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Title

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Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 47(0)

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Publication Date

2025

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Generation and Evaluation in the Human Invention Process through the Lens of Game Design

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Abstract

Humans do not just follow rules and solve problems created by others: we modify those rules, set new goals, and create new problems—so can we be inventors and innovators. Creating a good rule or a good problem, however, depends not just on the ideas you come up with but on how you evaluate such proposals. Here, we study invention through the lens of game design. We focus particularly on the early stages of novice, "everyday" game creation, where the stakes are low. We draw on a dataset of over 450 human created games and conduct a model-based analysis of how people invented new games based on prior experience. We consider two different cognitive mechanisms that may be at work during the early processes of intuitive game invention: an associative proposal based on previous games one has seen, and evaluation based on simulations of play. In particular, we aim to understand two possible evaluation schemes (model-free and model-based) that a commonsense-based game creator may use to refine their initial draft proposals. We find that the generated games are best described by a model which incorporates both rapid model-free evaluations and slower, model-based estimates of game quality at a population level. Our work serves as a step forward towards the proposal and evaluation process in human invention. See https://sites.google.com/view/gen-eval-game-creation for additional details and preprint.

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