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Association between Go Experience and Sustained Attention in Young Adults

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Abstract

Due to increasing digital distractions, maintaining attention has become essential for effective learning and work performance. This cross-sectional study examined whether experience with the strategic board game Go is associated with enhanced attentional control in young adults. Ninety-nine university students (49 with substantial Go experience and 50 with minimal experience) completed the Sustained Attention to Response Task and a background questionnaire. Participants with extensive Go experience demonstrated higher overall accuracy than those with minimal experience and performed better on response trials than on withhold trials. Accuracy further increased with both Go proficiency and years of exposure. These results suggest an association between Go experience and sustained attention and inhibitory control in young adults, with implications for educational contexts.

Keywords: Go game, attentional control, sustained attention, inhibitory control, executive function, cognitive enhancement

I. Introduction

In learning environments, students must sustain attention amid constant distractions, multitasking, and short-form digital media, raising concerns about the capacity to maintain focus during instruction and independent learning. Mark (2023) reported evidence from her empirical work that the average time people spend on a single screen has decreased from approximately 2.5 minutes in 2004 to around 47 seconds by 2020. Educators likewise report that students often struggle to maintain attention for extended periods across all educational levels (Bunce et al., 2010; Hlas et al., 2019; Godwin, 2025; Cueto, 2025). Since attentional control and inhibitory control support key learning behaviors such as following instructions, resisting distraction, and completing extended tasks, there is renewed interest in activities and instructional approaches that may help strengthen these skills.

Digital and board games offer diverse cognitive demands, and their increasing popularity has motivated research on how games influence human behavior and cognitive functions. A common approach compares players with non-players. Recent studies have reported that players tend to exhibit superior cognitive performance compared to non-players (Martinez et al., 2023; Choi et al., 2020; Noda, Shirotsuki, & Nakao, 2019). However, evidence varies by game genre, outcome measure, and study design, and the mechanism behind the benefits remains under debate.

The strategic board game Go (also known as Baduk in Korea) provides a relevant context for studying attentional control. It requires prolonged focus, continuous monitoring, anticipation of the opponent's next moves, and refraining from impulsive responses. Recent review articles agree on the view that Go is associated with a broad range of cognitive benefits. Kim (2025) surveyed cognitive and neural lifespan evidence and reported intervention findings that suggest improvements in working memory, attention, strategic decision-making, and emotion regulation. Long-term Go training is associated with structural and functional brain adaptations, whereas short Go programs show rapid, domain-specific gains, particularly among individuals with ADHD, mild cognitive impairment, and dementia. The author notes methodological heterogeneity as a key limitation and calls for larger, longitudinal, and cross-cultural studies. Rieger and Wang (2021) similarly summarized neurobiological and psychological research linking Go play to enhanced general intelligence, attention, creativity, emotional intelligence, and personality, as well as its potential use as a treatment for patients with ADHD. Wu (2025) reviewed board-game research and empirical studies on Go, describing existing evidence that supports benefits for executive function, working memory, attention, and reasoning of children and older adults. She argues that introducing Go in early elementary education could be a promising innovation for fostering cognitive skills. Wu also addresses methodological flaws, such as small sample sizes, a lack of reporting effect sizes, and the small number of studies.

Building on these findings, the present study examines whether experience with Go predicts attentional control in non-clinical young adults. Specifically, we investigate whether Go experience relates to sustained attention and inhibitory control, and whether proficiency level and years of exposure contribute to individual differences. We assess these abilities with a standard sustained-attention task (SART). Our pre-specified hypotheses were: (H1) students with Go experience would show higher SART accuracy scores than Go novices, and (H2) attentional performance would be positively associated with both proficiency and years of exposure. Understanding the link between

Go experience and attentional control may provide new insights into the educational benefits of learning and playing Go and inform pedagogical practices.

II. Literature Review

1. Attentional Control and Games

The relationship between traditional games, modern games, and attentional control can be understood through their respective cognitive demands and effects on attentional processes. Most research to date has focused on modern digital games, particularly action video games, and their influence on attention and executive control. Comparatively fewer studies directly examine traditional games, but their cognitive impact can be inferred from shared features such as rules, competition, and strategy. A review of the aspects of attention enhanced in digital game players suggests changes in the mechanisms that control attention allocation and efficiency (Hubert-Wallander, Green, & Bavelier, 2011; Shahmoradi, Mohammadian, & Rahmani Katigari, 2022; Wiley, Robinson, & Mandryk, 2021).

Research on modern digital games shows consistent evidence of a direct relationship between playing them and having better measures of attentional control. Action video games have been found to enhance both the ability to select relevant information and the ability to respond efficiently to it (Chisholm & Kingstone, 2015). In all the studies reviewed, players typically demonstrate faster reaction times, greater resistance to distraction, and more efficient task-switching compared to non-gamers (Cain et al., 2012). These improvements appear to be related to enhanced top-down attentional control: frequent players show fewer involuntary shifts of attention toward irrelevant stimuli, indicating better suppression of distractions (Cain et al., 2014). Neurocognitive evidence suggests that these attentional advantages are linked to strengthened activation of frontoparietal networks involved in executive control (Bavelier et al., 2012).

Importantly, the benefits of digital games are not restricted to a single sensory domain. Studies report cross-modal attentional improvements, showing that video game training positively affects both visual and auditory attention, indicating a supramodal effect on alerting and executive control (Wu et al., 2021). Beyond action games, real-time strategy games have also been shown to improve visual attention and reactive control, and these effects appear stronger when accompanied by background music that promotes proactive control (Zhang et al., 2016). In educational contexts, serious games have demonstrated measurable improvements in attention, especially in students with ADHD and learning disorders, indicating that attentional gains are not limited to entertainment-focused game design (García-Redondo et al., 2019).

Although empirical data on traditional games are more limited, existing evidence reveals that they also engage and develop attentional mechanisms. Turn-based board games such as chess or Go require sustained and selective attention, as well as working memory, functioning similarly to non-action digital games in terms of attentional demands. Traditional physical games (such as tag or ball games) train divided attention and motor coordination through real-time monitoring of multiple moving targets (Bavelier & Green, 2024), which parallels the attentional benefits associated with action video gaming.

Research has consistently found that both traditional and modern games contribute to attentional development, but they do so through different mechanisms. Traditional games tend to promote attentional endurance, planning, and perseverance, whereas modern digital games more efficiently train rapid attentional shifts, executive control, and distraction suppression across multiple sensory modalities. Together, they provide complementary pathways for strengthening attention management. However, merely playing a game may not be sufficient to produce observable effects. Variables such as length of use (i.e., years spent playing) or level of proficiency (regular practice vs. sporadic play) could yield very different findings.

2. Attentional Control and Go

Go provides a natural setting to train attention: players need to stay focused while monitoring a gradually developing position, evaluate local fights while estimating the whole-board position, and resist impulsive moves. These features support sustained-attention skills. The two components (sustained focus and inhibition of prepotent responses) mirror the demands of the Sustained Attention to Response Task (SART) used in the present study.

Developmental and clinical studies align with this view. In a six-month kindergarten program, Kim and Cho (2010) reported gains in performance IQ, problem-solving, and delay of gratification relative to a control group. In children with ADHD (7–12 years), an intensive 16-week Go program (10 hours/week) was associated with reduced inattention, better working memory, and prefrontal electroencephalography (EEG) changes compared to a matched non-ADHD group (Kim et al., 2014).

EEG studies with primary-school children also report attention-related benefits of Go training. A three-month pre–post study found improvements in

EEG-based indices of attention but lacked a control group (Ahn, 2008). In a follow-up study, 20 children received intensive Go instruction (80 minutes/day, five days/week for one year) and outperformed a control group on measures of mental activity and emotional stability (Ahn et al., 2010).

In later life, a 15-week program with residents of Japanese care homes diagnosed with mild to moderate dementia, weekly Go lessons improved attention and working memory relative to controls (Iizuka et al., 2018). Subsequent work reported better visual-memory span test results, with stronger effects for face-to-face than tablet-based instruction (Iizuka et al., 2019). Together, these findings across childhood and ageing suggest that Go training engages cognitive processes relevant to attention regulation throughout the lifespan, yet the effects during early adulthood (a period of high cognitive plasticity) remain largely unexplored.

Neuroimaging research in Go experts complements these findings. Early work linked Go to the activation of brain areas involved in attention and visuospatial processing (Chen et al., 2003), while Ouchi et al. (2005) implicated dorsal parietal and frontoparietal networks during Go problem-solving, with efficiency differences observed between experts and novices. Diffusion-tensor imaging also suggests structural adaptation with long-term Go practice: young Go experts with 12 years of experience showed increased white matter connectivity in networks for attention, working memory, and cognitive control (Lee et al., 2010). Additional structural and resting-state work points to adaptations in networks supporting monitoring and decision-making (Jung et al., 2013; Sohn et al., 2017), and during non-Go working-memory tasks, experts showed superior parietal activation and stronger frontoparietal and frontotemporal connectivity (Jung et al., 2018). In number-estimation tasks, Go professionals exhibit greater cerebellar engagement that is linked to complex cognitive processes and fast, intuitive decision-making (Lee et al., 2025). Furthermore, Wojtasinski and Francuz (2019) found that Go expertise correlates with visuospatial ability and pattern recognition in young male adults (18–26 years). Overall, these neuroimaging results converge on the idea that Go expertise involves adaptations in neural systems responsible for monitoring, decision-making, and top-down attentional control.

Compared to other frequently studied board games such as chess, Go may place distinct demands on attentional and executive processes. While chess often relies on piece-specific rules, discrete move sets, and relatively constrained decision trees, Go involves a larger board, more uniform rules, and a substantially higher number of possible configurations. This may place greater demands on sustained attention, global monitoring, and the integration of local and global patterns over extended periods of time. In addition, the absence of clearly defined piece hierarchies in Go may reduce reliance on rule-based processing and instead emphasize distributed attention and strategic flexibility. Furthermore, games of Go usually last longer than games of chess. In other words, players need to focus on a single game for longer until the outcome is decided. These characteristics suggest that Go may engage attentional control mechanisms in ways that differ from other board games, potentially leading to distinct cognitive profiles.

Despite these encouraging findings, the cognitive benefits of Go for healthy young adults remain understudied. Much of the literature targets children, older or clinical populations, and the few young-adult samples are male-only. Most intervention studies are short-term, except for a one-year study on children. Existing evidence nonetheless suggests that Go may enhance attention control, but effects are likely to vary with individual experience. The present study, therefore, tests whether Go experience relates to sustained attention and inhibitory control in young adults and examines whether these outcomes depend on individual factors such as length of exposure and proficiency in the game.

III. Methodology

1. Participants

This cross-sectional study included 99 Korean undergraduate students (aged 18–28) enrolled at two private universities in South Korea. Participants were recruited through a course participant pool between March and December 2023. Participation was voluntary, and all participants provided written informed consent. Data from a small number of non-Korean participants were excluded from the analyses.

Participants were divided into two groups: a group with substantial experience playing Go (hereafter, the Go Group) and a group with minimal experience (the No-Go Group), with the demographics shown in Table 1. The Go Group consisted of 49 participants (13 were females and 36 males), with an average age of 21.88 years (SD = 2.35). This group demonstrated a diverse range of proficiency in their second language (L2, English), with the majority indicating intermediate (or lower) proficiency (81.63% of the participants). Their experience with Go was notable, with all members possessing extensive knowledge of the game. On average, they began learning Go at the age of 6.94 years (SD = 1.93) and accumulated significant experience, with an average of 14.94 years (SD = 3.30) of playing the game. They reported currently spending an average of 4.80 hours per week (SD = 7.98) on Go-related activities (learning, playing, or teaching Go).

The No-Go Group consisted of 50 participants (35 females and 15 males), with an average age of 21.38 years (SD = 2.50). Unlike the Go Group, all participants in this group had experience with an L2 (English), with most of them rating their proficiency as intermediate or higher (82%). Only 36% of the participants had any proficiency in Go. On average, they started learning Go later in life, at the age of 8.61 years (SD = 1.94) and had minimal experience, with an average of 0.65 years (SD = 1.25). Furthermore, they reported currently spending a negligible time of 0.01 hours per week (SD = 0.07) on Go activities.

As shown in Table 1, groups differed significantly in gender distribution, $\chi^2(1) = 17.02$, $p < .001$, and knowledge of Go, $\chi^2(1) \approx 45.00$, $p < .001$. No significant differences were observed for age, $t(97) = 1.02$, $p = .31$, or self-reported attention, $t(97) = 1.97$, $p = .052$. As expected, all Go-related variables differed significantly between groups (all $p < .001$), reflecting the criteria used to define group membership.

Table 1. Participant demographics

	Go Group	No-Go Group	Test	p-value
Gender	13 female, 36 male	35 female, 15 male	$\chi^2(1) = 17.02$	< .001
Age	21.88 (2.35)	21.38 (2.50)	t(97) = 1.02	.31
Knowledge of Go	100%	36%	$\chi^2(1) \approx 45.00$	< .001
Age starting to learn Go	6.94 (1.93)	8.61 (1.94)	t ≈ 4.30	< .001
Years of experience with Go	14.94 (3.30)	0.65 (1.25)	t ≈ 27.00	< .001
Current hours per week playing Go	4.80 (7.98)	0.01 (0.07)	t ≈ 4.20	< .001
Go Level (0-5, see Table 2)	4.86 (0.35)	0.78 (1.15)	t ≈ 20.00	< .001
Self-reported attention	72.33 (14.36)	66.59 (14.65)	t(97) = 1.97	.052

The aim was to compare individuals with significant Go experience to those with little or none. However, because Go is culturally widespread in South Korea and commonly perceived as educationally beneficial (TNO, 2024), recruiting a completely naïve control group was not feasible. Accordingly, while the between-group analyses used the categorical distinction above, analyses of individual differences in Go experience were conducted at the participant level, irrespective of group (Table 2).

The primary outcome variable was SART2 accuracy. The experimental design incorporated three independent variables: (a) group (Go vs. No-Go), (b) Go proficiency level (0-5; 0 = no experience; 5 = expert), and (c) years of exposure to Go. Gender and L2 proficiency were considered potential moderating factors.

Table 2. Participants' Go Proficiency

	Female	Male	Total
Go proficiency (0-5) [1]			
0=non-player	23	9	32
1=beginner	2	2	4
2=basic	6	1	7
3=intermediate	4	3	7
4=advanced	3	4	7
5=expert	10	32	42
Total	48	51	99

1) Non-player = Does not know how to play Go. Beginner = weaker than 20 kyu. Basic = 19−11 kyu. Intermediate = 10−1 kyu. Advanced = 1−4 dan. Expert = stronger than 4 dan.

2. Tasks and Procedure

Participants completed two tasks: a background questionnaire and the Sustained Attention to Response Task 2 (SART2).

The background questionnaire (presented bilingually in English and Korean) aimed to gather demographic information such as age, gender, language proficiency, and familiarity with the game of Go. Additionally, it included questions regarding participants' self-reported attention levels and other relevant factors, for which we adapted the questions of the Attention Control Scale (ATTC or ACS), a widely used self-report instrument designed to assess individuals' ability to maintain focus and flexibly shift attention between competing stimuli or tasks (Derryberry & Reed, 2002). The scale captures two complementary dimensions of attention control: focusing, or the capacity to resist distraction and sustain attention on a task, and shifting, or the ability to redirect attention efficiently when required. Higher scores indicate greater perceived control over attentional focus and flexibility.

The SART2 (a newer version of the SART that provides visual feedback when the participant presses the button correctly and an error message after each mistake) was implemented using the online PsyToolKit software (Stoet, 2010; 2017). We adjusted the tool by creating a Korean version of the instructions. The instructions for the SART2 were translated into Korean to ensure participant comprehension. This adaptation was limited to the instructional component, while the task structure, stimuli, and timing parameters remained identical to the original validated version (Stoet, 2010, 2017). Given that the SART2 is a non-verbal task relying on simple digit recognition and response inhibition, the translation of instructions was not expected to affect the underlying cognitive processes assessed.

The test sessions were conducted either individually or in small groups within a designated lab area. During the SART procedure, a total of 225 single digits, comprising 25 of each of the nine digits, were visually presented over a 3.2-minute period. Each digit appeared for 149 milliseconds, followed by an 899-millisecond mask. Participants were instructed to respond by pressing the space bar to each digit (henceforth, "response condition") except for the 14 occasions when the digit "3" appeared, prompting them to withhold their response (henceforth, "withhold condition"). Performance in the response condition reflects sustained attention and response consistency, whereas accuracy in the withhold condition indexes inhibitory control, that is, the ability to suppress an automatic response.

Participants used their preferred hand to respond. The target digit was distributed randomly throughout the 225 trials. The time interval between digit onsets was 49 milliseconds. Participants were instructed to give equal priority to accuracy and response speed during the task. The digits were displayed in one of five randomly assigned font sizes, ranging from 37 to 109 points, to increase the cognitive demand for processing numerical value rather than relying on peripheral features for identifying the no-response target. Both digits and masks were presented in the middle of the screen in white against a black background. The screen was positioned at a typical viewing distance of approximately 40-50 cm from the participant's eyes, following standard SART protocols (Stoet, 2010; 2017). Each session began with a practice period involving seven-digit presentations, two of which were targets.

The SART and its updated version, the SART2, have been widely employed to assess sustained attention and inhibitory control (Alloway & Alloway, 2012; Ralph et al., 2015; Robertson et al., 1997). By combining these measures, the present study aimed to examine how attentional control relates to individual differences in Go experience and proficiency.

3. Statistical Analysis

A range of data analyses were conducted using R (R Development Core Team, 2009), depending on whether a group comparison was made or the effects of individual differences with respect to experience with Go were analyzed.

For the group comparison, a Two-Way Analysis of Variance (ANOVA) was conducted using R (R Development Core Team, 2009) to compare the effects of Group (Go, No-Go) and Condition (Response, Withhold) on accuracy in the SART2 task. All effects were statistically significant at the 0.05 significance level.

Although experience with Go is inherently a continuous variable, its distribution in the present sample was highly uneven, with minimal-experience participants showing very limited exposure and no active engagement at the time of testing. In addition, exploratory correlation analyses treating experience as a continuous predictor yielded inconclusive results. Therefore, for the primary analyses, a categorical distinction (Go vs. No-Go) was retained to allow for more robust and interpretable group comparisons. Analytical decisions were guided by prior literature on attentional control and game-based cognitive engagement, with a focus on a limited set of theoretically motivated variables (group, condition, proficiency level, and years of exposure). Additional variables were explored but not retained in the final models to preserve parsimony and avoid issues related to collinearity and overparameterization, mostly given the exploratory nature of this study.

Potential covariates, including age and gender, were examined in preliminary analyses to assess their association with SART2 accuracy. These variables did not show consistent or statistically meaningful relationships with the outcome measure and were therefore not included in the primary models. Additional covariance analyses were conducted to determine whether gender distribution and bilingual proficiency significantly influenced attentional-control performance. Although the groups differed descriptively in both variables, neither gender ($F(1, 86) = 0.59$, $p = .446$, $\eta p^2 = .007$) nor bilingual proficiency ($F(1, 86) = 0.55$, $p = .459$, $\eta p^2 = .006$) emerged as statistically significant predictors of SART2 accuracy after controlling for group membership. Importantly, the main effect of Go experience remained significant after inclusion of these covariates ($F(1, 86) = 15.19$, $p < .001$, $\eta p^2 = .15$). Furthermore, given the sample size and the focus on theoretically motivated predictors, excluding additional covariates helped preserve model parsimony and avoid overparameterization.

After examining the accuracy results separately for both groups (Go, No-Go) and the two conditions (Response, Withhold), we conducted two additional analyses on individual differences related to participants' experience with Go. The first analysis, a Two-Way ANOVA, was conducted to compare the effects of Condition (Response, Withhold) and level of Go (coded numerically, ranging from 0 for individuals without knowledge of Go to 5 for participants at an expert level) on SART2 accuracy. Finally, the effect of years of learning Go was examined using Pearson's linear correlation analysis in R (R Development Core Team, 2009). The value representing years of learning Go was calculated by subtracting the age at which participants started learning Go from their current age (unless they explicitly stated in the questionnaire that they had stopped playing the game earlier).

Reaction-time measures were examined during the preliminary stages of analysis. However, the present study ultimately focused on accuracy-based outcomes for several methodological reasons. First, participants were instructed to prioritize accuracy over speed during task performance. Second, data collection took place across different testing locations and hardware configurations, and variables such as monitor refresh rates and keyboard response latency were not systematically controlled. Finally, the withhold condition of the SART2 paradigm does not generate meaningful reaction-time data for successful trials because accurate responses involve inhibition rather than overt motor responses. Accordingly, accuracy was considered the most reliable and interpretable measure of sustained attention and inhibitory control in the present dataset.

IV. Results

1. Group Comparison

The results of comparing the two groups are shown in Figure 1. Accuracy in the response condition is represented in dark grey, and that for the withhold condition in light grey for the Go and No-Go groups, respectively.

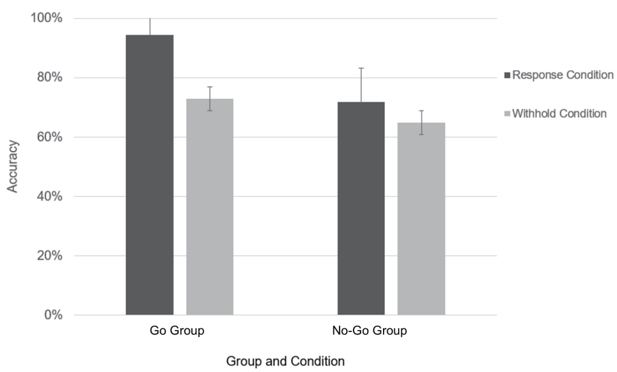

Figure 1. Accuracy in the attention-control task of the two groups across the two conditions

A Two-Way Analysis of Variance (ANOVA) was performed to analyze the effects of Group (Go, No-Go) and Condition (Response, Withhold) on accuracy in the attention-control measure. A main association of Group showed that participants in the Go group were statistically more accurate than participants in the No-Go group ($F(1, 98) = 35.43$, $p < .001$, $\eta p^2 = .27$). A main association of Condition showed that participants were more accurate in the response condition than in the withhold condition ($F(1, 98) = 78.49$, $p < .001$, $\eta p^2 = .44$). Finally, there was a marginal interaction between Group and Condition ($F(1, 98) = 3.90$, $p = .052$, $\eta p^2 = .04$), revealing that participants in the Go group were statistically more accurate in the response condition than in the withhold condition, compared with the No-Go group.

2. Impact of Go Strength

Accuracy as a function of level of mastery in Go is shown in Figure 2. The horizontal axis displays levels of proficiency in Go ranging from 0 (individuals without experience) to 5 (individuals with expertise). Accuracy in the response condition is depicted in dark grey, and accuracy in the withhold condition in light grey.

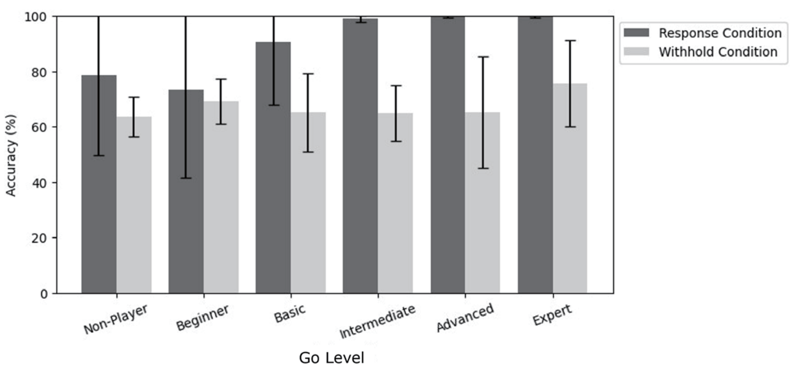

Figure 2. Accuracy in the attention-control task by Go level for both conditions

A Two-Way Analysis of Variance (ANOVA) was performed to analyze the effects of Go strength (six proficiency groups: Non-player, Beginner, Basic, Intermediate, Advanced, Expert) and Condition (Response, Withhold) on individuals' accuracy results in our attentional control measure. A main association of proficiency level showed that participants at higher levels of expertise were statistically more accurate than those at lower levels ($F(1, 194) = 34.44$, $p < .001$, $\eta p^2 = .15$). A main association of Condition showed greater accuracy in the response condition than in the withhold condition ($F(1, 194) = 77.69$, $p < .001$, $\eta p^2 = .29$). Finally, there was a significant interaction between proficiency level and Condition ($F(1, 194) = 2.53$, $p < .001$, $\eta p^2 = .01$), indicating that participants were better in the response condition than in the withhold condition as their mastery in Go increased.

3. Impact of Years of Exposure to Go

The correlation between years of exposure to Go and accuracy in the SART2 task is shown in Figure 3.

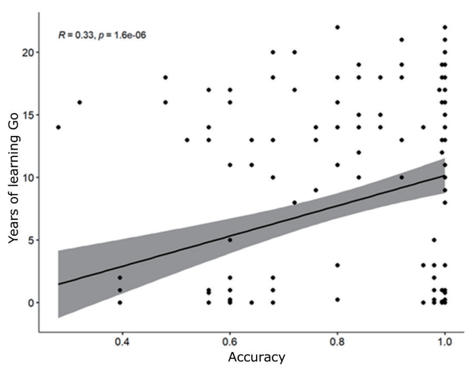

Figure 3. Accuracy in the attentional control task as a function of years of learning Go

The results of the correlation analysis showed a significant, moderate, positive correlation between years of exposure to Go (learning and playing the game) and participants' accuracy results in the attention-control task ($r = 0.33, p < .001$). According to Cohen's (1988) benchmarks, this represents a medium effect size, suggesting a practically meaningful association between accumulated Go experience and attentional-control performance.

V. Discussion

The present study examined whether learning and playing Go are associated with attentional control in young adults and which factors modulate this relationship. Young adults with Go experience outperformed minimally experienced peers on the Sustained Attention to Response Task (SART) accuracy. Moreover, higher Go level and more years of exposure predicted better performance, implying a graded, experience-related association with sustained attention and response inhibition.

These results align with previous developmental (Kim & Cho, 2010) and clinical studies (Kim et al., 2014; Iizuka et al., 2018) that have reported attention-related benefits from Go instruction, and extend those findings to a non-clinical, young-adult population. Playing Go naturally requires prolonged monitoring of board positions, suppression of impulsive candidate moves, and strategic evaluation at local and global levels, skills that plausibly overlap with those required in the SART2 task employed in the current study. Comparable findings have been observed in other cognitively demanding games, such as chess and certain video games, where structured practice is linked to gains in working memory and executive control (Choi et al., 2020). For chess, evidence suggests that transfer to other domains is most likely when it is learned for at least 25-30 hours (Sala & Gobet, 2016). Neuroimaging evidence of activation in frontoparietal and visuospatial networks among Go experts (Chen et al., 2003; Ouchi et al., 2005) and structural white-matter adaptations linked to attentional control (Lee et al., 2010) offer a convergent neural explanation for these behavioral associations. Importantly, our findings indicate that not only familiarity with Go, but also proficiency and accumulated experience, are associated with attention-control performance.

Gender differences may have partially influenced the results. Evidence on gender effects in attention is mixed and often task-specific. Some studies report that females outperform males on tasks involving information inhibition and episodic memory (Hasher, Zacks, & May, 1999; Herlitz, Nilsson, & Bäckman, 1997), while others report minimal or inconsistent effects in sustained-attention tasks. For instance, Riley et al. (2016) found that males responded faster but with more commission errors on a continuous performance task, whereas Chan (2001) reported no gender differences in SART performance. In the present data, male participants appeared to perform slightly better than females, but this difference was not statistically significant. Nevertheless, because the Go group was 73.5% male compared with 30% in the No-Go group, some degree of confounding by gender composition cannot be ruled out. At the same time, additional covariance analyses did not identify gender as a significant predictor of attentional-control performance after controlling for group membership, suggesting that the observed Go-related associations are unlikely to be fully attributable to gender composition alone. Future work should further clarify potential gender-specific mechanisms in sustained-attention tasks.

Another relevant variable concerns bilingualism. Many participants reported proficiency in a second language, most often English or Chinese, and bilingualism was particularly common among those with minimal Go experience. Since bilingualism has been associated with enhanced attentional control and inhibitory processing (Bialystok, 2009), this factor could have attenuated the between-group differences observed here. However, additional analyses did not reveal a statistically significant association between bilingual proficiency and SART2 accuracy in the present dataset. In other words, if bilingualism indeed confers an advantage in attention control, the contrast between Go-experienced and minimally experienced participants might have been even larger under stricter control of language background. Nevertheless, this overlap highlights an interesting intersection between two potential sources of attentional enhancement—bilingual experience and Go practice—both of which merit closer examination. Future studies should incorporate validated proficiency measures to clarify whether the effects of Go experience and bilingualism are additive, overlapping, or interactive in shaping attentional performance.

Several broader limitations should be noted. First, the cross-sectional design precludes causal inference. It remains unclear whether Go experience strengthens attentional control or whether individuals with naturally stronger attention are more likely to engage in and persist with Go from an early age. Nonetheless, the association between SART accuracy and both Go proficiency and years of exposure to Go suggests that the relationship extends beyond a simple player–non-player contrast. Longitudinal and intervention studies are therefore needed to confirm causality. Second, the sample consisted exclusively of Korean university students, for whom Go is culturally familiar and socially valued. The generalizability of these findings to other cultural contexts remains to be established.

Despite these limitations, the results carry potential educational implications. The findings suggest that engagement with Go may provide a valuable context for the development of attentional control. Specifically, (1) playing Go is associated with improved sustained attention and inhibitory control; (2) this association appears cumulative, increasing with practice intensity and duration; and (3) higher mastery is linked to greater attentional benefits. Together, these results indicate that opportunities to engage with Go may support the development of attentional skills in educational settings. In this context, our findings are consistent with the view that Go could be a promising enrichment activity for fostering attentional skills, and they provide a potential cognitive rationale for Wu's (2025) proposal that Go may be particularly valuable when introduced in early elementary education.

In conclusion, Go experience in young adults is associated with enhanced sustained attention and inhibitory control, and performance increases with both proficiency and years of exposure. These findings support the view of Go as a promising, accessible means of training attention control, while emphasizing the need for longitudinal, intervention, and cross-cultural research to establish causal mechanisms and broader applicability.

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