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Development of a Match-Scenario Training Model for Decision Making and Mental Toughness in Sepak Takraw

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Keywords

Mental Training; Match Scenarios; Decision-Making; Mental Toughness; Sepak Takraw

Abstract

This study aims to develop a match scenario-based mental training model (MLMBSP) to improve decision-making and mental toughness of sepak takraw athletes in preparation for the 2026 Central Java PORPROV. The research uses the Research and Development (R&D) method using a 4D (Define, Design, Develop, Disseminate) model. Thirty sepak takraw athletes from various regions in Central Java participated as research subjects. The research instruments include expert validation sheets, decision-making questionnaires, mental toughness questionnaires, and model practicality questionnaires. The results of expert validation showed an average score of 4.06 (Decision Making), 4.06 (Mental Toughness), 3.84 (DM Rubric), 4.00 (MT Rubric), 4.34 (DM Questionnaire), 4.19 (MT Questionnaire), and 4.59 (MLMBSP Model), categorized as valid to very valid. The results of the practicality test showed an average score of 4.44 which was categorized as very practical. Pre-test and post-test data showed an increase in decision-making from moderate (mean 3.06) to high (average 3.99), and mental toughness from moderate (mean 2.79) to high (average 4.20). The model consists of three main scenarios: (1) a tight score of 13-13, (2) a comeback from a deficit of 5-12, and (3) facing the opponent's match point, integrated with self-talk imagery and techniques. This research contributes significantly to the development of a more holistic and psychologically oriented sepak takraw athlete training model.

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INTRODUCTION

Sports achievements in the modern era of competition can no longer be understood solely as a result of physical ability and mastery of technique (Isyani, 2024). The psychological aspect of athletes is a factor that increasingly determines the success of performance (Lestari & Dewi, 2022). According to Travel (2025), athletes with relatively similar physical conditions and techniques often show different results, and these differences are often rooted in mental readiness in the face of pressure and competition dynamics. Therefore, the development of psychological aspects is an integral part of fostering modern sports achievements (Candra et al., 2025). Sepak takraw is one of the sports that requires a high level of integration between physical, technical, and mental abilities (Hanafi et al., 2026). Virginia dkk. (2025) Affirming that Sepak Takraw demands a complex combination of technical skills, speed of decision-making (decision-making), and mental resilience (Mental toughness) in the face of the pressure of the match. In every rally, athletes must respond quickly to changing situations, from reading the opponent's movements, anticipating the direction of the ball, to determining the best response in seconds (Ratnadi & Mudarya, 2023).

Decision-making is a very crucial cognitive ability in sepak takraw (Virginia et al., 2025). (2025) stating that the quality of decision-making is one of the main determinants of the effectiveness of athletes' performance in competitive sports. Meanwhile, Maya (2025) shows that in team sports, skill levels play an important role in quality decision-making, where more experienced athletes tend to make faster and more accurate decisions

Although there has been a lot of research on decision-making in sports such as football, basketball, and volleyball, research that specifically examines decision-making in sepak takraw sports is still relatively limited. Most previous research has focused more on aspects of the technique, physical condition, and basic skills of athletes. Therefore, the novelty of this study lies in the analysis of the decision-making ability of sepak takraw athletes by reviewing the influence of the level of experience or training treatment given on the quality of decisions produced during the game. This research not only emphasizes the aspect of technical skills, but also integrates the cognitive aspect as an important factor in improving the performance of sepak takraw athletes. Thus, this research is expected to make a scientific contribution in the development of more effective training models to improve the decision-making ability of sepak takraw athletes.

In addition to decision-making, according to (Arisman, 2024) Mental toughness This is also a very important psychological aspect. Haq et al. (2025) explains that Mental toughness It includes key components of confidence, consistency, emotional control, and the ability to stay motivated and focused on goals despite stressful situations. Isyanite al, (2024) and Vauziah et al. (2026) shows that Mental toughness This correlates positively with athlete performance, resistance to stress, and the ability to perform optimally under the pressure of competition.

The reality on the field shows that the development of the psychological aspects of athletes has not received balanced attention with the physical and technical aspects (Irawan et al., 2025). Harahap et al. (2025) stating that although mental training has been shown to be effective in improving the psychological aspect of athletes, its implementation is still relatively limited because there is no training model that applies and is appropriate to the context of a particular sport.

One of the approaches that is considered effective in developing the psychological aspect is mental training based on match scenarios (Edo & Utami, 2024). Lofandri (2025) Explains that scenario-based training allows athletes to develop perceptual, cognitive, and emotional abilities simultaneously through close experience with real situations.

The urgency of this research is based on the importance of decision-making skills and mental readiness in the game of sepak takraw which takes place quickly and dynamically. So far, sepak takraw training has focused more on technical and physical aspects, while the development of the mental and cognitive aspects of athletes is still not optimal. In fact, the ability to read game situations, control emotions, and make decisions quickly greatly affects the performance of athletes during matches.In addition, research on the effectiveness of scenario-based mental training in sepak takraw sports is still relatively limited. Therefore, this

research is important to provide an understanding of the influence of scenario-based mental training on the decision-making ability of sepak takraw athletes and to be a reference in the development of a more effective and comprehensive training program.

Haq et al. (2025) adding that repeated exposure to systematic match scenarios allows athletes to thrive decision-making faster and more accurate, when building Mental toughness which is stronger in the face of competitive pressure.

Based on this phenomenon, this study aims to develop a mental training model based on appropriate match scenarios (MLMBSP) to improve decision-making and mental toughness of sepak takraw athletes in preparation for the 2026 Central Java PORPROV. The developed model integrates imagery and self-talk techniques in three systematically and contextually designed match scenarios.

METHODS

This research uses *a Research and* Development (R&D) approach with a 4D model developed by Thiagarajan (1974), including the stages of Definite, *Design*, *Develop*, and *Disseminate*. The selection of 4D models is based on its suitability in developing instructional products that are structured, systematic, and oriented to the needs of users in the field (Sugiyono, 2019).

Table 1. Development Model Design

Stages	Main Activities	Purpose	Expected Results
Define	- Analysis of the mental training needs of sepak takraw athletes. - Identify the problem of decision-making and mental toughness of athletes. - Literature study on scenario-based mental training models. - Preparation of needs analysis instruments. - Determination of the purpose of developing the training model.	- Understand the initial mental condition and training needs of sepak takraw athletes. - Determine the aspects *of decision-making* and *mental toughness* that need to be improved. - Establish relevant matching scenarios as the basis for the training model.	- A defined profile of the athlete's mental training needs. - Compile a list of relevant critical match scenarios. - Identify *decision-making* and indicators *of mental toughness* to be developed.
Design	- Designing a mental training model framework based on match scenarios. - Draw up match scenarios (pressure situations, counterattacks, critical situations). - Designing mental training protocols	- Create a structured and systematic training model design. - Make sure the match scenario reflects the real situation in sepak takraw.	- A scenario-based mental training model framework is prepared. - Establishment of a sepak takraw match scenario bank. - Availability of comprehensive

Stages	Main Activities	Purpose	Expected Results
	(*image, self-talk, goal setting*). - Prepare *decision-making* and *mental toughness evaluation instruments*. - Designing training support media (scenario videos, athlete worksheets).	- Prepare a valid instrument to measure improved *decision-making* and *mental toughness*.	assessment instrument design.
Development	- Development of mental training modules in accordance with the design that has been designed. - Production of match scenario videos as a training medium. - Model validation by a sports psychologist and sepak takraw coach. - Trials are limited to small groups of athletes. - Model revision based on validator input and test results.	- Develop a training model that is ready to be implemented. - Ensure the feasibility, validity, and practicality of the training model. - Assess the initial effectiveness of the model in improving *decision-making* and *mental toughness*.	- Availability of validated match scenario-based mental training modules. - Prototype training model ready for wider testing. - Documentation of expert validation results and input for improvement.
Deploy	- The application of the training model to sepak takraw athletes in full. - Measurement of improved *decision-making* and *mental toughness before post*. - Dissemination of training models to coaches and sepak takraw clubs. - Publication of development results in scientific journals or sports seminars. - Evaluation and feedback from users (athletes, coaches).	- Prove the effectiveness of the model in improving *the decision-making* and *mental toughness of athletes*. - Disseminate the model so that it can be used by the wider sepak takraw community. - Get feedback for future model improvements.	- Significantly improving *the decision-making ability* and *mental toughness of* sepak takraw athletes. - The training model is accepted and implemented by coaches and athletes. - The availability of scientific publications as a contribution to the development of sports science.

In the *Define stage* as the initial stage of the 4D model, the researcher analyzed the mental training needs of sepak takraw athletes, identified *decision-making* problems and *mental toughness* experienced by athletes, and conducted a literature study related to mental training models based on match scenarios. In addition, the researcher compiles a needs analysis instrument and determines the goals of developing a specific and measurable exercise model. This stage aims to understand the initial mental state of the athlete, determine the aspects *of decision-making* and *mental toughness* that need to be improved, and determine the relevant match scenarios as the basis for the development of a training model.

In the *design stage* , the initial design of the mental training model to be developed is carried out, including the model framework, training protocol, and supporting media. Activities at this stage include designing match scenarios that represent situations of pressure, counter-attacks, and critical conditions in sepak takraw, designing mental training protocols (*imagery*, *self-talk*, *goal setting*), developing *decision-making* and *resilience* mentally evaluate instruments, as well as designing supporting media in the form of scenario videos and athlete worksheets. This stage aims to produce a structured training model design that is structured, systematic, and able to reflect the real situation in a sepak takraw match.

At the *development stage* , the design implementation process is carried out into a real product in the form of a mental training module based on a sepak takraw match scenario. Activities at this stage include the development of comprehensive training modules, the production of match scenario videos as training media, model validation by sports psychologists and sepak takraw coaches, trials limited to small groups of athletes, and model revision based on validator input. The goal is to produce a training model that has been validated and meets the standards of feasibility, validity, practicality, and effectiveness in improving *the decision-making* and *mental toughness of* athletes.

At the *dissemination* (implementation) stage, the process of distributing training model products to more widely targeted users is carried out. Activities at this stage include the full implementation of the sepak takraw athlete training model, the measurement of improved *decision-making* and *mental toughness* through *pre-post design*, the dissemination of the model to sepak takraw coaches and clubs, and the publication of development results in scientific journals or sports seminar forums. The goal of this stage is to prove the effectiveness of the training model empirically, disseminate the model so that it can be used by the sepak takraw community in general, and obtain feedback from users as material for future evaluation and refinement of the model.

The research subjects consist of 30 sepak takraw athletes who are undergoing the preparation program for the 2026 Central Java PORPROV from various regions in Central Java. Expert validation involves two validators who have expertise in the field of sports psychology and sepak takraw coaching.

The research instruments used include: (1) expert validation sheets to assess the feasibility of instruments and models, (2) athlete decision-making questionnaires (16 items), (3) athletes' mental toughness questionnaires (16 items) based on the 4C model (Clough et al., 2002), (4) model practicality questionnaire (16 items), and (5) model implementation observation sheet. Data is collected through *Pre-test pre-tests* on the research subject.

The research instruments include material validation sheets and media experts which were carried out using *the Learning Object Review Instrument* (LORI) questionnaire instrument.*An Experience Questionnaire of athlete responses* to test the practicality of the training model was developed. The effectiveness of the exercise model was tested through the implementation of *pre-test* and *post-test*, with the test results then analyzed using a paired sample t-test.

Expert validation and practicality data were analyzed using a Likert scale of 1-5 and categorized based on a predetermined range of scores. The *data on the decision* making and *mental toughness of* athletes were analyzed descriptively by comparing pretest and posttest scores to determine the improvements that occurred after the application of the model.

This research uses two data analysis techniques, namely qualitative data analysis and quantitative data analysis. The analysis of the validity of the material was carried out using

the LORI instrument. The results of the assessment from each material and media expert were then analyzed using the formula used as follows (Putria et al., 2023).

$$V = \frac{Total\ Skor\ Empirik}{Skor\ Maksimal} \times 100\%$$

The percentage score obtained from each expert is then calculated as the average percentage of validity and categorized based on the eligibility level criteria listed in **Table 2.**

Table 2. Eligibility Level Criteria

Aspects of the Model	Highly Valid	Applicable	Quite Valid	Invalid	Highly Invalid
Decision Making Mental Illness	Score > 4	3 < Score ≤ 4	2 < Score ≤ 3	2 < Score ≤ 1	Score < 1
DM Headline Pen Shoes	Score > 4	3 < Score ≤ 4	2 < Score ≤ 3	2 < Score ≤ 1	Score < 1
Rubrik Penskoran MT	Score > 4	3 < Score ≤ 4	2 < Score ≤ 3	2 < Score ≤ 1	Score < 1
DM Questionnaire Sheet	Score > 4	3 < Score ≤ 4	2 < Score ≤ 3	2 < Score ≤ 1	Score < 1
MT Questionnaire Sheet	Score > 4	3 < Score ≤ 4	2 < Score ≤ 3	2 < Score ≤ 1	Score < 1
Scenario-Based Mental Training Model	Score > 4	3 < Score ≤ 4	2 < Score ≤ 3	2 < Score ≤ 1	Score < 1

The practicality of the questionnaire was analyzed using data from the UEQ questionnaire given to 30 PORPROV sepak takraw athletes in Batang. In the UEQ questionnaire, there are 16 aspects that are practical assessments with the average score of each aspect in the UEQ categorized based on the level of practicality listed in **Table 3.**

Table 3. Questionnaire Practicality Level Criteria

Score Range	Category
3.76 - 5.00	Very Practical
2.51– 3.75	Quite Practical
1.26 - 2.50	Less Practical
0.00 – 1.25	Impractical

The results of the athletes' pre test and post test were analyzed using a pair sample t test. The score obtained is then averaged and interpreted

$$\bar{x} = \frac{\text{post test score-pre test score}}{\text{maximum score-pre test score}}$$

Table 4. Categories Effectiveness of scenario-based training models

Interval	Category: Effectiveness
$\bar{x} \geq 0{,}7$	Height
$0{,}3 \quad 0{,}7 \leq \bar{x} <$	Medium
$\bar{x} < 0{,}3$	Low

The Scenario-based Training Model developed has been shown to be effective in improving the Decision-making and Mental Toughness of athletes. Based on the results of the t-test analysis of paired samples, the average obtained was 0.71, which indicates that most athletes experienced significant improvements in Decision-Making and Mental Toughness. If it is in the moderate category ($0.3\ 0.7 \leq \bar{x} <$) it indicates that despite the improvement, there are still some athletes who need additional training to achieve maximum results. However,

overall, the Scenario-Based Training Model has high effectiveness in improving the decision making and mental toughness of athletes.

RESULTS AND DISCUSSION

The Match Scenario-Based Mental Training Model (MLMBSP) was developed through four stages according to the 4D model. In the Define stage, a needs analysis was carried out through field observation and interviews with coaches, which resulted in findings that sepak takraw athletes have a level of decision-making and mental toughness that is still in the intermediate category.

In the Design stage, three main mental training scenarios are designed: (1) Strict score scenarios of 13-13 with a focus on Decision Making + Mental Toughness (Control & Confidence), (2) Scenarios of coming back from falling behind 5-12 with a focus on Mental Toughness (Commitment & Challenge) + Decision Making, and (3) Scenarios facing opponents's match point with a focus on Mental Toughness (Control & Confidence) + Decision Making is very important. Each scenario integrates imaging and self-talk techniques that are delivered through three stages of implementation: Briefing, Simulation, and Reflection. In the Development stage, the prototype of the Match Scenario-Based Mental Training Model (MLMBSP) is printed and can be read and practiced directly by athletes. The book presents varied information, and an attractive visual display.

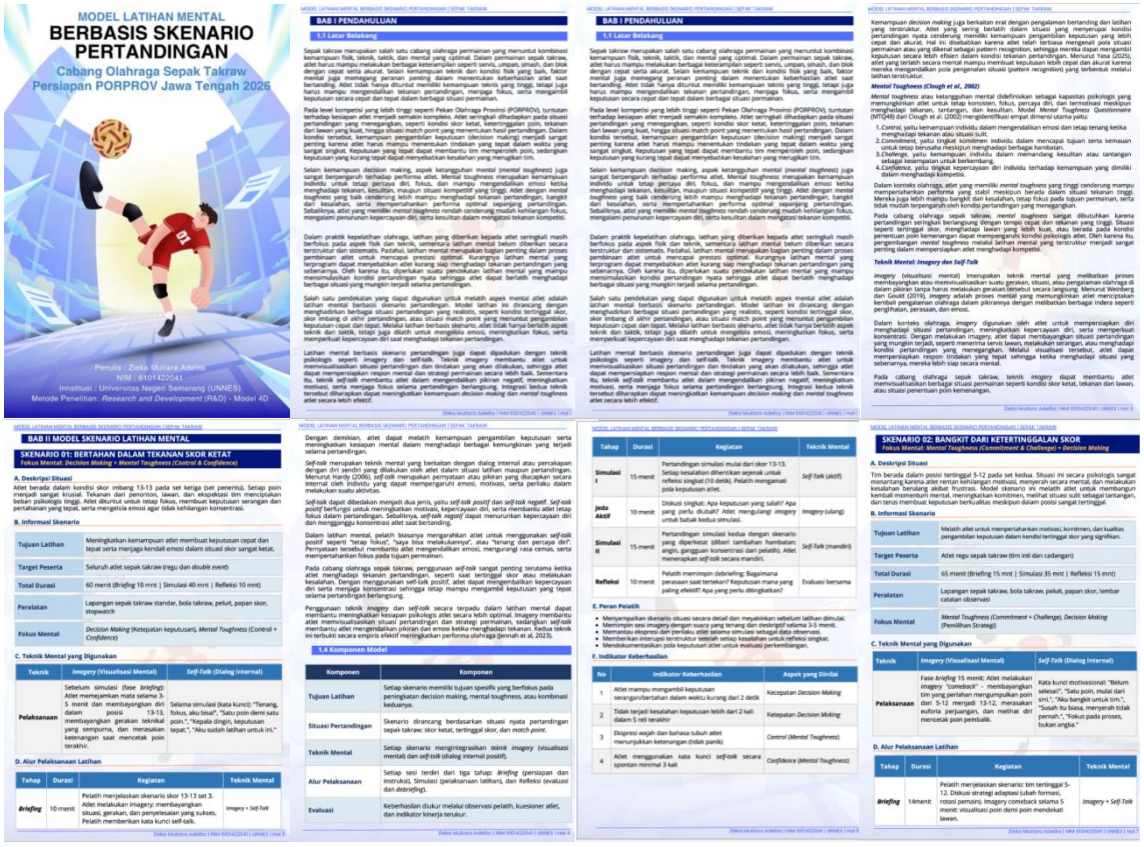

Figure 1. Book Cover And Contents

Figure 1 shows the cover and contents of the Match Scenario-Based Mental Training Model (MLMBSP). The developed model is then assessed for feasibility in terms of materials and media.

The assessment of the validity of the material was carried out by 2 lecturers of the Department of Sports, State University of Semarang and a sepak takraw coach. The results of the assessment showed that the Match Scenario-Based Mental Training Model (MLMBSP) material was declared feasible, in accordance with the

Expert Validation Results

Expert validation was carried out by two validators on seven aspects of the developed model. The validation results are presented in **Table 5.**

Table 5. Validation Results of MLMBSP Model Component Experts

Aspects of the Model	Expert Score 1	Expert Score 2	Average	Category
Questionnaire Decision Making	4,13	4,00	4,06	Applicable
Mental Toughness Questionnaire	3,75	4,38	4,06	Applicable
DM Headline Pen Shoes	4,21	3,47	3,84	Applicable
Rubrik Penskoran MT	4,11	3,89	4,00	Applicable
DM Questionnaire Sheet	4,69	4,00	4,34	Highly Valid
MT Questionnaire Sheet	4,44	3,94	4,19	Applicable
Model MLMBSP	4,81	4,38	4,59	Highly Valid

Based on Table 5, all aspects of the model were obtained valid to very valid categories from both experts. The MLMBSP model as a whole obtained the highest average score of 4.59 with a very valid category, which indicates that the developed model has good content feasibility to be applied in the mental training program of sepak takraw athletes.

Practicality Test Results

The practicality test model was carried out by involving 30 athletes as respondents. The results of the practicality test are presented in **Table 2.**

Table 6. Results of the MLMBSP Model Practicality Test

Components	Shoes	Category
Number of Respondents	30 athletes	-
Total Practicality Score	2.129	-
Average Respondent Score	70,97	-
Average Practicality Score (5 scale)	4,44	Very Practical

The results in Table 6 show that the MLMBSP model obtained an average practicality score of 4.44 out of a scale of 5, which is categorized as very practical. These findings suggest that coaches and athletes find this model easy to apply independently without the need for a sports psychologist, in line with the main principle of model development that prioritizes application on the field.

Pretest and Posttest Decision Making and Mental Toughness Results

Pretest and posttest data were used to determine the initial picture and changes in the level of decision-making and mental toughness of athletes after the application of the model. The results of the data analysis are presented in **Table 7.**

Table 7. Pretest and posttest decision-making results and athletes' mental toughness

Variabel	Prates Rata-Rata	Category	Postgraduate Rate	Category
Decision Making	3,06	Medium	3,99	Height
Mental Toughness	2,79	Medium	4,20	Height
DM Increase (%)	30,28%		Medium → High	
MT Increase (%)	50,59%		Medium → High	

The data in Table 7 show a significant improvement in both variables. *Athletes' decision-making* increased from an average of 3.06 (medium category) to 3.99 (high category), reflecting an increase of 30.28%. Meanwhile, *mental toughness* is increasing, from an average of 2.79 (moderate) to 4.20 (high), reflecting an increase of 50.59%. This improvement demonstrates the effectiveness of the model in providing a contextual and systematic mental experience to athletes.

The results of this study show that the Match Scenario-Based Mental Training Model (MLMBSP) developed meets the feasibility criteria in terms of validity and practicality. These findings are in line with Candra et al. (2025) which states that the match scenario-based approach aims to improve athletes' readiness to face real situations through realistic mental simulations. When mental training is integrated directly into the match scenario, the transfer of skills from training to competition becomes more optimal than conventional abstract mental training (Hamid et al, 2025).

Improvement *decision-making* From medium to high category confirm views Putri et al. (2025) which affirms that superior decision-making skills require structured, systematic, and contextual exercise. In the MLMBSP model, each scenario is designed to stimulate the process *Pattern recognition* athletes through repeated exposure to critical match situations. This process allows athletes to develop stronger cognitive schemes to deal with real stress, as described Saharullah dkk. (2022) that mentally trained athletes are able to make decisions

faster and more accurately through situational recognition patterns formed from structured exercises. Improvement *Mental toughness* (50.59%) compared to *decision-making* (30.28%) showed that realistic match scenarios have a very significant impact on the development of the psychological dimension of athletes. This is consistent with Oktavira (2025) that show that athletes with *Mental toughness* A good one is able to manage pressure, maintain focus, and demonstrate resilience in the face of challenging competitive situations. Model 4C developed by Clough et al. (2002) which is the basis of the dimensions *Mental toughness* In this study, this includes *Control, Commitment, Challenge*, and *Confidence*, all of which are explicitly trained in all three developed match scenarios.

Engineering integration *Image* and *Self-talk* in the model is proven to provide a strong synergistic effect (Hamid et al., 2025). Kasmad et al. (2025) revealed that visualization-based mental training has an important role in improving the psychological readiness of athletes, especially in the context of competitive sports. Meanwhile, Juhanis et al. (2025) demonstrate that the implementation of *Positive self-talk* which are integrated into game scenarios play an effective role in helping athletes manage mental stress. Findings Isyani & Firdausi (2024) Stating that both techniques have been proven to be empirically effective in improving sports performance further strengthens the relevance of the model design developed in this study.

The model's high practicality score (4.44; very practical category) indicates that coaches can apply MLMBSP independently without the need for in-depth sports psychology expertise. This is a significant advantage, considering the limited access to sports psychologists in the regions, especially in preparation for the 2026 Central Java PORPROV. Zafitri (2024) Emphasizing that Sepak Takraw athletes need a mental approach that is practical and can be applied in the context of regional coaching, because the characteristics of the fast and dynamic game demand psychological readiness that is constantly honed.

Overall, the MLMBSP developed in this study offers a more contextual approach than conventional mental training because: (1) it is integrated directly into training sessions, rather than separately; (2) based on real match scenarios specifically for sepak takraw; and (3) using measurable indicator-based evaluation and structured observations. This is the novelty that distinguishes this study from previous studies that have generally examined mental exercise in a more general context.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that: (1) The Match Scenario-Based Mental Training Model (MLMBSP) of sepak takraw athletes has met *the valid* to *very valid criteria* based on expert assessment, with an overall model validation score of 4.59; (2) The model obtained a practicality score of 4.44 in the very practical category, indicating that the model can be applied independently by the trainer in the field; (3) The application of the model provides an increase *in athlete decision-making* from medium (3.06) to high (3.99) and an increase in *mental toughness* from medium (2.79) to high (4.20). The MLMBSP model, which consists of three match scenarios integrated with *imagery* and *self-talk techniques*, has proven to be suitable for use as a mental training guide for sepak takraw coaches and athletes in preparing for the 2026 Central Java PORPROV.

The results of this study are in line with the opinion of Edo and Utami (2024) who stated that mental training based on match scenarios is effective in developing the psychological aspects of athletes. In addition, the findings of this study also support the statement of Lofandri (2025) that a scenario-based approach is able to help athletes improve perceptual, cognitive, and emotional abilities through training situations that resemble real matches. The improved decision-making and mental toughness in this study showed that the integration of imagery and self-talk techniques in the training model can help athletes be better prepared for the pressures of the game and make decisions faster when playing. Therefore, the MLMBSP model consisting of three integrated match scenarios with imagery and self-talk techniques has proven to be suitable for use as a mental training guide for sepak takraw coaches and athletes in preparing for the 2026 Central Java PORPROV.

The study is recommended to be further developed through experimental effectiveness tests with a quasi-experimental design to prove the significant impact of the model on

statistical improvement of decision-making and mental toughness. In addition, this model can be adapted for other gaming sports that have similar psychological characteristics.

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