

## The Game of Go as Support for Cognitive Skill Development

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Mexico

Research Project of the “Adopt a Talent Program” (PAUTA), Category Social Sciences at the National Autonomous University of Mexico (UNAM)

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**Abstract:** Go is a strategy game of oriental origin that has spread to many countries. With an antiquity of more than 2,500 years, its influence has expanded to Mexico, where it is currently practiced by people of all ages, without distinction of gender. Information on the web and studies indicate that practicing Go can influence the strengthening of cognitive skills of the people who play it. Therefore, the interest in this project is focused on studying the influence of the game Go on the development and strengthening of cognitive skills in people who play it in Mexico City and the metropolitan area, based on the evaluation and comparison of two groups: a group of 22

people who play Go and a group of 22 people who do not. The study was carried out in June 2023. Four cognitive skills were chosen for evaluation: reasoning, creativity, mathematical ability, and emotional intelligence. The evaluations consisted of exercises designated by school levels: primary, secondary, and high school and beyond. The data obtained was compiled into a table to create comparative graphs. The interpretation of the results revealed that the group that played Go obtained higher percentages in the evaluation of cognitive abilities, with mathematical ability showing the most significant improvement.

**Keywords:** Go game (Baduk, Weiqi), cognitive skills, mathematical ability, decision-making, creativity, emotional intelligence

# I. Introduction

Go is a strategy game of oriental origin, practiced worldwide. In China it is called Weiqi, in Japan, they call it Go, and in Korea, it is called Baduk. It is more than 2,500 years old and is considered one of the four traditional arts of ancient China, along with calligraphy, painting, and music. In Mexico it is known by the name Go. In eastern countries, Go is part of the curricular plan in schools (Gürbüz, 2022).

In Mexico, there are schools and places where people teach how to play, practice, and participate in tournaments, mainly in Mexico City. At the National Autonomous University of Mexico (UNAM) Go has been a sports discipline since 2019.

There are scientific studies that indicate that practicing Go can influence the development or strengthening of cognitive skills of people who practice it, such as concentration, reasoning, analysis, problem-solving, creativity, decision-making, numerical ability, and emotional management, among others. It is even mentioned that it could help in the treatment of diseases such as Alzheimer's (Lin, 2015, in Gürbüz, 2022) or in improving the cognitive functions of students with attention deficit and hyperactivity (Kim, 2014).

Cognitive skills are skills that the brain has to function with the information it receives from the environment (Lifeder, 2022). Among the 10 main cognitive skills mentioned by the author are: perception, attention, comprehension, memory, language, orientation, praxis, executive functions, reasoning, and behavior management. Pradas (2020) adds more skills to the list, including motivation, affective prediction, lateral thinking, and planning, among others.

I was interested in this topic because I want to check if these skills are

enriched by practicing Go, because if so, it would be very useful to extend the practice of Go in educational centers and communities to strengthen the development of cognitive skills and, furthermore, as it is a game could be of more interest to practice.

**Research question:** Will people who play Go have greater development in their cognitive skills than people who have never played Go?

**General objective:** Check if practicing the oriental game of Go benefits people in strengthening their cognitive skills.

**Particular objective:** Check if the game of Go helps in strengthening the cognitive skills (mathematical reasoning, decision-making, creativity, and emotional intelligence) of people through a comparison between groups of people who play Go and people who do not play Go. Hypothesis: Playing Go helps strengthen people's cognitive skills, as it is a strategy game that requires putting into practice skills such as reasoning, analysis, decision-making, and creativity, among others.

## II. Research Method and Materials

44 people participated, divided into 2 groups of 22 people each. One group practiced Go and the other group did not practice it. The two groups were evaluated on the skills of mathematical reasoning, decision-making, creativity, and emotional intelligence. The evaluations were assigned according to the participant's education (primary, secondary, high school, and above). The exercises were the same for both groups.

**Materials:** mazes, word search, mathematical calculation exercises, and a “cat” game with a small questionnaire to find out their emotions in the game.

- Exercises for mathematical reasoning: 5 exercises were applied and a score was established to evaluate: correctly answered = 1, poorly answered = 0.
- Decision-making exercise: labyrinth. They were given three minutes to resolve it. 1 point was scored for completing the maze or achieving more than  $\frac{3}{4}$  parts, and 0.5 for achieving less than  $\frac{3}{4}$  parts.
- Exercise for creativity: word search. They were given 3 minutes to find the greatest number of words. Those who managed to find 7 words or more were scored with 1 point, and 0.5 for those who managed to find 6 words or less.
- Exercise for emotional intelligence: They played CAT (5 attempts) and then answered a questionnaire with response options.

### III. Data analysis and results

The results were recorded in two tables: IF you play Go and DO NOT play Go. Graphs were made to have percentages of the general comparisons, and the following was found:

Mathematical reasoning: The group that plays Go managed to solve a greater number of the exercises compared to the group that does not play Go, out of a total of 110 points, the group that does play achieved 82.72%, and the group that does not play 67.27% (see Figure 1).

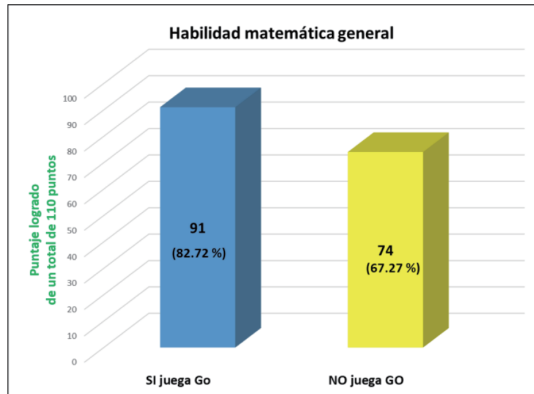


Figure 1. General mathematical ability

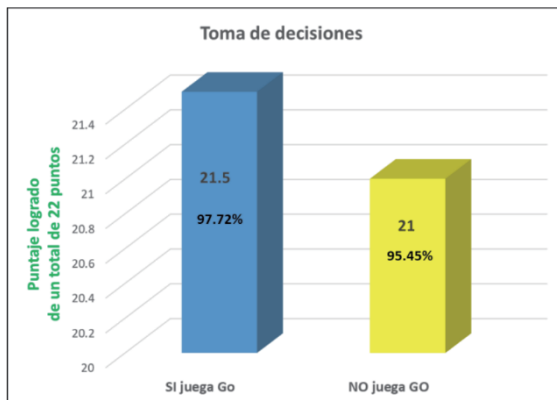
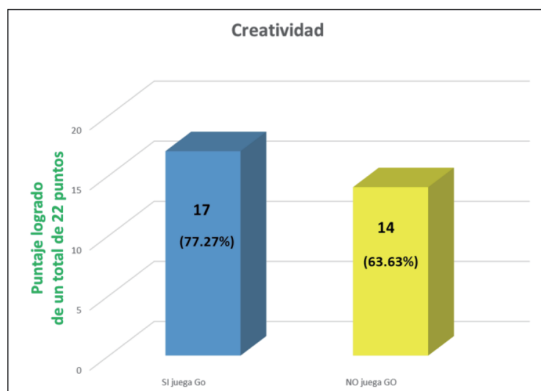


Figure 2. Decision-making

Decision-making (mazes): Of a total of 22 points, the group that plays Go achieved 97.72%, and the group that does not play Go achieved 95.45% (Figure 2).



**Figure 3. Creativity**

Creativity (word search): Of a total of 22 points, the group that does play Go achieved 77.27% and the group that does not play Go 63.63% (Figure 3).

Emotional intelligence: the emotions that were most used to express how they felt when playing cat, winning or losing were the following:

1. The group that plays Go was more descriptive in expressing their emotions by using words such as: excited, satisfied, and calm.
2. The non-Go-playing group was less descriptive: calm.

## IV. Conclusion

The skills were greater in the group that plays Go. In mathematical ability, the difference was 15.45% greater compared to the group that does not play Go. In decision-making, the difference was 2.27% greater in the group that plays Go, and in creativity, the difference was 13.64% greater in the group

that plays Go. In emotional intelligence, a greater variety of emotions were used to express themselves in the group that plays Go. With the results I found, I can conclude that my hypothesis was fulfilled.

The social impact of my project is that with the practice of Go, we can strengthen the development of the skills necessary in school or in daily life and in the management of our emotions; therefore, in our self-esteem and in the relationship with our environment, and you can learn to play at any age, so its benefits are very broad. The best thing is that Go is a game and that makes it more fun.

In the future, I would like to know how the strengthening of cognitive skills happens now with a group of girls and boys who do not practice Go, first, evaluate them as I did with this project, then teach them to play Go and after a few weeks evaluate them again to know if there were changes that help their cognitive abilities.

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## Author Introduction

Michelle Alejandra Wong Sámano is a ten-year-old from Ecatepec, Mexico, currently in the fifth year of primary school. Since 2017, she has been an enthusiastic participant in Siddhartha Avila’s library Go workshop, where her dedication led her to secure first place in the intermediate category at the 2023 Baduk Festival.

As a student in the “Adopt a Talent Program” (PAUTA) at the National Autonomous University of Mexico (UNAM) since 2018, Michelle has conducted five research projects, one of which, “The Game of Go as Support for Cognitive Skill Development,” is being published in this journal. Her research work has earned her a prestigious award, the 2020 ICN Women’s Award. Her Go study spanned one year within the science program, culminating in a presentation at the finalist exhibition, where it was showcased alongside other children’s science projects on August 19, 2023 (see Figure 1).



**Figure 1: Michelle Alejandra Wong Sámano presenting her Go research project at a Science Fair.**

Michelle's diverse talents extend beyond her academic pursuits. Since 2020, she has taken on the role of a children's presenter at the Centro Cultural de España en México, actively participating in children's radio programs where she discusses various topics, including children's rights, pets, Go, interviews, and more. Furthermore, her versatility shines as she provides voice-over work. Since 2021, Michelle has been a trained storyteller for children, and in 2022, she assumed the role of coordinator for a children's reading club. In her leisure time, Michelle enjoys ballet, aerial dance, reading, and drawing. She also values spending quality time with friends, going for walks, and watching TV. While she takes pleasure in playing chess as a casual pastime, her true dedication lies in her pursuit of Go, which represents a serious and deeply studied endeavor in her life.