

# Statistical Analysis of Championship Matches Outcomes in World Wrestling Entertainment (WWE) Pay-Per-View Events

Hilary I. Okagbue, Sheila A. Bishop, Abiodun A. Opanuga, Aderemi A. Atayero, Nkolika J. Peter

**Abstract:** *WWE Pay per view events features championship or title matches where WWE branded and coveted titles are hotly contested. This paper presents the analysis of the frequency of winnings in WWE PPV events from the year January 2000 to February 2019. Some definite criteria were applied to the raw data to ensure that the outcome was either a champion win or lose. Champions of any official titles of the WWE have retained their titles in 664 (63.78%) occasions of the PPV events, while new champions have emerged on 377 (36.22%) occasions. It was also observed that it is only in 14 (5.3%) that any of 266 PPV events were shown without at least a champion win while 59 (22.2%) of the PPV events have been shown without witnessing at least a champion lose. In conclusion, it appears that PPV events often favored the reigning champions and the probability of champions losing their titles and new champions emerging is small.*

**Keywords:** *WWE, wrestling, sport analytics, statistics, pattern, pay-per-view.*

## I. INTRODUCTION

World Wrestling Entertainment (WWE) is the United States-based professional wrestling promotion organization. WWE prides herself as the largest professional wrestling promoter in the world, holding branded events such as the WWE Raw, WWE Smackdown, 205 Live, NXT, and others. WWE is exclusively entertainment in nature and the events are unfolded from the scripted storyline and characterized by predetermined outcomes. Over the years, WWE has grown to be a household name and is viewed by millions of wrestling fans in different countries of the world. Currently, the WWE network has the exclusive rights to broadcast the live matches.

Interestingly, not all the events are freely available for the viewers. Some of the events are viewed based on a subscription known as pay-per-view (PPV). The PPV events were introduced in 1985. PPV is a direct marketing strategy adopted by the WWE to generate revenue for the organization which emanates from the increasing demand for the sport. According to Watanabe [1], demands for sports usually come in two general forms; live attendance and PPV buy. Details

**Revised Manuscript Received on January 15, 2020**

\* Correspondence Author

**Hilary I. Okagbue**, Department of Mathematics, Covenant University, Ota, Nigeria.

**Sheila A. Bishop**, Department of Mathematics, Covenant University, Ota, Nigeria.

**Abiodun A. Opanuga**, Department of Mathematics, Covenant University, Ota, Nigeria.

**Aderemi A. Atayero**, Department of Electrical & Information Engineering, Covenant University, Ota, Nigeria.

**Nkolika J. Peter**, Department of Estate Management, Covenant University, Ota, Nigeria.

can also be sourced from Borland and MacDonald [2]; Budzinski and Setzer [3]; Watanabe [4] and Tainsky *et al.* [5]

The WWE PPV events were originally for the traditional big Four WWE events (Royal Rumble, WrestleMania, Summer Slam, and Survivor Series), but the successes of the PPV events have led to a significant increase in the number of the events over the years. The PPV events organized by WWE are unique, themed, annually recurring, often based on some definite stipulations, and sometimes played based on the brand (Raw, Smackdown) or development (NXT) and most importantly, it contains the title or championship matches. Recently, an all-female PPV event was introduced and aimed at promoting gender equality. In some instances, PPV events have been held outside the United States.

Most of the academic researches done on PPV was based on team sports such as basketball and football [6], and little is done on individual sports. Even when available, emphasis and objectives are on the economic drivers of PPV events. The selected economic drivers are intense rivalry among the competitors, star power, adequate promotion of main events, event posters, spicy scripted storylines, interesting stipulations, fan preferences, outcome uncertainty, unexpected comebacks, scheduling preferences and so on [6, 7-8]. The analysis of the frequency of title outcomes (champions/titleholders retaining or losing their titles) has not been investigated.

This paper aims to conduct statistical data analysis of the title matches outcomes in World Wrestling Entertainment (WWE) pay-per-view events between the years 2000 to 2019. The objectives of the study are outlined;

- To obtain the data summary in tabular form of states in the United States and Countries that have hosted at least one WWE PPV events from inception to date.
- To define some inclusion criteria that will guide the nature of championship matches to be included in the study.
- To perform statistical analysis on the selected championship matches based on the predetermined inclusion criteria.

The analysis will be helpful in the prediction of the outcome of winnings, determine the competitiveness and randomness of winnings in PPV events. It will also be helpful in sports commentary and analysis of past events, auditing, marketing, and future event planning.

## II. RESEARCH METHODS

### A. Data

The raw data was obtained from the websites of WWE [9] and Wikipedia [10], strictly based on some inclusion criteria outlined in this article. The PPV events are all the professional wrestling events promoted, organized and managed by WWE and based on pay-per-view only. The reasons for choosing these years are; first, to reflect the current trend of events and secondly, most of PPV from the year 2000 backward are no longer produced by WWE except the Royal Rumble, WrestleMania, Summer Slam, and Survivor series. PPV is usually every month and now promoted based on scripted storylines from the Raw and Smackdown brands of WWE. Currently, WWE has adopted a dual-brand strategy for PPV events. Also, some of the PPV events are thematically tailored to suit a specific or unique stipulation. The events must feature at least a match with the pre-assigned stipulations.

The data were obtained irrespective of the brand affiliation of the wrestlers or events. The conditions that culminated in the data collection were listed. The PPV events often feature non-title, title matches and some special matches with unique stipulations.

### B. Inclusion Criteria

As widely known, PPV events contain title/championship or non-championship matches. Non-championship matches are picked to settle rivalries, promotion or fan preferences. Championship matches are matches for contesting coveted WWE titles. The criteria are defined to ensure fairness and only cases where a clear winner emerges from a championship match.

- The criteria for inclusion or exclusion of the matches are as follows:
- All WWE PPV from 2000 to present were considered irrespective of the venue of the event.
- All the former and present WWE (men and women) championships in pay-per-view were considered.
- Non-title matches played with any kind of stipulations were not considered.
- Title matches that ended in no contest were not considered.
- Invitational champions versus champions' matches were not considered.
- Doubles' title matches were considered as separate cases.
- Title matches that ended in draws were not considered.
- Title matches that ended in double disqualifications or count outs were not considered.
- Title matches for vacant championships were not considered.
- Matches for the title of Miss WrestleMania were included.
- Inter-promotional matches to promote WWE brands contested by title holders were not considered.
- Pre-event matches involving title matches were considered.

- Title matches for unification of two championship titles were not considered.
- Champion versus champion matches was excluded.
- Cash-in matches for the money in the bank contract were considered as title matches and as such were included.
- Themed Team matches such as Royal rumble matches, battle royals, Raw versus Smackdown, elimination chamber were not considered.
- Winners of the André the Giant memorial trophy was not included.
- Greatest Royal Rumble (2018) was considered as Royal rumble PPV.
- WWE Evolution was considered and the titles therein such as NXT Women championship and NXT UK Women championship.
- WWE World Cup winners are not considered.

Statistical exploration and tests were carried out and the results were adequately presented in the result section.

## III. RESULTS

### A. Analysis of WWE PPV Venues

Several venues in 50 states of the United States, Washington DC, Puerto Rico, England, Canada, Saudi Arabia and Australia have hosted WWE PPV events. The first event took place in Madison Square Garden, New York in 1985. Thereafter, other venues have hosted the events. Some of the venues are: Rosemont Horizon, Rosemont, Illinois; Miami Arena, Miami, Florida; USAir Arena, Landover, Maryland, Gund Arena, Cleveland, Ohio, Alamodome, San Antonio, Texas, SAP Center, San Jose, California and other venues in other US States, Washington DC, Puerto Rico, England, Canada, Saudi Arabia and Australia. The states in the United States and Countries that have hosted at least one WWE PPV events from inception to date are presented in **Table 1**. Sixteen states in the US are yet to host any WWE PPV events as of the events confirmed for February, 2019. The states are: Alaska, Delaware, Hawaii, Idaho, Iowa, Kansas, Maine, Mississippi, Montana, New Mexico, North Dakota, South Dakota, Utah, Vermont, West Virginia and Wyoming.

It can be seen from **Table 1** that PPV events are strategically held in US states with a high population and states with a high percentage of residents with high income. This was further highlighted in the aforementioned states that have not held any of the events. Interestingly, most of those states are conservative.

The recent hosting of PPV events in Australia and Saudi Arabia are strategically done to increase revenue. Also, there has been a decline in hosting of PPV events in Canada and England.

**Table 1: Frequency of the US states, capital, territory and other countries that have hosted at least one WWE PPV event from 1986 to February 2019**

State/Country	Freq.	State/Country	Freq.
California	38	New Jersey	13
New York	34	Michigan	12
Texas	30	England	12
Pennsylvania	23	Maryland	9
Florida	19	North Carolina	9
Illinois	19	Arizona	8
Ohio	16	Georgia	8
Massachusetts	15	Tennessee	8
Missouri	14	Indiana	6
Canada	14	Louisiana	6
Nevada	6	Australia	2
Wisconsin	6	Nebraska	2
Washington DC	6	Oregon	2
Minnesota	5	South Carolina	2
Rhode Island	5	Alabama	1
Connecticut	4	Arkansas	1
Kentucky	4	Colorado	1
Virginia	4	New Hampshire	1
Washington	3	Oklahoma	1
Saudi Arabia	3	Puerto Rico	1

**B. Statistical Analysis**

Statistical methods were used in the analysis of the frequency of wins and losses of the title (championship) matches for all the WWE PPV events from the year 2000 to February 2019, obtained using the predefined inclusion criteria. Articles of similar nature may be explored, see **Pozzato [11] and Okagbue et al. [12-16]** for some examples.

**Table 2: Descriptive findings of the overall PPV events for instances of champions win and champions lose**

Statistic	Champions win	Champions lose
Mean	2.496240602	1.417293
Standard Error	0.079230252	0.069724
Median	2	1
Mode	2	1
Standard Deviation	1.292206305	1.13716
Sample Variance	1.669797134	1.293134
Kurtosis	-0.478779227	1.458218
Skewness	0.156371823	0.942919
Range	6	6
Minimum	0	0
Maximum	6	6
Sum	664	377
Count	266	266

The descriptive findings were summarized in **Table 2** and the detailed statistical tests and hypotheses were summarized

in **Table 3**. Also, frequency tables and bar charts were used to present the two mutually exclusive events of champions, winning or losing and this can be seen in **Tables 4 and 5** and **Figures 1 and 2** respectively.

It can be seen that from **Table 2** that 266 PPV events have been produced by WWE from January 2000 to February 2019. Champions of any official titles of WWE have retained their titles in 664 (63.78%) occasions while new champions have emerged for 377 (36.22%) occasions. The results will vary significantly if the criteria defined in this article are not followed. It can also be deduced that the average champions win and lose is per WWE PPV are 2 and 1 respectively.

**Table 3: Summary of the statistical tests and hypotheses of the overall PPV events for instances of champions win and champions lose.**

Test	Statistic	Comment
Mann-Whitney Test	*W = 87517.0	The medians are significantly different
T test	*t = 10.22	The means are significantly different
ANOVA	*F = 104.511	The variances are significantly different

\*p < 0.0001

It can also be seen from **Table 3** that the trio of Mann-Whitney test, t-test and analysis of variance showed that the two groups have different medians, means and variances respectively.

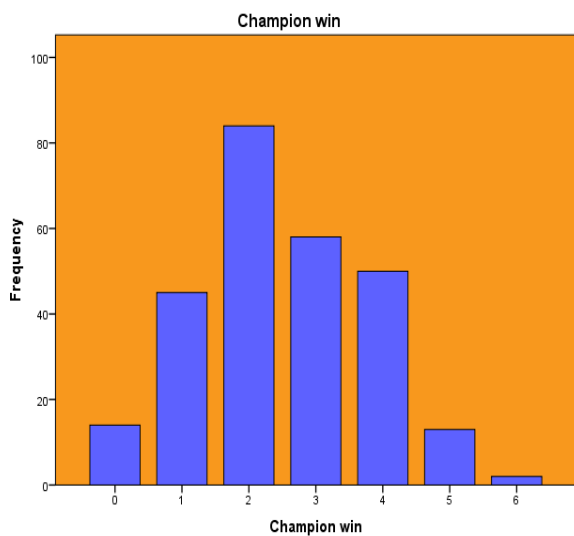
**Table 4: Frequency of champions wins in WWE PPV events (January, 2000 to February, 2019)**

Champion win	Frequency	Percent	Cumulative Percent
0	14	5.3	5.3
1	45	16.9	22.2
2	84	31.6	53.8
3	58	21.8	75.6
4	50	18.8	94.4
5	13	4.9	99.2
6	2	0.8	100.0
Total	266	100.0	

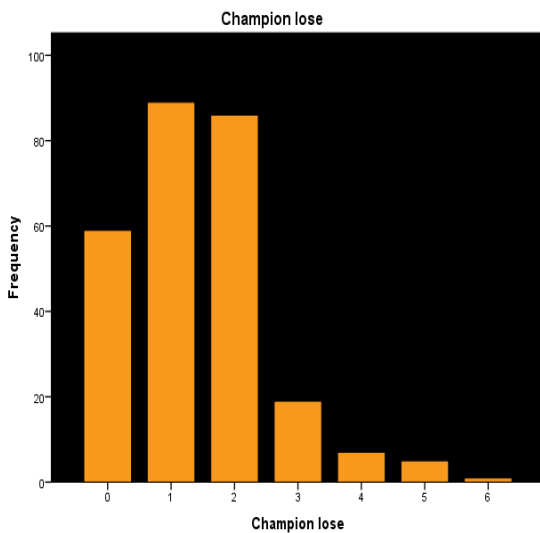
**Table 5: Frequency of champions lose in WWE PPV events (January, 2000 to February, 2019)**

Champion lose	Frequency	Percent	Cumulative Percent
0	59	22.2	22.2
1	89	33.5	55.6
2	86	32.3	88.0
3	19	7.1	95.1
4	7	2.6	97.7
5	5	1.9	99.6
6	1	0.4	100.0
Total	266	100.0	

# Statistical Analysis of Championship Matches Outcomes in World Wrestling Entertainment (WWE) Pay-Per-View Events



**Figure 1: Chart of champions wins in WWE PPV events (January, 2000 to February, 2019)**



**Figure 2: Frequency of champions loses in WWE PPV events (January, 2000 to February, 2019)**

From **Tables 4** and **5**, it can be seen that it is only in 14 (5.3%) that any of 266 PPV events were shown without at least a champion win while 59 (22.2%) of the PPV events have been shown without witnessing at least a champion lose. Also, 237 (89.1%) PPV events have witnessed between 1 and 4 champion wins while in 234 (88.0%) PPV events have witnessed between 0 and 2 champions lose.

## IV. CONCLUSION

In this paper, the following was reported from the analysis of data on the frequency of championship match outcomes from WWE PPV matches from January 2000 to February 2019.

- PPV events are strategically held in US states with a high population and states with a high percentage of residents with high income.
- 16 states in the US have not hosted any PPV event as of February 2019. The states are generally conservative and low income and less populated.
- There has been a decline in hosting of PPV events

in Canada and England while new countries like Saudi Arabia and Australia have recently hosted PPV events.

- PPV events often favored the reigning champions.
- The probability of champions losing their titles and new champions emerging are small
- The PPV events always produce a least a champion win.
- The PPV events yielded more matches that resulted in champions win than the opposite.
- There are significant differences between the median, mean and variances of instances of champions win and lose.
- Betting institutions are most likely to benefit from this research.

## ACKNOWLEDGMENT AND CONFLICT OF INTEREST STATEMENTS

There is absence of conflict of interest among the authors. The paper was sponsored by Covenant University, Ota, Nigeria.

## REFERENCES

1. Watanabe NM. Demand for pay-per-view consumption of Ultimate Fighting Championship events. *Int. J. Sports Magt. Market.* 2012; 11(3-4): 225-238.
2. Borland J, Macdonald R. Demand for sport. *Oxford Rev. Econ. Policy.* 2003; 19(4): 478-502.
3. Budzinski O, Satzer J. Sports business and multisided markets: towards a new analytical framework? *Sports, Bus. Magt.* 2011; 1(2): 124-137.
4. Watanabe NM. Sources of direct demand: An examination of demand for the Ultimate Fighting Championship. *Int. J. Sports Fin.* 2015; 10 (1): 26-41.
5. Tainsky S, Salaga S, Santos CA. Estimating attendance for the Ultimate Fighting Championship: A demand theory approach. *Int. J. Sports Magt. Market.* 2012; 11(3-4): 206-224.
6. Tainsky S, Salaga S, Santos CA. Determinants of pay-per-view broadcast viewership in sports. *J. Sports Magt.* 2013; 27(1): 43-58.
7. Reams L, Eddy T. The impact of rivalry antecedents on mediated demand for an individual sport. *Sports Market. Quart.* 2017; 26 (4): 247-260.
8. Reams L, Shapiro S. Who's the main attraction? Star power as a determinant of Ultimate Fighting Championship pay-per-view demand. *Euro. Sports Magt. Quart.* 2017; 17(2): 132-151.
9. www.wwe.com, accessed on 18th February, 2019.
10. www.en.wikipedia.org/wiki/List\_of\_WWE\_pay-per-view\_events; retrieved on 18th February, 2019.
11. Pozzato GL. Preferential description logics meet sports entertainment: Cardinality restrictions and perfect extensions for a better royal rumble match. *CEUR Workshop Proceedings.* 2015; 1459: 159-174.
12. Okagbue HI, Adamu MO, Oguntunde PE, Opanuga AA, Rastogi MK. Exploration of UK Lotto results classified into two periods. *Data in Brief.* 2017; 14: 213-219.
13. Okagbue HI, Atayero AA, Adamu MO, Opanuga AA, Oguntunde PE, Bishop SA. Dataset on statistical analysis of editorial board composition of Hindawi journals indexed in Emerging sources citation index. *Data in Brief.* 2018; 17: 1041-1055.
14. Okagbue HI, Erundu EC, Atayero AA, Oguntunde PE, Opanuga AA, Olawande TI, Ijezie OA, Eze GA. Statistical analysis of frequencies of opponents' eliminations in Royal Rumble wrestling matches, 1988-2018. *Data in Brief.* 2018; 19: 1458-1465.
15. Okagbue HI, Opanuga AA, Adamu MO, Ugwoke PO, Obasi ECM, Eze GA. Personal name in Igbo Culture: A dataset on randomly selected personal names and their statistical analysis. *Data in Brief.* 2017; 15: 72-80.



16. Okagbue HI, Opanuga AA, Oguntude PE, Ugwoke PO. Random number datasets generated from statistical analysis of randomly sampled GSM recharge cards. *Data in Brief*. 2017; 10: 269-276.

### AUTHORS PROFILE



**Hilary I. Okagbue** is of the Department of Mathematics, Covenant University, Ota, Nigeria.



**Sheila A. Bishop** is of the Department of Mathematics, Covenant University, Ota, Nigeria.



**Abiodun A. Opanuga** is of the Department of Mathematics, Covenant University, Ota, Nigeria.



**Aderemi A. Atayero** is of the Department of Electrical and Information Engineering, Covenant University, Ota, Nigeria.



**Nkolika J. Peter** is of the Department of Estate Management, Covenant University, Ota, Nigeria.