PSYCHOLOGICAL FUNCTION ASSESSMENT TESTS FOR FEMALE TABLE TENNIS PLAYERS AGED EIGHT TO NINE YEARS OLD IN LONG AN PROVINCE, VIETNAM

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Abstract:

Table tennis is a sport with complex and fast-paced situations, requiring athletes to maintain strong mental focus to perform well during matches. This study aims to identify psychological function tests for assessing female table tennis athletes aged eight to nine in Long An Province. The study employed document review, interviews, neuropsychological testing, and statistical analysis. The subjects included 32 young female table tennis athletes of this age group in Long An Province, along with 16 table tennis experts. The results identified four psychological function tests suitable for these young athletes, including Simple reaction time (ms), Choice reaction time (ms), Comprehensive attention (points), and Information processing capacity (bits/second).

Keywords: tests, psychological function, table tennis player, eight to nine years old, Long An Province, Vietnam

1. Introduction

Table tennis is an individual competitive sport that demands not only physical fitness but also exceptional mental resilience, as match outcomes are closely tied to the athlete's psychological state. Hence, it is often believed that the four key psychological qualities required in a table tennis player are decisiveness, courage, cleverness, and mental stability [1], [2], [3]. Furthermore, modern table tennis places a high premium on speed,

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necessitating rapid execution of movements with intense concentration. Thus, it is no coincidence that table tennis is often referred to as the "*nerve-testing sport*" [4].

To become a skilled table tennis athlete, one must possess sharp visual acuity to accurately predict the opponent's ball trajectory through their stance and posture. Science has demonstrated a close relationship between the flexibility of the nervous system and the refinement of motor skills, meaning that the motor analysis organ significantly influences the development of a composite neural response involving visual and auditory sensory organs [5]. This means that high-intensity activities, for example, lengthy training sessions, can lead to central nervous system fatigue and diminish its regulatory capacity over bodily functions. This is manifested in decreased excitability and functional flexibility of the nervous system. "*Reaction time is a sensitive indicator that reflects the excitability and functional flexibility of the central nervous system, as well as of sensory and effector organs*" [6]. When the central nervous system exhibits high excitability and functional flexibility, reaction time is quick, motor capacity is elevated, and endurance is high. Conversely, slow reaction times reveal diminished central nervous system function and reduced capacity to handle physical exertion.

In table tennis competitions, strong psychological factors enable athletes to stay focused, quickly observe, and make prompt decisions. Additionally, flexibility and high concentration can enhance a player's ability to react swiftly to an opponent's offensive moves (in defense) and to make precise offensive decisions to gain an advantage. Every action taken by a table tennis player is based on complex choice reaction mechanisms, characterized by not only speed and accuracy but also timeliness. A player's predictive ability and precise reactions to varying ball speeds are crucial indicators of the effectiveness of their responses. Therefore, it is understandably stated that athletes need to possess a decent, strong mind and mental health. Due to this importance, we have chosen to conduct a study entitled: *Psychological function assessment tests for female table tennis players aged eight to nine years old in Long An province, Vietnam*".

2. Materials and methods

2.1 Methods
The study employs the following methods:
- **Literature Review Method:** This method synthesizes, analyzes, and processes sources related to the psychological functioning of table tennis athletes, establishing a theoretical foundation to support the analysis and discussion of research findings.
- **Survey Method:** Surveys are conducted with experts and experienced trainers to select evaluation criteria for the psychological functioning of eight-to-nine-year-old female table tennis athletes in Long An Province.
- **Neuropsychological Testing Method:** This method involves testing the selected psychological function tests on the table tennis athletes.

- **Statistical Analysis Method:** The data collected in the study are processed, analyzed, evaluated, and compared with the aid of SPSS 22.0 to support the study's findings and conclusions.

2.2 Participants
2.2.1 Test takers
32 talented female table tennis players aged eight to nine in Tan An City, Ben Luc District, Thu Thua District, Chau Thanh District, Duc Hoa District and Kien Tuong Town, Long An Province.

2.2.2 Surveyees
16 table tennis experienced experts, managers, and lecturers from various universities, including Ho Chi Minh City University of Physical Education and Sports, Hanoi University of Physical Education and Sports, Ho Chi Minh City University of Physical Education and Sports, Da Nang University, and Ho Chi Minh City University of Economics.

3. Results

To identify psychological function assessment tests for female table tennis athletes aged eight to nine in Long An, Vietnam, three steps were conducted as follows:
- **Step 1:** Compiling psychological function tests in table tennis based on previous studies,
- **Step 2:** Consulting with experts and trainers to shortlist the tests,
- **Step 3:** Testing the validity of the shortlisted tests.

3.1. Compilation of table tennis psychological function tests from previous studies
The study synthesized table tennis psychological function assessment tests from the works of domestic and foreign authors such as General Department of Physical Education and Sports Table Tennis (1996) [7], Nguyen Ngoc Cu et al. (1998) [8], Bui Quang Hai (2007) [9], Le Nguyet Nga (2016) [1], Nguyet Nga et al. (2016) [10], Tran Hong Quang, Do Vinh, Lam Quang Thanh (2008) [11], Tran Hong Quang (2011) [2], Vu Thanh Son (2006) [12], Nguyen Tien Tien (2001) [13], Nguyen The Truyen (1999) [14], Nguyen Thi Tuyet (2000) [15], Nguyen Danh Hoang Viet (2005) [16], Nguyen Quang Vinh et al. (2013) [17], Le Huang Tie Hua (1999) [18.], Zhu Lin et al. (1999) [19]. Liu You Qiong (2000) [20].

Based on the synthesis results, the study selected five criteria, including Simple reaction time (ms), Choice reaction time (ms), Comprehensive attention (points), Information processing capacity (bits/second), and Nervous system type (points).

3.2. Consultation with experts and trainers

Based on the results of the first step, the researchers proposed a questionnaire and conducted surveys twice, with a 15-day interval between them. There was guaranteed no significant difference between the two times. Responses were regulated as follows:

- Strongly Agree: 5 points,
- Agree: 4 points,
- Neutral: 3 points,
- Disagree: 2 points,
- Strongly Disagree: 1 point.

The surveys involved 16 experts, administrators, and university lecturers with extensive experience in table tennis. To verify the consistency of results between the two surveys, a comparison was made using the Chi-square (χ^2) test, as shown in Table 1.

Table 1: Survey results of psychological function assessment tests for female
table tennis athletes aged eight to nine years old in Long An province

No.	Test	1st N = 16		2nd N = 16		x^2	Sig
		Total points	%	Total points	%		
1	Simple Reaction Time (ms)	73	91.25	72	90.00	0.09	0.76
2	Choice Reaction Time (ms)	72	90.00	72	90.00	0.00	1.00
3	Nervous System Type (points)	53	66.25	53	66.25	0.00	1.00
4	Comprehensive Attention (points)	74	92.50	73	91.25	0.10	0.75
5	Information Processing Capacity (bits/second)	74	92.50	73	91.25	0.10	0.75

Table 1 indicates that, for all tests across the two rounds of interviews, the calculated Chi-square values (χ^2) were less than the table value of 3.84, with a significance level (Sig) > 0.05. This means that the differences between the two sets of results were not statistically significant at the Sig > 0.05 level, demonstrating a high consistency in responses among the administrators, experts, coaches, and lecturers.

The researchers had decided to select the tests that received a total score above 55 points (indicating agreement). According to this criterion, four tests were identified to assess the psychological functions of female table tennis athletes aged 8-9 in Long An province, including Simple Reaction Time (ms), Choice Reaction Time (ms), Comprehensive Attention (points), and Information Processing Capacity (bits/second).

3.3. The validity of the shortlisted tests

The validity of a test, also referred to as its "informational value," indicates the test's accuracy in measuring a particular attribute (such as quality, ability, or characteristic). Experimental validity encompasses test results compared to specific indicators, also known as statistical validity. Experimental validity reflects the relationship between the test's outcome and an intermediate indicator directly related to the characteristic being measured. These intermediate indicators are often referred to as central factors. In sports, common central factors include the overall score or competition rankings. In sports

measurement, performance results are frequently used as indicators [77, p. 86]. Thus, it is vital for the correlation coefficient between a test and the indicator, known as the informational coefficient, to be calculated. Furthermore, it should be noted that the validity is closely tied to the reliability of the test. Tests that lack reliability generally lack validity. Practically, if the validity coefficient is no less than 0.4, the test is considered usable, and if it is no less than 0.6, the test can also be used for predictive purposes [21].

To verify the validity of the psychological function assessment tests for female table tennis athletes aged 8–9 in Long An province, the study calculated the validity coefficient by determining the correlation between the selected tests and the competition performances of the athletes. Spearman's correlation coefficient formula was used for this calculation [22], and the analysis results are presented in Table 3.

Table 3: Correlation coefficient between psychological test results and competition performance of female table tennis players from eight to nine years old in Long An province

No.	Test	r	P
1	Simple Reaction Time (ms)	0.88	<0.05
2	Choice Reaction Time (ms)	0.9	<0.05
3	Comprehensive Attention (points)	0.73	<0.05
4	Information Processing Capacity (bits/second)	0.81	<0.05

Table 3 shows that the four tests above are correlated with competition performance ($r > 0.4$ and $P < 0.05$). Therefore, it can be concluded that these tests are valid for assessing the psychological function of female table tennis players between eight and nine years old in Long An province.

4. Discussion

The psychological characteristics of table tennis athletes refer to the ability to quickly and accurately orient themselves in complex match situations. To achieve this, athletes must maintain intense focus throughout the game, often under stressful and variable psychological conditions. Therefore, the ability to sustain attention is critically important for table tennis players [23] [24].

Additionally, when receiving the ball, table tennis players tend to distribute their attention across multiple aspects simultaneously to assess the ball's incoming speed and spin, estimate the distance, monitor the opponent's position and movements, and select the most suitable stroke technique. All of these depend on each athlete's attentional distribution ability, often referred to as information processing capacity—one of the key factors determining table tennis athletes' performance efficiency [2] [10].

According to Chinese experts, psychological criteria are crucial in selecting athletes, with particular emphasis on attentional capacity [15] [25]. Additionally, an athlete's cognitive ability is equally essential, as it influences their tactical awareness and strategic thinking. As a result, it is understandable to state that psychological criteria are often prioritized in the selection of table tennis athletes. Those selected possess strong

cognitive abilities, a good sense of tactics, and a proactive approach to advancing in table tennis. In summary, the chosen tests have proven to be reliable for assessing those essential psychological characteristics.

5. Conclusion

The research has identified four tests to assess the psychological characteristics of female table tennis players aged eight to nine years old in Long An province, which include Simple reaction time (ms), Choice reaction time (ms), Comprehensive attention (points), and Information processing capacity (bits/second).

Conflict of Interest Statement
The authors declare no conflicts of interest.

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