

The Goodness of Decision Making: In Search of the Universal Measure

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1. Introduction

Solving MCDM Problems: Process Concepts is a refreshing, stimulating and much needed discussion on identifying the characteristics of and designing good decision processes. However, in the attempt to present a simple solution to this important problem, characterized by an objective–subjective attributes–criteria dichotomy, the authors fall prey to many simplistic assumptions about decision makers and their processes, thus considerably restricting the applicability of their remarks.

The prescriptive design of a decision process that supports insight, learning, exploratory search, etc., needs to take seriously many alternative conceptions of rationality that have grown out of descriptive studies of cognitive limitations and the search for intelligence in human choice behaviour. Incorporating these elements will lead, we believe, to a considerably more subtle and less rigid characterization of a "good" process than Henig and Buchanan's two main issues: understanding preferences and expanding alternatives.

The authors' discussion grew out of the recent debates in the MCDA¹ community on the limitations of the field, the necessity of incorporating discoveries from other fields and the need to expand the MCDA paradigm.² This discussion, from the behavioural viewpoint, has been well researched: process is a critical element of decision making. However, the formal and prescriptive perspective may serve as a bridge between MCDA and behavioural methods and as a vehicle for the enhancement of decision models and aids. To achieve this the underlying assumptions have to be defensible and reasoning based only on these assumptions. In this note we focus on a few key claims made by Henig and Buchanan.

¹ To stress both the theoretical and applied aspects of decision making and include decision support, the acronym MCDA is used here as both Multiple Criteria Decision Analysis and Multiple Criteria Decision Aids, and covers multiple criteria decision making.

² See, for example, the *Manifesto of the New MCDA Era* by D. Bouyssou, P. Perny, M. Pirlot, A. Tsoukias and Ph. Vincke, and the subsequent discussions.

2. Process

The key issue is the question of the goodness of a decision making process. Yet, it is not clear what the process *is*. The authors state that " ... the decision making process is about establishing mappings between alternatives and attributes and between attributes and criteria." (p. 8) and identify three steps that should be included in the typical decision process. This definition is heavily oriented towards decision aids. It does not include such steps, discussed in the literature, as recognition of decision opportunity or necessity, identification of criteria and attributes, search for alternatives, decision implementation, follow-up and control. A decision making process, like any other activity, has its own attributes, including effort, time, commitment and cost. A rational decision maker will not embark on a process without the expectation that the results will outweigh expenditures. This is a key issue and all too often ignored in decision analysis although postulated a long time ago by Simon (1960) and others.

During the process, the incremental improvement in problem understanding and/or criteria achievement may not be worth the additional effort. In many difficult decision situations it is irrational to expect that "Before the final act of selecting an alternative, this structure should be fully assessed." (p. 8). Simon's satisficing approach to decision making reflects the fact that the assessment is not resource free. To push the matter to the extreme, a decision maker who wants to have complete knowledge of himself, the problem, and its implications will never make a decision.

The authors say that the process is creative and involves learning. However, as Fromm (1941) says, life is the process of learning and we die when we cease to learn. We have to make decisions and are aware of the process attributes and our cognitive limitations, time and effort constraints, information overload and—at the same time—lack of possibly relevant information. We are also aware that there are other decisions to be made and other opportunities. Therefore, we often make decisions accepting the inconsistencies, errors and contradictions.

3. Cognitive Limitations

Expansion of the set of alternatives may not uniformly be a good idea. While the spirit in which Henig and Buchanan propose expansion as a characteristic of a good decision process is clear, the implicit assumption that the decision maker would be quite willing to search through the enlarged space on the way to a single final alternative suggests a neglect of cognitive efforts and limitations. These aspects are reflected in multiple and

evolving rationalities (March, 1978; Nozick, 1993) and suggest that a contraction of the set of alternatives may be desirable in some contexts, and the definition of a good process, therefore, needs to take the context into account.

The amount of mental effort and the psychological costs of decision making engendered by a decision process can change an individual's preferences. Preferences are neither exogenous, stable, nor precise. Clearly, process rationality concepts are necessary.

Similar remarks apply to the requirement that the decision maker understands her preferences. While plausible, it is not always necessary for the decision maker to understand her own preferences to make better decisions. This is not to gainsay the importance of enhancing self-understanding in most problem situations, especially ill-structured ones. Rather, we do not want the drive towards detailed value analysis to be emphasized to the exclusion of all pragmatic considerations. Instead, we may wish to retain efficiency (reduction of the cognitive costs incurred by any kind of analysis) as an explicit consideration in the design of good decision processes. Further, any measurement of values, criteria and preferences is bound by simplifications and errors which are difficult to assess. Perhaps, this is why some expert decision makers manipulate representations *instead* of applying solution procedures to a given problem representation (Mayer, 1992). They move from general representations to a specific one that has only one feasible alternative.

There are circumstances when explicit consideration of the value system may have negative effects. Chess masters develop a value system over possible configurations, but if they stop to analyze its components they are bound to lose the game. Chess is played through recognition. Executive decision makers under pressure may do better to respond with quick judgments than with an analysis of their preference system; systemic rationality may substitute for calculated rationality. Another reason why a decision maker may not want her preferences clarified is because of the context of decision making: her value system may become clearer to others and that may leave her open to manipulation by others who are more competent at consequential argument (March, 1978). Further, people often need to play games with themselves and misstate their goals in order to manage their preferences; these issues are often discussed as game rationality.

4. Subjectivity and Objectivity

Whether talking about attributes, criteria, goals, or outcomes, distinguishing objective issues from subjective ones is an important part of any good decision process, a feeling we

share with Henig and Buchanan. Why does subjectivity arise at all? Primarily because the decision maker's understanding of and preferences between various states on the world cannot—in general—be externally imposed. The decision problem can be objectively solved but its construction contains both subjective and objective components. From this perspective, normative-prescriptive decision analysis can be defined as the science—"science" by definition implies objective methods—of coping with the subjectivity of human decision making. Decision analysis is thus positioned on an extreme boundary of science, possessing a mixed bag of philosophical assumptions; various assessments of the assumed subjective component lead towards different definitions of "good" decisions and processes.

When value subjectivity appears by very assumption, it follows that the analyst will not attempt to influence or manipulate the decision maker's prior preferences. This is a questionable assumption, since first of all it presumes that there *does* exist an a priori set of preferences. Many researchers believe to the contrary; preferences are constructed as one goes along and they are influenced by the process. At least one aspect of an analyst's job is to modify the decision maker's subjective perspective and influence her preferences when they appear to be problematic. The issue then is how to design a process which takes the evolution of preferences into account. However, there are other approaches to decision making. For example, given a set of subjective values, it may be objectively possible to determine what must be done. Thus, sometimes an expert can objectively *prescribe* what criteria and (sub)goals the decision maker ought to have and limit the set of acceptable alternatives to one or a very few.

On the other hand, and contrary to the authors' claims, both attributes and alternatives may be subjective, both in terms of selection and measurement. This is because feasibility may be coined in terms of constraints selected by the decision maker, some of which reflect her perception of what she can and cannot do, afford or accept. Moreover, it is impossible to consider all the attributes of any entity so the decision maker is bound to select those that she considers important in terms of the feasibility and criteria. The scope and depth of these selections are constrained by the acceptable effort and cost of the process, which are also subjective. A successful decision maker may be one who knows better than others what are the relevant attributes and constraints. A very successful one may "break the rules" and disregard many attributes and constraints which others traditionally consider.

5. The Two-Level Mapping and Sensitivity Issues

Henig and Buchanan attempt to deal with subjectivity by splitting the problem representation structure into two levels, one that objectively maps attributes to alternatives, and one that maps attributes to criteria with explicit acknowledgment of the subjectivity of this mapping. The claim is that constructing this two-level mapping makes for a good decision process since it will force understanding of preferences and facilitate expansion of the set of preferences.

Attempting to interpret the two-level mapping in terms of the theory of influence diagrams (ID) should make the issues clearer. Value nodes correspond to criteria, and chance or deterministic nodes correspond to attributes. It is quite evident from the usual literature on IDs that subjectivity arises not only in the computation of values from attributes, but also in the influences between attributes themselves; in particular, Bayesians model the latter by means of subjective belief functions. The relationships in IDs form an acyclic directed graph, and the subjectivity could be anywhere; therefore there does not seem to be much of a case for a two-level bifurcation of all the nodes. Of course, stressing that subjectivity is present in various parts of the model is important; indeed, one purpose of IDs is to focus attention on relationships (between attributes and/or value nodes) where the decision is sensitive to the subjective judgments made.

The issue of objective versus subjective may sometimes drop out if one does sensitivity analysis. For example, an attribute–criterion link that is considered subjective and poorly understood may turn out not to deserve much attention anyway because it does not significantly affect the likely choices among the alternatives. Therefore the attention to the objective-subjective mapping called for by Henig and Buchanan may be appropriate only when placed within a sensitivity analysis loop, rather than globally at the outset.

6. Conclusion

It is an odd claim that with a good process “... the alternative finally chosen will be the best (based on the decision maker's preferences)...” (p. 16). There may be no preferences at all (apart from the individual criteria) to resolve the choice, or the preferences may be tentative and formulated only to solve some aspects of the problem. Further, this claim suggests that a correct use of appropriate methods guarantees a quality of the process outcomes (a decision). We argue that sole focus on the process is not a panacea for good decision making; a decision maker may make a terrible decision when her perception of the world is at odds with reality. Focusing on a “good and rational” process may actually reinforce her misperception.

The authors, in an attempt to escape from decision maker's axiomatic rationality—so often violated and criticized—to process rationality, expect the difficulties with the former to disappear. Since there are no objectively good decision outcomes, they try a rescue in an objective process. While some elements of the process may and should be objective, the overall process is controlled by subjective perceptions and involves many inherently subjective activities. Restriction of the process to three steps, which are amenable to formal representations easier than others, may lead to downgrading of MCDA methods. The upgrading effort has to include support in the development and analysis of cognitive maps, different and evolving rationalities, causality, process attributes, use of multiple problem representation and solution methods, and transformations from qualitative to quantitative structures.

The concept of the quality of a decision based on what the decision maker desires should not be discarded, because it also can be scientific. Although, there is no one except the decision maker who can objectively judge her desires, it is often possible to objectively judge whether the selected alternative is the one that best meets her desires.

This is not to say that the concern with the process is not important. On the contrary it can enhance and expand the MCDA theoretical and applied research endeavors. It should not, however, become another attempt to determine a uniform and universal measure of quality. Preferences are not limited to decision criteria; decision makers have to control their limited resources and the use of faculties. They may also have preferences in the way these resources are employed. The process and its attributes thus provide yet another set of criteria in the complex world of multiple criteria.

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