14 (3) (2025) 912 - 917
Journal of Physical Education, Sport, Health and Recreations
https://journal.unnes.ac.id/journals/peshr

The Effect of Gate Position Start on BMX Cross Athletes' Perception of Anxiety

Rere Anne Marisa Nuraini[1], Moch. Yamin Saputra[2], Yopi Kusdinar[3]✉

Indonesian University of Education, Bandung, West Java, Indonesia[123]

Article History

Received October 2025
Accepted October 2025
Published Vol.14 No.(3) 2025

Keywords:
Anxiety Perception; BMX Athlete; Gate Start Position

Abstract

Background: Gate startIn BMX Cross, the starting gate is a crucial phase that determines an athlete's strategic position and initial performance. Different starting positions can elicit varying levels of psychological stress, particularly in the form of competitive anxiety. This anxiety has the potential to disrupt an athlete's focus, mental preparedness, and technical effectiveness during the race. This study highlights the influence of starting gate position on BMX Cross athletes' perceptions of anxiety during competition. Objectives:This study aims to analyze the perception of anxiety of BMX Cross athletes.based on the difference in starting positions occupied by each athlete. Method: The method used in this study is descriptive quantitative with the Sport Anxiety Scale-2 (SAS-2) instrument. The sample involved was 30 BMX Cross athletes with a total sampling technique. Data analysis is presented using SPSS version 25. Results: The results of the study indicate that there are differences between starting gate positions on athletes' anxiety perceptions with a significance value of p = 0.004. Conclusion: This study concludes that starting gate positions can significantly influence anxiety perceptions in BMX Cross athletes. Suggestion: This study suggests implementing mental management exercises so that athletes can control the anxiety they experience when under pressure.pressure and athletes can implement it when they compete.

How to Cite

Nuraini, R. A. M., Saputra, M. Y., & Kusdinar, Y. (2025). The Effect of Gate Position Start on BMX Cross Athletes' Perception of Anxiety. Journal of Physical Education, Sport, Health and Recreation, 14 (3), 912-917.

✉ Correspondence address :
E-mail: yopikusdinar@upi.edu

p-ISSN 2460-724X
e-ISSN 2252-6773

INTRODUCTION

BMX Crossis one of the numbers in the extreme bicycle racing sport which relies on speed, strength and accuracy, thus demanding high physical, technical and psychological readiness from the athletes (Di Rienzo et al., 2017). One of the most decisive phases in this competition is the starting gate, which functions as a strategic position determinant at the first corner (D'Aumerie, 2024). Based on data from the 2017 Supercross BMX World Cup and the 2020 Tokyo Olympics, the highest number of accidents occurred in the early stages of the race, especially after the start (Campbell & Davis, 2024; Carey, 2023). These findings indicate that pressure in the gate start phase is not only technical, but is also closely related to psychological aspects, especially competitive anxiety (Wu et al., 2023).

Competitive anxiety has the potential to reduce an athlete's performance, both from a physiological and technical aspect, such as decreased concentration, delayed reactions, and ineffective technique at the start (Trpkovici et al., 2025). The starting gate positions in BMX Cross are divided into three main categories, namely internal, center, and external positions, where each position has its own challenges and advantages (Di Rienzo et al., 2017; Grigg, 2019). The inside position is often considered more strategic, but it also causes mental stress due to the high potential for collisions and the demand to maintain position from the start on the first berm (Di Rienzo et al., 2017). In contrast, external positions require greater effort to achieve the ideal trajectory, thus triggering additional psychological burdens (Di Rienzo et al., 2017). An athlete's perception of their starting position influences their emotional state and the strategies they employ during the race. In this regard, anxiety, as a form of psychological stress, is an important aspect that requires in-depth study (Prior et al., 2025).

This study focuses on the role of anxiety perception in influencing the readiness and performance of BMX Cross athletes before and during the race (Carey, 2023). Competitive anxiety has been shown to affect performance from both physiological and technical aspects, such as decreased concentration, delayed reactions, and ineffective technique in the early stages of the race (Hudgins, 2025; Trpkovici et al., 2025). In high-intensity sports such as BMX Cross, these psychological factors have a significant influence on an athlete's success (Candra et al., 2025). Although a number of studies have examined motivation, self-confidence, and goal setting, anxiety is the psychological variable that most directly impairs performance (Conde-Ripoll et al., 2024a; Junli et al., 2021). Therefore, it is important to explore how starting position triggers anxiety in competitive situations.

Several previous studies have shown that starting position has an influence on athletes' anxiety levels and physical performance. Di Rienzo et al., (2017) found that starting position can determine the psychological pressure experienced by athletes, while research by Daneshfar et al., (2022) And Grigg, (2019) confirmed that athletes starting from the inside lane tend to experience greater psychological stress than athletes starting from the outside lane. This finding highlights the crucial role of starting position in shaping an athlete's mental readiness and strategy during a race.

Although previous studies have demonstrated the influence of starting position on anxiety, they have not detailed how variations in starting gate position quantitatively influence anxiety levels. Furthermore, individual athletes' perceptions of competitive pressure during the starting phase have not been thoroughly explored. Therefore, more comprehensive research is needed that can provide a clearer picture of the relationship between starting gate position and athletes' perceptions of anxiety, as well as the factors that influence their psychological responses.

The urgency of this research is reinforced by the limited literature explicitly linking starting gate position to anxiety perceptions in BMX Cross athletes. Most previous studies tend to focus on biomechanics, starting technique, or race strategy, without examining the athletes' psychological state in depth (Leite et al., 2018; Moya-Ramón et al., 2022). High-risk sports such as BMX Cross are very demanding on the mental readiness of athletes and have an equally important role as physical readiness (Marquardt et al., 2023; Prots et al., 2021). By examining anxiety perceptions based on starting position, this research is expected to provide practical contributions to the development of training programs that focus not only on technical aspects but also on mental aspects. This is a strategic step to help athletes manage competitive pressure more adaptively.

The novelty of this research lies in its focus on specifically identifying differences in anxiety perception based on internal, center, and external positions within a competitive context. This study utilizes validated sports psychology instruments to obtain objective and measurable data (Tomczak et al., 2022). The implementation of this research in an actual competition situation

is also a distinct advantage that distinguishes it from previous research, which tends to be conducted in a simulated environment. With this approach, the results obtained are not only theoretically relevant but also applicable in developing psychologically based training strategies. This research is expected to enrich the sports psychology literature, particularly in the context of extreme sports such as BMX Cross, and support the development of more physically and mentally resilient athletes.

METHODS

The method used in this study is a quantitative descriptive method involving 30 BMX Cross athletes who are still actively participating in national or even international competitions (Fraenkel et al., 2023). The research subjects were selected to represent BMX athletes with varying levels of experience and competition. The instrument used was the Sport Anxiety Scale-2 (SAS-2), an anxiety questionnaire. The instrument was distributed to the subjects once, with three different gate start positions filled in via Google Form using a Likert scale.

Tabel 1. Summary of the Sport Anxiety Scale-2 (SAS-2) Instrument

Subscale	Example Item	Number of Items	Scale
Somatic Anxiety	"My body feels tense."	5	1–4
Worry	"I worry that I will not perform well."	5	1–4
Concentration Disruption	"It is hard for me to focus on what I'm doing."	5	1–4

The questionnaire contained 15 items covering three aspects: somatic anxiety, worry, and concentration problems (Tomczak et al., 2022). Each item in the questionnaire is assessed on a 4-point Likert scale (Purnamasari & Novian, 2021). Data analysis is presented through percentage results to describe the distribution of BMX Cross athletes' anxiety perceptions based on the starting position occupied by each athlete.

RESULTS AND DISCUSSION

The results of data processing and analysis are presented in tables and figures for easier understanding. A statistical description can be seen in **Table 2.**

Table 2. Statistical Description

	N	Min	Max	Sum	Mean	Standard Deviation	Variance
internal	30	15	56	1067	35.57	12,741	162,323
center	30	15	51	841	28.03	9,427	88,861
external	30	14	47	795	26.50	8,831	77,983

Based on **Table 2**, the sample size was 30 athletes. The internal variable had the highest average score of 35.57 with a range of 15–56, indicating the most dominant internal factor with a fairly high variation (SD = 12.741). The center variable had an average of 28.03 (range 15–51) with moderate variation (SD = 9.427). Meanwhile, the external variable showed the lowest average of 26.50 (range 14–47) with relatively small variation (SD = 8.831). Next, the author presents a normality test.

Based on the results of the Shapiro-Wilk normality test, all research variables showed significance values above 0.05 (internal = 0.066; central = 0.179; external = 0.150). This indicates that the data for all three variables are normally distributed. The authors then present the results of the homogeneity test.

Based on the results of Levene's Test, a significance value of <0.05 was obtained, so it can be concluded that the data does not meet the assumption of homogeneity of variance. Therefore, the hypothesis analysis is continued usingOne-Way ANOVAto examine the effect of gate start position on anxiety perception. The authors then present the results of the hypothesis test, which can be seen in **Table 3.**

Table 3. Statistical Test

Gate Start Position	Sig.	Influence	Scale
Internal	0.031	Significant	1–4
Center	0.853	Not Significant	1–4
External	0.010	Significant	1–4

Based on the **Table 3.** Statistical test results in Table 3, it can be seen that the internal (p = 0.031) and external (p = 0.010) positions significantly influence anxiety, while the center position (p = 0.853) does not show a significant effect. Athletes' anxiety levels tend to be more triggered when in the inside or outside starting positions, compared to the relatively more stable center position. To strengthen these findings, the authors conducted an ANOVA test to examine differences in anxiety levels across gate starting positions as a whole.

The results of the hypothesis test show

a value of F = 6.439 with a significance of p = 0.002. This value is smaller than 0.05, so the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. This indicates that starting position placement is not only a technical aspect of the race, but also has important implications for the psychological condition of athletes before the race. Next, the author presents the percentage of BMX Cross athletes' perceptions of anxiety, which can be seen in **Figure 1.**

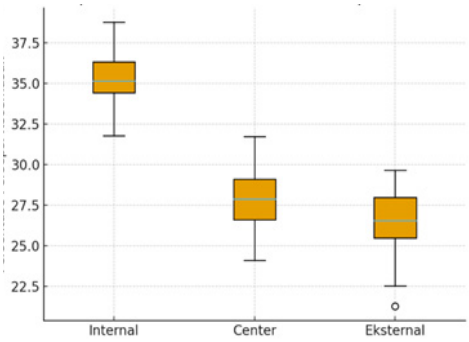

Figure 1. Average Percentage of BMX Cross Athletes' Perception of Anxiety

Figure 1 shows differences in the percentage of anxiety perceptions among BMX Cross athletes at each starting gate position. The internal starting gate position showed the highest percentage of anxiety perceptions, at 35.6%, followed by the center starting position at 28.0%, and the external starting position at 26.5%. This indicates that athletes tend to experience higher levels of anxiety when in the internal starting gate position compared to the center or external starting positions.

The results of this study provide a comprehensive overview of the starting gate position and its influence on the anxiety perception of BMX Cross athletes (Di Rienzo et al., 2017; Princelle et al., 2019). The internal position was recorded as having the highest anxiety level, followed by the center position and the external position with the lowest score. Based on these results, the internal and external positions were proven to have a significant influence on anxiety. Conversely, the center position showed no significant effect. These findings confirm that variations in starting position influence the psychological state of BMX Cross athletes (Di Rienzo et al., 2017). Psychological factors, particularly competitive anxiety, can be triggered by specific environmental situations such as starting position, not solely by the athlete's technical ability (Hagan Jr et al., 2017). This anxiety can take the form of somatic responses such as muscle tension, increased heart rate, and excessive sweating, which can potentially interfere with physical readiness. Furthermore, the worry aspect is related to negative thoughts about failure or mistakes during the start, thus increasing mental stress. This condition also has implications for impaired concentration, where athletes are more easily distracted by the starting signal and race strategy, thus disrupting performance in the early stages of the race. This situational stress aligns with the theory that anxiety in sports is often contextual and influenced by external factors faced by athletes during competition (Broa & Baradillo, 2024; Eysenck & Wilson, 2016).

Based on the existing data results, variations in the internal start gate position have the highest influence on the perception of anxiety in BMX Cross athletes. This position has been recorded as having the highest anxiety level compared to other positions. This high level of anxiety is caused by the pressure of quickly competing for position in the first corner and the increased risk of physical contact with opponents (Di Rienzo et al., 2017; Grigg, 2019). This psychological pressure causes somatic anxiety in the form of muscle tension and increased heart rate, as well as cognitive anxiety in the form of worry about failing to maintain a stable position (Trpkovici et al., 2025). Concentration disorders also occur more frequently in internal positions because athletes must focus on reaction speed while anticipating potential collisions..This indicates that internal positions not only require physical readiness, but also require good mental management skills (Camilleri et al., 2024; Carey, 2023). If an athlete is unable to manage this anxiety, they risk experiencing decreased focus and hasty decision-making, which can actually hinder their performance (Mulvey, 2024; Wilson et al., 2019).

Unlike the internal position, the center position did not significantly impact athlete anxiety. The average anxiety score recorded for the center position indicated a more stable psychological state. This is because the center position balances risk and opportunity, allowing athletes to feel more in control of the race (Carey, 2023). This position allows athletes to make strategic adjustments without facing the same pressure as in internal or external positions (Carey, 2023; Grigg, 2019). With minimal risk of physical contact and extreme tactical demands, the emotional burden felt by athletes is also lighter (Sabato et al., 2016). The center position can be seen as the most neutral position in influencing anxiety levels (Di Rienzo et al., 2017). The relatively maintained emotional stability in this position provides psy-

chological benefits in the form of increased self-confidence and self-control, so that athletes can focus more on technical performance without being distracted by excessive negative thoughts (Junli et al., 2021).

The external starting gate position has also been shown to significantly influence athlete anxiety, although the levels of anxiety are lower than those of the internal starting gate. The average anxiety score for the external starting gate indicates a certain psychological pressure on athletes. Athletes starting from the outside lane are required to quickly close the lane to the inside of the track to remain competitive (Conde-Ripoll et al., 2024). These strategic demands create cognitive pressure in the form of fears of being left behind and performative anxiety regarding the success of strategy execution (Perry, 2019). Although the risk of physical contact is lower than in an internal position, the mental burden remains significant (Camilleri et al., 2024). In this situation, concentration problems can arise due to the multitasking demands of maintaining optimal speed and choosing the fastest path to the first corner. Thus, external position influences athlete anxiety primarily through tactical and strategic aspects of the race (Hudgins, 2025). This condition shows that anxiety in external positions is more influenced by performance expectations and strategy, not just physical risks, so that concentration management and tactical thinking skills are very important in determining an athlete's mental stability (Hardy et al., 2016).

Overall, the results of this study confirm that internal and external starting positions have a significant influence on BMX Cross athletes' perceptions of anxiety, while center position did not show a significant influence. ANOVA analysis showed that variations in starting position contributed 12.3% to differences in anxiety levels, indicating that this factor is an important determinant of athletes' psychological readiness. These findings emphasize that the starting phase in BMX Cross requires not only technical skills, but also mental readiness and anxiety management skills. Internal positions generate the highest emotional burden, while external positions generate anxiety related to strategy and decision-making (Carey, 2023; Perry, 2019). Thus, the start phase can be understood as a combination of physical demands, race strategy, and psychological pressure. Therefore, additional psychological interventions are needed to become an effective approach that can help athletes manage anxiety across various starting positions. Trained mental readiness will support consistent performance while reducing the negative impact of situational pressure (Marquardt et al., 2023).

CONCLUSION

Based on the results and discussion, this study concludes that the starting gate position has a effectlively influence on the perception of anxiety of BMX Cross athletes. The findings of this study emphasize the importance of integrating psychological aspects in planning BMX Cross starting strategies, in addition to technical aspects. Therefore, the authors suggest that coaches can implement training related to mental management during core training, especially during the gate start phase, especially to minimize athlete anxiety in internal and external positions, so that athletes can better control the anxiety they experience when under pressure and athletes can implement it during competition.

REFERENCES

Broa, D. I. G., & Baradillo, D. G. (2024). A Grounded Theory On The Dynamics Of Sports Anxiety Of Collegiate Athletes. European Journal of Physical Education and Sport Science, 11(7).

Camilleri, D., Williams, R., Hyde, C. L., Sallis, R. J. T., & Quach, J. (2024). Exploring BMX as a tool for wellbeing promotion. Leisure Studies, 1–16.

Campbell, D., & Davis, L. (2024). Analyzing the British News Media's Representations of British Female Olympians. The International Journal of Sport and Society, 15(3), 43.

Candra, O., Parulian, T., Yolanda, F., Novrandani, S., & Darmawan, D. V. (2025). Holistik dengan Mengintegrasikan Latihan Kondisi Fisik, Psikologi Olahraga, dan Karakter. Journal Of Human And Education (JAHE), 5(1), 782–792.

Carey, A. (2023). Determining the importance of ramp performance during BMX Supercross: Use of predictive assessments and strategies to improve performance outcomes.

Conde-Ripoll, R., Escudero-Tena, A., & Bustamante-Sánchez, Á. (2024a). Position and ranking influence in padel: somatic anxiety and self-confidence increase in competition for left-side and higher-ranked players when compared to pressure training. Frontiers in Psychology, 15, 1393963.

Conde-Ripoll, R., Escudero-Tena, A., & Bustamante-Sánchez, Á. (2024b). Pre and post-competitive anxiety and self-confidence and their relationship with technical-tactical performance in high-level men's padel players. Frontiers in Sports and Active Living, 6, 1393980. https://doi.org/10.3389/fspor.2024.1393980

D'Aumerie, J. C. (2024). Optimal Movement and Timing in BMX Starts.

Daneshfar, A., Petersen, C. J., & Gahreman, D. E. (2022). The effect of 4 weeks motor imagery training on simulated BMX race performance. International Journal of Sport and Exercise Psychology, 20(2), 644–660. https://doi.org/10.1080/1612197X.2020.1869801

Di Rienzo, F., Martinent, G., Levêque, L., MacIntyre, T., Collet, C., & Guillot, A. (2017). The influence of gate start position on physical performance and anxiety perception in expert BMX athletes. Journal of Sports Sciences, 36(3), 311–318. https://doi.org/10.1080/02640414.2017.1303188

Eysenck, M. W., & Wilson, M. R. (2016). Sporting performance, pressure and cognition: Introducing attentional control theory: Sport. In An introduction to applied cognitive psychology (pp. 330–351). Psychology Press.

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2023). How to Design and Evaluate Research in Education. In McGraw-Hill (Eleventh). McGraw Hill.

Grigg, J. (2019). A biomechanical analysis of the BMX SX gate start. Not Published Doctoral Thesis. Bond University.

Hagan Jr, J. E., Pollmann, D., & Schack, T. (2017). Elite athletes' in-event competitive anxiety responses and psychological skills usage under differing conditions. Frontiers in Psychology, 8, 2280. https://doi.org/10.3389/fpsyg.2017.02280

Hardy, L., Jones, G., & Gould, D. (2016). Understanding psychological preparation for sport: Theory and practice of elite performers. John Wiley & Sons.

Hudgins, R. J. (2025). Factors Associated With Pre-Competition Anxiety in Ironman Triathletes. Washington State University.

Junli, L. I. U., Tianyuan, L. I. U., & Jinglan, S. U. N. (2021). The Impact of Self-confidence, Self-motivation and Competitive State Anxiety on attentional control in athletes in China. Revista De Psicología Del Deporte (Journal of Sport Psychology), 30(1), 31–48.

Leite, L. B., Pussieldi, P. P., & Pussieldi, G. A. (2018). Analysis of falls in different rounds of the supercross world cup in the netherlands and belgium. 7(3), 7–10. https://doi.org/10.28985/181231.jsc.03

Marquardt, N., Stierle, K. E., van der Velden, E.-M., & Schürmann, V. (2023). Mental readiness in emergency response tasks. Performance Improvement Quarterly, 36(3), 111–123.

Moya-Ramón, M., Haakonssen, E., Peña-González, I., Mateo-March, M., & Javaloyes, A. (2022). Predicting BMX Performance with Laboratory Measurements in Elite Riders. Journal of Sports Sciences, 40(21), 2461–2467.

Mulvey, M. (2024). The Impact of Anxiety on Athletic Performance.

Perry, J. (2019). Performing under pressure: Psychological strategies for sporting success. Routledge.

Princelle, D., Monnet, T., Brunet, E., Sastre, J., & Domalain, M. (2019). Dynamic analysis of the BMX start: interactions between riders and their bike. Computer Methods in Biomechanics and Biomedical Engineering, 22(sup1), S311–S313.

Prior, E., Papathomas, A., & Rhind, D. (2025). A balancing act: Sport psychologist insights into supporting athlete mental health in elite sport. Journal of Applied Sport Psychology, 1–21.

Prots, R., Yakovliv, V., Medynskyi, S., Kharchenko, R., Hryb, T., Klymenchenko, T., Ihnatenko, S., Buzhyna, I., & Maksymchuk, B. (2021). Psychophysical training of young people for homeland defence using means of physical culture and sports. BRAIN. Broad Research in Artificial Intelligence and Neuroscience, 12(3), 149–171.

Purnamasari, I., & Novian, G. (2021). Tingkat Kepercayaan Diri dan Kecemasan Atlet PPLP Jawa Barat selama Menjalani Training From Home (TFH) pada Masa Adaptasi Kebiasaan Baru (AKB). Jurnal Patriot, 3(2), 203–213. https://doi.org/10.24036/patriot.v3i2.784

Sabato, T. M., Walch, T. J., & Caine, D. J. (2016). The elite young athlete: strategies to ensure physical and emotional health. Open Access Journal of Sports Medicine, 99–113. https://doi.org/:10.2147/OAJSM.S96821

Tomczak, M., Kleka, P., Walczak, A., Bojkowski, Ł., Gracz, J., & Walczak, M. (2022). Validation of Sport Anxiety Scale-2 (SAS-2) among Polish athletes and the relationship between anxiety and goal orientation in sport. Scientific Reports, 12(1), 12281. https://doi.org/10.55606/jcsr-politama.v3i1.4760

Trpkovici, M., Makai, A., Prémusz, V., & Ács, P. (2025). The possible application of virtual reality for managing anxiety in athletes. Frontiers in Sports and Active Living, 7, 1493544.

Wilson, M. R., Kinrade, N. P., & Walsh, V. (2019). High-stakes decision making: Anxiety and cognition. In Anticipation and decision making in sport (pp. 232–249). Routledge.

Wu, Y., Lukosch, S., Lukosch, H., Lindeman, R. W., McKee, R. D., Fukuden, S., Ross, C., & Collins, D. (2023). Training mental imagery skills of elite athletes in virtual reality. Frontiers in Virtual Reality, 4, 1189717.