

The Effect of Warm-Up Styles on Soccer Player's Performance

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Outside Studies:

Mikayala Thiegles and Chad Smith, researchers from Oklahoma University and Weber State University respectively, had a goal of comparing the effects of an “active, post-activation (PAP) warm-up” to a passive warm-up on a vertical jump performance. The research concluded that an “Active warm-up prior to vertical jump testing appears to be superior to a passive warm-up. Physiologically the body may perform better following dynamic movements rather than through a passive increase in intramuscular temperature.” Thiegles and Smith’s experiment encounters similar treatments upon experimental units and demonstrates a similar motivation to rule the effect of warm-up style on physical performance; however, this study attempts to mitigate the inconsistencies present in the researchers’ study and observes a more focalized audience – Manchester United soccer players.

Purpose of the Experiment:

- This experiment aims to discover whether warm-up styles, consisting of dynamic, static, and FIFA 11+ stretches, increase player’s performance, more specifically player’s sprinting ability and agility. By analyzing a variety of performance tests, consisting of 10 m sprint test, Illinois Agility Test, and RPE, this study seeks to identify the effectiveness of various warm-up styles on player’s performance during training sessions.

Factors and Levels:

- Factors: Type of Treatment
- Levels (Type of Warm-Up Style)
 - I. Dynamic
 - II. Static
 - III. FIFA 11+

Experimental Units:

- A Manchester United player training session (27 players)

Response Variable:

- I will observe player performance through three methods of performance tests, which include a 10 m sprint measured in units of m/s, the Illinois Agility Test measured in units of seconds, and the Borg RPE Scale, which measures the intensity of a workout.
- The analysis will consist of from the performance tests, which will determine the player’s performance from three categories of performance – agility, intensity of the workout, and sprint speed.
- Additionally, the treatment period will take 10 minutes and tests will be held 3 minutes following the treatment period.

Treatments:

- Dynamic: Players take part in dynamic stretches and perform a series of performance tests, which includes an Illinois Agility Test, 10 m Sprint Test, and RPE.
- Static: Players take part in static stretches and perform a series of performance tests, which includes an Illinois Agility Test, 10 m Sprint Test, and RPE.
- FIFA 11+: Players take part in FIFA 11+ warm-up sessions and perform a series of performance tests, which includes an Illinois Agility Test, 10 m Sprint Test, and RPE.

Random Assignment:

- Players will perform Manchester United officiated Fitness Tests, to determine attributes of the players and discover similarities and differences in performance level among players. To randomly assign the players, the experimentalist assigns 9 players to three blocks, which are based on their Manchester United officiated fitness test percentile, which encompasses a 10 m sprint Test, a 12-minute Cooper Test, and 300-Yard Shuffle.
 - i. Block 1 - Consists of players whose Fitness Test Percentile is in the upper 69-99th.
 - ii. Block 2 – Consists of players whose Fitness Test Percentile is in the median 35-68th percentile.
 - iii. Block 3 – Consists of players whose Fitness Test Percentile is in the lower 1st – 34th percentile
- (Cont.) Within each block, the experimentalist will randomly permute the three treatments, randomizing the order of treatments received by every experimental units within each block.
- The table below demonstrates the random permutation.
- Key: A=Dynamic, B=Static, C= FIFA 11+

Experiment	Block	WithinBlock	Treatment
1	Block 1	1	C
2	Block 1	2	A
3	Block 1	3	B
4	Block 1	4	B
5	Block 1	5	B
6	Block 1	6	C
7	Block 1	7	A
8	Block 1	8	C
9	Block 1	9	A
10	Block 2	1	A
11	Block 2	2	C
12	Block 2	3	A
13	Block 2	4	B
14	Block 2	5	A
15	Block 2	6	C
16	Block 2	7	B
17	Block 2	8	B
18	Block 2	9	C
19	Block 3	1	A
20	Block 3	2	B
21	Block 3	3	C
22	Block 3	4	A
23	Block 3	5	A
24	Block 3	6	B
25	Block 3	7	C
26	Block 3	8	B
27	Block 3	9	C

4 Principles of Experimental Design:

Comparison: My design compares three treatments to player's warm up styles. The first treatment consists of dynamic warm-ups, the second treatment consists of static warm-ups, and the third treatment consists of FIFA 11+ warm-ups.

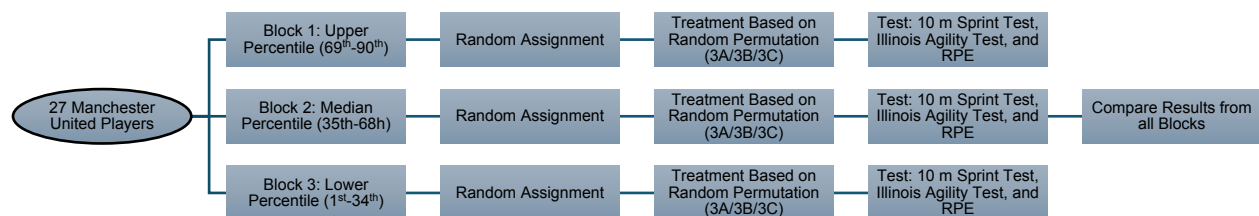
Random Assignment: My design uses blocks, since certain players are much more athletically gifted than others, basically player's athletic ability on their Manchester United officiated Fitness Test. By using blocks, we reduce the chance that players who are similar in athletic performance will affect how they respond to the treatments. My design makes use of random permutation, which assigns 3 Dynamic treatments, 3 Static treatments, and 3 FIFA 11+ treatments within each block of 9. This randomizes

the assignment of treatments, reducing the likelihood of bias emerging within the experiment.

Control: Some external factors or variables that are held constant include: the number and type of exercises or stretches performed within each warm-up (FIFA 11+, since it is an officiated warm routine is already constant), warm-up duration (10 minutes for every condition and test start 3 minutes after warm-ups conclude), and rest intervals for each warm-up.

Replication: There are nine players in each block and nine players receiving each treatment, so there are enough experimental units so the effects of the treatment can be identified and reduced from chance differences between groups.

Flow Chart:



Possible Confounding Variables: Some possible confounding variables that may affect the response include:

Surface and Weather Conditions: Surface Conditions such as grass hardness and wetness can affect traction and player acceleration, which can both overestimate and underestimate player performance. For example, on a rainy day, fields tend to be wet,

worsening players' traction and their ability to accelerate, which can underestimate the quality of the players' performances. Moreover, weather conditions can affect players' thermoregulation and fatigue, deteriorating intensity of sessions and player's performances on the Illinois Agility test and 10 m sprint Test. For example, on a sweltering day, players are likely to experience signs of fatigue and dehydration, which can also underestimate the intensity of sessions and the quality of the players' performances. These confounding variables of surface and weather conditions could create inaccurate connections between type of warm-up styles and player performance.

Fatigue or Soreness: Fatigue and Soreness can affect explosive performance and reaction time, which can underestimate player performance especially on the Illinois Agility Test and 10 m sprint test, where explosiveness and reaction time is essential. The extraneous variables of fatigue and soreness could create erroneous relationships between types of warm-up styles and player performance, where fatigue and soreness are covertly affecting the outcomes of the study, exacerbating the effectiveness of the experiment.

Comparison of Results:

When data about players' performance from the Illinois agility test, RPE, and 10 m sprint test are obtained, experimentalists will compare the treatments of dynamic, static, and FIFA 11+ among all the blocks, using statistical analysis. The statistical analysis will determine if there is a significant difference among the three groups in each category of performance test, which gives evidence to make a conclusion.

Works Cited

- “Comparison of an Active Warm-Up Vs. Passive Warm-Up on Vertical Jump Performance”. *European Journal of Sport Sciences*, vol. 1, no. 6, Dec. 2022, pp. 27-32, <https://doi.org/10.24018/ejsport.2022.1.6.50>.