Journal of Go Studies
Volume 19, No. 2
2025

바둑학연구

2025

국제바둑학회

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인쇄일: 2025년 12월 10일
발행일: 2025년 12월 10일
인 쇄: 인쇄와 디자인 (02-957-7744)
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『바둑학연구』는 국제바둑학회의 기관지로서 연 2회 발행하며, 바둑 분야의 개관논문, 경험논문, 사례분석 연구를 게재한다. 본 학회지는 학회 회원에게 무료로 배부하며, 비회원에게는 일정한 구독료를 받고 배부한다.

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Introduction

<Research Articles>

Introduction

Despite what some theorists wish to say, every book has its beginning, and so does our journal. A substantial number of our issues have been concerned with the relation of thought to *Go* — hence this volume. The field of thought and *Go* is, of course, much too wide in its academic implications for a collection of papers to illuminate much more than a narrow arc. But we can say that our issues have always had unique stories of their own, and this issue is no exception, featuring the remarkable effects of *Go* on cognitive maintenance, the well-known history (most of which lies buried beneath the surface), and two compelling case studies.

Wu Xiuwen's work is inspiring. It synthesizes research published between 2000 and 2024 to investigate the potential cognitive benefits of *Go* for different age demographics. The analysis of thirteen sources, including quantitative intervention research and neuroimaging studies, addresses *Go*'s role in supporting cognitive development in children and cognitive maintenance in older adults. The findings suggest that *Go* training assists children with ADHD by improving attention regulation and executive function while supporting mathematical and strategic reasoning skills. For older adults, the intervention was associated with stable or improved cognitive performance, enhanced quality of life, and biological markers related to neuroplasticity, even among individuals with mild cognitive impairment. The paper concludes that *Go* is an accessible, low-cost intervention with therapeutic potential across the lifespan, although the field is currently limited by small sample sizes and a need for longer-term studies.

The second article, "Pattern Acquisition and Comparative Analysis in the Game of *Go*," examines the strategic shifts within this complex game following the emergence of advanced AI systems post-2015. The researchers updated a statistical methodology for automatic pattern acquisition to quantify changes in professional play style. They compiled and compared the frequency of move patterns across two extensive datasets: roughly 19,600 games played between 2002 and 2011, and over 17,000 recent matches up to 2025. This comparative analysis demonstrated an evolution in strategy, confirming that modern players have adopted tactics—such as the early 3-3 invasion—that challenge centuries of established conventions. Ultimately, the study offers quantitative insights into contemporary *Go* theory, underscoring AI's enduring influence on professional human play.

The third paper presents an academic analysis of the restrictions and subsequent breakthroughs experienced by female Chinese *Go* players in the mid-to-late 20th century, centering its discussion on the life and career of Rui Naiwei. The article first establishes the historical context of *Go*'s development in China before examining how early female professionals faced systemic problems such as gender discrimination and an unequal distribution of competitive opportunities. Rui Naiwei's journey is detailed, highlighting personal injustices, such as the controversial 'Three *Go*rges Incident', which ultimately forced her to leave the Chinese national team and become a wandering *Go* traveler. However, her success abroad, including winning major titles against top male players, proved her skill and magnified the issue of inequality back home. The paper concludes that her departure and achievements spurred significant policy changes within the Chinese *Go* community, leading to fairer selection processes and greater support for the new genera-

tion of female professionals.

The fourth paper outlines a comprehensive strategy developed by Silvia Lozeva for popularizing the strategic board game of *Go* in Australia, focusing primarily on empirical evidence gathered in Western Australia from 2019 to 2025. The core of the strategy is the *Go* Promotional Framework (GPF), an adaptable model built upon four essential pillars: Accessibility, Inclusivity, Engagement, and Integration. The methodology involved active participation and mixed-methods research based on community initiatives, such as the successful *Go* Community Play programs conducted in six Perth libraries aimed at reducing social isolation. Simultaneously, promotion expanded into the business sector through the '*Go* Strategic Play' method, which introduced the game's strategic principles to corporate teams and startups to enhance decision-making skills. The findings demonstrate that by leveraging institutional partnerships, cultural sensitivity, and technological integration, the framework offers a scalable approach for introducing *Go* into diverse social and professional environments.

Guo Zhenghao's paper investigates the successful development of the local *Go* (Weiqi) system in Luoyang, China, presenting a framework designed to overcome the limitations of traditional, elite-focused national sports models. The research proposes a 'Culture-Market-Talent' triangular synergy model that explains how the city achieves long-term viability by connecting its cultural heritage with economic growth. The study details how cultural embedding, rooted in Luoyang's ancient history and industrial legacy, is used to attract new participants and support market-driven operations such as commercialized tournaments and training institutions. This multi-source

funding model allows the ecosystem to shift away from heavy reliance on *go*vernment subsidies toward industrial revenue generated primarily through training fees and sports tourism. Utilizing a mixed-methods approach, the findings demonstrate that this synergistic approach successfully balances mass popularization with elite talent cultivation, offering a replicable solution for integrating sports, culture, and tourism in other local contexts.

In concluding this introduction, I would like to remind you that the upcoming year 2026 marks the 10th anniversary of the *Go*ogle DeepMind Challenge Match, a monumental event in the history of *Go*. While it carries various meanings, the Match is significant in that it represents 'Machine vs. Human' played out on the board. Above all, it remains an open question whether we can truly approach the kind of intelligence exhibited by the biological brain and body through technological advances, whether Deep Learning, Generative AI, or otherwise. In that sense, the ISGS is preparing an academic event to commemorate that day. We promise to keep you informed of its progress through our webpage as the program takes shape, and we hope for the strong support of our members.

Dec. 2025

Bae Incheol, Editor-In-Chief

일반논문

Research Article

바둑학연구, 제19권 제2호, pp. 11-44
Journal of Go Studies
2025. Vol.19, No.2. pp. 11-44

Go for the Mind: A Review of Go's Cognitive Benefits for the Young and Old

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Abstract

This systematic qualitative review synthesizes research on the cognitive benefits of the board game Go, focusing on its role in fostering cognitive development in children and supporting cognitive maintenance in older adults. It addresses two key questions: (1) Which studies have examined the relationship between Go and cognition in children and older adults? (2) What cognitive benefits have these studies reported?

Thirteen peer-reviewed studies (2000–2024) were identified, all of which used Go as the main intervention and reported cognitive outcomes. Studies were coded for participants, methodology, setting, and outcome measures. Participants included children and older adults, with cognitive outcomes ranging from global cognition to attention, executive functioning, and memory. Methodologies in the quantitative studies varied and included randomized controlled trials, pre- and post-tests of cognitive function, neuroimaging (QEEG, PET), and biomarker analyses.

Evidence indicates that Go may foster cognitive growth in children and support cognitive functioning in older adults. Among older adults, including those with mild cognitive impairment or early-stage Alzheimer's, Go was associated with improved or stable cognitive performance, reduced depressive symptoms, and enhanced quality of life. Neuroimaging and biomarkers suggest increased brain activation and improved brain health. For children with ADHD, Go supported improvements in attention regulation, working memory, and executive function. Its visual-spatial and strategic features also support reasoning, problem-solving, and mathematical thinking.

Overall, Go is a low-cost, accessible tool with potential cognitive, educational, and therapeutic benefits across the lifespan. However, research on children and classroom contexts is limited, with small sample sizes and inconsistent reports on effect size. Future studies should expand to young children, explore classroom applications, and continue longitudinal research to fully assess Go's developmental and cognitive potential.

Keywords: Systematic review, cognitive development, cognitive maintenance, children, older adults, ADHD.

I. Introduction

This review serves two purposes. First, it synthesizes research on Go and cognition, with a particular focus on its role supporting cognitive development in children and maintaining cognitive functioning in older adults. Second, it explores the broader implications for Go's educational applications and for future research.

In a culture dominated by video games, board games have experienced a rekindled interest, driven by factors such as digital fatigue, affordability, entertainment value, and their capacity to engage cognitive processes (Bayeck, 2020; Donovan, 2017). At the same time, advancements in neuroscience during the late 1990s and early 2000s led to what is often called the "neuroimaging boom" (Raichle, 2009; Van Horn & Toga, 2014), making it increasingly feasible to study the relationship between Go gameplay and cognition. Although relatively few studies have examined this relationship, recent literature indicates that Go has attracted increasing attention in the field of neuroscience over the past decade.

Focusing on cognition in both youth and older adults addresses critical periods of cognitive growth and vulnerability. Supporting cognitive development in children lays the foundation for lifelong learning, whereas fostering cognitive health in older adults is increasingly important for maintaining independence and quality of life in an aging society.

This review, distinct from previous literature surveys, specifically focuses on Go gameplay and addresses two central questions: 1) Which studies have examined the relationship between Go and cognitive development in children and cognitive maintenance in older adults? 2) What cognitive benefits of Go have these studies identified?

II. Review Methods

Guided by these questions, a systematic and iterative review of relevant literature was conducted, including empirical studies and review articles published from 2000 to the present, a time frame that emerged naturally during the search process. The literature included in this review employed a variety of methods, including neuroimaging techniques such as fMRI experiments and PET scans, quantitative analyses from intervention studies such as randomized controlled trials (RCTs), and qualitative research studies.

1. Literature Search Process

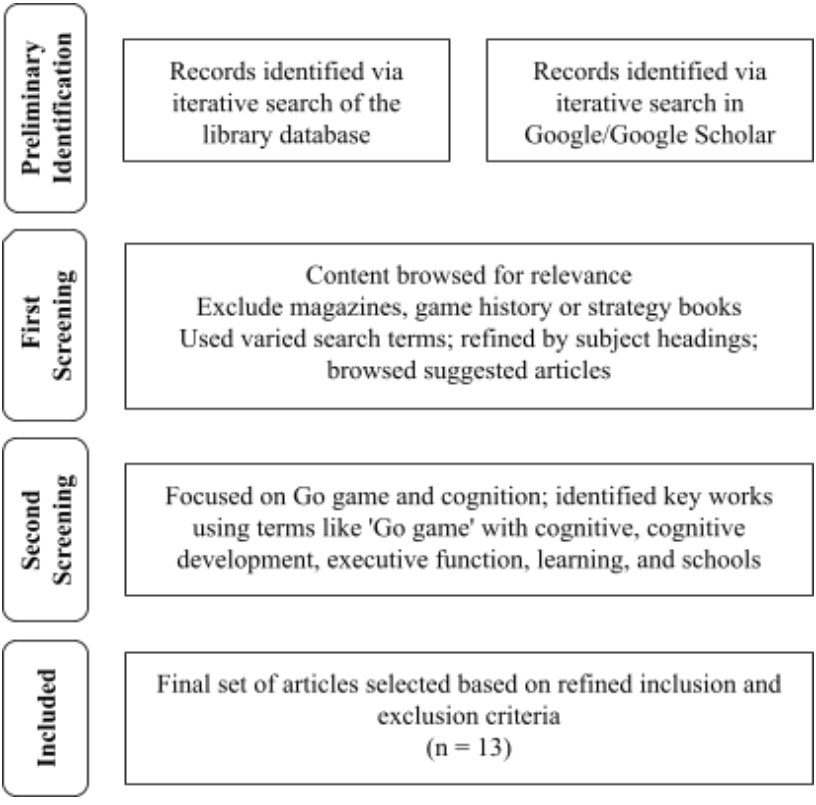
Twelve iterative search rounds were conducted using EBSCOhost, Academic Search Complete, Google Scholar, and Google. Searches employed keywords and phrases such as: *Mind sports and cognition; Board game(s); Go, Weiqi, Baduk, cognitive; Go game AND cognitive development; Go Game, AND learning AND children; Go game AND executive function.*

The initial search using broad terms like “mind sports and cognition” and “board games” yielded roughly 3,800 results, with “board game” alone returning about 2,800, many unrelated to traditional games like Go. Titles and abstracts were reviewed for relevance, a method shown to minimize error and bias (Chander et al., 2013; Atkinson et al., 2014). This process determined which sources proceeded to the next stage. Over 12 iterative rounds, potentially relevant sources were recorded, with abstracts or full texts examined as needed. Search terms were refined after each round using insights from prior results. This approach clarified inclusion and exclusion criteria and ensured a transparent review process (Nightingale, 2009; Page

et al., 2021). Figure 1 shows the study selection flow.

Figure 1

Flow Diagram of the Study Selection Process



2. Inclusion and Exclusion Criteria

Clear inclusion and exclusion criteria are essential for systematic reviews because they define what will be included, help keep the review focused, and reduce selection bias (Booth, 2016; Gough et al., 2017). Initial searches often reveal inconsistent terminology and irrelevant results, which help refine the inclusion and exclusion criteria over time and are particularly important in scoping reviews (Arksey & O'Malley, 2005). Practical considerations, such as including only studies published in English helped keep the review focused and manageable.

Studies were included if they examined Go as the main intervention targeting cognitive outcomes in children and older adults. Excluded were studies involving video or commercial games, "serious board games" designed for teaching or learning (Bayeck, 2020), and those focused on Go expertise development or decline, brain structure differences in professional players, or intelligence constructs.

Selected articles represent research from the United States, Japan, Korea, China, Canada, France, Italy, and Switzerland. Target populations included children, older adults, and novice or amateur Go players who engaged in the game as a leisure activity, aligning with the review's focus on cognitive development and maintenance across the lifespan. Both qualitative and quantitative studies, along with review and neuroimaging research, were included if they reported findings on Go gameplay and its effects on cognitive functions. Studies lacking incomplete results or reported outcomes were excluded.

All studies included in the review were drawn from peer-reviewed academic journals. The principal journals represented are: *Aging Clinical and Experimental Research; American Journal of Alzheimer's Disease &*

Other Dementias; BioPsychoSocial Medicine; Brain and Behavior; Brain Research; Frontiers in Aging Neuroscience; Games for Health Journal; Geriatrics & Gerontology International; International Journal of Geriatrics Psychiatry; Journal of Alzheimer's Disease; Journal of Mathematical Behavior; Psychiatry Investigation.

Table 1 below presents an overview of the included studies, organized by lead author, focus, participants, methodology, primary data and outcome measures, and key findings. The review includes 13 sources: 5 review articles and 8 empirical studies on Go and cognitive function. Of the empirical studies, 3 were qualitative studies involving children, and 5 were quantitative interventions with older adults.

Table 1

Overview of the Included Studies

Articles (Years)	Focus	Participants	Methodology	Primary Data/ Outcome Measures	Key Findings
Noda, S. et al. (2019)	Effects of board games on cognition, education, and related conditions	Elementary students (aged 6+) and adults, including elderly with diverse health conditions	Systematic Review	Cognitive function and skills	Go improved attention, working memory, and ADHD symptoms; chess enhanced math and metacognitive skills in children.
Nakao, M. (2019)	How playing board games may support psychosomatic health	From children to elderly; novices to expert board gamers; with/ without medical or psychological conditions	Systematic Review	fMRI and EEG; Cognitive function measurements (memory, attention, executive function, etc.)	Go studies reported symptom improvement and BDNF increases in Alzheimer's patients and suggest board games as preventive and therapeutic tools for conditions like ADHD and dementia.
Lizuka et al. (2019).	Systematic review of cognitive leisure interventions for older adults	Older adults (aged 60 +) who were healthy or had dementia or mild cognitive impairment, including community-dwelling and institutionalized older adults.	Systematic Review	Global cognition and specific cognitive domain measures (e.g., executive function, memory, attention, verbal function, processing speed, visuospatial cognition)	Cognitive leisure activities that involve new skills, intellectual stimulation, and social interaction can boost cognition in older adults. Learning Go supports cognitive function, even in those with decline.

Chen, P. J. (2022)	Tabletop games' effects on cognition (attention, memory, executive function, verbal fluency) in older adults	Adults (mean age 67+) in long-term care, community, or daycare, with cognitive impairments or intact cognition	Systematic Review	Global cognition and specific cognitive domain measures (e.g., executive function, memory, attention, verbal fluency, etc.)	Tabletop game interventions improved cognition in older adults, including those with mild cognitive impairment or dementia, and enhanced executive function in cognitively intact individuals.
Pozzi, F. E., et al. (2023)	Impact of traditional board games on cognitive decline in the elderly	Elderly (aged 60+) in nursing homes, hospitals, community, or day care with cognitive impairment, and cognitively impaired patients of any age	Systematic Review/Meta-analysis	Global cognition and specific cognitive domain measures (e.g., executive function, memory, attention, verbal fluency, etc.)	Go may boost visual and working memory and strengthen brain activity and connectivity related to cognition.
Lin et al. (2015)	Effect of Go on BDNF levels in Alzheimer's patients	Patients with Alzheimer's disease (AD) in hospital, with no previous experience of Go	Quantitative Intervention Research	Biomarker lab test to quantify serum brain-derived neurotrophic factor (BDNF); Neuropsychological tests	After the Go intervention, participants showed increased serum BDNF, reduced depressive symptoms, and improved quality of life.

Lizuka et al. (2018).	Effects of Go intervention on cognitive function in nursing home residents	Adults (aged 65 +) with cognitive decline in nursing homes	Quantitative Intervention Research	Global cognition and specific cognitive measures (e.g., attention, working memory, and short-term memory)	Go intervention improved attention and working memory, while these declined in controls.
Lizuka et al. (2019)	Impact of Go on cognitive function in older adults, isolating social interaction effects	Adults (aged 65 +) without Go experience, independent in daily living	Quantitative Intervention Research/ RCT	Specific cognitive measures: working memory (visual and verbal); verbal function; executive function	Playing Go may improve visual working memory in older adults, with face-to-face interaction further enhancing cognitive gains.
Lizuka et al. (2020)	Brain activity changes from a Go intervention: relationship between brain activity and acquisition of Go skills	Adults (aged 65 +) without Go experience, independent in daily living, no history of diagnosis of dementia	Quantitative Intervention Research/ RCT	Neuroimaging/ PET scan image; cognitive function tests (visual memory span; digital span; verbal fluency; logical memory; MMSE-J)	Playing Go increased activity in cognitive regions and improved logical memory (LMII) in the intervention group.
Lizuka et al. (2024)	Feasibility and potential benefits of a peer-led Go program	Community-dwelling adults (aged 65+) with cognitive decline	Quasi-experimental design	Pre- and post-cognitive function tests and individual interviews	Go beginners showed no significant cognitive gains but reported emotional and social benefits. Supporters demonstrated improved global cognition.

Kim, et al. (2014)	Effects of Go on cognition, executive function, and prefrontal EEG in children with ADHD	Children aged 7 to 12 years old, with no experience playing Go	Quantitative Intervention Research	Specific cognitive measures (working memory, attention, executive functioning); EEG; ADHD Rating Scale (ARS)	Sixteen weeks of Go training improved attention, executive function, working memory, visuoperceptual skills, cognitive flexibility, and persistence in children with ADHD, supporting its potential as a complementary therapy.
McFeetors, P. J., & Palfy, K. (2018)	Elementary students' reasoning development through abstract strategy games, including Go	Grades 5 and 6 students	Qualitative Research	Field notes; photos of game board configurations during games that showed strategic thinking; recordings of students' oral descriptions of strategies; student interviews; teacher interviews; record sheets; pedagogical processes	Abstract strategy games like Go, with no element of chance, require students to plan reasoned moves and strategies. Their authenticity encourages collaborative play that develops mathematical reasoning through representing, conjecturing, convincing, and justifying.

Yu, Y. (2021)	Examine how a Go-based curriculum fosters spatial and mathematical thinking in young children by mapping numbers to space and using spatial visualization to teach numerical and arithmetic concepts.	Students in grades 2 and 3, aged 7 to 9 years old	Qualitative Research	Pre- and post-assessment of students' spatial thinking and pattern recognition; Mental Rotation Task; Corsi Blocks; spatial working memory test; Observations; Videos of teaching and Go game play; Student interview	Children in Grades 2–3 engaged in conjecturing, justifying, and generalizing through Go's spatial reasoning activities. Although Go did not affect mental rotation, its dynamic patterns and board-based number representations supported flexible thinking, deepened understanding of number, operations, and early algebra, and promoted problem-solving and multiplicative strategies through score-counting.

III. Findings

This section synthesizes the impact of Go on cognitive functions in youth and older adults across 13 selected sources. It first summarizes five review articles on various board games, including Go, and then focuses on the eight individual empirical studies that specifically examine Go as an intervention and its cognitive effects.

1. Findings from Review Articles

The review articles are organized from broad to specific. The first two examine a wide age range, from elementary-aged children to older adults, and explore the cognitive effects of various board games, including Go. The remaining three reviews are grouped together, as they focus specifically on older adults and the potential of Go and other traditional board games to support cognitive functioning in the context of cognitive decline or dementia.

Nakao's systematic review focuses on the roles of board games in health education and training for health-related issues, basic brain mechanisms, and healthy aging—including prevention of cognitive decline and dementia, enhancement of cognitive functioning, reduction of depression, and alleviation of symptoms in individuals with ADHD and Alzheimer's disease. Of particular interest to this paper is their review of studies on traditional board games, a category that includes Go. The review included seven studies on Go from Korea, the UK, China, Japan, and Mexico. Five studies focused on Go experts, the relationship between Go and AI, or reflex epilepsy, all of which are beyond the scope of this review, while only two examined Go's impact on cognitive functioning.

Lin et al. (2015) investigated the effects of Go gameplay on 147 patients

with Alzheimer's disease (AD), who were randomly assigned to one-hour or two-hour daily intervention groups or a control group. Serum levels of brain-derived neurotrophic factor (BDNF), a protein essential for neuron growth and survival and linked to conditions such as depression and AD, were measured before and after six months. Both Go groups showed significantly higher BDNF levels and reduced AD symptom severity compared to controls, suggesting that regular Go play may support cognitive and emotional functioning in individuals with AD.

Nakao also included a study on ADHD by Kim et al. (2014), which found significant reductions in ADHD symptom severity among children. The study reported notable improvement in executive function, working memory, visuoperceptual abilities, cognitive flexibility, and persistence over 16 weeks compared to the control group. Greater positive changes were seen in the right prefrontal theta/beta ratio—a key marker of inattention and executive difficulties in ADHD—suggesting that the training specifically improved attention-related brain activity.

Concurrent with Nakao (2019), Noda et al. published a review examining effects of board games and related programs on educational knowledge, cognitive functions, and conditions such as ADHD, Alzheimer's disease, anxiety, and physical activity. Most of their included studies focused on health, safety, or lifestyle topics, which are outside the scope of this review. For cognitive functions, they analyzed 11 studies on games including the Thai game "Ska" and the strategy games chess and Go, with chess being the most commonly studied.

Four studies in Noda et al.'s review examined cognitive functions related to Go: one compared chess and Go (Sala & Gobet, 2016), and three focused solely on Go (Kim et al., 2014; Lin et al., 2015; Iizuka et al., 2018). Since

Lin et al. (2015) and Kim et al. (2014) were also included in Nakao's review and have already been highlighted, they are not repeated here. The two remaining Go studies from Noda et al.'s review are discussed below.

In their study, Sala and Gobet conducted two experiments, one of which involved three fourth-grade classes comprising 52 students. In this experiment, the students were randomly assigned to one of three groups: a chess intervention group, an active control group receiving Go lessons, or a passive control group that continued with regular classroom instruction. Both the chess and Go groups received 15 hours of lessons that replaced regular math and science instruction. The experiment sought to compare the effects of chess and Go lessons with standard teaching, but no significant differences were found in students' post-intervention mathematical problem-solving, measured with a six-item test, or in metacognition, assessed through a 15-item questionnaire evaluating students' perceived behaviors during math problem-solving activities.

Lizuka et al. (2018) conducted a randomized trial with older adults, providing the intervention group 15 weekly one-hour Go sessions that included instruction, problem-solving, and gameplay, while the control group received usual care. The intervention group showed significant improvements in attention and working memory, whereas the control group declined.

The remaining three review articles focus on the role of games, including Go, in supporting cognitive functions and preventing cognitive decline among older adults. Lizuka et al. (2019) reviewed 20 studies on leisure activities aimed at enhancing or maintaining cognition in healthy older adults and those with dementia or mild cognitive impairment. Only three studies involved board games: two on mahjong and one on Go, and all reported positive effects on cognitive function. The Go study found improvements in

attention and working memory, suggesting that learning new Go skills can enhance cognition even among individuals experiencing decline. Effective game interventions shared three features: they provided greater intellectual stimulation than daily routines, required learning new skills, and incorporated social interaction, leading to broad cognitive gains such as improved working memory.

Pozzi et al. (2023) and Chen et al. (2022) both examined the cognitive benefits of traditional and tabletop games such as chess and Go for older adults. Pozzi et al. defined these as skill-based games engaging multiple cognitive domains and, through a meta-analysis of 15 studies (including four on Go), found that such games may help prevent dementia and slow cognitive decline, with improvements often seen within three to four months. Different games targeted specific domains—Go and ska enhanced attention, while mahjong improved executive function—with Go's limited impact on executive function possibly due to brief or low-intensity interventions. Similarly, Chen et al. found that tabletop games involving rules, strategy, and planning enhanced global cognition and specific domains such as attention, memory, executive function, and verbal fluency, while also fostering social interaction. Notably, Go interventions improved cognition even among older adults with mild cognitive impairment or dementia, suggesting structured gameplay remains accessible and beneficial despite cognitive decline.

Overall, the five reviews suggest that board games, particularly Go, support cognitive function in both children, including those with ADHD, and older adults, regardless of cognitive status. Two reviews examined broad age ranges and multiple games, while three focused on older adults with cognitive decline. Across studies, Go was associated with improvements in attention, working memory, and global cognition, with one review also

reporting reduced ADHD symptoms and brainwave changes linked to executive function in children. Older adults with mild cognitive impairment or dementia were able to learn and benefit from Go, showing cognitive gains. Its combination of simple rules and strategic depth makes it engaging for beginners and supports sustained interventions, highlighting its potential as a cognitively stimulating activity for both development and maintenance.

2. Findings from Individual Empirical Studies

This section summarizes eight studies on Go and cognition, grouped by older adults (Table 2) and children (Table 3). Five older adult studies were quantitative (Lin et al., 2015; Iizuka et al., 2018, 2019, 2020), comparing Go to active controls and assessing global cognition or specific cognitive domains. Three studies on children included two qualitative (McFeetors & Palfy, 2018; Yu, 2021) and one quantitative (Kim et al., 2014).

Studies of older adults (65+) involved participants with no prior Go experience, with interventions lasting 12 to 24 weeks or six months, and sessions of one to two hours delivered in-person or remotely. Findings suggest Go was associated with slowed Alzheimer's progression and symptom reduction. Participants experienced improved working memory, attention, logical memory, and visuospatial skills. fMRI showed increased activity in regions for semantic memory, cognitive control, and reinforcement learning.

Studies focused on Go's benefits on children examined Go's effects on cognitive and mathematical development in children grades 2–6. Programs ranged from 8 weeks to a year, with 1-2 hour sessions. Kim et al. (2014) found that 16 weeks of Go reduced ADHD symptoms and improved attention, executive function, verbal working memory, and visuoperceptual

skills. McFeetors and Palfy (2018) found Go games helped children engage in strategic reasoning and core mathematical practices, including representing, analyzing, conjecturing, and justifying. Yu (2021) highlighted spatial thinking in Go, showing how children externalized reasoning and used spatial strategies—such as grouping, arranging, and combining stone patterns—to support multiplication, flexible problem-solving, and numerical fluency through mental and physical manipulation of visual forms.

Table 2

Individual Studies on Go and Cognition in Older Adults

Articles (Years)	Methodology	Participants	Intervention	Cognitive/Related Measures	Go Effects on Cognition
Lin et al. (2015)	Quantitative Intervention Research/RCT	Patients with Alzheimer's disease (AD) in hospital, with no previous experience of Go (n=147)	147 AD patients with no prior Go experience were enrolled in a 6-month randomized controlled trial across three groups: control (n=49), short-time Go intervention (1 hour daily, n=49), and long-time Go intervention (2 hours daily, n=49). Go groups learned the rules online and received coaching from a player. Participants played in randomly paired matches or, if no partner was available, played against staff or observed games.	Serum BDNF, neuropsychological tests	A six-month Go game intervention significantly reduced depressive symptoms and improved quality of life in patients with Alzheimer's Disease (AD). Participants also showed increased serum BDNF levels—a protein essential for learning and memory—indicating a potential biological mechanism underlying the observed benefits. These findings support Go as a promising, feasible, and non-pharmacological approach to slowing AD progression, alleviating depressive symptoms, and enhancing life quality of AD patients.

Lizuka et al. (2018).	Quantitative Intervention Research	Adults (aged 65 +) with cognitive decline in nursing homes	Participants were randomly assigned to a Go intervention (n=9) or control group (n=8). The 15-week intervention involved weekly 1-hour sessions at nursing homes, led by Go instructors. Each session included a rules lecture, exercises, and gameplay, with content adjusted to cognitive ability. Participants learned basic rules, with some progressing to advanced techniques.	Global cognition (MMSE & MoCA-J) and specific cognitive measures (e.g., attention, working memory, and short-term memory); digit span forward and backward tasks	The Go intervention significantly improved the total digit span score (a measure of attention and working memory) and maintained the digit span backward score in nursing home residents with mild to moderate dementia, while these scores declined in the control group. Notably, all participants, including those with moderate dementia, were able to learn the rules of Go, and those with milder cognitive impairment could play successfully.

Lizuka et al. (2019)	Quantitative Intervention Research/RCT	Healthy adults aged ≥ 65 years with no previous experience playing Go (community dwellers)	Participants were randomly assigned to one of three groups: a face-to-face Go group (FG, n=25), a non-face-to-face Go group (NFG, n=25), or an active control group (CG, n=22). FG participants attended twelve weekly in-person Go classes with instruction, gameplay and social interaction. NFG participants followed the same curriculum individually via tablet, without live interaction. CG participants attended monthly health lectures unrelated to Go.	Specific cognitive measures: working memory tests: VMST DSTVerbal function: logical memory (LM); Verbal fluency tests (logical memory and verbal fluency) Executive function: Trail Making Test (TMT)	Playing Go may enhance visual working memory in community-dwelling older adults, independent of social interaction. However, greater cognitive gains in the face-to-face group suggest that social interaction amplifies the benefits of gameplay.

Lizuka et al. (2020)	Neuroimaging/ RCT	Adults (aged 65 +) without Go experience, independent in daily living, no history of diagnosis of dementia	Participants were randomly assigned to an intervention group (IG; n=16) receiving 12 weekly 60-minute Go lessons, or a control group (CG; n=8) attending three monthly 120-minute health lectures.	PET scan image; cognitive function tests (visual memory span; digital span; verbal fluency; logical memory; MMSE-J)	Playing Go was linked to enhanced brain activity in regions related to cognitive functions, including the left middle temporal gyrus (semantic memory and cognitive control) and the bilateral putamen (reinforcement learning). Increased activation in the left frontal lobe was observed only in the intervention group, which also showed significant gains in logical memory performance (LMII).
Lizuka, et al. (2024)	Quantitative Intervention Study	Community-dwelling adults (aged 65+) with cognitive decline	Twelve weekly 60-min Go classes with lecture, exercises, and gameplay; beginners (n=10) paired with supporters (n=10) for in-class and weekly phone guidance; daily 10-min homework.	Pre- and post-cognitive function tests: Mini Mental State Examination-Japanese (MMSE-J) and Montreal Cognitive Assessment-J (MoCA-J); individual interviews	Go beginners showed no significant cognitive changes. Supporters demonstrated significant global cognition improvement, with MMSE-J scores improving post-intervention ($p < .05$).

Table 3

Individual Studies on Go and Cognition in Children

Articles (Years)	Methodology	Participants	Intervention	Cognitive/Related Measures	Go Effects on Cognition
Kim, et al. (2014)	Quantitative Intervention Research	Children aged 7 to 12 years old, with no experience playing Go (n=34)	Seventeen children with ADHD and 17 control participants without ADHD took part in a 16-week Go training program, playing 2 hours/day, 5 days/week, with a Go instructor.	Memory, and executive functioning: Digit Span, CCTT, QEEG, ADHD Rating Scale; ADHD Rating Scale (ARS); Electroencephalography (QEEG) brain mapping	Over 16 weeks of Go training, children with ADHD in the intervention group showed reductions in ARS total and inattentive subscores, along with greater decreases in theta/alpha and theta/beta ratios—EEG markers linked to inattention and cognitive under-arousal. They also demonstrated improvements in executive function and attention. Digit Span Forward scores suggested enhanced verbal working memory, while Children's Color Trails Test (CCTT) results indicated gains in visuoperceptual skills, cognitive flexibility, and persistence. These findings support Go as a potential complementary intervention for improving core cognitive and attentional functions in children with ADHD.

McFeetors, P. J., & Palfy, K. (2018)	Qualitative Research/ Action research	Grades 5 and 6 students (n=45)	Three multi-age grade 5–6 classes participated in a year-long weekly program integrating strategy games to support mathematical reasoning. In Cycle 1, students played Gobblet Gobblers and Othello in pairs to develop and describe basic strategies. In Cycle 2, Go and Tic Stac Toe were introduced; students either advanced in their initial game or explored new ones, focusing on strategy refinement and justification. In Cycle 3, students refined and defended their chosen game strategies. Sessions ran 1 hr/week, led by a researcher with support from classroom teachers.	Field notes, board photos, student and teacher interviews, strategy recordings, record sheets, pedagogical processes	Abstract strategy games like Go, absent from elements of chance, prompt students to construct purposeful, reasoned strategies, fostering an appreciation for logical thinking. Their interactive and authentic nature promotes collaborative play, where mathematical reasoning unfolds through representing, conjecturing, justifying, and convincing. With teacher scaffolding, students advanced from simpler games to Go, demonstrating increasingly sophisticated reasoning and sustained engagement.

Yu, Y. (2021)	Qualitative Research	Students in grades 2–3 (Total N = 56) across three sites: Site A–an 8-week, 2-hour enrichment program (n = 5); Site B–a 10-week in-school Go class held once weekly across two combined classrooms (n = 44); and Site C–a 12-week, 1-hour weekend Go and math course (n = 7).	Examination of a Go and math curriculum specifically designed to teach young children how to play Go while simultaneously fostering their math skills, and of how the spatial features of Go and the spatial forms/shapes in instruction provided structures and support for children's development of arithmetic understanding and mathematical reasoning practices	Pre- and post-tests of spatial thinking (2D Mental Rotation Task [MRT] and Corsi Block); classroom observations, instructional photos/videos, student exit interviews, math problem-solving worksheets (pattern recognition)	Go fosters children's mathematical reasoning by promoting pattern recognition, generalization, and justification. The spatial numerical forms integrated into the Go curriculum—visual patterns that organize numbers for counting—support students' understanding of multiplication and problem solving. With teacher guidance, students progressed from finger counting to grouping by tens, then to skip counting with arrays, and ultimately to using the board grid for multiplication, demonstrating how spatial engagement deepens mathematical understanding.

IV. Discussion

1. Biological and Neurocognitive Evidence of Go's Effect

The findings of this review are supported by converging neuroscientific and physiological evidence. Studies using biological outcome measures demonstrate increased serum levels of BDNF following Go interventions, a finding typically associated with enhanced neuroplasticity and reduced cognitive decline. Furthermore, EEG studies showed that children with ADHD exhibited decreased right-hemisphere theta/beta ratios following Go intervention, indicating improved attention and cognitive control. Supporting evidence from neuroimaging includes PET studies, which revealed that older adults aged 65 and above exhibited increased FDG uptake observed in the left middle temporal gyrus (MTG), the bilateral putamen, and the left frontal lobe. These regions are associated with higher cognitive functions such as semantic memory and lexical retrieval, suggesting that Go may serve as a cognitively enriching activity that supports language processing and memory in later life.

2. Cognitive Benefits for Development and Maintenance Across Lifespan

Overall, these findings support the view that Go can improve symptoms in children with neurodevelopmental conditions such as ADHD and enhance cognitive health in older adults, including those with typical aging and those with dementia or age-related decline. This review highlights Go's potential to support cognitive and learning development in children and cognitive maintenance in older adults. Synthesis of the included literature suggests

that Go enhances reasoning, problem-solving, attention, memory, and executive function in children, while boosting cognitive reserve, slowing decline, and improving quality of life in older adults. Crucially, both populations show gains in the same global cognition and specific domains, including reasoning, visuospatial thinking, executive function, attention, and memory, suggesting that Go engages fundamental neural systems across the entire lifespan.

3. Implications for Future Research on Go

While the findings of this review consistently point toward Go's cognitive benefits across the lifespan, a critical analysis reveals several key limitations that constrain the generalizability and interpretation of these findings.

First, only 13 articles met the inclusion criteria, including five review papers and eight individual empirical studies. The relatively small number of studies overall constrains the generalizability of findings. Among the empirical studies, sample sizes were typically small, which affects statistical power and reliability. For example, quantitative Go intervention studies typically involved fewer than 30 participants.

Another key limitation is the inconsistent reporting of effect sizes. Only five of the thirteen reviewed articles—including three reviews and two empirical studies—reported effect sizes, indicating that this crucial information remains underemphasized in the field. Without consistent reporting, it is difficult to compare the magnitude of Go's impact across studies.

Many studies were short-term (under four months) or pilot in nature, with limited or no follow-up, limiting conclusions about the sustainability of Go's cognitive effects and optimal intervention formats. Future research is

recommended to use longer interventions with larger, more diverse samples and report standardized effect sizes for meaningful comparisons. Additional classroom-based qualitative studies are also needed to explore how Go can provide an authentic, game-based context for developing students' mathematical reasoning, numerical skills, and a positive mindset.

V. Conclusions

The synthesis of existing studies indicates that Go, combining accessibility with sustained intellectual challenge through its rich strategic depth, can promote cognitive functioning and reasoning. It is well-suited for use in schools, community programs, and therapeutic settings across age groups.

The promising evidence and untapped potential of Go invite researchers, educators, and Go players to collaborate in exploring and expanding its role as a versatile resource for both cognitive development and educational innovation. Interdisciplinary collaboration provides a valuable opportunity to explore how this long-standing traditional board game can enhance thinking, problem-solving, and lifelong learning in diverse educational and therapeutic contexts.

The review suggests that introducing Go in early grades through classroom or after-school programs holds promise, particularly when it helps teachers and diverse learners realize its cognitive benefits, including improved executive function, working memory, attention, and reasoning. School-based integration can support early interventions to strengthen academic skills, especially in mathematics, and encourage the adoption of strategic learning habits. Collaborations among researchers, educators, and the Go community are essential for developing sustainable Go research and

instructional initiatives that address learning challenges and foster reasoning. Framing Go as an educational and cognitive tool rather than a competitive focus makes it more suitable and engaging for all learners and supports thinking skills and lifelong learning.

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Received：1, Nov,2025

Accepted：20, Nov,2025

바둑학연구, 제19권 제2호, pp. 45-58
Journal of Go Studies
2025. Vol.19, No.2. pp. 45-58

Pattern Acquisition and Comparative Analysis in the Game of Go

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Abstract

The game of Go represents a major challenge for artificial as well as human intelligences due to its profound complexity.

Although computer programs capable of playing Go have existed for decades, the period from 2015 to 2025 has marked a turning point, with these systems achieving—and even exceeding—professional human performance. A notable shift in gameplay strategy emerged around 2016, driven by the adoption of unconventional yet effective moves demonstrated by AI programs, challenging previous conventions of preferred moves.

Nowadays, the process of learning Go has evolved from traditional knowledge transfer, based on centuries of established conventions regarding strat-

egy, positional judgement and move value to modern trends developed by AI playing style, lacking the explanatory heuristics inherent in both human style of playing and oral tradition.

Facing this new challenge, we rely on our curiosity to understand our opponents' moves beyond technological and language barriers as we continue to explore the mysterious depths of this timeless game.

Keywords: Statistical analysis, Pattern recognition, AI interpretability, Modern theory, Style evolution, Professional Games, Computational Go.

I. Introduction

For our investigation of this perceived evolution in the style of play, we first compiled a selection of academic literature published in the latest 50 years, regarding analysis of Go from a mathematical standpoint. Among other approaches, the work of Liu and Dou (2007) titled "Automatic Pattern Acquisition from Game Records in Go"[1] presented a simple and effective methodology that persisted in guiding our inquiries. Their study of frequency in patterns sampled the placement of each stone on the board statistically across 9,500 professional games from the early 2000s.

We focused our research in reiterating this simple but effective methodology with existing records of both current and previous professional games, expecting to find changes in the frequency of moves played then as opposed to now.

The scope of this work is as follows:

- First we present an updated algorithm for automatic pattern acquisition, building on the algorithm introduced in [1].
- Then we analyze high-frequency patterns from over 17,000 recent professional games, as well as 19,000 from a period before AlphaGo (2002-2011) in order to identify the evolution of most frequent patterns in professional play.
- Finally we provide a comparative analysis of the most popular patterns then and now, offering quantitative insights into the evolution of Go strategies.

II. Related Work

1. Literature

The acquisition and analysis of patterns in Go have been extensively studied, with early efforts focusing on manual compilation of patterns and language-based approaches denoting specific moves in relationship to their resulting shapes, such as: knight's jump (*keima*), hug (*hane*), kick (*tsuke*), corner enclosure (*shimari*), forcing move (*kikashi*), solid connection (*nobi*), one space jump (*ikken-tobi*), etc.

Studies published as early as 1990 have paved the way to explore the role of patterns in Monte Carlo tree search and move generation, [2] and the use of terminology to identify the essential components of whole board positions such as liberties, captures, ko situations, life and death of groups, etc. [3],[4]

A statistical method for automatic pattern acquisition was introduced in 2007 [1] defining patterns as spatial relationships within a fixed 5x5 grid. This approach demonstrated the feasibility of extracting repeatable patterns from game records and highlighted the importance of statistical usage in determining pattern urgency.

Recent advances in AI, particularly deep reinforcement learning, have shifted the focus toward end-to-end learning systems such as AlphaGo. Nevertheless, pattern-based approaches remain relevant for understanding human play and improving interpretability in AI systems.

Recent work involves combinatorial game theory applied to complex endgame positions [5], as well as measurements of the degree of complexity of several variants and rulesets relevant to the game of Go. [6] Despite these advancements, there is a lack of comparative studies analyzing the evolution

of Go patterns over time.

Our research bridges that gap by revisiting the methodology of [1] and applying it to a modern dataset of professional games.

2. New Analysis

Evaluating patterns by extracting 5x5 grids, as per selected literature [1] results in what could be compared to “atomic” components of the whole board strategy inherent in the game of go. While this criteria yields interesting results, we decided to leverage today’s availability of computing power to expand the area of possible patterns.

This enlargement allowed us to obtain a whole board perspective and detect the appearance of well-known joseki sequences, akin to “molecules” in a figurative sense. In order to achieve this, results obtained in [1] had to be replaced by our new analysis, in order to be consistent enough for a comparative analysis.

III. Methodology

1. Pattern Definition

A Go pattern is defined as a spatial configuration of stones where the most recent move is displayed in the center of a 19x19 grid. [1] Our primary objective was to construct a database of such patterns, extracted from every move in the sampled game records, and quantify their frequencies. To ensure accuracy, we also implemented a canonical representation function that groups

equivalent patterns across the board and accounting for rotations, reflections, and color inversions of each pattern to produce a statistically coherent count, allowing for mirror images of the same pattern to be represented as variations of the same move, regardless of the color of the stones, orientation relative to the board's symmetries.

Note: This canonical representation implies that the color of the stones playing a certain move is arbitrary, as it groups together equivalent moves without differentiating the sequential turns that are customary in Go (i.e. black is followed by white)

Additionally, a function that differentiates the outermost (first) three lines of the board was necessary. This function becomes increasingly important as the most frequent moves are normally located in the corners of the board, and even more so with modern opening strategies, according to our findings.

2. Datasets

We compiled two datasets:

A) ~19,600 games played between 2002 and 2011

~17,300 pro games played between 2016 and 2025.

The records were downloaded using a simple python script and sourced from http://gokifu.com

After the datasets were examined for games containing illegal moves or corrupt data, dataset A consisted of 19,584 records, while dataset B totaled 17,173 records suitable for analysis.

3. Pattern Acquisition Algorithm

The script employs a python library called *sgfmill* that is able to parse SGF records and extract data one move at a time. Other libraries are necessary such as os, *pathlib* for accessing files and folders, as well as *collections* for efficiently cataloguing moves canonically. the core algorithm is based on the pseudocode presented in[1], and implemented using Python 3.

The algorithm processes each move in each game record using nested *for* loops as follows:

1. For each game record:

1.1 For each move:

1.1.1 Extract the 19x19 grid centered on the move.

1.1.2 Convert the grid into its canonical form.

1.1.3 Update count of pattern in the database1.1.4 Update count of game files containing the pattern

2. Sort database in descending order 3. Print top entries with overall frequency and # of game records

This algorithm has a complexity linear to the number of moves, making it highly efficient for large datasets)[1]

4. Statistical Analysis

We analyzed the frequency distribution of patterns across the dataset, identifying the 19 most frequent 19x19 patterns for cross-temporal analysis. This allowed us to visualize stylistic shifts in professional play statistics over the course of 18 years of professional Go matches.

In order to compute the data effectively, we designed a simple notation using the following symbols:

- ☻ (black smiley face): Player in turn.

☺ (white smiley face): Opponent.

+ (plus sign): Empty intersection.

/ (slash sign): Edge intersection (first line of the board).

. (dot) : Space outside the board.

These symbols allow for consistent pattern matching while performing transformations on matrices, while keeping track of plays near the edge of the board as different from patterns located in the central area, identifying plays in the 4,4 corner star point (*hoshi*) and its adjacent 3,4 intersection (*komoku*) separately.

IV. Findings

1. Change in Frequency of Patterns in Professional Games

Our analysis reveals patterns found in the professional dataset, with the new top 19 highfrequency patterns compared to pre-AI style of play (see Table 1).

We observe a significant rise in the early san-san invasion to a corner star point, a trademark aspect of AI style. Modern *joseki* sequences therefore appear considerably more often, displacing approaches to opponents' single stones in the corners of the board

2. Evolution of Go Strategies

Our results indicate that certain patterns have remained consistently popular, while others have declined in usage. For instance, the 3-3 invasion has

become more frequent, signaling a preference for corner territory as opposed to developing the edges early in the game. However, corner enclosures appear to occur less frequently, with a two-space jump from the 3-4 point becoming more urgent than the classical knight's jump.

These trends effectively represent the evolving strategies in professional Go and the influence of AI on human play.

V. Discussion

By comparing a pattern's prevalence to that of its local follow-ups, we infer the relative frequency of moves outside the local area—a phenomenon consistent with *tennuki* (prioritizing a distant move over local continuation). For instance, when a pattern's frequency surpasses that of its immediate continuation, it implies players often prioritize global strategy over local battles.

Periodic replication of this study could deepen our understanding of professional play, challenge time-honored proverbs, and modernize pedagogical frameworks for learning and improving at Go.

For experienced players, these findings provide actionable insights into contemporary strategies, while beginners and intermediates gain a structured approach to studying professional games. Ultimately, this research bridges tradition and innovation, fostering a dynamic, datadriven culture within the Go community.

VI. Conclusion

This article presents a modern approach to automatic pattern acquisition in the game of Go. By analyzing large datasets of recent professional games, we identify key trends and shifts in pattern usage, offering new insights into the evolution of Go strategies.

Our results underscore the importance of pattern-based approaches in both human and AI play, and provide a framework for future research in game AI and pattern recognition.

VII. Acknowledgements

This work is dedicated to the memory of Professor José “Pepe Chac” Chacón, for his exemplary fighting spirit and invaluable contributions to Mexico’s Go community.

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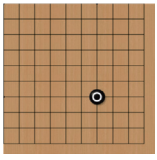
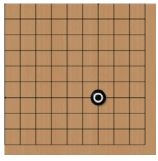
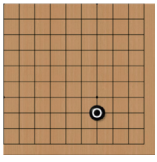
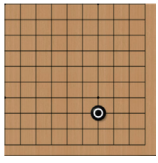
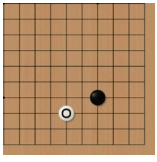
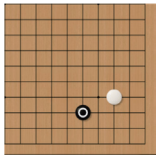
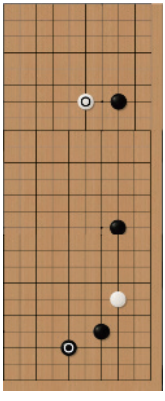
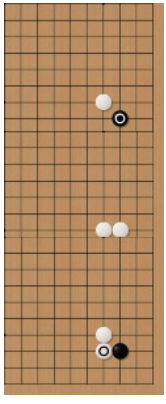
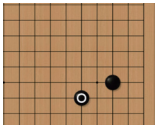
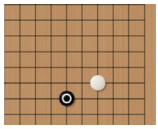
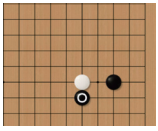
Table I.

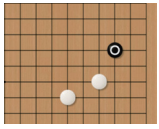
2007 (a)	2025 (b)	
		1. the 4-4 star point remains most frequent
		2. komoku (3-4) also remains as second most frequent pattern
		3. A low approach to a 3-4 point is nowadays more urgent than both a low approach to 4-4, (pattern 3a) and a high approach to a 3-4 (pattern 4a)
		4. A san-san invasion is more urgent than a high approach to an opponent's komoku 5. this standard sequence after a san-san invasion leaves the invader in gote, suggesting the invaded stone may reply with *tennuki* before extending 6. Once white extends, it its less likely that black will *tennuki*, considering the result of pattern 5b



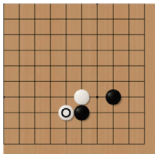


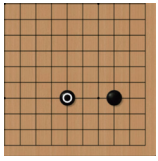
7A. low approach to the 4-4 is now less frequent than a san-san invasion, see pattern 5a



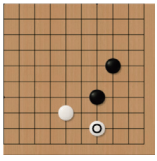


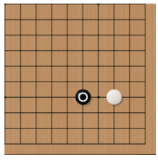
8. This approach resembles the joseki pattern in 6a but is actually a low approach to the opponent's enclosure from the 4-4 point. The fact that this encolsure pattern does not appear without the approach, suggests this move follows most of the time



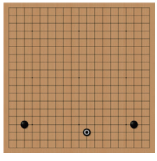


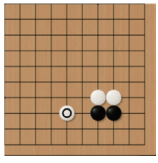
9. A *joseki* continuation to pattern 5b not as frequent 10Two space jump from komoku appears as the most urgent form of enclosing a corner



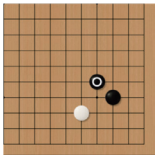


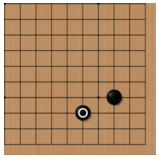
11. a high approach to komoku descends from 4th to 11th most frequent pattern



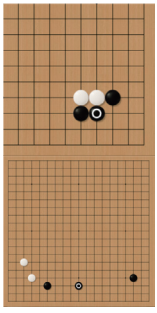


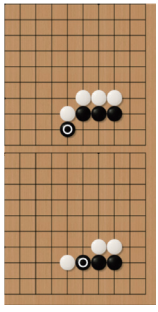
12. Another continuation from pattern 5b precedes its subsequent *joseki* moves in patterns 14b, 15b and 17b



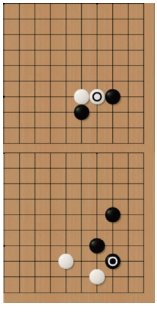


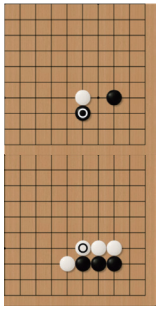
13. This move is now less frequent, see pattern 7a





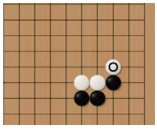
14. This joseki pattern naturally appears after a san -san invasion. but an extension from white's stone in the third line is not always the immediate follow-up, suggesting white's *tennuki* 15Though less frequent, this sequence from san-san invasion *joseki* also suggests white's *tennuki*, instead of following up with *hane* as in pattern 14b

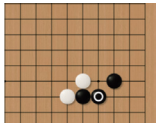




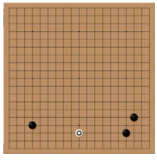
16 This pattern has become less frequent, see 8a

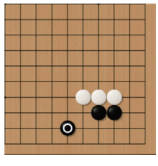
17 Similarly to pattern 14b, sequence suggests this black's *tennuki* immediately after white's hane.





18. This joseki pattern is less frequent in modern play, see 9a





19. Another continuation from pattern 9b

Received : 1, Nov,2025

Accepted : 20, Nov,2025

바둑학연구, 제19권 제2호, pp. 59-78
Journal of Go Studies
2025. Vol.19, No.2. pp. 59-78

Breaking Barriers: Chinese Female Go Players in the Mid-to-Late 20th Century Through the Lens of Rui Naiwei

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Abstract

As an outstanding female Go player in the world, Rui Naiwei's life experience clearly shows the constraints that female Go players in China and the world have faced and the breakthroughs they have made in recent years. This article will analyze Rui Naiwei's experience from the aspects of social environment and career development, and discuss the challenges faced by female Go players in the middle and late 20th century, as well as a series of breakthroughs, and finally obtain a relatively equal status and recognition with the male players in the field of Go .

Keywords: Rui Naiwei, Female Go players, Gender discrimination, Career development

I. Research background

The development of Go in China has a long history of more than two thousand years. Historically, as an ancient board game, Go was regarded as a male-dominated pursuit.

However, female players have also left a significant mark on its history. Especially since the 1980s, Chinese women's Go has risen to prominence on the international stage. Led by Rui Naiwei, a 9-dan professional, the team known as "Four Heavenly Kings" showed their strength, surpassing Japanese women's Go at the very beginning of their establishment, and even defeated top Japanese players in international competitions. Rui Naiwei, as an outstanding representative of Chinese women's Go, has made many achievements in the field of Go and earned global respect of the world for her contributions to the game.

However, the development of Chinese women's Go has not been smooth sailing. Rui Naiwei and other pioneers have faced various injustices in the Chinese Go community. Nevertheless, Rui has remained committed to the game, and her unwavering professionalism has become a source of inspiration for players around the world. In recent years, with the support of policies and improvements in the tournament system, Chinese women's Go has made great progress. A new generation of players, such as Yu Zhiying, has gradually emerged, and the overall level of Chinese women's Go has been significantly improved.

Rui Naiwei's journey in the world of Go serves as a microcosm that shows the evolution of Chinese female Go players from enduring various forms of injustices to gaining recognition and establishing a strong presence in the professional Go community. This article takes Rui Naiwei's life as a clue to

analyze the difficulties encountered by female Go players in the last century and the changes that have taken place since then.

II. Research objectives

By analyzing the development of Chinese women's Go and Rui Naiwei's personal experience, this article aims to reveal the difficulties that Chinese women players have faced and their current breakthroughs. In the 1980s and 1990s, Chinese female Go players were faced with many challenges from social culture, competitive environment and opportunities. However, with their perseverance and love of Go, they gradually emerged on the field both at home and abroad.

Rui Naiwei, a standout among her peers, has inspired generations of female players with her tenacity and dedication to Go. Her experience not only sets an example for Chinese female Go players but also provides them with valuable insights and lessons for those who follow. With policy support and improvements in the tournament system, a new generation of female Go players, such as Yu Zhiying, have gradually emerged on the international stage, injecting new vitality into the development of women's Go in China.

By analyzing the constraints and dilemmas encountered by Chinese female Go players in the last century, this paper hopes to provide valuable references for future research and practice, and promote the sustainable development of Chinese women's Go.

III. Development of Go in China in the 20th century

1. 1960-1980s

In the 1960s, the development of Go in China experienced several twists and turns. At the beginning of the People's Republic of China, Go was under the jurisdiction of the Ministry of Sports, but in 1960, it was put under the administration of the newly established General Administration of Sport, which was a significant change that influenced the development direction of modern Go in China.

Lv Guoliang(吕国梁), a famous Go educator, believed that the shift was related to the one-sided policy adopted by China after the establishment of diplomatic relations with the Soviet Union. It was imperative to adopt the Soviet sports model, which reclassified Go as a competitive sport. In addition, the Chinese Go community, weakened by social upheaval and war throughout the first half of the 20th century, saw catching up with Japan as its primary goal. The new approach emphasized Go's competitive nature, challenging traditional concepts of the Japanese notion that placed excessive value on the beauty of art and the idealized shape of the move. With the support of state leaders such as Chen Yi, Go developed rapidly in China during this period.

As a visible outcome of these reforms, the Chinese National Go Training Team was formally established in 1961. However, the momentum did not last long. Due to the outbreak of the Cultural Revolution, Go was banned as the "Four Olds," and the regular study and competition of Go could not be carried out. As a result, the development of Go in China was stagnant for years.

It was not until 1973 that the Chinese National Go Team was reorganized, and the development of Go returned to the right track. That same year, Rui Naiwei began learning Go at the age of 11. In 1979, she placed second in the National Girls' Go Competition and was selected to the National Go Training Team.

2. 1980-2000s

Following the reform and opening-up, China entered a period of recovery. The revival of Chinese Go began with institutional reconstruction at the national level and immense spiritual encouragement. In 1982, the National Sports Commission introduced an official dan-ranking system for Go, marking the formal establishment of China's Go ranking system and the initial steps toward professionalization. At that time, the criteria for rank evaluation were based on ten players who were officially on the roster of the national team and were treated as the "benchmark cohort." Rankings were determined with reference to these ten players' previous competitive results. Among them, Chen Zude and Nie Weiping, having won national championships multiple times and defeated Japanese 9-dan professionals, were accordingly conferred the rank of pro 9-dan. Wu Zongseng, who had repeatedly finished as runner-up in national tournaments and defeated a Japanese 9-dan in a best-of-three match, was likewise promoted to 9-dan. Wang Runan and Hua Yigang, both national runners-up, were rated 8-dan. Luo Jianwen, Shen Guosun, and Huang Dexun were evaluated as 7-dan. The female player Kong Xiangming was ranked 6-dan, while another female player, He Xiaoren, was ranked 5-dan.

Meanwhile, in 1987 and 1988, the Tengen(天元战) and Meijin(名人战)

Go tournaments were launched one after another, modeled on Japan's title-holder challenge system, providing an important platform for players and greatly energizing the Go community.

However, the event that truly propelled Go from a niche pastime to a nationwide phenomenon and elevated it from a sport to a symbol of national spirit was the China-Japan Go Supermatches, which commenced in 1984. In these protracted battles spanning several years, Nie Weiping single-handedly achieved stunning reversals at critical junctures, creating the legendary "eleven consecutive wins" and earning the nickname "Nie Whirlwind." This victory not only greatly boosted national confidence but also sparked an unprecedented "Go fever" across the country, attracting a large number of young people, represented by Chang Hao and Gu Li, to take up the game. This laid a strong foundation for the emergence of future Go prodigies.

Inspired by the "Nie Whirlwind," Chinese Go began to accelerate its systematic construction and integrate fully into the world Go scene. Firstly, the playing strength of the players, centered around Nie Weiping and Ma Xiaochun, improved comprehensively, reaching a level capable of competing for world titles. Within the same system, women's Go also received strategic support. The establishment of women's divisions in national tournaments gave rise to the first generation of leading players, represented by Kong Xiangming. The pinnacle of this achievement was Rui Naiwei's promotion to 9-dan in 1988, making her the first female 9-dan player in the world. This was not only a result of China's Go institutional development but also signified that Chinese women's Go had reached the world forefront.

Simultaneously, 1988 saw the inauguration of the first World Professional Go Championship, the "Ing Cup," regarded as a milestone in Go's globalization. Although Nie Weiping narrowly lost to Korea's Cho Hun-hyun in the

inaugural final, the emergence of world championships set a higher competitive goal for Chinese players.

In 1995, Ma Xiaochun won both the "Tong Yang Securities Cup" and the "Fujitsu Cup," becoming China's first world champion. This marked the "zero breakthrough" for Chinese Go in the highest level of international recognition after years of steady progress, reaching the peak of this phase.

Meanwhile, the domestic Go ecosystem continued to improve. Outside the official system, private Go academies, such as the Nie Weiping Dojo, began to emerge in the 1990s. This new talent cultivation model, blending traditional mentorship with modern training, became an important cradle for future top players.

Chinese Go's upward trajectory encountered severe challenges in the mid-to-late 1990s. South Korean players, represented by Lee Chang-ho and Cho Hun-hyun, became formidable rivals. Particularly, the "Stone Buddha" Lee Chang-ho, with his impeccable and stable performance, long suppressed generations of Chinese players, including Ma Xiaochun and Chang Hao, plunging Chinese Go into a relatively prolonged "resistance against Korea" downturn.

To address these challenges and seek sustainable development, Chinese Go initiated profound reforms in the professional system. The core measure was the establishment of the Chinese Weiqi League (Wei Jia) in 1999. Through its home-and-away format and the introduction of foreign players, the Chinese League created a market-oriented, regularized, high-level competitive platform, fundamentally altering the previous training and competition model dominated by individual tournaments and invitational events. It not only ensured the quantity and quality of players' games but also greatly facilitated exchanges among players and nurtured the growth of young tal-

ents like Chang Hao and Gu Li.

In short, from the 1980s to the 2000s, Chinese Go completed its transformation from a symbol of national spirit to a professional sport. It achieved social popularization and spiritual mobilization through the China-Japan Supermatches, established a preliminary professional system through the creation of the dan ranking system, national tournaments, integration into world championships, and finally, under the impact of the "Korean Wave," embarked on a path of deepened professionalization through measures like the establishment of Chinese Weiqi League. This series of developments laid a solid foundation in terms of institutions, talent, and market infrastructure for the comprehensive revival of Chinese Go in the 21st century.

IV. Rui Naiwei's Go experience

Rui Naiwei, born on December 28, 1963, in Shanghai, China, is the world's first female professional Go player to achieve the rank of 9 dan. Her promotion to 9 dan in 1988 marked a historic breakthrough for Chinese women's Go, elevating its competitive standard to new heights. However, at the peak of her career, due to a combination of personal and institutional problems, she left the national team in the early 1990s and spent over two decades living abroad in Japan and South Korea, becoming a "wandering Go traveler."

However, Rui Naiwei's absolute dominance in women's Go also revealed a "lonely peak" phenomenon in the women's scene. Her strength far surpassed that of her female contemporaries and allowed her to compete on equal footing with top male players. However, her extended absence from China left

the domestic women's Go scene without a central figure. At the same time, it opened a new generation of talent to emerge and grow.

Her time overseas coincided with a shifting landscape in the global of Go. Her achievements in South Korea were particularly remarkable, as she notably won the Kooksoo Title by defeating top male players such as Lee Chang-ho and Cho Hun-hyun, solidifying her historical status as the "greatest female Go player in history" with compelling results. Approximately twenty-one years later, she eventually returned to her roots and came back to China. Her career trajectory—from her early breakthroughs domestically, to her mid-career exile and peak achievements abroad, and finally her late-career return—is not only a personal legend but also serves as a critical historical footnote for exploring the constraints and breakthroughs experienced by Chinese female Go players in the mid-to-late 20th century. Even now, well past the age of sixty, she remains active as a professional player, her longevity and cross-regional influence being rare in the history of Go.

1. The famous "Three Gorges Incident"

As previously mentioned, in 1979, Rui Naiwei won second place in the National Girls Go Competition and was selected to join the national Go Training Team. From 1986 to 1989, she won the National Women's Go individual Championship four times in a row. But it was in the golden period of Rui Naiwei's career that she encountered the "Three Gorges Incident," which profoundly changed her life. At that time, the match was held on a passenger ship in the Three Gorges section of the Yangtze River, and it subsequently came to be known as the "Three Gorges Incident."

In 1987, she participated in the China-Japan Go Match on behalf of the Chinese Go team. That year, only three women qualified to participate: Rui Naiwei, Yang Hui and Zhang Xuan. The Chinese team is the host, and the Japanese team sent a delegation of eight players, including Masao Kato (head), Noriki Yoda, Naoto Hiban, Shunya Imamura and Koichi Oya.

At that time, the Chinese Go team enforced a controversial rule intended to protect female players: female players were prohibited from entering the room of male players. During a break, Noriki Yoda of the Japanese team warmly invited the Chinese players to play fast games. Due to the restriction, Rui Naiwei and Zhang Xuan initially decided to play in the corridor. However, the lighting in the corridor was too dim, and the Japanese players' room, located in the Foreign Guest Department, offered much better conditions, so the players eventually moved to the Japanese team's room to play games.

After this incident became known to the Chinese coaches, both Zhang Xuan and Rui Naiwei were summoned for formal interviews and instructed to write self-criticisms. As a result, Rui was banned from the national tournament, while Zhang was disqualified from the preliminaries of the Go tournament. At the time, male players could play two games in the national competition, whereas female players had only one game, despite both male and female players being at the same level. This disparity highlighted the gender inequality in the system, and the suspension was especially harsh for the two female players.

However, in the year-end summary report of the Training Authority, the incident was labeled as "improper behavior of female Go players", and Rui Naiwei and Zhang Xuan became subjects of widespread discussion. Reflecting on the event, Rui said, "I've always thought that Zhang Xuan and

I went to the Japanese male player's room solely to play Go. Our only fault was violating the team's rules. Since we had broken the rules, we deserved to be criticized, but I do not agree with the severity of the punishment." Rui Naiwei felt deeply wronged by the incident, viewing it not only as a personal injustice but also as an insult to women who place great importance on their reputations.

2. A dilemma with no chance to play Go

In June 1988, Rui Naiwei became 9 dan, becoming the world's only female player to reach that level at that time. However, behind the outstanding accomplishment lay a lot of pressure. From 1980 to 1988, Rui had been a member of the national Go team for nearly a decade, but the opportunities to play in the international competition were extremely limited. The competitions designated by the team were reserved only for the strong male players, and Rui was not considered eligible to participate.

In 1988, there were only two major international Go tournaments: the Fujitsu Cup and the Ing Cup. The Ing Cup was held once every four years, and in the Fujitsu Cup, only the top two male players from the national team were directly qualified, and other male players had to play a qualification tournament for a chance to participate.

Rui Naiwei felt this policy was unfair. She had earned her 9 dan by competing with male players and had won the women's individual Go championship multiple times. Rui asked the coaching staff whether the women's champion could also be granted direct entry into the World Championship, but her request was denied. Willing to compromise, she proposed participating in the men's qualification tournament instead. However, her proposal

was again rejected by senior figures such as Nie Weiping, Hua Yigang, and Luo Jianwen, on the grounds that there was no precedent for a female player competing in the men's division.

Rui Naiwei found herself with no way out, which was undoubtedly unfair to her. However, it was a systemic problem within the Chinese Go and could not be resolved by individual will at the time. "Three Gorges Incident" caused lasting damage to Rui with all kinds of pressure, and Rui Naiwei had no choice but to leave the Chinese national team, looking for a chance that could provide a fair atmosphere for female Go players.

3. The wandering experience on Go career

The age range from 27 to 36 is considered the most valuable period in a Go player's career. But during this crucial decade, Rui Nian Wei has been in a state of stagnation with no Go competition to attend.

In 1990, she went to Japan to find opportunities to play Go. However, since she had not officially left the Chinese Go Association, she could only take part in one or two official competitions per year. The rest of the time, she could only watch others play in Japanese Go Association. "Rui Naiwei Incident"

In 1992, the second Ing Cup World Professional Go Championship was originally scheduled to be held in China. However, following Rui Naiwei's departure from the Chinese national team, the Chinese Go Association maintained that she was still a registered player of the Chinese Go Association who had been trained by the national Go team for many years. As a result, they opposed her participating as a representative of China. The tournament organizers extended an invitation for Rui to participate independent-

ly, without representing any country. Both South Korea and Japan supported this arrangement. In the end, the Chinese Go Association reluctantly agreed to allow Rui Naiwei to participate as an individual, but the Chinese team withdrew from the tournament as a protest, and the hosting country was changed from China to Japan.

This was Rui Naiwei's first appearance on the top stage of the World Championship, in which she defeated Hideki Komatsu, Li Changho, and Liang Daihao to reach the final four, setting a record for the best result ever achieved by a female Go player in the World Championship. After losing to Japanese player Hero Otaki in the semifinals with a score of one to two, Rui Naiwei broke down in tears, not because she doubted her skill or lamented the hardships of her game, but because she had no more game to play.

In 1996, Rui Naiwei finally requested permission from the Japanese Go Association to participate in professional tournaments in Japan. However, the director, Kazuichi Fujisawa, informed her that he had received a letter from the Chinese Go Association stating, "We hope you will refuse to allow Chinese players to play tournaments in Japan." The Japanese Go community agreed with this and denied Rui's request. Unable to enter the Japanese professional Go scene, Rui Naiwei chose to move to the United States with her husband, Jiang Zhujiu, who was also a 9 dan player of Chinese Go Association.

In 1999, she officially became a guest player of the Korea Go Association. Her journey found a new direction when Cho Hoon-hyun successfully convinced the Association to accept Rui Naiwei and her husband as guest players.

It was not until 2011 that Rui Naiwei returned to the Chinese Go team. After a 21-year absence, she finally chose to return to her roots. Having

won eight world women's individual titles, Rui Naiwei returned to China and once again joined the Chinese national team.

4. In Summary

Rui Naiwei chose to leave the Chinese Go team due to the limited opportunities to participate in the world championships and the unfair treatment she experienced in the national team. After her departure, the Chinese Go Association implemented many reforms, such as giving female Go players spots in international tournaments, reducing the percentage of the prize money for the male champions. For example, less than three years after Rui Naiwei left the team, the Chinese Go Association issued a resolution to allow the winner of the national women's individual competition to compete in the Fujitsu Cup. Ironically, Rui herself had never been granted such an opportunity during her time on the team.

V. The constraints imposed on Chinese women Go players in the 20th century

Rui Naiwei's early experience can be seen in the constraints imposed on Chinese women Go players in the 20th century.

1. Gender discrimination and social prejudice

Traditionally, Go has been considered a domain where men are good at,

and women's participation was often dismissed as "unprofessional". Rui Naiwei also encountered similar prejudice in her early stages of her career. Despite her exceptional talent, societal expectations for female Go players remained low, and their abilities were.

2. Uneven playing field

Chinese women Go players often face an unequal playing field when they compete with their male counterparts. In the professional Go field, the number of female Go players has long been far lower than that of men. Female Go players have faced considerable disadvantages in training and competition opportunities and sponsorship. It was 1978 that China held its first separate women's individual competition, marking a shift from the previous model where men and women competed together in the national Go championships. That year, Kong Xiangming made history by winning all 15 games and became the first female Go champion in China. despite such milestones, female players have continued to face systemic barriers. Their chances of being selected for international tournaments have remained much lower than those of their male counterparts, making it difficult for female Go players to show themselves on the world stage, and their career development path is relatively narrow.

3. Social concept and public opinion pressure

The unfair treatment Rui Naiwei received in the "Three Gorges Incident" was compounded by the Chinese Go coaching team's mischaracterization of her behavior as "improper behavior." This stigmatization affected Rui

Naiwei's performance in Go for a long time. This reflected the pressure of public opinion on women in society at that time, and all these factors had a negative impact on the psychology and career development of female Go players.

VI. The Change and breakthrough of Chinese female Go players: Rui Naiwei's success and the Changes of the Times

Rui Naiwei's decision to leave China marked a turning point in her personal journey and indirectly affected the development pattern of women's Go in China. After Rui Naiwei withdrew from the national team, the Chinese women's Go team lost a leading figure, and the performance of the Chinese women's Go was not satisfactory in the international arena. This has aroused social concern about gender equality in Go, and prompted the Go community to reflect on and improve the treatment and competition opportunities of female players.

1. A shift in social attitudes

With social progress and increased awareness of gender equality, public acceptance of women's participation in Go has greatly increased. Society has given more recognition and respect to the skills and achievements of female Go players. The Go community has also begun to make efforts to create a more level playing field for female players. For example, in the past, male players were given two selection spots in the World Series while female

players had only one. Today, both men and women have equal opportunities.

2. Go Policy Changes

The Chinese Go Association has issued a series of policies. In 2016, the association also put forward the "Go for all" strategy, and women's Go gained unprecedented attention. The Government has also gradually increased its financial investment in the sport, especially its support for women's Go. The Chinese Women's Go Association has also been established to formulate and implement the development plan for women's Go. The emergence of Chinese Women's Go Master Tournament and Women's League has improved the competitive level and popularity of women's Go. In addition, international events have been introduced, such as the Women's Go World Cup and Women's Go Team Championship.

3. Training and development of female Go players

The professionalization of Go has increased, with more opportunities for women's career development, and the training resources, competition opportunities and sponsorship available to female players have all improved. The promotion channels for professional Go players have become fairer, providing more room for female players to develop.

4. Role models

Rui Naiwei, the world's first female 9 dan professional player, won the world Women's Go Championship several times in just 10 years and swept

the world women's Go arena, setting an example for later women players. Her achievements and influence inspired more women to pursue the career of Go, breaking the concept that "Go is only for men".

5. Increased media attention

Compared with the past, the media has paid significantly more attention to female Go players, and their matches and achievements have been more widely reported, enhancing the social influence of female Go players.

VII. Conclusion

Rui Naiwei's life story vividly illustrates the constraints faced by female Go players in the past and the breakthroughs made by the following generation. Although women still face some challenges in the field of Go, with the progress of society and the promotion of women's status, it is believed that more and more female Go players will emerge, and they will shine on the global stage of Go, adding more colors to the sport. Standing on the shoulders of their predecessors like Rui Naiwei, the next generation should continue to work hard and contribute to the realization of true gender equality.

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Received : 1, Nov,2025
Accepted : 20, Nov,2025

바둑학연구, 제19권 제2호, pp. 79-98
Journal of Go Studies
2025. Vol.19, No.2. pp. 79-98

Theory and Practice of Go Promotion: Strategic Framework for promoting Go to the Australian people

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"I hope that people become aware of Go and that it becomes an easy option to choose as one of their hobbies. If it suits their taste, I hope they will take pleasure in Go and experience the joy it offers, and that the game might even help them, in some small way, to understand the principles of life."(Shin Jinseo, 2025)

Abstract

Through my experience promoting the game of Go in Australia I have developed a strategic framework which has helped me navigate the challenges involved in spreading my passion for this wonderous, humbling, and insight provoking game. This paper introduces the Go Promotional Framework (GPF), combining theoretical approaches with practical applications. The GPF framework consists of four pillars: Accessibility, Inclusivity, Engagement, and Integration. The paper utilizes empirical research from Australia, based on my active participation of promoting Go activities in the community, to businesses and to educational institutions, between 2019-2025.

I. Background

Go has been steadily growing within Australian communities, with a now estimated 1,000 to 2,000 active players. This includes casual enthusiasts and those who compete in national tournaments organized by the Australian Go Association (AGA). Of the approximately 800 registered AGA members, around 250 can be considered active, having participated in at least one face-to-face tournament in the past three years. However, the wider Go-playing population extends beyond AGA membership, with an estimated 5,000 individuals—primarily from Chinese, Japanese, and Korean descent—playing privately and within closed knit groups. For instance, a private group of about 80 Chinese players meets in Campsie, Sydney, combining traditional Go games with cultural activities such as dancing, singing, and Mahjong. (1)

The AGA, a founding member of the International Go Federation, plays a key role in promoting Go through clubs, online tournaments, and also provides pathways for Go players to compete for Australia in international tournaments. The broader Go community in Australia reflects the global trend of increasing interest among youth and professionals, as highlighted in reports by the International Go Federation in 2016.

The game of Go, while steeped in tradition and widely revered in East Asia, remains less popular compared to other strategic board games in Australia. Despite this, Go has seen a surge in interest following recent events, such as the TEDx Perth 2019 talk on the game delivered by myself, Dr Silvia Lozeva (2) which has inspired curiosity about the games strategic depth, and educational potential. Another stream of interest I was involved in, was in October 2024, when ABC Radio National broadcasted a featured episode dedicated to Go, exploring its history and relevance in the modern era. (3)

Although this paper focuses on the period 2019-2025, it is very much also worth noting that the popularity of Alpha Go in 2016 has a lasting legacy, and continues to inspire new Go players, especially those who are in the IT and technology sector.

To increase the popularity of the game and its benefits, this paper explores additional avenues for growth and engagement, drawing on lessons from Australia's diverse and evolving Go community.

II. Background information

Perth (Nyungar: Boorloo) is the capital city of the state of Western Australia, the largest state in Australia with population of about 2.5 million. The city is known as the most isolated city in the world (as measured from other cities in similar size). (6) The city is situated on the traditional land of the Whadjuk Nyungar people, where Aboriginal Australians have lived for at 60,000 years.

The city is situated on the coastal area of the Indian Ocean, where Swan River (Nyungar: Derbal Yerigan) meets the sea, and it spans 125kms in lengths and 45 kilometers from the coast to the East. The city has 350 suburbs and 30 local government areas.

Perth was classified as one of the world's most livable cities as part of the Global Livability Ranking by the Economist Intelligent Unit.

The city was populated with migrants after the WWII mostly from Britain and from Southern Europe. Continuous waves of migration, at a later stage

from Asia have shaped a truly multicultural city, where half of the population rise is due to overseas arrivals currently, and 25 percent of Australians have at lease one parent was born overseas.

III. Methodology and Empirical Approach

Through my work as a Founder and Director of Institute 361, an independent business consultancy focused on gamifying strategic thinking, in the period 2016-2025, we introduced various activities in Western Australia to increase the popularity of the game.

The adopted methodology was participatory, where I participated in the events listed below and was actively involved in the organizing and the promotion of the activities. Feedback was collected through feedback forms, as well as through anecdotal verbal conversations from participants.

IV. Analysis of Feedback Forms

The feedback analysis employed a mixed-methods approach combining both quantitative metrics and qualitative thematic analysis. Participants were provided with brief feedback forms following each Go session, which included Likert-scale questions on enjoyment, clarity of instruction, and perceived benefits (quantitative), as well as open-ended prompts for reflections and suggestions (qualitative). Quantitative data was compiled into basic statistical summaries to identify trends across programs and locations. Meanwhile,

open-ended responses were coded thematically to extract recurring themes, such as increased social connectedness, intellectual challenge, or cultural curiosity. This hybrid approach allowed for both generalizable trends and rich, context-sensitive insights to emerge.

V. Verbal Feedback Collection

Verbal feedback was collected through semi-structured informal discussions conducted during or after sessions. These conversations typically took place with individuals or small groups and were not audio-recorded, but documented through note-taking shortly after the interaction. While informal in tone, a consistent set of prompts guided these discussions, such as:

"What brought you here today?"

"What did you find most interesting or challenging about the game?"

"Would you recommend this to others?"

Did you learn something new?

This systematic yet casual method allowed participants to speak freely while ensuring comparability across sessions. These notes were later reviewed using inductive thematic analysis, and insights were triangulated with the written feedback to verify validity and comprehensiveness.

VI. Overall Empirical Approach

Beyond direct participation and feedback collection, the empirical strategy included participant observation, action research, and practice-led inquiry:

Participant Observation: As the lead facilitator and organizer, I (Dr Lozeva) observed group dynamics, attendance patterns, and participants' level of engagement during sessions. These observations informed both the refinement of the program and the interpretation of feedback.

Action Research: Iterative cycles of implementation, reflection, and adjustment were central to the evolution of the Go programs. For instance, feedback from earlier workshops prompted the inclusion of Mandarin-speaking facilitators and better-aligned venues.

Practice-led Inquiry: Drawing on my background in sustainability and innovation studies, I reflected on the evolving practices and community response to Go programs to develop the Go Promotional Framework (GPF). This framework itself is an outcome of empirical synthesis and practical experimentation.

Case Study Method: Each of the local government programs served as a mini-case study. Data from these distinct contexts were compared to identify transferable practices and unique local variations.

VII. Go activities

Some of these Go promotional activities included:

Organizing the first academic Go Symposium in Australia at the AGA 2018, Sydney University to raise awareness about the theoretical applications of Go Studies to science, technology and society alongside the AGA National Tournament. The Symposium attracted international presenters which covered a range of topics about the earliest poem written about Go, Mathematics and Go, Go as an educational tool, and others.

Premier screening of "The Surrounding Game", the first documentary movie on the game of Go at Curtin University and the University of Western Australia, which coincided with Harmony Day in 2017. The screening at UWA was also accompanied with talks from founding members of the Perth Go Club, Clive Hunt, academics Professor Baldassar from the Migration Research Network and Silvia Lozeva, as the founder of institute 361. *The Surrounding Game* is a 2017 documentary that delves into the world of Go, one of the oldest and most complex board games. The documentary chronicles the historic tournament to crown America's first professional Go player, capturing a four-year journey across multiple countries.

Numerous community presentation in Universities, schools and community and cultural clubs (including Japanese cultural centres).

Following on these activities, I developed a more structured approach to introduce Go (Baduk) to communities and business.

1. For the period 2022-2025, Go Community Play programs were introduced in 6 (six) local libraries in Perth, Western Australia, which included a more structured approach of 8-10 weeks activities. These programs were sponsored by Local City and delivered at the Library by Institute 361 and supported by non-for profit organizations (Multicultural Futures and Multilingual Australia). The aims of the program was successfully linked with the Strategic Plan of the Local Governments to reduce social isolation and to foster social connections, particularly in the post COVID-19 period. This more structured approach allowed for an effective delivery, leveraging also on the promotion of the local cities and the local libraries' e-newsletters and social media (see table 1).

2. Parallel to the non-for-profit community-based work, in 2023 I also expanded Go demonstration in the business sector, particularly in industry spaces, where Go was introduced as a way to deepen strategic thinking into the corporate world. The "Go Strategic Play"(6) method brought a unique approach to team coaching, offering three tiers designed to help high-performing teams perform even better by integrating the ten strategic principles of Go (also known as the ten golden rules) into business philosophy. Feedback from these sessions highlighted the method's success in raising awareness and its effectiveness as a tool for strategic growth. Expanding Go Strategic Play into the start-up scene, especially in co-working spaces, has also proven to be a successful promotional strategy. By tapping into the energy and innovation of entrepreneurs, the approach showcased how the timeless principles of Go can bring fresh perspectives and creative solutions to the fast-paced world of business. This approach appears to be also a successful method in

other settings (see for example the captivating development of the Go scene in Kyrgystan).

Presenting at business conferences and conventions about the adaptation and the principles of the game was another avenue of Go promotional activities. For example in 2023-24, the 10 principles of strategic thinking were presented at the Cloud and Data Convention in Perth, Western Australia and also at the Western Australian Mining Expo and Conference, which attracted large audience, as the mining sector is key to the W.A. economy.

Table 1. Go Community Play programs 2022-2025

Local Government	Timeline	Number of participants	Number of G workshops	Comments
City of Bayswater	2022	30	10	Program for older Australians over 55 from a culturally and linguistically diverse background in partnership with Umbrella Multicultural Services
City of Fremantle	2023	55	12	Program for people from diverse backgrounds held weekly at Fremantle Library in partnership with Multicultural Futures
City of Cockburn	2023	70	10	Program for community to engage in new new learnings and to foster social connections in partnership with Multicultural Futures
City of Joondalup	2024-25	35	8	Program aimed at a wide range of community members, from different ages, cultural backgrounds and abilities in partnership with Multilingual Australia
City of Kwinana	2024-25	25	10	Community program to reduce social isolation and loneliness in partnership with Multilingual Australia
City of Armadale	2025	70	8	Community program to reduce social isolation and loneliness in partnership with Multilingual Australia
City of Stirling	2025	30	4	Community program to reduce social isolation and loneliness in partnership with Multilingual Australia (4 Go workshops)

The programs are about 8-10 weeks, and designed for people who have never played by structured Go sessions during a 10-week school term.

VIII. Findings

In analyzing the main findings from the programs run, there are a few useful characteristics that stand out. They are summarized in the Go Promotional Framework (see Fig.1)

Accessibility: Choosing venues near public transport with ample parking facilitated participant attendance. This was important, also from the point of view in a research, which the lead author conducted on good practices for intercultural hubs (4) (see Shamim and Lozeva, 2018). Due to the spread of the geographical areas in Perth, the city is mainly designed for cars, which makes parking anchors accessibility even more important. Perth is the longest city in the world, so the spread-out of the city also makes it difficult to find a central point for everyone to group together, and this is why it is better to have smaller, but more diverse groups at local hubs, which the libraries provide. In one occasion, a participant travel more than 100 km to attend a Go session. We later introduced Go workshops close to her location.

Inclusivity: Local facilitators fluent in Mandarin created a welcoming atmosphere. Structured curricula progressively built participants' skills and knowledge. In the City of Cockurn and the City of Armadale, as well as in the Cities of Stirling and Maylands, the program was especially successful because of the participation of a Mandarin-speaker and a Go teacher, who

was already known by the community. He was also well known to the lead author, as they were both part of the Curtin University Go Club more than 10 years ago. As a high level Go player, an educator and a dual-language speaker, it proved to be a very successful way in engaging and attracting participants.

It is also worth mentioning that participants varied a lot, and the Go sessions provided an inclusive atmosphere for neuro-divergent individuals, people whose second language was English and people who were at risk of social isolation.

On the TEDx stage in 2019 in Perth the talks was delivered by people from culturally diverse background - me as a speaker from Bulgaria, while the game was demonstrated by two other players who were from China and New Zealand.

Engagement: Co-promotion with libraries and visually appealing posters significantly increased awareness and participation (see Fig. 2). Diverse participants from various backgrounds enriched the experience. Some of the examples of Go promotion included the posters below (see Fig. 2). Participants included 4 years old to 80 years old. In some instances the library staff were actively engaged with the Go classes and with the facilitation of the program, and played a key role in the promotion of the Go classes amongst other staff and visitors. Important element of the program was engaging the local Government, and acknowledging their contribution and support of the Go classes. While the numbers at the beginning were small, the number of participants grew gradually, as the program matured and gain momentum

and popularity from one City to another.

Integration: Exposure and networking outside the Go community were crucial. Presenting at conferences like the Data Cloud and Storage convention and the Mining conference led to collaborations with mainstream businesses. A key component was the "Go Strategic Play" workshop, a half-day session that gamified strategic thinking for business professionals. This workshop demonstrated how Go's principles could be applied to enhance strategic decision-making in the corporate world. Through the GPF and the Go Strategic Play workshop, we successfully blended theory and practice to promote Go, offering a replicable model for enhancing community engagement and business integration.

This model is offered both in-person and online, as well as in blended mode and allows participants to explore the principles of strategic decision-making in a short timeframe. While the method relays only the fundamentals and the basics of Go, it taught the ways of thinking, which facilitate better decision-making and provokes interest in continuing learning of the game. Particularly well-received was the workshop at business startup courses and integrating it with the needs to think outside the box, showcasing some of the innovations that the game of Go has sparked, such as the inventions of the QR code and the break-through of AI technology through Deep Mind and Google - Alpha Go.

Use of technology: while most of the time, the program sued traditional Go sets, the use of the IZIS AI Go set gave a strong advantage, as it attracted a large interest. During the course of this article, Sese Robot Go also

emerged on the Western market, which is another highly interactive technology. Technology was an important element to draw attention to the programs, although not often used in the demonstration. Rather it serves as the next stepping stone for improving participants' skill levels.

Fig. 1 Go Promotional Framework

Fig. 2. Go poster for City of Fremantle, Go Community play

Fig.3 Participants in Go workshop who also were on the TEDx stage.

IX. Conclusions

The promotion of Go in Australia from 2019 to 2025 has demonstrated the effectiveness of a structured, strategic approach in fostering engagement across community, educational, and business sectors. The Go Promotion Framework (GPF), with its four pillars—**Accessibility, Inclusivity, Engagement, and Integration—has provided a robust foundation for expanding Go's reach and relevance in contemporary Western Australian society.**

Through empirical research and participatory methods, this study has

highlighted the success of tailored approaches in different settings. Community-based initiatives, such as Go Community Play programs in libraries, have shown the importance of accessibility and cultural inclusivity in sustaining participation. The introduction of Mandarin-speaking facilitators and structured curricula proved particularly effective in attracting diverse groups and maintaining long-term engagement. Moreover, leveraging institutional partnerships with local governments, non-profit organisations, and educational institutions facilitated the seamless integration of Go into existing social programs aimed at reducing social isolation and fostering connections.

The business sector has also emerged as a key avenue for Go promotion. The "Go Strategic Play" (6) methodology successfully introduced Go principles to corporate settings, demonstrating their applicability in strategic thinking, team-building, and decision-making. Presenting Go at business conferences and industry conventions has broadened its appeal beyond traditional Go-playing communities, leading to new collaborations and increased visibility within professional networks.

Technology has played a crucial role in modernising Go's appeal. While traditional Go sets remained central to the programs, the integration of digital tools, such as the IZIS AI Go set, attracted new participants, particularly those with an interest in technology and artificial intelligence. This suggests a promising direction for future Go promotion efforts, particularly among younger audiences and those in the tech industry.

Overall, the findings from this research suggest that the promotion of Go in Australia can be further enhanced by continued investment in inclusive community programs, strategic business engagement, and technological innovation. The Go Promotion Framework offers a scalable and adaptable model that can be replicated in other regions seeking to integrate Go into diverse cultural and professional landscapes. Moving forward, collaborations

with international Go bodies, further integration into educational curricula, and a sustained presence in industry spaces will be essential to solidifying Go's place in Australia's cultural fabric.

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Received：1, Nov,2025

Accepted：20, Nov,2025

바둑학연구, 제19권 제2호, pp. 99-126
Journal of Go Studies
2025. Vol.19, No.2. pp. 99-126

Cultural Embedding and Market-Driven: The Construction Path and Theoretical Implications of Luoyang's Local Go System

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Abstract

Against the backdrop of global Go development and China's sports governance transformation, traditional elite-oriented models (national system and Go dojos道场) fail to meet local demands for popularization, cultural inheritance, and industrial linkage. In China, as Go promotion shifts to local cities, constructing a comprehensive system becomes critical. Luoyang, a "Hundred-Dan Go City," offers rich empirical data with its 43 professional players and 152 total dan ranks by 2023.

Existing studies focus on competition, cultural value, or single cases, lacking analysis of multi-factor synergy and the interaction between cultural embedding and market drive. This study addresses three questions: how cultural embedding supports market drive; whether Luoyang's multi-source funding model is sustainable; and how to balance popularization and elite

cultivation.

Using case study, in-depth interview, bibliometrics, and cost-benefit analysis, this study employs cultural embedding, market drive, and sports ecosystem theories, proposing a “Culture-Market-Talent” triangular synergy model.

Findings show that cultural embedding and market drive synergize to form a positive cycle; Luoyang’s multi-stakeholder collaboration achieves an ecological closed-loop; the model is universally applicable. The study enriches sports ecosystem theory, provides practical solutions for local cities, and offers policy references for integrating sports, culture, and tourism. Limitations include single-case bias and historical data gaps; future research could expand case scope and explore digital integration.

Key Words: Local Go System, Cultural Embedding, Market-Driven, Triangular Synergy Model, Sports Ecosystem

I. Background

1. Luoyang: A City Where History Meets Go

Luoyang, located in central China's Henan Province, stands as one of the world's oldest continuously inhabited cities, with a 5,000-year civilization as 13 dynastic capitals. As the cradle of Heluo Culture—the foundational root of Chinese civilization—Luoyang is inherently intertwined with the origins of Go, making it a unique site where cultural heritage and intellectual sport converge. Spanning 15,230 square kilometers with a population of 7.17 million, the city balances its UNESCO World Heritage status (home to the Longmen Grottoes, White Horse Temple, and 隋唐大运河 ruins) with a dynamic modern identity.

Its industrial legacy is equally pivotal to Go's development: in the 1950s, Luoyang became a core hub of China's "First Five-Year Plan," attracting 329,000 industrial workers from across the nation to districts like Jianxi. Actually, Luo Yang's status in China is comparable to that of Manchester and Liverpool in the UK.These migrant workers—many educated and passionate about Go—laid the groundwork for a vibrant grassroots Go culture, turning factories and communities into incubators for talent.

2. Historical Context of Go in China

Go, a 4,000-year-old strategic board game, is deeply rooted in Chinese philosophy, with its grid and stone mechanics mirroring the cosmic order of "Hetu Luoshu"河图洛书 (River Diagram and Luo Book). Its modern development in China reflects broader shifts in sports governance:

National System Era (1950s-1980s): Go was classified as a national sport, with government-funded sports schools and national teams focused on elite training. This era peaked with the China Vs Japan Go Super Challenge Match 中日围棋擂台赛 (1984-1996), where Nie Weiping 9P's victories sparked nationwide "Go fever," driving mass participation.

Market Transition Era (1990s-2010s): As state support declined, private Go academies (In Go domain, we called these academies Dojos or 道场"daochang") emerged in Beijing, Hangzhou, and Shanghai, focusing on preparing young players for professional qualification exams (定段赛"dingduan sai"). While this model produced elite talent, it neglected grassroots popularization and cultural integration, leaving local cities with fragmented Go ecosystems.

Local System Era (2010s-Present): China's "Sports Power" and "Cultural Power" strategies shifted governance focus to grassroots development, tasking local governments with building comprehensive systems that balance popularization, cultural inheritance, and industrial linkage. This transition addressed the limitations of both the national system (overly elite-focused) and academy model (geographically concentrated), positioning local cities as the new engines of Go development.

3. The Development and Significance of Go in Luoyang

Luoyang's Go journey encapsulates China's local sports transformation, evolving through four phases to become the "Hundred-Dan City" (Hundred-Dan, this saying , in the field of Go, is originally from Hundred-Dan

Dojo founded by Go Master Kitani Minoru.）—a title earned in 2005 when its professional players collectively reached 100 dan ranks. By 2023, this figure had risen to 152 dan ranks across 43 professional players, solidifying its status as a non-first-tier city leader in Go development.

3.1. Foundation Phase (1960s-1970s): Systematic Training Takes Root

Prior to the 1960s, Go in Luoyang was confined to a small circle of scholars. The turning point came in 1964, when Xue Youjun, director of the Luoyang Railway Bureau, recruited Chen Dai 4 dan—one of New China's first professional players—to serve as the city's first full-time Go coach. Chen, a veteran of national tournaments, brought standardized training methods, and in 1966, the Luoyang Sports Commission built a dedicated Go training facility in Wangcheng Park, marking the start of organized mass activities.

Despite disruptions during the Cultural Revolution, Luoyang's Go community persisted. With support from Henan Provincial Party Secretary Liu Jianxun—who famously pledged to "preserve the seeds of Chinese Go"—Chen Dai continued mentoring young talents, including future professionals like Wang Jianhong 9-dan 汪见虹九段 and Wang Guanjun 8-dan 王冠军八段. By 1973, the Luoyang Sports School Go Class was established, and in 1976, Luoyang won its first provincial team championship. The 1982 introduction of China's professional dan system solidified this foundation: seven Luoyang players were among the first batch of professional rank holders, setting the stage for future success.

3.2. Popularization Phase (1980s-1990s): Industrial Heritage Fuels Grassroots Growth

The 1980s marked a golden age for Luoyang Go, driven by two synergistic forces: the national "Go fever" from the Sino-Japanese Super Match and the city's industrial heritage. Jianxi District, home to 110,000 workers, became a Go hub: factories like Luoyang Bearing Factory and First Tractor Works organized clubs and tournaments, with workers volunteering as coaches for local children.

Key figures emerged from this grassroots movement: Yu Zhaochang, a Zhejiang-born technician at Luoyang Bearing Factory, founded a Go class at the factory's primary school, mentoring Wang Jianhong and Yu Meiling 4-dan; Wang Jiaqiang, （于梅玲四段, 汪见虹九段）a disciple of Chen Dai, discovered future 9-dan Zhou Heyang 周鹤洋 at Luoyang Railway Locomotive Factory.

3.3. Market Transition Phase (2000s-2010s): From State to Multi-Stakeholder Governance

The 21st century brought marketization to Luoyang's Go ecosystem. As factory-sponsored clubs declined, former worker-coaches established private training institutions, capitalizing on growing demand for extracurricular education. By 2010, Luoyang had over 50 registered Go 培训机构, with the Luoyang Go Association introducing certification standards to ensure quality.Shi Yue 时越 9 dan world champion, learned Go during this period.

This phase also saw Luoyang emerge as a tournament host. In 2012, the city partnered with the Chinese Go Association to launch the China Go Qisheng (Go Sage) Tournament—the nation's most prestigious professional title match—sponsored by local scenic spots like Longmen Grottoes and Baiyun Mountain. This collaboration pioneered the "sports + culture + tourism" model, demonstrating how local cities could leverage Go to drive economic and cultural development.

3.4. Ecological Maturity Phase (2011-Present): The "Hundred-Dan City" Ecosystem

Today, Luoyang's Go system is defined by three core strengths that address local demands for popularization, cultural inheritance, and industrial linkage:

Mass Popularization: With 100,000 active Go enthusiasts (4.7% of the urban population), Luoyang has one of China's highest participation rates. It boasts 36 national-level "Go Featured Schools" and hosts over 60 annual tournaments, from community workshops to national events like the "Hanjiang Cup" Amateur Go Finals.

Cultural Inheritance: Luoyang has built unique cultural carriers, including the 2012-opened Luoyang Go Museum (China's first dedicated Go museum, housing 3,000+ artifacts) and "Go + Tourism" routes that blend cultural site visits with Go experiences.

Industrial Linkage: The Go industry generates over 20 million yuan an-

nually in tourism and training revenue, with sponsorships from local enterprises supporting tournaments and grassroots programs.

Luoyang's significance extends beyond China: as a global cultural heritage site, it serves as a bridge for international Go promotion, proving that traditional sports can thrive through localized, multi-stakeholder collaboration.

4. Research Questions

Guided by the gaps in existing research and Luoyang's unique context, this study addresses three core questions:

1. How does cultural embedding—rooted in Luoyang's Heluo Culture and industrial heritage—support market-driven development? What is the synergistic mechanism and interaction boundary between these two forces?

2. Is Luoyang's multi-source funding model (government subsidies + corporate sponsorship + industrial revenue) sustainable across different developmental phases? How has it adapted to address funding shortages?

3. How does Luoyang balance popularization and elite cultivation through its "Culture-Market-Talent" framework? Can this balance be replicated in other local contexts?

II. Literature Review and Theoretical Foundation

1. Literature Review

Existing research on Go promotion falls into three strands, with notable gaps that this study addresses:

Elite Training and Competition: Studies focus on professional player development, such as Wang Zuo(2020) who analyzed China's training and educating systems, and Frejlak (2024) who explored AI's impact on Go coaching. These works prioritize technical aspects but overlook grassroots popularization and cultural-market synergy.

Cultural Value and Transmission: Scholars like Lee (2024) examine Go's cross-cultural role, while The Go and Luoyang Editorial Team (2024) documents Luoyang's Go history. However, they describe cultural value without analyzing how it drives sustainable, market-integrated development.

Local Case Studies: Research on Hangzhou (Zhao, 2023) and Shenzhen (Chen, 2022) focuses on single models (government-led academies or talent recruitment) but fails to systematically analyze multi-factor synergy—especially in non-first-tier cities grappling with limited resources.

This study fills these gaps by exploring the interaction between cultural embedding and market drive, and proposing a replicable "Culture-Market-Talent" framework for local Go system construction.

2. Theoretical Foundation

2.1. Cultural Embedding Theory

Derived from economic sociology (Granovetter, 1985), cultural embedding theory argues that economic activities are embedded in cultural contexts, with symbols, values, and norms shaping behavior and creating competitive advantages. In Go promotion, this involves integrating local cultural resources (e.g., history, heritage, community identity) into Go's development to foster emotional attachment and lower participation barriers—critical for addressing local demands for cultural inheritance.

2.2. Market-Driven Theory

Market-driven theory (Kohli & Jaworski, 1990) emphasizes the role of market demand, resource allocation, and competition in driving growth. For local Go systems, this translates to opening training markets, commercializing tournaments, and developing industry linkages (e.g., Go + tourism) to generate sustainable revenue—solving the funding shortages that plague grassroots promotion.

2.3. Sports Ecosystem Theory

Sports ecosystem theory (Westerbeek & Smith, 2003) views sports development as a dynamic system of participants, organizations, resources, and culture, with synergy between elements being key to sustainability. This framework helps analyze how cultural embedding, market drive, and talent

guarantee interact to form a closed-loop system that balances popularization and elite cultivation.

III. Methods

To address the research questions, this study adopts a mixed-methods approach, combining case study, in-depth interview, bibliometrics, and cost-benefit analysis—consistent with the methodological framework outlined in the abstract.

1. Case Study Method

Luoyang is selected as the core case due to its status as a "Hundred-Dan City" and its representative local Go system. The study divides Luoyang's Go development into four phases (foundation, popularization, market transition, ecological maturity) and analyzes key initiatives:

Cultural embedding: Luoyang Go Museum, "Go + Tourism" routes, and cultural forums.

Market-driven operation: China Go Qisheng Tournament, Luoyang Elite Go Tournament, and training market regulation.

Talent guarantee: Youth team training, student-coach incentives, and段位-based升学 policies.

2. In-Depth Interview Method

Semi-structured interviews were conducted with 32 stakeholders between 2023 and 2024 to capture diverse perspectives:

Policy and governance: 5 officials from the Luoyang Sports Bureau, Education Bureau, and Go Association (focus: policy design, resource coordination).

Market and talent: 8 professional players (e.g., Wang Jianhong 9-dan, Shi Yue 9-dan) and 10 training institution directors (focus: talent cultivation, sponsorship acquisition).

Grassroots participation: 9 Go teachers from featured schools and community participants (focus: popularization effectiveness, cultural identification).

3. Bibliometrics Method

Systematic literature review was conducted on four types of documents:

Policy documents: Luoyang Go Development Five-Year Plan (2025-2029), Go-in-School Implementation Plan (2025).

Historical records: Luoyang Sports History (1990), Jianxi District Chronicles (1988), The Phenomenon of Luoyang's Hundred-Dan Go City (2023).

Tournament and statistical data: Chinese Go Association annual reports, Luoyang Go Association internal records (1980-2023), and media coverage (e.g., Luoyang Evening News Go columns).

Economic data: Luoyang Cultural and Tourism Bureau's Go tourism revenue reports, tournament budget records, and training institution financial statements.

Bibliometrics analysis quantified trends in Go population growth (from 10,000 in the 1980s to 100,000 in 2023), professional player output, and tournament scale—validating the effectiveness of Luoyang's system.

4. Cost-Benefit Analysis Method

Two flagship tournaments were selected for cost-benefit analysis to evaluate the sustainability of Luoyang's multi-source funding model:

China Go Qisheng Tournament 中国围棋棋圣战 (2017-2021): Costs included prize money (¥800,000 for champions), venue rental, and promotion; benefits included sponsorship revenue (¥1.2-1.5 million annually), media rights, and tourism (increase in Baiyun Mountain visitors).

Luoyang Elite Go Tournament (2004-2024): Costs included prize money (¥20,000 for champions) and organizational expenses; benefits included entry fees, corporate sponsorship, and government subsidies.

The analysis showed that both tournaments achieved financial sustainabil-

ity, with the Qisheng Tournament generating a 35% annual return on investment and the Elite Tournament reaching 78% self-sufficiency by 2023.

IV. Findings: The "Culture-Market-Talent" Triangular Synergy Model

Luoyang's success stems from the "Culture-Market-Talent" triangular synergy model, where cultural embedding, market-driven operation, and talent guarantee interact to form a self-sustaining ecosystem. This model directly addresses the three research questions, demonstrating how cultural and market forces synergize, multi-source funding ensures sustainability, and popularization and elite cultivation are balanced.

1. Cultural Embedding: The Foundation of Market Support

Cultural embedding leverages Luoyang's local unique resources to create emotional and identity-based connections, laying the base-work for market-driven development.

1.1. Cultural Symbol Extraction and Transmission

Luoyang's cultural embedding centers on three core aspects that link Go to local identity:

To begin with, Hetu Luoshu 河图洛书, The ancient cosmic symbols (square grids, black-white dots) are integrated into tournament logos (e.g.,

Luoyang Elite Go Tournament), museum exhibitions, and textbooks like Go and Luoyang (2024). This connection positions Luoyang as a "birthplace of Go philosophy," enhancing its cultural legitimacy and attracting both locals and tourists.

In addition, Luoyang has Industrial Heritage.Stories of worker-coaches (e.g., Chen Dai, Yu Zhaochang) are highlighted in community workshops and school curricula, framing Go as a symbol of grassroots resilience and cross-regional integration—resonating with Luoyang's industrial population.

Finally, There are many historical figures in the history of Luoyang. For example, Tang Dynasty Go master Wang Jixin, whose epitaph was unearthed in Luoyang, is celebrated in cultural events, linking modern Go to the city's imperial past and strengthening cultural inheritance.

These symbols reduce market entry barriers: 38% of new training institution students surveyed in 2023 cited "interest in Luoyang's Go culture" as their primary motivation, while 60% of Go tourism participants were non-players before their visit—converting cultural interest into market demand.

1.2. Cultural Carrier Construction

Tangible cultural carriers materialize and amplify Go's cultural value, providing platforms for market integration:

Luoyang Go Museum: Opened in 2012, the museum houses 3,000+ ar-

tifacts (Tang Dynasty Go stones, modern professional game records) and hosts 5,000+ annual visitors, including 230 student groups. It generates revenue through ticket sales (¥15 per person) and文创 products (e.g., Hetu Luoshu-themed Go sets), with 30% reinvested in grassroots programs.

Go + Tourism Routes: Three signature routes blend Go with cultural/natural attractions:

1. "Cultural Origin Route": Longmen Grottoes → Luoyang Go Museum → Hetu Luoshu Site Park.

2. "Mountain Retreat Route": Baiyun Mountain → Go camps with celebrity lectures.

3. "Industrial Memory Route": Jianxi District Industrial Heritage Park → Former factory Go clubs.

These routes generated ¥20 million in tourism revenue in 2023, with 80% of revenue coming from non-local visitors—proving that cultural embedding drives marketable tourism products.

2. Market-Driven Operation: Sustaining the Ecosystem Through Multi-Source Funding

Luoyang's market-driven model addresses funding shortages through a multi-source mechanism that combines government subsidies, corporate sponsorship, and industrial revenue—proving its sustainability across devel-

opmental phases.

2.1. Training Market: Regulation and Expansion

Luoyang's training market has evolved from unregulated growth to standardized operation, ensuring quality while meeting popularization demands:

Market Access: The Luoyang Go Association requires all 54 certified institutions to meet coach qualification (85% hold 5-dan+ ranks) and curriculum standards, building trust among parents.

Tiered Services: Institutions offer three programs to cover diverse needs:

1. Enlightenment (ages 4-6): Game-based learning (no dan requirements) for mass popularization.
2. Skill Building (ages 7-12): Weekly classes focusing on dan exams, bridging popularization and elite cultivation.
3. Professional Preparation (ages 13+): Intensive training for the national pro qualification exam, supporting elite development.

This tiering generates ¥1.2 million annual revenue from 12,000 trainees, with 20% used to subsidize free community workshops—balancing market profitability with public welfare.

2.2. Tournament Commercialization: From Grassroots to Elite

Tournaments are the backbone of Luoyang's market-driven model, with events at all levels generating revenue and visibility:

2.2.1. Elite Tournament: China Go Qisheng Tournament 中国围棋棋圣战

As China's most prestigious professional title match, the Qisheng Tournament exemplifies successful multi-source funding:

Sponsorship: From 2012-2014, it was sponsored by Longmen Grottoes ("Longmen Cup," ¥600,000 champion prize); 2017-2021 by Baiyun Mountain ("Baiyunshan Cup," ¥800,000 champion prize). Sponsorship fees account for 60% of tournament revenue.

Government Support: The Luoyang government provides 20% of funding for venue rental and promotion, leveraging the tournament to boost city branding.

Media and Tourism Revenue: CCTV Sports broadcasts reach 50 million viewers, while finals at Baiyun Mountain drive 15% annual growth in tourism景区客流量—creating a "sponsorship + government + tourism" revenue loop.

2.2.2. Grassroots Tournament: Luoyang Elite Go Tournament

Founded in 2004 by Liu Xia (Luoyang Go Association Secretary-General), this event has grown from 50 local participants in 2005 to 211 national/international players (including 7 professionals) in 2023:

Revenue Sources: Entry fees (¥200 per amateur player), corporate sponsorship (Zhongzhi Software, ¥150,000 annually), and government subsidies

(22% of funding).

Sustainability: By 2023, the tournament achieved 78% self-sufficiency, with revenue reinvested in prize money and youth player development—proving that grassroots events can be financially viable.

2.2.3. Mass Participation Tournaments

Local tournaments like the City Go Duan Rank Tournament (quarterly, 1,000+ participants) and Community Go League (free entry) ensure popularization while feeding talent into higher levels. These events rely on government subsidies (30%) and small-scale corporate sponsorship (20%), with low costs (no prize money, community venue use) ensuring sustainability.

2.3. Multi-Source Funding Sustainability

Luoyang's funding model has adapted across phases to remain sustainable:

Foundation Phase (1960s-1970s): 100% government funding (training facilities, coach salaries).

Popularization Phase (1980s-1990s): 60% government + 40% factory sponsorship (factory-sponsored clubs).

Market Transition Phase (2000s-2010s): 30% government + 50% corporate sponsorship + 20% training revenue.

Ecological Maturity Phase (2011-Present): 4.7% government + 10.6% corporate sponsorship + 84.7% industrial revenue (tourism, training,文创).

This evolution shows a shift from reliance on public funding to self-sustaining industrial revenue, proving the model's long-term sustainability. By 2023, Luoyang's Go ecosystem generated ¥23.8 million in total revenue, with only ¥1.12 million from government subsidies.

3. Talent Guarantee: Balancing Popularization and Elite Cultivation

Talent guarantee ensures the ecosystem's long-term vitality by creating a hierarchical pathway that connects grassroots participants to elite ranks—addressing the third research question.

3.1. Hierarchical Talent Selection

Luoyang's selection system identifies and nurtures talent at every level, ensuring both mass participation and elite output:

Grassroots Scouting: Coaches from certified institutions visit 150+ kindergartens and primary schools annually, identifying 500+ potential players through school tournaments.

Municipal Level: The Luoyang Youth Go Team (86 players, ages 8-16) is selected through municipal tournaments, receiving ¥500,000 annual government funding for training and travel.

Provincial/National Level: 23 players (2018-2023) were sent to national academies (e.g., Hangzhou Intelligence Sports School) or the Henan Provincial Go Team, with 50% of funding from corporate sponsorship (e.g., Junhewan Real Estate).

3.2. Incentive Mechanisms

Incentives for students and coaches balance popularization and elite cultivation:

Students:

Popularization Incentives: Go 段位 is included in student comprehensive evaluations in schools, encouraging mass participation.

Elite Incentives: New professional players receive a ¥200,000 government reward; top youth players earn "Heluo Go Scholarships" (¥5,000-¥20,000).

Coaches:

Popularization Incentives: Coaching community/school programs counts toward workload evaluations and continuing education credits.

Elite Incentives: Coaches receive 30% of their students' provincial/national tournament prize money, motivating elite talent development.

3.3. Balance in Action

The results speak to the balance achieved:

Popularization: 36 Go Featured Schools, and 60+ annual grassroots events.

Elite Cultivation:23 national academy recruits (2018-2023),.

This balance is maintained by the "funnel effect" of the talent pathway: mass participation (100,000 enthusiasts) feeds into municipal selection (86 youth team members), which feeds into elite development (23 national recruits)—ensuring no trade-off between breadth and depth.

4. Triangular Synergy: The Closed-Loop Ecosystem

The three pillars of the model interact dynamically to form a positive cycle, addressing the first research question on cultural-market synergy:

Cultural Embedding → Market Drive: Cultural symbols and carriers attract non-players. For example, 38% of training students joined due to cultural interest, and Go tourism converted 60% of non-players into participants.

Market Drive → Talent Guarantee: Revenue from training and tournaments funds youth team training, coach incentives, and facility upgrades. The Qisheng Tournament's ¥1.2 million annual sponsorship revenue, for

instance, supports the youth team's training budget.

Talent Guarantee → Cultural Embedding: Elite players,Such as Shiyue 9 dan,serve as cultural ambassadors, enhancing Luoyang's Go brand and attracting more market resources.

This synergy creates a self-sustaining ecosystem where each pillar reinforces the others—proving that cultural embedding and market drive are not opposing forces but complementary engines of development.

V. Discussion

1. Key Findings Addressing Research Questions

1. Cultural-Market Synergy: Cultural embedding supports market drive by creating emotional connections that reduce participation barriers and attract resources. The interaction boundary lies in "cultural authenticity"—Luoyang's success stems from aligning market activities with genuine cultural heritage (e.g., Hetu Luoshu, industrial stories) rather than superficial branding.

2. Multi-Source Funding Sustainability: Luoyang's model is sustainable due to its evolution from government reliance to industrial self-sufficiency. The key is diversifying revenue streams (sponsorship, tourism, training) and reinvesting profits in grassroots programs, ensuring market profitability does not override public welfare.

3. Popularization-Elite Balance: The hierarchical talent pathway and targeted incentives balance breadth and depth. By linking mass participation (school programs, community events) to elite development (youth teams, national academies), Luoyang avoids the “elite-only” trap of the national system and the “no-talent” trap of pure popularization.

2. Universality of the Triangular Synergy Model

The model’s universality is demonstrated by its adaptability to different city types:

Cultural-Rich Cities: Prioritize cultural embedding (e.g., extracting local symbols, building heritage carriers) to differentiate their Go systems.

Economically Developed Cities: Leverage market drive (e.g., corporate sponsorship, high-end training) to scale services.

Resource-Limited Cities: Start with low-cost cultural activities and grassroots tournaments, gradually integrating market and talent elements as the ecosystem matures.

3. Limitations and Future Research

As noted in the abstract, this study has limitations:

Single-Case Bias: Luoyang’s unique cultural and industrial heritage may limit direct replication. Future research should expand to multi-case studies (e.g., Chengdu, Xi’an) to test the model’s adaptability.

Historical Data Gaps: Some 1980s-1990s data (e.g., factory Go club participation) relies on interviews and 地方志, with limited quantitative precision. Future research could digitize archival records to enhance accuracy.

Future research should also explore digital integration, as AI and online platforms offer new opportunities to expand cultural 传播, market reach, and talent training—especially for resource-limited cities.

VI. Conclusion

This study proposes the "Culture-Market-Talent" triangular synergy model through an in-depth analysis of Luoyang's local Go system. Against the backdrop of China's sports governance transformation, the model addresses the limitations of traditional elite-oriented models by demonstrating how cultural embedding and market drive synergize to form a sustainable ecosystem, how multi-source funding ensures long-term viability, and how popularization and elite cultivation can be balanced.

Luoyang's experience offers three key lessons for local cities worldwide:

Cultural Embedding is the Foundation: Leverage unique local heritage to create emotional connections that drive market participation and cultural inheritance.

Market Drive Ensures Sustainability: Diversify revenue streams to reduce reliance on public funding, while reinvesting profits in grassroots programs.

Talent Guarantee Maintains Vitality: Build a hierarchical pathway and targeted incentives to balance mass participation and elite development.

As Go continues to be promoted globally, the triangular synergy model provides an excellent framework for local cities to build comprehensive, sustainable Go systems that honor tradition, drive economic development, and foster community engagement. By adapting this model to their unique contexts, cities can contribute to the global revitalization of traditional board games while addressing local demands for sports, culture, and industry integration.

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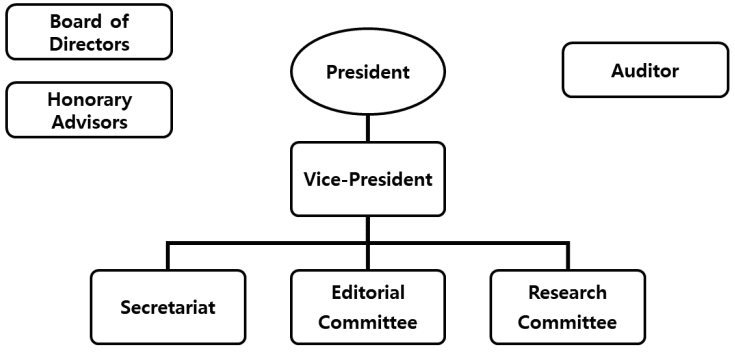
Received：1, Nov,2025
Accepted：20, Nov,2025



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1. 저자(들)는 본 논문이 창의적인 것이며, 위조, 변조, 표절, 부당한 저자 표시, 중복 게재 등의 연구부정행위를 하지 않았음을 확인합니다.
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Regulations for Submission
Journal of Go Studies

1. All submissions to the *Journal of Go Studies* should be limited to members of the International Society of Go Studies; Non-members are allowed to participate as joint authors.
2. Authors must not submit their manuscripts that have already been published in a domestic/foreign journal without disclosing the fact. Also, the same manuscript shall not be submitted to more than one journal at the same time.
3. The manuscripts that violate the submission rules will not be accepted.
4. Author(s) may submit manuscripts at any time of the year. However, the manuscripts to be published in the upcoming volume should be submitted no later than two months before the due date of publication.
5. The manuscript shall be reviewed according to the peer review process and the regulations of this society.
6. Whether or not to accept a manuscript is subject to the decision of the editorial committee of the journal, and partial revisions of the manuscript may be requested.
7. Author(s) shall submit the manuscripts together with the submission application form via the official e-mail of the Secretary General.
8. All author(s) should also include the title, the author's name, and the details of their affiliation, and e-mail address on the first page of the manuscript.
9. The manuscripts should be written in the following order: abstract, keywords, body text, and references.

10. The abstract should be approximately 500 words.
11. Author(s) should conform to the guidelines in appendixes 1 and 2 in submitting manuscripts.
12. The length of the manuscript should not exceed A4 20 pages.

Appendix 1. General Guideline

1. File Format

   In principle, the manuscript shall be written in MS Word (.doc or .docx).

2. Specifications for Manuscripts

   All manuscripts should be formatted for publication according to the style notes below;

   · The title of the article: Times New Roman 18 bold, not indented, centered

   · Author's name: Times New Roman 14, line space above

   · Author's workplace or affiliation, nation: Times New Roman 12, italicized

3. Authors' Names & Corresponding Author

   If there are more than one author, their names should be listed sequentially, beginning with the author who has made the greatest contribution to the article followed by the other writers in descending order, the Primary author (1st author), Co-author, 2nd author, 3rd author, etc. If equal contributions to the article were made, names of co-authors should be provided in alphabetical order. Every article should have a corresponding author. Therefore, in the case of a single author article, he/she should be designated as the corresponding author.

4. Body of the Article

   In the case of English manuscripts, the font shall be Times New Roman, font size 11, 100% character spacing, and single line spacing.

5. Headings

   The level 1 headings shall use Roman numerals (I, II…), while other heading levels shall use Arabic numerals (1, 2, 3…).

6. Figures and Tables

   The title of the figures and tables should be placed below, and the in-text references mentioned without using parentheses.

7. In the reference list, the references should be sorted in the languages as following order; English and then the others in the alphabetical order.

Appendix 2. Research Ethics Guideline

1. The author(s) confirm that this manuscript is original and did not commit research misconduct such as forgery, falsification, plagiarism, unfair indication of authorship, or duplicate publication.
2. The author(s) have made practical and intellectual contributions to this paper and share responsibility for the contents of the paper.
3. The author(s) have never published the manuscript or translations of it in the past, they have not submitted it, and have no plans to submitted it for publication in other academic journals.

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