Decisions and Performance Under Bounded Rationality: Evidence from Professional Chess

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Most real-world decision problems are so complex that the perfectly rational solution cannot be computed. Nevertheless, perfect rationality still serves as the conventional benchmark for assessing behaviour and performance. We develop an alternative method that involves comparing human behavior to a computational benchmark that is based on artificial intelligence and simulates rational behavior under cognitive bounds that are comparable to those of human decision makers. We apply this method to a dataset consisting of real-world strategic behavior in a competitive environment: chess.

Our analysis documents several distinct dimensions in which behavior deviates from the computational benchmark. Deviations are related to asymmetric evaluation in terms of losses and gains, time pressure, fatigue, and complexity, but are not necessarily associated with worse performance. Faster decisions are associated with more frequent deviations from the benchmark, yet they are also associated with better performance, consistent with an important influence of intuition and experience.