

Chess vs Go vs Magic: the Gathering

A Comparative Complexity Analysis

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Abstract—This white paper explores the cognitive and strategic demands of three iconic games: Chess, Go, and *Magic: The Gathering (MTG)*. While Chess and Go are often cited as pinnacles of abstract strategy, MTG introduces an additional layer of complexity through hidden information, probabilistic outcomes, and a constantly evolving meta-game. By comparing the decision space, the type of information, and the skill requirements, this analysis highlights why the MIT Technology Review has recognized MTG as the most complex game in the world. The goal is to provide a framework for understanding strategic depth in traditional and modern competitive games and to illustrate how game design can challenge and develop advanced cognitive skills.

Index Terms—Chess, Go, Magic: The Gathering, Game Complexity, Strategic Analysis, cEDH

I. INTRODUCTION

Strategy games provide a lens into human cognition, decision-making, and problem-solving. Classic games, such as Chess and Go, have long been studied for their complexity, while modern collectible card games like *Magic: The Gathering* introduce probabilistic elements and evolving metagames that demand advanced, adaptive strategies. This paper compares these games across multiple dimensions, including game type, complexity, and skill requirements, to analyze how cognitive challenges differ across traditional and modern competitive platforms.

II. COMPARATIVE ANALYSIS

Table I summarizes the key characteristics of each game.

III. DISCUSSION

Chess and Go are perfect-information games that emphasize deterministic strategy and pattern recognition. While Chess demands tactical calculation and positional awareness, Go focuses on long-term strategic balance and influence. *Magic: The Gathering*, particularly in the Competitive Elder Dragon Highlander (cEDH) format, adds layers of hidden information, probabilistic reasoning, and constantly evolving metas, requiring advanced systems thinking and adaptive strategy.

The complexity of MTG arises not only from the sheer number of possible card combinations but also from the emergent interactions between cards, opponents, and evolving strategies. This dynamic environment makes MTG a unique platform for studying advanced decision-making and strategic cognition.

IV. CONCLUSION

While Chess and Go provide rigorous exercises in abstract strategy, *Magic: The Gathering* offers a multi-dimensional environment combining combinatorial complexity, hidden information, and evolving metas. Project cEDH demonstrates how these challenges can be approached systematically through optimization, probabilistic reasoning, and meta-level analysis. This comparative study highlights the value of modern strategy games in developing advanced cognitive and strategic skills.

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REFERENCES

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TABLE I
COMPARATIVE ANALYSIS OF CHESS, GO, AND MAGIC: THE GATHERING (MTG)

Aspect	Chess	Go	Magic: The Gathering (MTG)
Type	Abstract, perfect-information, two-player board game	Abstract, perfect-information, two-player board game	Collectible card game, multiplayer, imperfect information
Origin	6th century India / Europe evolution	China, 2000 BCE	1993, USA
Complexity	High tactical & positional depth, but finite	Extremely high; simple rules, vast strategy space	Extremely high; combinatorial depth, rules interactions, and emergent strategies
Game State Size	$\sim 10^{47}$ positions	$\sim 10^{170}$ positions	Effectively unbounded due to card combinations & interactions
Information	Perfect	Perfect	Imperfect (hidden cards, draws, opponent strategy)
Decision Type	Deterministic, tactical + strategic planning	Deterministic, long-term strategic planning	Probabilistic, adaptive, multi-layered strategic reasoning
Time to Master	Decades to become grandmaster	Lifelong mastery possible; very high ceiling	Lifelong mastery; constantly evolving meta, high variance
Recognition	Globally established, competitive tournaments	Culturally iconic in East Asia, growing worldwide	Recognized by MIT Technology Review as the world's most complex game; evolving competitive scene
Skills Required	Calculation, pattern recognition, strategy, endgame mastery	Pattern recognition, long-term planning, balance of influence	Systems thinking, probability, optimization, meta-analysis, adaptability, creativity