

Simulated Training -- a Study on its Scientific Principles and its Application in the Chinese National Table Tennis Team

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I Introduction

Simulated training is a kind of pre-tournament work in which a player goes in for repeated practice with a partner who simulates the playing features of his prospective opponent. It helps the player to find the optimum way of dealing with the opponent he expects to meet in an upcoming tournament.

This method has been used by the Chinese National Table Tennis Team since the nineteen-sixties and has contributed to its unfading glory over the last two decades and more. Why is simulated training so effective? How should we use this method? What are the things to be noted in the course of the training? These are questions of interest to many coaches and scientific researchers. In this paper the scientific principles of simulated training are studied for the purpose of providing a theoretical basis for the correct application and improvement of this training method.

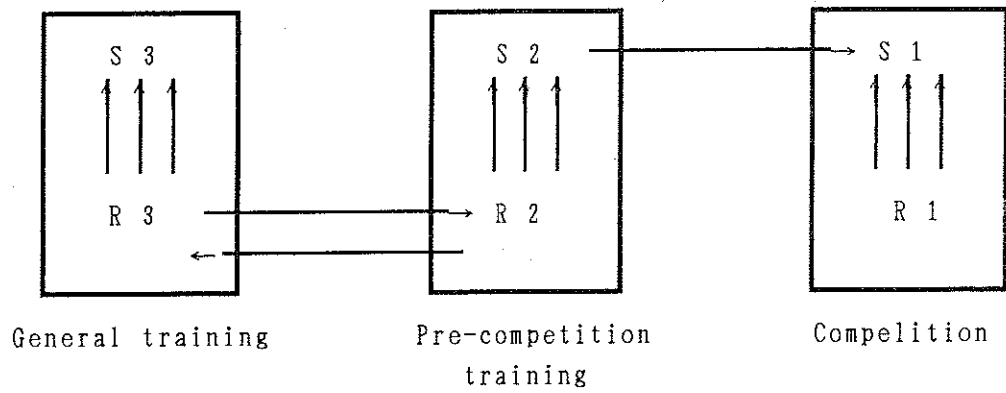
II Research Methods

Our chief method consisted of surveys, the findings of which were verified in experimental researches.

(1) Surveys: 14 coaches and 29 players (all internationals) on the Chinese National Team were interviewed on their experiences in simulated training.

(2) Experimental researches: a comparison was made between the different effects of simulated and non-simulated training on the mastery and application of special motor skills for returning heavy loops. Twenty boys and girls aged 9-11, all with more than two years of training experience, were randomly divided into two groups of 10: the training group (Group I) adopting simulated training and the control group (Group II) using general training methods. Before the experiment, the players in the two groups were given a preliminary test, in which they showed little difference in the level of performance. During the experiment, they practiced with a robot producing loops at seven different rotational speeds (in terms of revolutions per second), which were coded as A (141.7 r/s), B (139.0 r/s), C (113.6 r/s), D (122.8 r/s), E (117.4 r/s), F (112.0 r/s), and G (106.6 r/s). Table 1 shows how the training of the two groups was arranged.

III Results and Discussion



Legend: S = Stimulation by shots from opponent or robot
 R = Reaction of the player to the stimulation
 ↑ ↑ ↑ = Repeated practice

Diag 1 Model showing the relationship between training and competition

Number of drills								Final tests		
	1	2	3	4	5	6	7			
Group I	B	B	B	B	B	B	B	A	C	E
Group II	G	B	F	D	F	F	F	A	C	E

Note: The speeds of spins for the control group were arranged at random.

Table 1 Arrangement of drills in returning loops with different spins

1. Simulated training conforms to the idea that training should be geared to the needs of specific competitions.

One of the principal aims of training is to improve the trainee's ability to adapt to the opponent's way of playing. Theoretically, this can best be achieved by experiencing more matches with the actual opponent. But this is difficult to carry out in daily training. Experience shows, however, that to a certain extent this aim can also be realized by simulated training.

Simulated training serves as a link between training and competition, as is illustrated by the model in diagram 1.

From the model we can see that a competition is not a simple process of the player's reaction (R1) to the opponent's stimulation (S1) during matches but it is closely related to his experience in training prior to the competition. The more closely his experience in training resembles actual game situations, the more successful will be his performance in competitions. If S2 given by the imitator closely resembles S1 produced by the opponent, R2 experienced by the player will stand him in good stead when he encounters S1 in an actual competition.

2. Simulated training enables a player to master the specific techniques and tactics for defeating his opponent.

Twenty-three (or 88.5%) of the 26 players interviewed showed confidence in handling their opponents after simulated training, in which process they had readapted their techniques and tactics to expected game situations.

Between general training and simulated training there exists a marked disparity in the acquisition of motor skills. From the final tests in the experiment we mentioned earlier in this paper, it was found that the performance level of Group I in forehand and backhand returns of loops A and C was significantly higher ($p < 0.05$) than that of Group II (see Table 2). It is clear that simulated training was favorable to the mastery of skills for coping with heavy loops. On the contrary, general training methods had no such advantage because they did not involve enough practice against heavy loops and no corresponding conditioned reflexes were set up. Instead of being exposed to a single type of stimulus as in simulated training, the trainee had to respond to various kinds of stimulus, which interfered with the acquisition of specific motor skills.

3. Simulated training makes it easier to apply specific techniques and tactics in competitions.

Most coaches (93%) and players (97%) interviewed were of the opinion that simulated training helped to adapt players to games against their actual opponents. This shows that this kind of training made it easier for players to apply in competitions the techniques and tactics they had acquired in training. In its daily simulated training, the Chinese National Table Tennis Team has always laid stress on raising the imitators' technical level. Before each major tournament they would watch video recordings of opponents in action so as to study and imitate the main features of their games. In the course of simulated training, they would practice with their partners so that they could work out the proper techniques and tactics for coping with the rivals.

In contrast to the case of Group I (simulated training), the performance level of the control group did not show noticeable improvement, and in some cases even declined (see Table 3) since the players did not have enough opportunities to master the techniques for dealing with heavy loops.

4. Simulated training can help a player's mental preparation.

A player's performance in competitions depends to a certain extent on his mental state. Usually he shows nervousness when subjected to unfamiliar stimuli. In order to adapt himself to the stimuli he may encounter in competitions, he undergoes simulated training in which his practice partner tries his best to imitate the chief playing features of the prospective opponent. Investigation of 26 players showed that they all felt psychologically better prepared for competitions after simulated training.

Things are quite different with those who have not undergone simulated training. Thus players in the control group were prone to errors in dealing with heavy loops in experiments, because they found the stimuli produced by these loops unfamiliar to them. In this way they would become anxious about their play. Interviews with these players after the experiment revealed that most of them felt anxious in the test and were not satisfied with their performance. Differences in the emotions of the players in the two groups can be seen in table 4.

To sum up, as an effective method, simulated training helps a player to master the necessary techniques and tactics, then to apply them in actual matches, and to get into a good state of mind so that he can perform well in competitions.

Diagram 2 illustrates how simulated training contributes to a player's performance.

5. Procedures of simulated training and basic requirements

Simulated training consists of three steps: 1) defining the playing features of the prospective opponent; 2) creating a model of the opponent; and 3) practicing with the model or imitator. These steps may be analyzed as in diagram 3.

The basic requirements to be fulfilled in the three steps are: correct assessment of the prospective opponent, true-to-life imitation and effective practice.

a. **CORRECT ASSESSMENT OF THE OPPONENT** is chiefly the job of the coaches, who should know the opponent very well and be able to define his playing features. After determining which opponent to be imitated, they should keep themselves informed of any technical or tactical changes made by the opponent so as to modify his model accordingly.

b. **TRUE-TO-LIFE IMITATION** requires that the imitator be technically almost as strong as the opponent he imitates, and that he can bring out playing features similar to those of the opponent during training and practice matches.

c. **EFFECTIVE PRACTICE** is possible only when the player who will play in actual matches with a prospective opponent practices with the imitator as seriously as if he were contesting with the real opponent. Only then can he master the necessary techniques and tactics for dealing with the opponent and apply them in actual competitions.

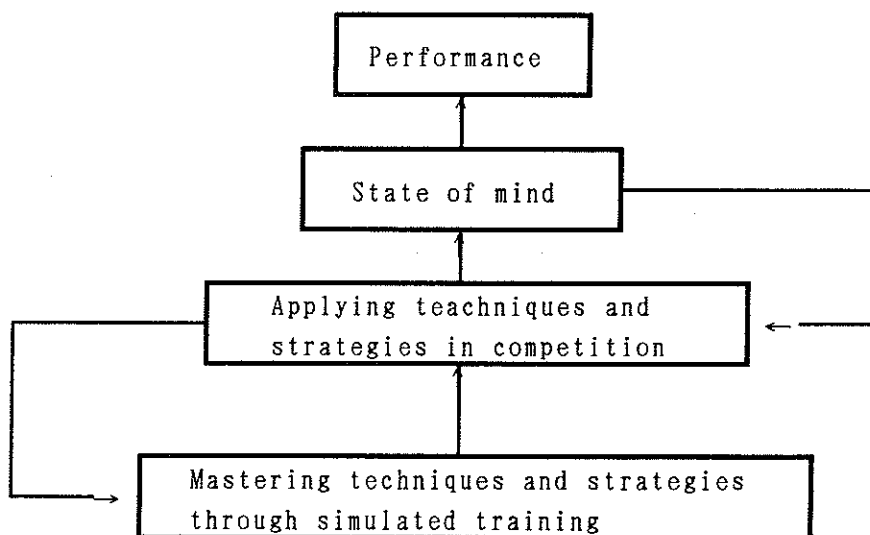
IV Conclusion

1. Simulated training is an effective method to improve the trainee's ability to adapt to the opponent's way of playing and eventually to win the matches, because it enables a player to master the specific techniques and tactics for defeating his opponents, makes it easier to apply them in competitions and helps a player's mental preparation; therefore,

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Kinds of loops	Backhand returns				Forehand returns			
	A(141.7 r/s)		C(133.6 r/s)		A(141.7 r/s)		C(133.6 r/s)	
Group No.	I	II	I	II	I	II	I	II
x	2.156	1.902	2.214	2.090	2.198	1.886	2.292	2.036
s	0.1577	0.1301	0.1408	0.1124	0.1351	0.1794	0.1584	0.1717
t	3.9289		2.1765		4.3932		3.4654	
p	《0.01		<0.05		《0.01		<0.01	

Table 2 Final tests of the two groups' performances in returning loops



Diag 2 Contribution of simulated training to a player's performance

Kinds of loops	Backhand loops				Forehand loops			
	A(141.7 r/s)		C(133.6 r/s)		A(141.7 r/s)		C(133.6 r/s)	
Group No.	I	II	I	II	I	II	I	II
x (before experiment)	1.902	1.856	2.042	2.012	1.896	1.850	2.088	2.038
x (after experiment)	2.156	1.902	2.214	2.090	2.198	1.886	2.292	2.036
t	3.1574	0.5947	1.7183	1.0643	5.7769	0.4540	3.9128	0.0331
p	<0.02	>0.50	>0.10	>0.20	<0.01	>0.50	<0.01	>0.50
Comparison of skill application between the two groups (%)								
	25.4		17.2		30.2		20.4	
	4.6		8		3.6		-0.2	

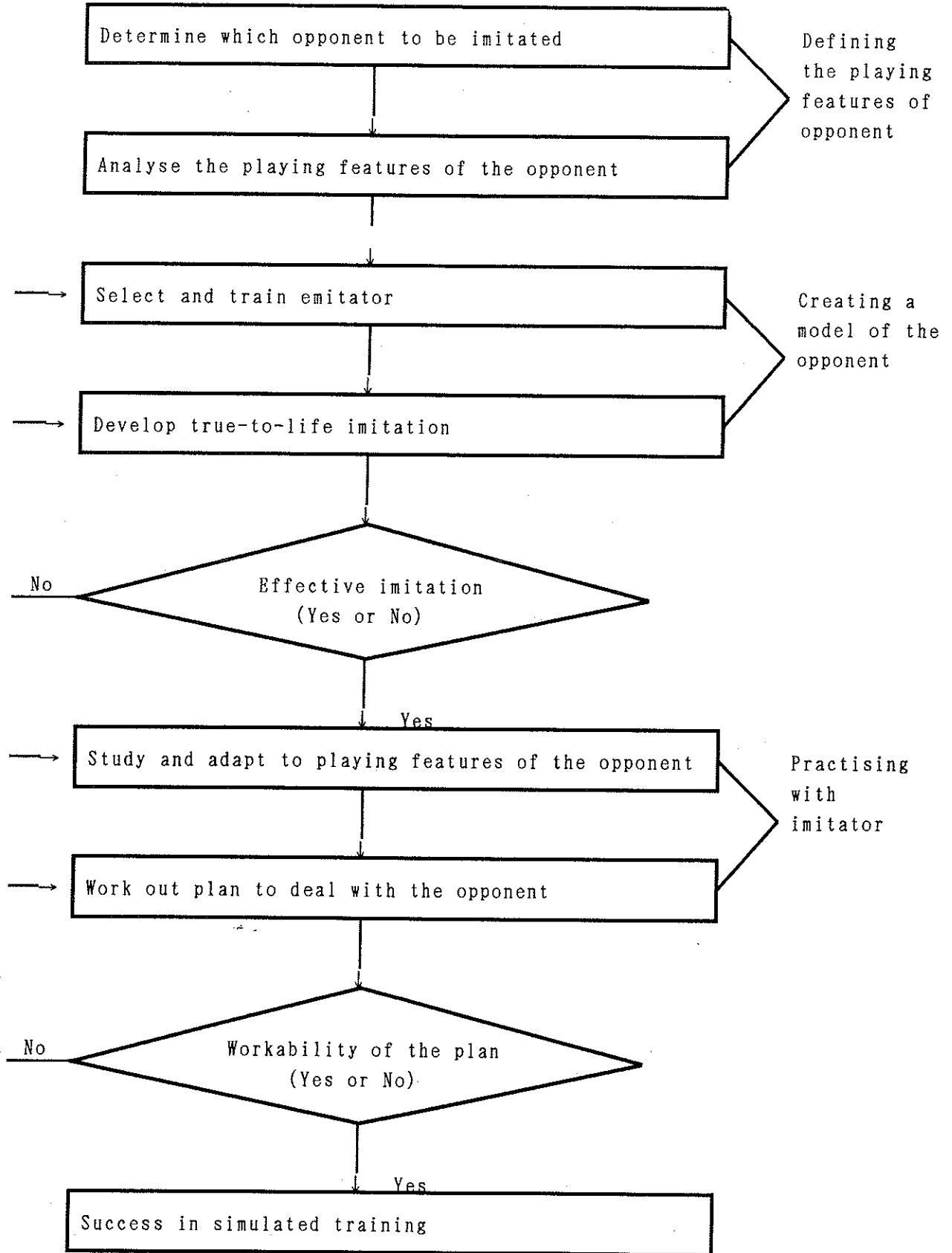
Legend: Group I Group II

Table 3 Comparison of skill application between the two groups

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Group No.		I (persons)		II (persons)	
How they feel about their performance	Backhand loops	Satisfactory	5	Satisfactory	1
		Fairly satisfactory	4	Fairly satisfactory	4
		Not so satisfactory	1	Not so satisfactory	4
		Unsatisfactory		Unsatisfactory	1
	H	76.5			
	P	< 0.05			
	Forehand loops	Satisfactory	5	Satisfactory	
		Fairly satisfactory	5	Fairly satisfactory	1
		Not so satisfactory		Not so satisfactory	5
		Unsatisfactory		Unsatisfactory	4
	H	57.5			
	P	< 0.01			

Table 4 Emotions of players as revealed in interviews after the final tests



Diag 3 Practical steps to be taken in simulated training

it conforms to the idea that training should be geared to the needs of specific competitions.

2. Simulated training consists of three steps: 1) defining the playing features of the prospective opponents; 2) creating a model of the opponents; and 3) practicing with the model or imitator. Step 2 "True-to-life imitation" and step 3 "effective practice" are main criteria for scientific simulated training.

3. In this paper, we have summed up the Chinese National Table Tennis Team's experience of arranging their simulated training. It will be a reference useful for all the other antagonistic sports events.

V Reference

- 1) Qiu Zhonghui etc. (1982)
"Research of Modern Table Tennis Techniques", People's Sports Publishing House of the P. R. China
- 2) Wang Jiazheng etc. (1983)
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