Axiomatic and Ecological Rationality: Choosing Costs and Benefits

There are two compelling general approaches to normative rationality, the *axiomatic approach* and *ecological rationality* [4,5]. In this talk I evaluate these approaches with respect to the "meliorative project" [6] of improving the rationality of individual agents. I show that the approaches' different methodologies result in each accepting a distinct package of costs and benefits, such that which approach is more useful in any given case will depend on the particular goals and the information that is available. Despite this, ecological rationality faces a serious challenge when it comes to providing an acceptable independent explication of goodness, and it is unclear how it could completely reject the standards of the axiomatic approach. For this reason, I defend a hybrid approach that – when it can be applied – combines the axiomatic and ecological approaches to offer a better package of costs and benefits than either approach alone can provide.

Axiomatic theories of rationality (such as Expected Utility Theory [7] or AGM belief revision [1]) define rationality in terms of sets of abstract axioms to which rational behavior conforms. Each set of axioms applies to a broad domain (e.g. choice under risk) and encodes coherence within that domain. In contrast, ecological rationality is defined as the match between the process an agent applies to a task (e.g. an inference heuristic) and the task environment. Whether one process is more ecologically rational than another (relative to a context) is a matter of which is more "fast, frugal, and accurate" [4,5].

Each of these approaches has very valuable features, but those advantages come from sacrificing other virtues. Developers of axiomatic theories have had empirical tests of rationality as a clear goal: for example, Expected Utility Theory was developed to operationalize rational choice behavior and obviate the need for psychological insight [7], while abstract syllogisms were studied to enable parties to a debate to check the validity of each other's arguments [3]. Sets of axioms thus provide clear empirical tests for rationality, but the cost of defining rationality solely in terms of observables is that intuitively relevant psychological information cannot be taken into account. Proponents of ecological rationality, on the other hand, have a primary goal of understanding the actual processes that underly people's choices, inferences, and so forth. Evaluating such processes is hugely beneficial for many reasons, and the meliorative project in particular is well served by investigating the sources of people's behavior and alternative strategies that might serve them better [6]. The most significant cost of this approach, though, is that it replaces the axiomatic approach's coherence standard with a correspondence standard in theory, but in practice it is often not clear what objective criteria can be found to fulfill this function. Especially when it comes to choice processes like the Priority Heuristic [2] (as opposed to those dealing with beliefs), the standards must depend on the agent's subjective preferences.

If we consider three important desiderata for an approach to rationality that facilitates the meliorative project, we see that the axiomatic and ecological approaches' costs and benefits complement one another; this suggests combining the two approaches to create a hybrid approach with a more attractive profile of costs and benefits than either component approach offers on its own. First, by operationalizing rationality, the axiomatic approach provides a clear and relatively objective way to render rationality judgments, while ecological rationality leaves the standards underspecified with the criterion of "accuracy." Ecological rationality is superior with respect to another desideratum, however: its judgments are directly actionable – in that an agent can implement a more ecologically rational process in order to improve – whereas an axiomatic judgment tells the agent whether they have made a manifest mistake, but not how they should respond to that verdict. The final (and very practical) desideratum is that the approach's evaluations be generalizable, in that they can be applied beyond a particular person or situation. Axiomatic judgments are easily generalizable in one way, because they are outcome-based; all agents who display the same choice pattern or draw the same inferences will receive the same rationality judgment. In another way, however, axiomatic judgments do not generalize much at all; we cannot tell whether an agent who conforms (or fails to conform) to a set of axioms in one instance will do so in other instances, because we do not know the underlying cause of their performance. Ecological rationality judgments will only be relevant to those agents known to use one of the evaluated choice processes, but given that they do, we can predict how they will perform in similar situations because the expected performance of the processes is what is evaluated. When process information is available, therefore, the best approach will be a hybrid approach that proceeds like ecological rationality in evaluating processes, but employs axiomatic criteria to judge those processes. In the absence of clear, defensible, objective correspondence criteria, coherence criteria play an invaluable role in offering empirical tests for rationality.

References

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