Zeroing in on zero-intelligence: Externalism, automaticity and opaqueness

This panel explores the notions of zero- and minimal-intelligence at the intersections between philosophy of mind, economics, performance studies and theories of rationality. The first presentation (Petracca) traces the notion of externalism in philosophy of mind and institutional economics. The second (Gallagher) examines two conceptions of zero-intelligence understood in relation to automaticity in the philosophy of performance and institutional economics. The third paper (Mastrogeorgio), using the example of market as an economic institution, argues that opaqueness can serve as a criterion of minimal-intelligence.

Opaqueness as a mark of minimal-intelligence

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Extended abstract

Some anthropologists reported on natives deciding about where to go fishing basing on haruspex (the inspection of the entrails of sacrificed animals), emphasizing that this method was, on average, successful. The explanation was that the type of randomness of entrails was "consistent "with the type of randomness required to preserve the ecological balance and to allow fish reproduction. The anecdote is able to shed light on the notion of zero intelligence, whose experimental benchmark is the one of a non-sophisticated agent that follows an arbitrary rule such as a random choice. Indeed a fundamental assumption in the zero/minimal intelligent debate is that external structures (e.g., markets) "do the job", so that they can substitute the for the (ir)rationality of economic agents (Gode & Sunder, 1993).

In this contribution I argue that randomness is an arbitrary criterion for defining zero-intelligence. I take the notion of *frugal heuristics* to be helpful in reconceptualizing the notion of minimal intelligence. And I propose to adopt *opaqueness* as a benchmark of minimal-intelligence.

In many domains (such as finance, medical decision-making, consumer behavior, etc.) decisions based on minimal rules — i.e. *frugal heuristics* — are often superior compared to decisions based on "muscular" information and computation-intensive methods (the 'less is more' effect). Frugal heuristics are able to generate "satisficing" outcomes, given the limits of knowledge, time and computational capabilities of humans (Gigerenzer & Gaissmaier, 2011; Newell & Simon, 1972). Frugal heuristics are constitutively based on the H.A. Simon's "scissors" argument: intelligence cannot be assessed relying only on internal criteria but must be evaluated as a matching between internal criteria and environmental structure. The notion of frugal heuristics allows disentangling

the minimalism/frugality of the rule from its outcome. Indeed a rule (e.g. a random choice) can generate different outcomes depending on the environment in which it is applied, so it cannot be considered in absolute terms and, a fortiori, it cannot be considered as an experimental benchmark.

Artificial systems that make decisions involving human beings, must be intelligible in their goals and processes. Transparency is required for artificial systems in order to avoid their degeneration (Bostrom, 2014). Following the idea of algorithmic transparency, we propose to re-conceptualize minimal intelligence not just in terms of arbitrariness of choice but with reference to its *opaqueness*, which is the property of a decision rule of being or not being intelligible. In other words opaqueness is the ambiguity of the causal link between the rule and its outcome. For instance, consider the following two heuristics:

- evaluating the quality of a restaurant by the number of cars present in its parking lot;
- predicting rain probability by observing the shapes of clouds.In the first case we easily realize that the number of cars is a meaningful piece of information. It is a proxy as it presents an ecological correlation with the intrinsic quality of the restaurant. In the second case we are able to make correct predictions but we do not know why, because we are not able to infer the causal link between the shapes of clouds and the rain probability. In others words, both rules are frugal, both rules work, but the second rule is more opaque than the first one.

The opaqueness of a minimal rule of decision is the contrary of its transparency, which is related to its quality of being rationalized by an economic agent. Here we suggest that minimal-intelligence occurs when external structures (such as market institutions) enable specific decision rules and specific cognitive processes (see Gallagher, Mastrogiorgio & Petracca, 2019), but they constrain their rationalization.

To conclude with the anecdote: once the natives are able to understand why the randomness of haruspex works, they will not be minimal-intelligent agents anymore. Nevertheless, they will continue to decide in a random manner.

Selected References

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