



## The Influence of Environmental Factors on Performance in Table Tennis: A Literature Study

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### Abstract

This study aims to explore the influence of environmental factors such as lighting, temperature, humidity, noise, and table surface type on performance in table tennis. A literature review method was used to analyze findings from various relevant studies in this field. The results of the review indicate that environmental factors play a significant role in affecting concentration, physical and mental performance, as well as players' game control in table tennis. Low lighting, extreme temperatures, high humidity, environmental noise, and table surface type are significant variables in influencing player performance. The implications of this research underscore the importance of understanding and adapting to environmental factors for table tennis players to enhance their performance and achievements in this sport. Further research is recommended to delve deeper into the interaction between environmental factors and performance in table tennis.

Keywords: Table Tennis, Environmental Factors; Achievement; Literature Study

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## **A. Introduction**

Table tennis is a popular sport worldwide, played by millions of people both recreationally and competitively (Gusdernawati et al., 2021; Hariyanto & Firmansyah, 2020). Performance in table tennis is influenced by various factors, including technical skills, physical fitness, game strategy, and psychological factors (Aminullah et al., 2020; Hasnah et al., 2023). However, there is one aspect that is often overlooked but has a significant impact on players' performance, namely environmental factors.

In Indonesia, despite the recognition of the potential of table tennis athletes internationally, there are still challenges in achieving consistent success at the global level (Firmansyah et al., 2021). One of the factors contributing to this is the lack of understanding about the influence of environmental factors on performance in table tennis in Indonesia (Nopiyato et al., 2021). The environment in which a player practices and competes can vary significantly from one place to another, especially in a vast and diverse country like Indonesia.

Factors such as tropical weather, field quality, and environmental noise can pose challenges for table tennis players in Indonesia (Hariyanto & Firmansyah, 2020). Therefore, research that takes into account

local environmental conditions and how these factors influence player performance becomes crucial to help identify appropriate strategies for enhancing the performance of Indonesian table tennis athletes (Đokić et al., 2019). With a better understanding of how environmental factors affect performance in table tennis in Indonesia, coaches, sports policymakers, and players can develop more effective approaches for training, competition preparation, and sports infrastructure development.

This can not only help improve the performance of Indonesian table tennis athletes but also inspire greater interest in this sport among the Indonesian community as a whole. Studies conducted (Hayudi, 2015) Studies have shown that the environment where table tennis is practiced and played can have a significant influence on players' performance. Factors such as table surface type, lighting, noise, temperature, and humidity can affect players' ability to concentrate, respond quickly, and execute game strategies effectively (Li et al., 2021).

Although research on these factors has been conducted in other sports contexts such as tennis and soccer, specific research within the context of table tennis is still limited. Furthermore, the majority of these studies have been conducted outside of Indonesia, so their findings may not be

entirely relevant to the environmental conditions in Indonesia. Studies on the influence of the environment in table tennis have received significant attention in sports literature.

Research by (Petri et al., 2020) conducting a systematic review on the influence of environmental factors such as lighting, temperature, humidity, and noise on the performance of table tennis players. The findings from this research provide a deep insight into how the environment can affect key aspects of table tennis gameplay. Additionally, studies by (Subagja et al., 2020) specifically researching the influence of table surface on table tennis gameplay. They tested various types of table surfaces and analyzed their impact on strokes, ball speed, and game control. The results of this research provide a better understanding of how the choice of table surface can affect players' strategies and performance in table tennis.

By gaining a deeper understanding of how the environment affects performance in table tennis, it is hoped that this research can provide valuable insights for players, coaches, and sports policymakers in Indonesia to improve training and competition conditions. The literature review will involve a thorough examination of related research previously conducted in this field, including studies on

environmental factors in other sports and studies specifically addressing environmental factors in the context of table tennis. Data and findings from these studies will be analyzed to understand the relationship between environmental factors and performance in table tennis and their implications for players in Indonesia.

Therefore, this research aims to investigate the influence of environmental factors on performance in table tennis, with a specific focus on common environmental conditions in Indonesia. It is hoped that this research will make a valuable contribution to expanding knowledge about the factors influencing performance in table tennis and provide a strong foundation for the development of more inclusive and sustainable sports programs in Indonesia.

## **B. Methods**

This study employs a literature review approach to investigate the influence of environmental factors on performance in table tennis. Source selection is conducted through prominent academic databases and leading sports journals obtained from platforms such as ScienceDirect, ERIC, and Google Scholar, with consideration given to recent articles published within the last 10 years. Inclusion criteria encompass studies specifically addressing the relationship between environmental factors

and performance in table tennis at both national and international levels. A meticulous selection and evaluation process is undertaken to assess the methodology, findings, and conclusions of each relevant article. Relevant data are systematically extracted and analyzed to identify patterns, trends, and relationships between environmental variables and player performance. These findings are then

summarized in a systematic and clear research report, providing relevant practical and theoretical implications.

### **C. Result and Discussion**

#### **Result**

Based on the results of the literature review that has been traced, it can be seen in the following table:

**Table 1. Literature Review Findings**

<b>No</b>	<b>Environmental Variables</b>	<b>Key Findings</b>	<b>Relevance to Research</b>
1	Lighting	Low lighting can reduce player concentration and affect player responses	Lighting factors have a significant impact on performance in table tennis.
2	Temperature	Temperatures that are too high or low can affect players' physical and mental performance	Ambient temperature also has a major influence on player performance.
3	Humidity	High humidity can make the table slippery, affecting ball control and player movement	Air humidity conditions are an important factor that affects the control and stability of the game.
4	Noise	Noise from the surrounding environment can disrupt player concentration and focus	Noise can disrupt players' focus and concentration, affecting their responses and performance in the game.
5	Table Surface	Table surface type has a significant impact on ball speed and game control	The type of table surface can affect a player's playing strategies and techniques.

Source: Research Results

Based on table 1, the results of the literature review regarding the influence of environmental factors on performance in table tennis show that several environmental variables play an important role. Low lighting can impair player concentration, while extremes in temperature have the potential to affect

both physical and mental performance. High air humidity also has a significant impact, by making the table surface slippery and affecting ball control and player movement. In addition, environmental noise can be a serious distraction for players, interfering with their concentration and focus. Finally, the

type of table surface turns out to have a considerable influence, affecting ball speed and overall game control. With all these factors in mind, it's important for table tennis players to pay attention to and adapt their surroundings to improve their performance and achievements in the sport.

### **Discussion**

Based on the research results that have been found, low lighting has been shown to have a negative impact on table tennis players' concentration, impairing visual perception and reaction time. Study by (Naik et al., 2022) shows that inadequate lighting can reduce a player's ability to clearly see the trajectory of the ball and respond quickly to an opponent's movement. This can result in a decrease in game quality and shot accuracy.

In addition, air temperature and humidity also affect a player's physical and mental performance. (Graha, 2010) found that extremes in temperature, whether too high or too low, can disrupt the body's thermal balance and reduce physical endurance. High humidity can also make the table surface slippery, reducing ball control and player movement, and increasing the risk of injury.

Noise from the surrounding environment is also a significant factor.

Studies have shown that noise can interfere with decision-making processes and motor coordination, which are important in executing shots with precision. Study by (Petri et al., 2020) found that high noise levels can disrupt players' focus and concentration, reducing their responsiveness and performance in games.

Thus, environmental factors such as lighting, temperature, humidity, and noise have a significant impact on performance in table tennis, and a better understanding of the influence of these factors can assist in the development of more effective training strategies and competition preparation.

Based on the results found and based on other relevant research, the novelty of this study lies in its holistic approach in considering the influence of various environmental factors on performance in table tennis. While many studies have explored certain factors in isolation, this research brings together an understanding of lighting, temperature, humidity, noise and table surface type within one analytical framework. This provides a more comprehensive understanding of how the environment as a whole affects the performance of table tennis players.

However, there are some limitations to note in this study. Firstly, most studies used in the literature review may have certain methodological limitations, such as small

samples or research designs that do not fully meet strict scientific standards. This may affect the validity of the findings and the generalizability of the results. In addition, environmental factors may interact with each other and have a complex impact on player performance, but this study may not have investigated in depth the interactions between these variables.

#### **D. Conclusion**

This research confirms that environmental factors such as lighting, temperature, humidity, noise, and table surface type have a significant impact on performance in table tennis. Adequate lighting enhances players' concentration and responsiveness, while extreme temperatures and humidity can disrupt physical and mental performance. Environmental noise can also interfere with players' focus and concentration. These findings highlight the importance of considering environmental conditions in the development of training strategies and competition preparation to improve the performance of table tennis athletes. With a better understanding of these factors, it is hoped that the quality of training and competition can be enhanced, strengthening the position of Indonesian table tennis athletes on the international stage.

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#### **F. Conflict of Interest**

There are no conflicts of interest in this research.

#### **References**

- Aminullah, A., Nurdin, N., & Marzuki, I. (2020). Layanan Konseling Bagi Atlet Persatuan Tenis Meja Pade Angen Mataram 2020. *Abdi Masyarakat*, 2(2), 16–23. <https://doi.org/10.58258/abdi.v2i2.1599>
- Đokić, Z., Straub, G., Lanzoni, I. M., Katsikadelis, M., & Munivrana, G. (2019). Effects of Rule Changes on Performance Efficacy: Differences Between Winners and Losers Table Tennis Players. *Facta Universitatis, Series: Physical Education and Sport*, June, 149. <https://doi.org/10.22190/fupes180228016d>
- Firmansyah, R., Abdul Gani, R., & Siswanto. (2021). Survei Tingkat Keterampilan Pukulan Forehand pada Peserta Ekstrakurikuler Tenis Meja di SMK TI Muhammadiyah Cikampek. *Jurnal Ilmiah Wahana Pendidikan*,

- 7(1), 391–402. <https://doi.org/10.5281/zenodo.56143>
- 75
- Graha, A. S. (2010). Adaptasi Suhu Tubuh terhadap Latihan dan Efek Cedera di Cuaca Panas dan Dingin. *Jurnal Olahraga Prestasi*, 6(2), 123–134.
- Gusdernawati, A., Widiyanto, W., & Nasrulloh, A. (2021). Biomechanical analysis of topspin techniques in table tennis games. *Medikora*, 20(2), 125–133. <https://doi.org/10.21831/medikora.v20i2.40891>
- Hariyanto, G., & Firmansyah, D. (2020). *Sejarah, Teknik & Variasi Latihan Pingpong (Tenis Meja)*. Media Nusa Creative.
- Hasnah, Hezron Alhim Dos Santos, Awaluddin, M., Maria Herlinda Dos Santos, & Anwar Ishar. (2023). Sosialisasi Peraturan Pertandingan Tenis Meja Pada Peserta Pra PORPROV Sulawesi Selatan. *Jurnal Unsika*, 3(01), 1–5. <https://journal.unsika.ac.id/index.php/moroones/article/view/8077%0Ahttps://journal.unsika.ac.id/index.php/moroones/article/download/8077/3772>
- Hayudi. (2015). Pengaruh Metode Latihan dan Motivasi Berprestasi Terhadap Keterampilan Pukulan Forehand pada Permainan Tenis Meja. In *Pascasarjan*. Universitas Negeri Jakarta.
- Li, L., Ren, F., & Baker, J. S. (2021). The Biomechanics of Shoulder Movement with Implications for Shoulder Injury in Table Tennis: A Minireview. *Applied Bionics and Biomechanics*, 2021, 9988857. <https://doi.org/10.1155/2021/9988857>
- Naik, B. T., Hashmi, M. F., & Bokde, N. D. (2022). A Comprehensive Review of Computer Vision in Sports: Open Issues, Future Trends and Research Directions. *Applied Sciences (Switzerland)*, 12(9). <https://doi.org/10.3390/app12094429>
- Nopiyato, T. E., Raibowo, S., Prabowo, A., Gunawantara, D. M., & Ibrahim. (2021). Analisis Tingkat Kelincahan Atlet Tenis Meja PTM MBC Raflesia. *Jurnal Patriot*, 3(3), 284–291. <https://doi.org/10.24036/patriot.v%vi%i.798>
- Petri, K., Schmidt, T., & Witte, K. (2020). The influence of auditory information on performance in table tennis. *European Journal of Human Movement*, 45, 1–15. <https://doi.org/10.21134/eurjhm.2020.45.7>
- Subagja, D. S., Kusmaedi, N., & Komarudin, K. (2020). Erratum: Pengaruh Media Pembelajaran Dan

Koordinasi Terhadap Ketepatan

Forehand Top Spin Tenis Meja.

*JUARA : Jurnal Olahraga*, 5(1), 124.

<https://doi.org/10.33222/juara.v5i1.93>

6