey the legal right to make treatment decisions but do not necessarily contain explicit guidance regarding what those treatments should be.

Advance directives can be created without using any preprepared forms, but the majority of U.S. states provide standard forms that follow specific state statutes. Verbal statements are also