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Attentional characteristics of junior taekwondo athletes during the training phase

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ABSTRACT



Background: Attentional control is a critical psychological factor influencing performance in combat sports such as taekwondo. However, limited research has examined attentional characteristics of junior athletes during the training phase, particularly within the Indonesian context. **Objectives:** This study aimed to describe the attentional characteristics of junior taekwondo athletes during training. **Methods:** A descriptive cross-sectional design was employed involving 30 athletes aged 14–16 years. Attentional characteristics were assessed using the Test of Attentional and Interpersonal Style (TAIS). Data were analysed using descriptive statistics (mean and standard deviation), and gender differences were explored descriptively. **Results:** Male athletes demonstrated slightly higher scores in the information processing dimension ($M = 56.29$, $SD = 11.66$) compared to female athletes ($M = 52.20$, $SD = 11.05$). However, overall differences between groups were small, indicating relatively comparable attentional profiles. Across dimensions, most athletes demonstrated moderate levels of attentional control. **Conclusion:** Junior taekwondo athletes exhibited generally moderate attentional characteristics during the training phase. Although minor differences were observed between genders, these were not substantial. Future research should employ larger samples and inferential analysis to better understand factors influencing attentional development.

Keywords: Attentional characteristics; taekwondo; youth athletes; training phase; TAIS

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Authors' Contribution: a – Study Design; b – Data Collection; c – Statistical Analysis; d – Manuscript Preparation; e – Funds Collection

INTRODUCTION

Attention is a critical cognitive component in combat sports such as taekwondo, as it enables athletes to filter relevant information, ignore distractions, and respond effectively in dynamic and high-pressure situations (Wilson & Eysenck, 2025; Zhang et al., 2025). Athletes with well-developed attentional skills are better able to anticipate opponents' movements, make accurate decisions, and execute techniques (Edmizal et al., 2025). In this context, attentional control plays a fundamental role in determining performance quality during both training and competition (Hüttermann & Memmert, 2017).

The Test of Attentional and Interpersonal Style (TAIS), grounded in Nideffer's attentional theory, provides a multidimensional framework for assessing attentional functioning (Hijazi, 2013). Unlike general attention

measures, TAIS captures both the width (broad vs. narrow) and direction (internal vs. external) of attentional focus, enabling a more comprehensive evaluation of athletes' attentional profiles. This multidimensional perspective is particularly relevant in sport contexts where athletes must continuously shift attention between internal and external stimuli.

Despite its importance, attentional ability among junior taekwondo athletes during the training phase remains highly variable. Some athletes are able to maintain focus effectively, whereas others experience difficulties, particularly in environments with multiple distractions such as noise and movement (Monsma et al., 2017; Williams et al., 2015). These differences may be associated with training practices that primarily emphasise physical and technical development, while cognitive aspects such as attention receive limited focus (Komarudin et al., 2024).

Previous studies have highlighted the importance of attentional regulation in martial arts, particularly in relation to tactical decision-making and anticipation of opponent movements (Noroozi et al., 2024). However, the existing literature has predominantly focused on elite athletes and has often relied on advanced perceptual-cognitive assessment tools (Brimmell et al., 2024; Jin et al., 2020, 2023). As a result, limited empirical evidence is available regarding the attentional characteristics of developing athletes in real training environments, especially when using accessible instruments such as TAIS. This gap is particularly evident in the Indonesian context, where research on psychological aspects of junior taekwondo athletes remains scarce.

Understanding attentional characteristics in junior athletes is essential, as this developmental stage represents a critical period for the formation of fundamental cognitive and motor skills (Weiß et al., 2024). Inadequate attentional control may lead to technical errors, delayed reactions, decreased performance, and increased injury risk (Legault & Faubert, 2024). Therefore, identifying attentional profiles at this stage can provide valuable insights for designing more effective and targeted training interventions. Accordingly, this study aims to describe the attentional characteristics of junior taekwondo athletes during the training phase. This study contributes to the literature by providing empirical evidence from district-level athletes using a multidimensional attentional assessment framework, thereby addressing both methodological and contextual gaps in current research.

METHOD

Study Design

This study employed a descriptive quantitative design using a cross-sectional survey approach to examine the attentional characteristics of junior taekwondo athletes during the training phase.

Participants

The study involved 30 junior taekwondo athletes aged 14–16 years from several clubs in Cirebon Regency, Indonesia. A total sampling technique was used, including all athletes who met the inclusion criteria: (i) aged 14–16 years, (ii) actively participating in regular training, and (iii) having at least one year of training experience. The sample consisted of 16 male and 14 female athletes, with age distribution of 7 athletes aged 14, 11 aged 15, and 12 aged 16. All participants were classified as junior athletes according to national taekwondo federation standards.

Instrumentation

Attentional characteristics were assessed using an adapted version of the Test of Attentional and Interpersonal Style (TAIS) based on Nideffer's theory (Hijazi, 2013). The instrument comprises 81 items across seven dimensions: BET (6), OET (12), BIT (8), OIT (9), NAR (12), RED (15), and INFP (19), rated on a 5-point Likert scale. The instrument was adapted for the Indonesian context through translation and expert validation, demonstrating high reliability (Cronbach's alpha = 0.916) and strong item validity (0.895–0.931).

Procedure

Data collection was conducted following regular training sessions at the Cirebon Regency Taekwondo Secretariat. Participants completed the questionnaire individually in a supervised setting to ensure consistency

and to minimize potential response bias. Each session was administered under the guidance of the researcher, and participants were instructed not to discuss their responses with others during completion. Prior to data collection, ethical procedures were strictly followed, including obtaining informed consent from all participants and written parental consent for underage athletes. Participants were assured of the confidentiality and anonymity of their responses and were informed that their participation was voluntary.

Data Analysis

Descriptive statistics (mean, standard deviation, and percentage) were used to summarise attentional characteristics across dimensions and gender groups. No inferential statistical analyses were conducted; therefore, the findings are limited to descriptive interpretation. All statistical analyses were performed using IBM SPSS Statistics software.

RESULTS AND DISCUSSION

Results

The results of the analysis is displayed in the form of tables and figures to facilitate understanding of the attentional abilities of junior taekwondo athletes in the training phase. The author presents the demographic data of the research subjects involved, shown in **Table 1**.

Table 1. Demographic Characteristics of Participants

Variable	Category	n	%
Gender	Male	16	53
	Female	14	47
Age	14 Years	7	23
	15 Years	11	37
	16 Years	12	40
Total		30	100

Table 1 presents the demographic characteristics of the participants. Of the 30 participants, 16 (53%) were male and 14 (47%) were female. In terms of age distribution, the largest group was 16-year-old participants (n = 12, 40%), followed by 15-year-olds (n = 11, 37%) and 14-year-olds (n = 7, 23%).

Table 2. Descriptive Statistics of Attentional Dimensions by Gender

Gender	Dimensions	Min	Max	Total	Mean	SD
Male	BET	18	26	155	22.14	2.734
	OET	22	48	290	41.43	9.537
	BIT	21	38	211	30.14	6.890
	OIT	16	41	199	28.43	8.482
	NAR	31	56	283	40.43	7.997
	RED	24	65	331	47.29	13.805
	INFP	32	68	394	56.29	11.658
Female	BET	16	24	107	21.4	3.435
	OET	25	51	183	36.6	10.213
	BIT	17	32	141	28.2	6.380
	OIT	21	36	150	30.0	5.523
	NAR	27	57	200	40.0	11.045
	RED	30	63	240	48.0	12.186
	INFP	37	62	261	52.2	11.054

*Notes: BET = Broad External Focus.; OET = Overloaded by External Stimuli ; BIT = Broad Internal Attentional Focus ; OIT = Overloaded by Internal Stimuli; NAR = Narrow Attentional Focus ; RED = Reduced Attentional Focus ; INFP = Information Processing.

Table 2 presents the descriptive statistics of attentional dimensions across gender groups. Overall, male athletes demonstrated slightly higher mean scores in several dimensions, particularly in Information Processing (M = 56.29) compared to female athletes (M = 52.20). However, the differences between groups were relatively small across most dimensions, indicating comparable attentional profiles. Both male and

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female athletes showed similar mean scores in Narrow Attentional Focus (NAR), while greater variability was observed in dimensions such as Overloaded by External Stimuli (OET) and Reduced Attentional Focus (RED), as reflected by higher standard deviation values. These findings suggest that attentional characteristics among junior taekwondo athletes are generally consistent across genders, with some variation in specific dimensions.

To enhance the interpretability of the results, **Figures 1 and 2** provide visual representations of attentional characteristics across dimensions and gender groups. **Figure 1** presents a bar chart illustrating the distribution of mean scores across attentional dimensions, allowing for direct comparison between male and female athletes. **Figure 2** displays a radar chart that highlights the overall attentional profile patterns, offering a comprehensive overview of similarities and variations across dimensions. These visualisations complement the descriptive statistics by making patterns more readily observable.

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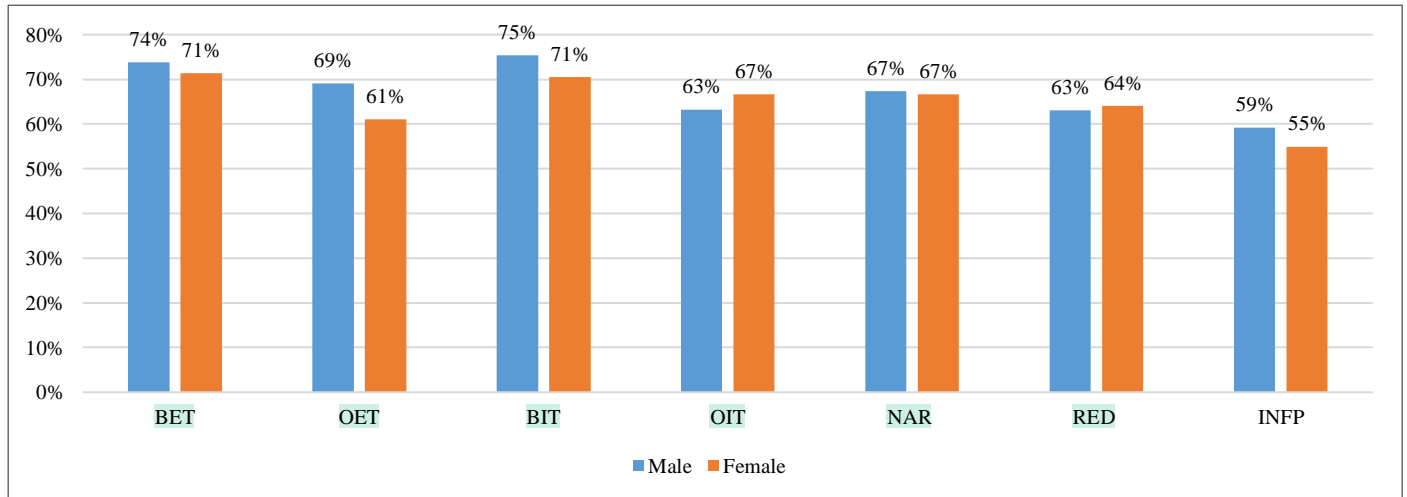


Figure 1. Bar Chart of Percentage Scores Across Attentional Dimensions by Gender

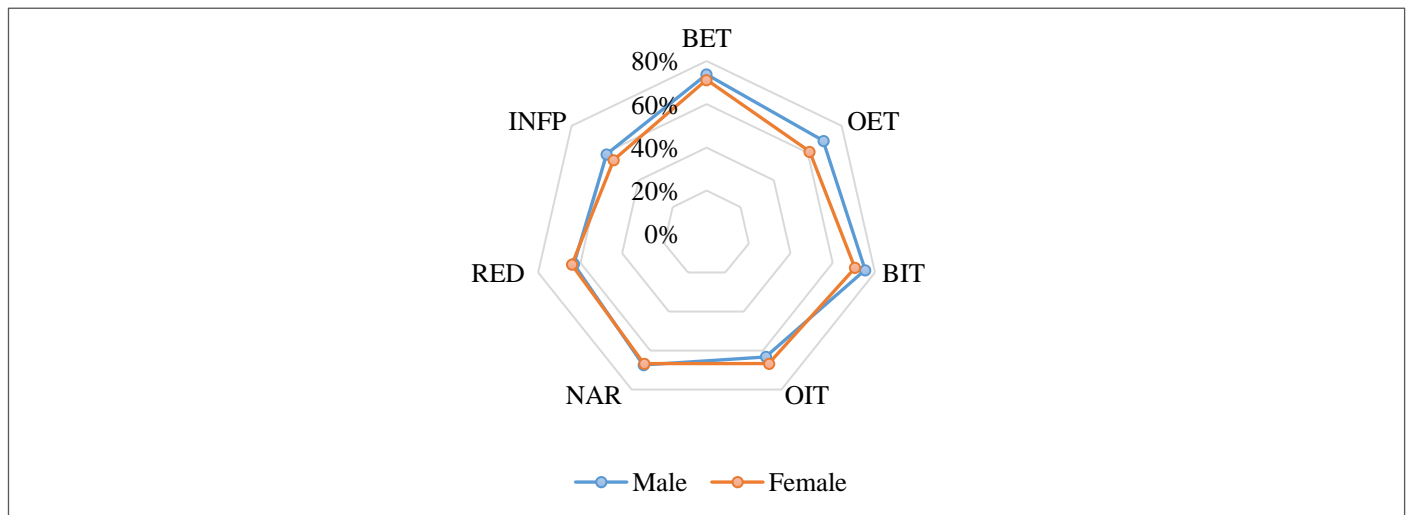


Figure 2. Radar Chart of Attentional Profiles by Gender

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As shown in **Figures 1 and 2**, both groups exhibited similar patterns across most attentional dimensions. Male athletes demonstrated slightly higher percentage scores in dimensions such as Broad External Attentional Focus (BET), Overloaded by External Stimuli (OET), Broad Internal Attentional Focus (BIT), and Information Processing (INFP). In contrast, female athletes showed marginally higher scores in Overloaded by Internal Stimuli (OIT) and Reduced Attentional Focus (RED), while both groups demonstrated identical scores in Narrow Attentional Focus (NAR). To provide an overall comparison of attentional ability, the combined percentage scores for each group are presented in **Figure 3**.

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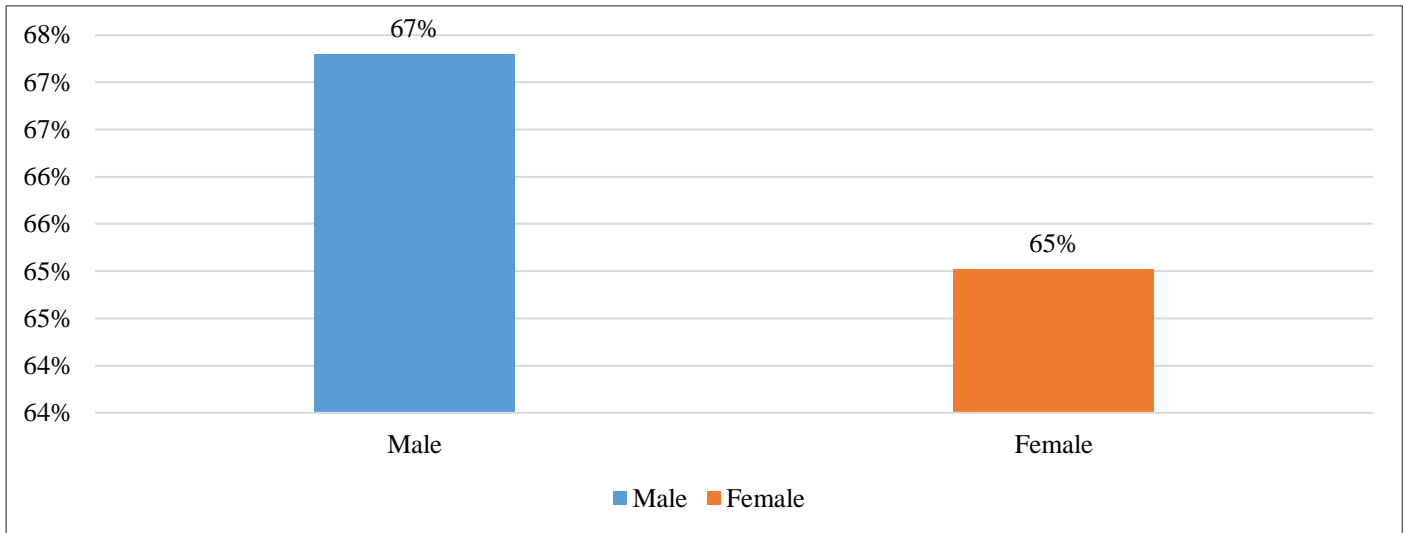


Figure 3. Overall Comparison of Attentional Ability Between Male and Female Athletes

Figure 3 shows that male athletes achieved an overall attentional score of 67%, while female athletes achieved 65%. This small difference indicates that overall attentional ability between the two groups is relatively similar.

30 Discussion

This study aimed to describe the attentional characteristics of junior taekwondo athletes during the training phase. Overall, the findings indicate that both male and female athletes demonstrated relatively comparable attentional profiles across most dimensions, with only minor variations observed in specific areas. These results suggest that junior athletes possess a generally adequate cognitive foundation to support skill acquisition and performance during training.

Interpretation of Key Findings

Although male athletes demonstrated slightly higher mean scores in Information Processing (INFP), the differences between groups were relatively small and should be interpreted with caution. Similarly, minor variations were observed in other dimensions, such as Reduced Attentional Focus (RED) and Narrow Attentional Focus (NAR), indicating that both male and female athletes may experience fluctuations in attentional control under certain conditions. From a theoretical perspective, these findings align with Nideffer's attentional framework, which emphasises that effective performance in sport depends on the ability to regulate both the width (broad vs. narrow) and direction (internal vs. external) of attention (Hijazi, 2013). The relatively balanced scores across dimensions suggest that athletes are developing adaptive attentional strategies, although variability in certain dimensions indicates areas that may require further training. This is consistent with previous research highlighting the importance of attentional flexibility for optimal performance in dynamic sport environments (Hüttermann & Memmert, 2017). These findings further support the notion that attentional control is a fundamental component of sport performance, as athletes are required to process information rapidly and maintain focus under dynamic and high-pressure conditions (Klatt & Smeeton, 2022).

Comparison with Previous Studies

The present findings are consistent with previous research highlighting the importance of attentional control in combat sports, particularly for decision-making and anticipation (Noroozi et al., 2024). However, unlike prior studies that primarily focused on elite athletes and utilised advanced perceptual-cognitive assessments (Brimmell et al., 2024; Jin et al., 2020, 2023), this study provides evidence from developing athletes in real training contexts using a multidimensional and accessible instrument.

While some studies suggest potential gender-related differences in cognitive processing (Delage et al., 2022), the current results indicate that such differences are minimal in this sample, reinforcing the notion that attentional development at the junior level may be more strongly influenced by training exposure and environmental factors rather than gender alone.

Practical Implications

These findings have important implications for coaching practice. Given the relatively similar attentional profiles across genders, training programmes should prioritise the development of attentional control across all athletes rather than relying solely on gender-based differentiation. However, targeted interventions may still be beneficial for specific attentional dimensions. For example, athletes showing higher susceptibility to attentional overload (e.g., OET and RED) may benefit from mental skills training such as mindfulness, focus control exercises, and simulated high-pressure scenarios. In addition, coaches should be equipped with knowledge of cognitive sport psychology to better identify and train different attentional dimensions according to individual athlete needs.

In addition, psychological factors such as motivation and self-confidence are known to influence attentional performance in athletes (Purnamasari & Novian, 2021). Therefore, integrating psychological skills training into regular practice is essential to enhance athletes' focus and cognitive readiness. Coaches play a crucial role in facilitating this process by designing training environments that support attentional development and by applying appropriate instructional strategies tailored to individual needs (Novian & Noors, 2020). Furthermore, incorporating mental skills training approaches, such as mindfulness and pressure simulation, may help athletes improve attentional stability and performance consistency (Komarudin et al., 2024).

Limitations and Future Research

This study has several limitations that should be acknowledged. First, the relatively small sample size (N = 30) limits the generalisability of the findings. Second, the use of a self-report instrument (TAIS) may introduce response bias, as the data rely on athletes' subjective perceptions. Future research should address these limitations by employing larger and more diverse samples, as well as incorporating objective measures of attention, such as reaction time or eye-tracking assessments. In addition, experimental studies are needed to examine the effectiveness of targeted cognitive-motor training interventions in improving attentional performance among junior athletes.

CONCLUSION

Overall, the findings indicate that junior taekwondo athletes demonstrate generally adequate attentional characteristics during the training phase, supporting the role of attention as a key cognitive component in sport performance. Although minor numerical differences were observed between male and female athletes across TAIS dimensions, these differences were relatively small, suggesting comparable attentional profiles between groups. From a practical perspective, the results highlight the importance of integrating attentional training into regular practice and equipping coaches with knowledge of cognitive sport psychology to address individual athlete needs.

This study is limited by the relatively small sample size (N = 30) and the use of a self-report instrument, which may introduce response bias. Therefore, future research should employ larger and more diverse samples, adopt experimental designs, and incorporate objective measures of attention (e.g., reaction time tests) to strengthen the evidence base for effective attention-focused training strategies.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest regarding the publication of this study.

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