

An Empirical Investigation into the Consistency of Subjective Trainer Analysis of Performance Technique in Three Fundamental Gym Exercises

A summary report of an experiment carried out on the 4th of June, 2015, by OCE Personal Trainer Students at the Malta College of Arts, Science and Technology (MCAST) Fitness Centre, by Lydon Bonnici, Andre Buhagiar, Joanna Calleja, Marvic Debono, Gail Darmanin, Kenneth Ekekezie, Clayton Farrugia, Gordon Galea, Rodrick Mifsud, and Robert Sammut.

Introduction, Questions, Instruments and Sampling

The primary question was, “How consistent are different observers in the analysis of the same performance of a given exercise?”

The participating students, who had recently completed a course module covering the analysis of exercise performance technique, acted as both the performers of the exercises, as well as the analysts. Three exercises were selected for the experiment; the squat, deadlift, and indoor rowing, which each of the students performed in turn, and analysed by identifying and classifying faults.

Identified faults were classified according to the SHARP technique model (Muscat Inglott, 2012), with which the participants were introduced and familiarised during the delivery and assessment of the course module itself. The chosen model consists of the following components as they relate to the accepted requirements of a given exercise;

- Speed of movement
- Heels or balls-of-feet balance point (intersection of line of gravity with base of support as observed from the lateral view)

- Alignment/positioning of relative joints and body parts
- Range of motion
- Posture, back management and breathing

When acting as analysts, the students were instructed to tick the component into which the identified fault could most accurately be classified, making the SHARP technique model the primary research tool used. Following the analyses, a discussion with the students was held.

Methodology

In order to establish the degree of consensus for identified faults, a Consensus Scale as (indicated in Table 1 below) was used. If no faults were identified by any of the nine analysts, a total consensus (100%) was considered to have been reached, since complete agreement was reached that no fault had indeed taken place for that particular technique component. Similarly, if all nine analysts reported a fault, a total consensus (100%) was also considered to have been reached, since complete agreement was reached that a fault had indeed taken place for that particular component.

Table 1: Consensus Scale

No of Analysts Identifying a Fault in a Given SHARP Component	Consensus (%)
0	100
1	89
2	78
3	67
4	56
5	56
6	67
7	78
8	89
9	100

A Consistency Rating was then used, based on Cronbach's Alpha for internal consistency measurement, as indicated in Table 2. A consensus of 100% represents an excellent consistency rating, while a consensus of 56% conversely represents a poor consensus rating.

Table 2: Consistency Rating

Consensus	Cronbach's Alpha	Rating
100	$\alpha \geq 0.9$	Excellent
89	$0.9 > \alpha \geq 0.8$	Good
78	$0.8 > \alpha \geq 0.7$	Acceptable
67	$0.7 > \alpha \geq 0.6$	Questionable
56	$0.6 > \alpha \geq 0.5$	Poor

Results

Tables 3, 4, and 5 indicate the data collected for the three fundamental exercises. The rows indicate the SHARP components, while the columns indicate the ten performances of the exercise.

The following data was extrapolated for the squat exercise;

Table 3: Consensus for the Squat

SQ	1	2	3	4	5	6	7	8	9	10	Mean
S	100	100	100	100	100	100	78	78	100	56	91.2
H	56	56	67	67	67	67	56	78	100	67	68.1
A	78	56	56	56	78	67	56	78	89	67	68.1
R	89	89	89	100	78	100	89	100	100	89	92.3
P	89	67	56	78	78	56	56	56	100	78	71.4
Mean	82.4	73.6	73.6	80.2	80.2	78	67	78	97.8	71.4	78.22

The following data was extrapolated for the deadlift exercise;

Table 4: Consensus for the Deadlift

DL	1	2	3	4	5	6	7	8	9	10	Mean
S	100	100	89	56	89	89	89	67	100	100	87.9
H	67	67	67	56	56	56	89	56	100	100	71.4
A	67	67	56	56	56	67	89	56	100	78	69.2
R	56	56	89	56	67	56	78	89	89	67	70.3
P	56	100	56	67	56	100	56	78	78	89	73.6
Mean	69.2	78	71.4	58.2	64.8	73.6	80.2	69.2	93.4	86.8	74.48

The following data was extrapolated for the indoor rowing exercise;

Table 5: Concensus for the Indoor Rowing

IR	1	2	3	4	5	6	7	8	9	10	Mean
S	100	67	89	100	100	89	56	56	100	100	85.7
H	100	100	89	67	100	100	100	100	100	100	95.6
A	100	89	100	78	67	100	100	100	89	100	92.3
R	89	79	89	89	100	78	67	100	89	67	84.7
P	67	56	78	89	100	78	89	89	100	89	83.5
Mean	91.2	78.2	89	84.6	93.4	89	82.4	89	95.6	91.2	88.36

A summary of the mean values extrapolated from all three exercises is presented in Table 6.

Table 6: Summary of Findings

	Squat	Deadlift	Rowing	Mean
S	91.2	87.9	85.7	88.26667
H	68.1	71.4	95.6	78.36667
A	68.1	69.2	92.3	76.53333
R	92.3	70.3	84.7	82.43333
P	71.4	73.6	83.5	76.16667
Mean	78.22	74.48	88.36	80.35333

The final mean values indicate the consistency among observers for each technique component.

Conclusion

The final mean value of 80.4% consistency, taking into account all three exercises chosen for the experiment, indicates that a group of analysts recently completing the same course module on exercise performance technique, were able to achieve a consistency score of “Good” according to the consistency rating scale outlined in Table 2.

Furthermore, the data indicated that concensus was most likely to be achieved during observation of the Rowing exercise, the mean value indicating a consistency rating of “Good”. The consistency rating for the observation of the Squat and Deadlift exercises was “Acceptable”.

The final discussion revealed some discrepancies in the students’ interpretation of the individual SHARP technique components, despite

receiving the same instruction throughout the course of the module they had just completed, resulting in uncertainties about how specific faults should be classified, and ultimately revealing the limitations of the model as a research instrument. Also, the number of students involved in the experiment (10), severely limited the possibility of drawing valid statistical inferences.

References

Muscat Inglott, M. (2012, November 11). SHARP Technique. *The Sunday Times of Malta*.