



# *Chess* and **Intelligence**

*Does chess make us smarter?  
The example of Demis Hassabis*

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## Summary

The relationship between chess and cognitive enhancement has sparked considerable debate, with proponents arguing that the game cultivates strategic thinking and improves various intellectual skills. Chess demands intense focus, critical analysis, and pattern recognition, which many believe contribute to heightened cognitive abilities in players, such as problem-solving, memory, and executive function.<sup>[1][2]</sup> Notably, figures like Demis Hassabis, a chess prodigy and co-founder of DeepMind, exemplify the potential link between chess engagement and cognitive excellence.

Hassabis achieved a FIDE rating of 2300 at the age of 13 and has since leveraged his chess background to pioneer advancements in artificial intelligence, showcasing how skills honed through chess can translate into real-world innovations.<sup>[3][4][5]</sup>

Research indicates that chess can lead to improvements in academic performance and emotional regulation. Studies have shown that students involved in chess programs often outperform their peers in reading and problem-solving skills, while also exhibiting better emotional intelligence and lower anxiety levels.<sup>[6][7]</sup> This has generated interest in integrating chess into educational curricula as a tool for enhancing cognitive and socio-emotional development, further highlighting the game's relevance beyond recreation.<sup>[8][7]</sup>

However, the assertion that chess universally makes individuals "smarter" is not without its critics. Some researchers argue that while chess may enhance specific cognitive skills, it does not necessarily lead to an overall increase in intelligence quotient (IQ) scores.<sup>[2]</sup> Moreover, the benefits of chess may be more closely related to engagement in intellectually stimulating activities rather than unique to the game itself. Critics caution that without a disciplined approach, novice players may develop overconfidence that hinders their decision-making capabilities, questioning the uniform efficacy of chess as a cognitive enhancement tool.<sup>[2][9]</sup>

## Does chess make us smarter? The example of Demis Hassabis

Demis Hassabis's journey from chess prodigy to AI leader illustrates the complex interplay between chess and cognitive development. While his achievements underscore the game's potential to nurture critical thinking and creativity, they also invite further exploration of the nuanced relationship between chess, intelligence, and innovation in the broader context of human and machine learning.[10]

### Background

Chess has long been regarded as a game that cultivates strategic thinking and enhances cognitive abilities. Each move on the chessboard requires players to focus intensely, analyze numerous potential outcomes, and make deliberate choices, which can lead to improved concentration and decision-making skills in real-life situations[1][2]. The cognitive demands of chess are so profound that it is often referred to as the ultimate test of strategic thinking, challenging players to recognize patterns and anticipate their opponents' moves[11].

Demis Hassabis, a notable figure in the chess community and the co-founder of DeepMind, exemplifies the intersection of chess and cognitive excellence. Having achieved a FIDE rating of 2300 at the young age of 13, he is celebrated not only for his contributions to artificial intelligence but also for his exceptional skills in chess[3]. His journey illustrates how deep engagement with chess can foster creative thinking and problem-solving capabilities, which are also crucial in technological advancements and innovations.

The practice of chess promotes mental flexibility by engaging the prefrontal cortex, the area of the brain responsible for higher-order thinking and creativity[8]. This brain region enables players to make connections between disparate ideas, leading to innovative solutions both on and off the chessboard. As players refine their cognitive skills through chess, they may find that the benefits extend into various aspects of their lives, including academic and professional pursuits[11][9].

Moreover, the cultivation of these skills through chess has garnered interest in educational circles, with studies suggesting a link between chess playing and enhanced cognitive abilities, including improved problem-solving and mathematical skills[2].

The structured, yet dynamic nature of chess serves as a compelling model for learning, demonstrating how strategic gameplay can lead to real-world advantages in various contexts, further underscoring the game's relevance beyond mere recreation.

## Chess and Cognitive Development

The intricate nature of chess, with its vast array of possible moves and strategies, complements the complex workings of the human brain. Each decision made during a chess game prompts the brain to activate and connect various neural networks, enhancing cognitive function significantly[12]. Neuroscientific research has identified several key areas of cognitive development that benefit from chess education, including problem-solving, executive function, and memory.

### Key Areas of Cognitive Enhancement

#### Problem-Solving Skills

As players navigate the chessboard, they must continuously evaluate potential moves and anticipate their opponent's responses, which sharpens their ability to solve problems efficiently and creatively[12]. The strategic demands of the game require players to think critically and adapt their strategies, skills that are invaluable in real-life scenarios such as business and project management[2].

#### Executive Function

Chess requires players to maintain focus and engage in logical thinking, improving their capacity for planning, self-regulation, and decision-making[12]. These executive functions are critical for success in various aspects of life, from academic performance to professional endeavors.

## Memory

Familiarity with chess positions and strategies enhances both short- and long-term memory[12]. The game requires players to remember and recall various moves and tactics, thereby providing consistent mental exercise that strengthens neural connections in the brain[13]. This memory training can have positive repercussions beyond the chessboard, contributing to improved cognitive function in everyday activities.

## Tailored Chess Education for Different Age Groups

Chess education can be tailored to meet the unique neurological needs and goals of different age groups. For children, programs should emphasize foundational skills such as attention, memory, and pattern recognition while ensuring that activities are engaging and enjoyable[12]. For adults, the focus can shift towards strategic thinking and applying skills learned through chess to professional and personal challenges.

## Broader Benefits of Chess

While the relationship between chess and IQ remains a topic of debate, the cognitive benefits of the game are undeniable. Chess fosters social interaction, teaches valuable lessons about planning and consequences, and offers a lifelong pursuit that can provide joy and mental stimulation well into old age[2]. Thus, while chess may not be a guaranteed method for boosting IQ, its impact on cognitive development and function is substantial, making it a valuable tool for mental enhancement across all age groups.

## Demis Hassabis

Demis Hassabis (born 27 July 1976) is a British computer scientist, artificial intelligence researcher, entrepreneur, and chess player, widely recognized for his contributions to AI and game design. As a child prodigy, he displayed exceptional skills in chess from the age of four, becoming the second-best player in the world for his age group by the age of twelve[14][15]. His early engagement with chess and strategic thinking laid the groundwork for his later endeavors in technology and science.

Hassabis began his career in the video game industry at Bullfrog Productions, where he contributed to the design of several successful games, including the well-known simulation game Theme Park, which he co-designed and led programming on at just 17 years old[4][16]. This experience in game design not only honed his technical skills but also ignited his passion for artificial intelligence, leading him to explore AI applications in gaming.

After completing his studies at Cambridge University, Hassabis pursued a PhD in cognitive neuroscience at University College London, further integrating his interests in gaming and cognitive science[14][16]. In 2010, he co-founded DeepMind, a pioneering AI company that focuses on machine learning and deep reinforcement learning techniques[4][5]. Under his leadership, DeepMind has achieved groundbreaking advancements, including the development of AlphaFold, an AI program that predicts protein folding, which garnered Hassabis the 2024 Nobel Prize in Chemistry alongside John M. Jumper[5][17]. This work has been described as a "lighthouse project" in terms of its potential to revolutionize biological research and address significant scientific challenges[5][16].

## Does chess make us smarter? The example of Demis Hassabis

In addition to his scientific contributions, Hassabis has been a vocal advocate for ethical AI development, emphasizing the technology's capacity to unlock scientific progress and benefit society as a whole [5][16]. His multifaceted career—spanning from chess to video game design to cutting-edge AI research—demonstrates a unique blend of creativity, strategic thinking, and scientific inquiry, reinforcing the idea that skills developed through chess can contribute to intellectual and professional success in various fields.

## Case Studies

### Cognitive and Academic Benefits of Chess

Research has shown that playing chess can significantly enhance various cognitive abilities and academic performance. A notable study conducted by Dr. Stuart Margulies in 1991 revealed that elementary students who participated in a chess program demonstrated improved reading skills compared to their non-chess-playing peers.

In districts where students typically performed below the national reading average, those involved in chess programs exceeded it, highlighting the game's potential

as an educational tool [6]. Additionally, a quasi-experimental study involving 170 schoolchildren suggested that chess practice enhances intellectual capabilities and

socio-emotional development, as measured by IQ tests and self-reports. This study indicated that students engaging in chess exhibited better problem-solving skills and emotional regulation than their counterparts involved in alternative extracurricular activities [7].



## Emotional Regulation and Social Skills

The effects of chess extend beyond cognitive skills to emotional regulation. A 2016 study published in the journal *Emotion* found that undergraduate students with chess experience demonstrated superior emotional regulation and lower levels of anxiety compared to those without chess experience. This suggests that chess can be a valuable tool in promoting emotional intelligence and well-being among players[8][3].

## Demis Hassabis: A Chess Prodigy Turned AI Pioneer

Demis Hassabis, a notable chess prodigy who achieved a master-level Elo rating of 2300 at just 13 years old, exemplifies the intersection of chess and cognitive development. His early success in chess fostered a deep curiosity about the human brain and intelligence, eventually leading him to co-found Google DeepMind. Hassabis emphasized that while chess is an incredible game for training the mind, his desire to explore broader concepts of intelligence propelled him toward artificial intelligence research[18][10]. Through his work at DeepMind, he has leveraged his

chess background to develop advanced AI systems, further illustrating the profound influence of chess on cognitive processes and problem-solving strategies in both humans and machines[10].

## Criticism and Counterarguments

Despite the enthusiasm surrounding the cognitive benefits of chess, several critics argue against the notion that playing chess inherently makes individuals smarter. One common argument is that the relationship between chess and intelligence is not as straightforward as it appears. Critics point out that while chess may enhance certain cognitive skills, such as problem-solving and strategic thinking, it does not necessarily translate to an increase in overall intelligence quotient (IQ) scores[2].

## Does chess make us smarter? The example of Demis Hassabis

This suggests that any cognitive improvements may be specific to chess rather than indicative of broader intellectual enhancement.

Furthermore, the concept of "hope as a strategy" in chess is often highlighted. Novices may rely on optimism and personal narratives of success, which can lead to overconfidence and suboptimal decision-making[9]. This tendency contrasts sharply with the disciplined, analytical approach employed by experienced players, who often test their strategies against potential competitor responses[9]. Critics argue that without this critical, strategic mindset, the benefits of playing chess may be limited or even counterproductive for beginners.

Additionally, the cognitive benefits attributed to chess may stem from the act of engaging in any intellectually stimulating activity, rather than the game itself. Studies have shown that diverse forms of problem-solving exercises can enhance cognitive functions similarly[2]. Critics assert that attributing these benefits solely to chess may ignore the broader context of cognitive engagement through various activities.

The skepticism extends to claims about the advancements in artificial intelligence, particularly regarding chess. Demis Hassabis, a prominent figure in AI research, emphasizes the unique qualities of human and AI strategies in chess, suggesting that understanding the game does not equate to sentience or conscious thought[15][10]. This distinction raises questions about whether the insights gained from AI chess engines can be fully applied to human cognitive development, as the learning processes between machines and humans differ significantly.

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## Chess and Intelligence

# Synopsis

The relationship between chess and intelligence has been widely studied, as chess is seen as a symbol of intellectual abilities. It is linked to strategic thinking, problem-solving, and creativity. Chess players need a deep understanding of game patterns and tactics, using this knowledge to make informed decisions. Playing chess can improve cognitive skills like reasoning, memory, and attention, contributing to mental agility. These improvements are often appreciated for their impact on other areas of life.

Additionally, chess fosters creativity by encouraging unconventional thinking and exploring multiple possibilities. While chess can enhance specific cognitive abilities, it doesn't necessarily increase overall IQ. Some experts argue that the cognitive benefits from chess may be limited to the game itself, rather than reflecting broader intellectual growth. Understanding this relationship requires examining how chess influences cognitive development.

