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We welcome and appreciate the insights and perspectives provided by Schwartz (2010, this issue), Tetlock and Mitchell (2010, this issue), and Bazerman and Greene (2010, this issue). Our thinking has benefited considerably from their responses, and we appreciate the opportunity to continue the discussion. In our reply, we address issues concerning the scope of moral rules and of cost-benefit analysis (CBA), including their relation to other decision modes. We then revisit the issue of closed-world assumptions (CWAs) and the question of how learning processes may operate for different decision modes.

CBA Is Not All Bad and Moral Rules Are Not All Good: The Importance of an Ecological Approach to Decision Modes

All of the commentaries addressed the normative status of cost-benefit calculations or moral rules: championing them, criticizing them, or suggesting that both have their limitations. Bazerman and Greene are skeptical about moral rules and quite sanguine concerning CBA. Schwartz builds on and deepens our analysis of the limitations of CBA. Tetlock and Mitchell nicely embed moral rules and CBA in situated social identities and develop corresponding implications for analyses of why people may shift between decision modes. Both Schwartz and Tetlock and Mitchell claim that neither CBA nor moral rules are sufficient to explain key aspects of decision making, hinting that our emphasis on the virtues of moral rules is overstated.

To remove any ambiguity, we concur with the view that neither CBA nor moral rules are sufficient to explain either how people do or ought to make decisions. We emphasized the cost side of CBA and the benefit side of moral rules for a transparent reason. We focused on the shortcomings of CBA because most decision science takes its merits for granted. We chose to emphasize the merits of moral rules for an analogous reason: Most decision science examining the conflict between moral rules and CBA either explicitly identifies adherence to moral rules as nonnormative or is silent on the normative question. We see our article as a small corrective to a long and systematic imbalance.

We also fully noted that CBA and moral rules are but two of many decision modes that may lead to good decisions. Often some combination of multiple modes will be ideal, and in other contexts it may be that no decision mode will prove effective. For this reason, we devoted extensive space to the discussion of decision modes and to an examination of the decision ecology and how that is related to the selection and performance of decision modes.

Schwartz and Tetlock and Mitchell provide compelling examples of shortcomings of CBA and recognize that moral rules play an important role in decision making. They also move beyond the CBA–moral rules dichotomy to describe their own views on how people make decisions in ways that do not correspond directly with either mode. Our ecological view fits with the view that experienced decision makers may effectively refine or deviate from their moral rules by using other decision modes or by integrating across two or more modes.

Bazerman and Greene take a stronger position, appearing to suggest that “good” CBA is the best decision mode we have regardless of domain and, in parallel, that adherence to moral rules—at least when it conflicts with the dictates of CBA—systematically makes things worse or no better. They write that there is, “no evidence in BMB or elsewhere that following moral rules will generally lead to better outcomes than careful attempts at a complex CBA” (p. 210). They recognize that CBA is imperfect, but they argue that if people don’t try to put all values on a common scale so they can be assessed using CBA, “we end up with an impoverished intuitive attempt to do the same” (p. 210). Their solution to biased CBA inputs is to replace them with unbiased ones.

We have three main responses to the Bazerman and Greene critique. First, they provide no evidence in their commentary or elsewhere that CBA will generally lead to better outcomes than the careful, complex application of moral rules or alternative

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decision modes. Second, although we do not doubt that CBA can be improved, a complete and unbiased CBA is simply impossible (as Schwartz nicely illustrates in his commentary; see also our target article). An incomplete CBA is not necessarily a fatal problem any more than it is a fatal problem that one has to rely on samples to estimate populations. But samples are good estimates of populations only to the extent they are unbiased. Our original article reviewed a large body of studies demonstrating that optimism about our potential to make unbiased estimates of costs and benefits should be viewed with suspicion. Third, there are many examples where adherence to moral rules seems to lead to better results than CBA. We provide several examples in our article, as do other researchers (e.g., Atran, Medin, & Ross, 2004; Goldberg, 2002).

Decision-Mode Learning and the Problem of CWAs

A second set of issues in the commentaries concerned the problem of CWAs, and the relationship between that problem and the selection and success of alternative decision modes. CWAs are decisions about what information, inferences and other forms of reasoning are relevant to making and evaluating decisions. Researchers often go to great lengths to limit the scope of what participants consider in some experimental task and then assume that participants adopt these (narrow) constraints (see the target article for concrete examples).

Our concerns with CWAs are twofold. First, researchers' CWAs may be quite different from those of their research participants, which may include life experiences, cultural background, beliefs, values, practices, and goals. Unless the CWAs of experimenters and participants are in harmony, researchers are not licensed to criticize decision makers' choices as nonnormative.

Second, CWAs often artificially constrain the decision task in ways that oversimplify it and give CBA a deceptively stronger footing than it has in the real world, where such assumptions do not hold. In turn, the acceptance of narrow CWAs often gives an apparent but specious disadvantage to alternatives to CBA. To help convey why alternatives to CBA may have a relative advantage outside narrowly construed CWAs, we followed our discussion of decision modes with a consideration of decision learning. Decisions from experience are associated with at least three distinct types of learning: evolution by natural selection, cultural evolution and socialization, and individual learning from experience. The costs and benefits integrated by these learning processes are often unavailable for CBA.

We thank Barry Schwartz for his examples of the challenge of CBA in an open world, illustrating how, in any decision context, one needs to "frame the situation and 'close' the world" (p. 204). Tetlock and Mitchell make a similar point, noting that CWAs are not an intrinsic problem with CBA; instead the issue is whether the CWAs adopted capture what is most relevant. We agree that the frame construction associated with

determining relevance is a critical component of decision making that has received very little attention by decision science.

Bazerman and Greene suggest that our argument about the limitations of CBA growing out of CWAs relies on a "false straw man." If we are presenting a straw man, then, keeping in the spirit of their metaphor, the examples they provide were taken from the hay field. For example, their description of the footbridge problem seems to take as a given that the people who choose not to push the man even though it would (ostensibly) save more lives are allowing "their emotions to take over in a manner that is inconsistent with their underlying preferences" (p. 210). Yet how are we to decide what their underlying preferences are if the decision makers themselves do not think they are making the wrong decision?

To support their stance, Bazerman and Greene point to research showing that "patients with emotion-related neurological damage are dramatically more likely to make utilitarian judgments" (p. 210). Is the fact that people with brain damage are prone to making CBA decisions meant as evidence that CBA leads to better decisions in an open world? Ironically, this example seems handpicked to support our claim rather than theirs. The compelling examples from *Descartes' Error* (Damasio, 1994) indicate that people suffering lesions in the ventromedial prefrontal cortex (paralleling those referenced in Bazerman and Greene) often retain their cost-benefit analytic ability but nonetheless often make disastrous real-life decisions.

Bazerman and Greene further note that contemporary decision analysis "readily allows, incorporates, and encourages the consideration and valuation of fairness, the outcomes of others, symbolic acts, unintended consequences, precedent setting, and even moral rules" (p. 209). But adding these considerations to utility models places them on the horns of a dilemma: they can adopt strong CWAs as in the footbridge example, in which case the predictions are often wrong, or they can employ these additional factors (would it be fair to push the man, set a bad precedent, or violate a moral rule?) after the fact to explain any result, in which case CBA has little explanatory power.

Conclusions

We hope it is not a paradox to suggest that decision science has made remarkable progress over the past several decades, much of it based on CBA and its close relatives. But the same assumptions that have enabled initial progress may have reinforced serious limitations. Instead of assuming that we can make CWAs for decisions because (sometimes) we can get by with it, we need to understand how people frame decisions in a variety of real-world contexts.

We believe making global contrasts of different decision modes is a less effective strategy than is a systematic study of the ecology of decision contexts and how different decision modes may be favored in different niches. Indeed, in their own work, the commentators on our article have made important contributions to our understanding of decision environments. Perhaps the most significant challenge is to meaningfully

contrast the effectiveness of alternative decision modes without prejudicing the results by our framing of the problem.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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