Construction of Norms for Skill Test Table Tennis Players

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Abstract: The purpose of this study was to construct the norms for evaluating performance of players in Table Tennis Skill Test. Since, there is a lack of standardized evaluative criteria in Table Tennis for assessing the ability, grading and predicting the performance of Table-Tennis players, an effort was undertaken to construct Norms for Skill Test for junior and senior Table Tennis Players. For this purpose 816 male, 410 Junior and 406 Senior, state and national level Table-Tennis players of different states in India were randomly selected to serve as subjects. The performance of Table Tennis players in Table Tennis test battery of four test items, Namely, Alternate Push Test, Target Service Test, Alternate Counter Test and Fore Hand Drive on Target Test with foot movement after playing backhand push, constructed by Pushpendra Purashwani and Dr. A.K. Datta, was chosen for the purpose of the study. The data was collected by administering the test for the selected test items during the Summer Coaching Camps and Regular Training Sessions of various districts, different Ranking Table Tennis Tournaments and State and Inter-District Table-Tennis Championships in the year 2006. The data, which was collected by administering tests, was statistically treated to develop norms for all the test items. The two normative scales, namely, the Percentile Scale and 7 Sigma Scale were constructed for the junior and senior table tennis players of state and national level. The norms were constructed by using Percentile and 7 Sigma Scale techniques analyzed through statistical packages, the scores were further classified into five grades i.e. very good, good, average, poor and very poor under Normal Distribution.

Keywords: Skill Test, Norms, Scales, Grades, Normal Distribution.

1. INTRODUCTION

Among different games and sports, Table Tennis is an extremely fast indoor game. Today, it is an accepted fact that Table Tennis is the most popular racket sport in the world and the second most popular participation sport. After the introduction of sandwich rubber it has become an extraneously speedy game. As Table Tennis can be played by a young and old person, that's why, it is called as "LIFE TIME SPORT".

Evaluation is essential in the process of teaching and coaching. Through evaluation, a teacher/coach can know the extent to which learning has taken place. Hence, the teacher/coach must be aware of some evaluation techniques, which will enable him to measure the student's/player's skill objectively and classify them initially as well as by measuring the progress made by them. There are few skill tests in various physical activities, which help to measure the playing abilities of the students/players in different games and sports

Sports skill test are designed to measure the basic skills used in the playing of a specific sport. Because of the wide range of skills in most sports, a selection of the most important skill is invariably necessary. The selection is usually based keeping in mind the literature available, opinion of experts as well as by applying appropriate statistical techniques. The skill items collectively are called test battery. The skill test helps the students to evaluate their performance in the fundamental skills the game and to provide an incentive for improvement. The test also serves the purpose of helping the teachers/coach to measure student's/player's performance and to evaluate their own teaching/coaching procedure and programme.

Norms are necessary if the test scores are to be adequately interpreted. There are several types and it depends on the purposes of the test and the characteristics of the group to be tested as to which type is selected. The procedure for developing norms starts with the collection of scores on the test from a large sampling of students from the population for which the test was intended. The large collection of scores can be converted into some type of normative scores. On the basis of these norms performance and achievement can be adequately evaluated, scores can be properly interpreted and groups can be compared.

There is a lack of standardized evaluative skill tests in Table Tennis for assessing the ability, grading and predicting the performance of Table Tennis players. The scholar had undertaken a study in Master of Philosophy in Physical Education, titled "Construction of A Skill Test for Table Tennis Players." The study was appreciated by various people, namely, Officials of T.T.F.I., Senior Coaches posted at NSNIS, Patiala, SAI Coaches, Physical Educators and Players. Everyone desired that had norms were constructed, this would have been an excellent skill test. Keeping the response from various quarters, the scholar was motivated to add

something worthwhile to the existing test by developing norms. Hence, a study was undertaken to Construct Norms for Skill Test for Table Tennis Players.

2. MATERIALS AND METHOD

Main objective of the study was to construct norms for skill test for male Table-Tennis players. For this purpose 816 male, 410 Junior and 406 Senior, state and national level Table-Tennis players of different states in India were randomly selected to serve as subjects. Table Tennis skill test constructed by Dr. Pushpendra Purashwani and Dr. A.K. Datta was chosen for the purpose of the study.

The performance of Table Tennis players in Table Tennis test battery of four test items, namely, Alternate Push Test, Target Service Test, Alternate Counter Test and Fore Hand Drive on Target Test with foot movement after playing backhand push were chosen as the criterion measures.

Alternate Push Test

Purpose : To measure the ability to execute push stroke.
Equipment : Balls, Rackets, Table, Twine, Twine Stands, Stop Watch and Score sheets.
Attachment and Table Marking : Twine was fixed on the clamp parallel to net assembly at a height of 20 cm. above the net.
Test Administration : The subject was instructed to warm-up and practice before the actual administration of the test. He was asked to make the numbers of push returns with the controller for a period of 30 seconds. Subject had to keep the ball in between of rope and net. Controller started the rally on the command "Start" having sufficient balls in hand/pocket to continue the rally in case ball goes out of play.

Fig.1. Subject Performing Alternate Push Test

Chances : Two chances were given.
Scoring System : One return was counted when ball crossed in between the net and the rope. Half a return was counted when ball touched the rope but passed in between net and the rope and no return was counted when ball crossed over the rope. Best score of two chances in a period of 30 seconds was considered as the final score.

Target Service Test

Purpose: To measure the serving ability.
Equipment: Balls, Rackets, Table, Marking Chalks/Tapes and Score sheets.
Table Marking : Two target areas of 30 X 15 cm. were marked on the side line on both sides at the distance of 37.5 cm. from the net and 5 was marked in that area. Two more target areas of 80 X 40 cm. were marked on the side line both sides at the distance of 12.5 cm. from the net and 3 was marked in that target area. The remaining area of half of the table, 1 was marked as indicated in Fig.2.
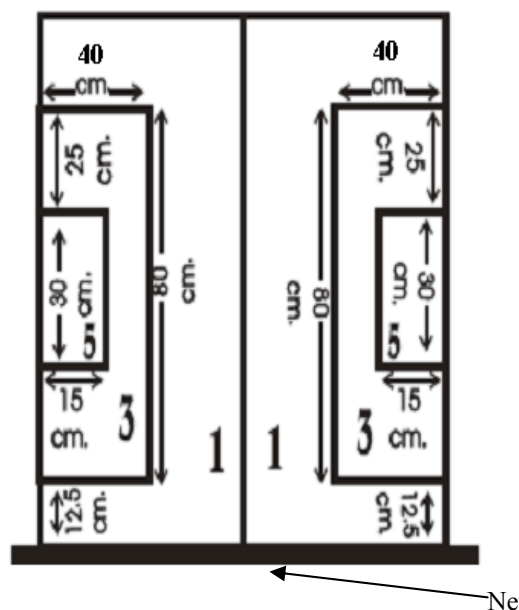

Fig.2. Target Service Test

Test Administration : The subject was instructed to warm-up and practice before the actual administration of the test. He was asked to serve from the left side of the table (in case of right handed players) and vice-versa for left handed players and I.T.T.F. Rules were followed strictly in this regard. Any kind of legal service was permitted.

Fig.3. Subject Performing Target Service Test

Chances : Two chances each comprising of three attempts were given.

Scoring System : Score was given according to the bounce of the ball in the marked areas. The total of best out of two chances (each chance comprised of three attempts) was counted as the score of the subject in Target Service Test.

Alternate Counter Test

Purpose : To measure the counter stroke ability.

Equipment : Balls, Rackets, Table, Stop Watch and Score sheets.

Test Administration : Subject was asked to make the numbers of rallies of alternate counter (one forehand and one backhand) at the left corner of the table with the controller for a period of 30 seconds after sufficient warming up and practice. Controller started the rally on the command "Start" having sufficient balls in hand/pocket to continue the rally in case the ball goes out of play.

Fig.4. Subject Performing Alternate Counter Test

Chances : Two chances were given.

Scoring System : Maximum numbers of returns were counted by an observer out of two chances of 30 seconds each.

Fore Hand Drive on Target Test with foot movement after playing Back Hand Push

Purpose : To measure the Drive Ability.

Equipment: Balls, Rackets, Table, Marking Chalks/Tapes and Score sheets.

Table Marking : Two target areas of 30 X 30 cm. from the corner point of the table were marked at the both corners of single portion of the table, and in those areas 5 was written. Two more target areas of 55 X 55 cm. from the corner point were marked at both corners of single portion of the table, and 3 was marked in those areas. In the remaining areas of the half of the table, 1 was marked as indicated in Fig.5.
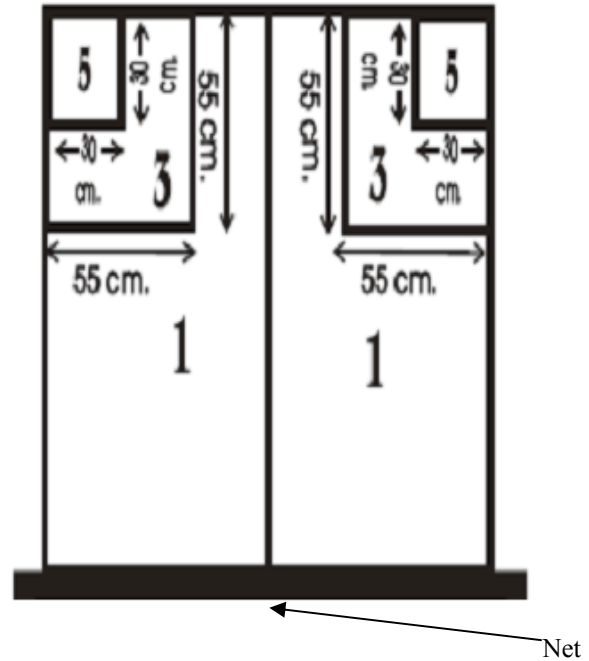

Fig.5. Fore Hand Drive on Target Test with foot movement after playing Back Hand Push

Test Administration : The controller fed the ball and the subject was asked to attack forehand drive with foot movement from left side of a particular half after playing backhand push from at the left corner of the table (in case of right handed player) and vice-versa for left handed players within 5 returns. Sufficient numbers of trials were provided.

Fig.6. Subject Performing Fore Hand Drive on Target Test with foot movement after playing Back Hand Push

Chances : Two chances comprising three attempts each were given.

Scoring System : Score was given according to the bounce of the ball in the marked areas. The best of two chances (each comprising of three attempts) was counted as the score of the subject.

Procedure of Test Administration

The test items were administered to all the subjects by the research scholar himself. The scores of each test items were recorded by the research scholar on the basis of performance in test. Each subject followed his own warming up procedure before actual performance. The subjects were given adequate demonstration, practice trials and required instructions for all tests. The subjects were exhorted to give their best performance.

The data was collected by administering the test for the selected test items during the Summer Coaching Camps and Regular Training Sessions of various districts, different Ranking Table Tennis Tournaments and Inter-District Table-Tennis Championships in the year 2006.

The data, which was collected by administering tests, was statistically treated to develop norms for all the test items. Two scales, namely, Percentile Scale and 7 Sigma Scale were constructed. Further, the scores were classified into five grades i.e. very good, good, average, poor and very poor. The analysis was done by using Statistical Package for Social Science 12.0 for Windows and Microsoft Excel 2007.

3. RESULTS

Two normative scales, namely, Percentile Scale and 7 Sigma Scale were constructed for the purpose of the preparation of the norms for the skill test for male junior state and national Table Tennis players, male senior state and national Table Tennis players and players of both categories (state and national). The percentile norms provided a basis for interpreting an individual's score in terms of his standing in a common group. It informs the player of the percentage of players who scored above or below his score. Thus, Percentile Scale was considered as appropriate scale. Zero Percentiles was located at the lowest score in the data, from which the Percentile table was constructed and 100th Percentile was placed at the highest score.

The other scale i.e. 7 Sigma Scale was constructed for two reasons. Firstly, it was based on normal probability and considers mean and standard deviation values of the distribution and for that reason considered a standard scale. Zero and 100 in the sigma table were located at a point three and a half sigma either side of the mean.

In the Percentile Scale, in Alternate Push Test, the highest performance scores were 26, 23, 26 and 31 and lowest performance scores were 10, 12, 10 and 10 for the group of Junior State, Junior National, Senior State and Senior National Table Tennis Players respectively. In Target Service Test, the highest performance scores were 13, 13, 15 and 15 and lowest performance scores were 3, 2, 3 and 3 for the group of Junior State, Junior National, Senior State and Senior National Table Tennis Players respectively. In Alternate Counter Test, the highest performance scores were 42, 47, 45 and 49 and lowest performance scores were 16, 12, 12 and 18 for

the group of Junior State, Junior National, Senior State and Senior National Table Tennis Players respectively. In Fore Hand Drive on Target Test with foot movement after plying Back Hand Push, the highest performance scores were 13, 13, 13 and 13 and lowest performance scores were 1, 0, 1 and 1 for the group of Junior State, Junior National, Senior State and Senior National Table Tennis Players respectively, and in both categories (junior and senior male Table Tennis players), the highest performance scores were 31, 15, 49 and 13 and lowest performance scores were 10, 2, 12 and 0 for the test items of Alternate Push Test, Target Service Test, Alternate Counter Test and Fore Hand Drive on Target Test with foot movement after playing Back Hand Push respectively.

Table 1

Percentile Scale for Both Categories (State and National Male Table Tennis Players)

Percentile Score	Alternate Push Test	Target Service Test	Alternate Counter Test	Fore Hand Drive on Target Test
100	31	15	49	13
95	22	13	42	11
90	22	13	40	11
85	21	11	37	11
80	20	11	36	9
70	18	9	32	9
60	17	9	30	9
50	17	9	28	7
40	16	7	27	7
30	15	7	25	6
20	14	6	22	5
10	13	5	20	3
0	10	2	12	0

In 7 Sigma Scale, with respect to Alternate Push Test, the highest performance score were 25, 27, 27 and 33 and lowest performance scores were 5, 7, 5 and 6 for the group of Junior State, Junior National, Senior State and Senior National Table Tennis Players respectively. In Target Service Test, the highest performance scores were 15, 15, 15 and 15 and lowest performance scores were 0, 0, 0 and 1 for the group of Junior State, Junior National, Senior State and Senior National Table Tennis Players respectively. In Alternate Counter Test, the

highest performance scores were 42, 54, 52 and 59 and lowest performance scores were 6, 4, 7 and 9 for the group of Junior State, Junior National, Senior State and Senior National Table Tennis Players respectively. In Fore Hand Drive on Target Test with foot movement after plying Back Hand Push, the highest performance scores were 15, 15, 15 and 15 and lowest performance scores were 0, 0, 0 and 0 for the group of Junior State, Junior National, Senior State and Senior National Table Tennis Players respectively and in both categories (junior and senior state and national male Table Tennis players), the highest performance scores were 29, 15, 55 and 15 and lowest performance scores were 4, 0, 3 and 0 for the test items of Alternate Push Test, Target Service Test, Alternate Counter Test and Fore hand Drive on Target Test with foot movement after playing Back Hand Push respectively.

Table 2

7 Sigma Scale for Both Categories
(State and National Male Table Tennis Players)

7 Sigma Score	Alternate Push Test	Target Service Test	Alternate Counter Test	Fore Hand Drive on Target Test
100	29	15	55	15
90	27	15	50	15
80	24	14	44	13
70	22	12	39	11
60	19	10	34	9
50	17	8	29	7
40	14	6	24	5
30	12	5	19	4
20	9	3	14	2
10	7	1	8	0
0	4	0	3	0

Distribution of Grades under Normal Distribution

The scores were further classified into five Grading scales viz. very good, good, average, poor and very poor under Normal Distribution. This classification has been done to make the selection criteria simpler, easier and better.

Table 3
Grading for Both Categories Under Normal Distribution
(State and National Male Table Tennis Players)

Test Items	Very Good	Good	Average	Poor	Very Poor
Alternate Push Test	> 23.26	18.97 – 23.26	14.69 – 18.97	10.4 – 14.69	< 10.4
Target Service Test	> 13.21	9.98 – 13.21	6.76 – 9.98	3.53 – 6.76	< 3.53
Alternate Counter Test	> 42.21	33.41 – 42.21	24.62 – 33.41	15.08 – 24.62	< 15.08
Fore Hand Drive on Target Test	> 12.29	9.02 – 12.29	5.76 – 9.02	2.49 – 5.76	< 2.49

Table 3 shows that the performance has been divided into five categories, namely, very good, good, average, poor and very poor. In Alternate Push Test the performance under five categories starting from very good, good, average, poor and very poor were more than 23.26, 18.97 to 23.26, 14.69 to 18.97, 10.4 to 14.69 and less than 10.4 respectively. In Target Service Test the performance under five categories starting from very good, good, average, poor and very poor were more than 13.21, 9.98 to 13.21, 6.76 to 9.98, 3.53 to 6.76 and less than 3.53 respectively. In Alternate Counter Test the performance under five categories starting from very good, good, average, poor and very poor were more than 42.21, 33.41 to 42.21, 24.62 to 33.41, 15.08 to 24.62 and less than 15.08 respectively. In Fore Hand Drive on Target Test with foot movement after playing Back Hand Push the performance under five categories starting from very good, good, average, poor and very poor were more than 12.29, 9.02 to 12.29, 5.76 to 9.02, 2.49 to 5.76 and less than 2.49 respectively

4. DISCUSSION

Percentile scales for all the four test items for male junior state and national Table Tennis players, male senior state and national Table Tennis players and players of both categories (state and national) taken together were constructed. Percentile scale seems to be appropriate because the highest performance in skill test receives the maximum scores whereas the lowest performance in the test items receives a score of 0. This type of scale is only suitable for the sample selected as in future an excellent player may exhibit better performance than the maximum performance of the

scale in comparison to the given sample. In that case, still the performance will be given the maximum score. This seems to be the lacuna in the percentile scale as this is only suitable for the given group and it does not take into consideration any performance i.e. either good or bad in future. Further, the other drawback noted in the percentile scale was that the similar performance credits different score which seems inappropriate. Such a finding may be due to the limited range of performance as players were categorized into four specific groups, namely, junior state, junior national, senior state and senior national Table Tennis players.

Keeping the drawbacks of percentile scale in mind, it was thought appropriate to construct 7 Sigma scale. This scale was appropriate for all the test items as a specific performance got a specific score. However, it was noted that there was a slight difficulty in giving score at extreme ends of the scale because for a similar performance different scores could be credited. This happened because of the nature of the test as any performance cannot score more than the permissible limit in Target Service Test and Fore Hand Drive on Target Test with foot movement after playing Back Hand Push.

Keeping the drawbacks of percentile and 7 sigma scale in mind, it was thought appropriate to categories players into five categories i.e. very good, good, average, poor and very poor. The results revealed that performance can be easily divided into five categories without encountering any difficulty. Hence, grading under normal distribution proved to be the most suitable way of categorizing players as the drawbacks of the percentile and 7 sigma scale were eliminated. Keeping the educational reforms in mind, there is a trend to award grades rather than the score in order to reduce stress and anxiety among the players. Thus, grading under normal distribution yielded a suitable scale.

Recommendations

In the light of conclusions drawn, the following recommendations are made:

1. The normative scales constructed by Research Scholar may be used to evaluate the performance of junior and senior table tennis players of state and national level.
2. The normative scales constructed in this may be used in sports schools, sports hostels, school education departments and professional students of physical education for motivation, classification and grading purposes.
3. A similar study may be undertaken with Table-Tennis players of different levels i.e. colleges, universities and inter-national levels.
4. Since, Table Tennis has become a popular game for women, similar study may also be conducted on women Table-Tennis Players.

REFERENCES

[1] Barry L. Johnson and Jack K. Nelson **"Practical Measurement for Evaluation in Physical Education"** (Delhi; Surjeet Publishers, 1982), p. 258-59.

[2] David H. Clarke and H. Harrison Clarke, **Research Process in Physical Education** (Englewood Cliffs, N. J.: Prentice Hall Inc., 1984), p. 226.

[3] Harold M Barrow, Rosemary Mc Gee and Kathleen A. Tritschler, **Practical Measurement in Physical Education and Sports** 4th Ed., (Philadelphia: Lea and Febiger, 1989), p. 40.

[4] Jane A. Mott and Aileen Lockhart**, "Table Tennis Backboard Test," Journal of Health and Physical Education**, 17, No.9 (November, 1946), p. 550.

[5] Larry Hodges, **Table Tennis, Steps To Success** (Champaign, Illinois: Human Kinetic Publishers, 1993), p.1.

[6] Ted A. Baumgartner and Andrew S. Jackson, **Measurement for Evaluation in Physical Education and Exercise Science**, 4th Ed. (Wm. C. Brown Publishers, Kerper Boulevard, Dobuque, U.S.A., 1992), p.177.