Does Video Game Critic Score Vary by 7th Generation Console Platforms?

Arthur Wu

Introduction

Playing video games is a hobby that has grown exponentially in popularity and technology within the past few decades. The years 2005 and 2006 mark a major advancement in home game consoles with the release of the 7th generation consoles Microsoft Xbox 360, Nintendo Wii and Sony PS3. These consoles brought forth new technology into gaming including motion capture and online gameplay, as well as a large selection of new video games of various genres and gameplay[1].

In this analysis, I have data on video games varying in platform, genre and publisher that have been released since 1980. This data includes critic scores and user scores drawn from Metacritic, game details such as genre and video game platform, and game sales by region. I will use this sample of video game data to represent the total population of release video games, including games that will be released in the future. Due to the popularity of 7th generation home consoles and games, I want to see the distribution of video game critic scores by game platform. I believe that the critic scores of video games are dependent on the platform the game is released on. Using data on video game critic scores and video game platforms, I will show that there is an associative relationship between game platform and video game critic scores for 7th generation gaming consoles.

Data

The dataset used in this study is a video game sales with ratings dataset that was compiled by Rush Kirubi and made available on his Kaggle profile[2]. The columns that this dataset include are basic game descriptions including game platform, genre and publisher, global and regional sales statistics, and critic and user ratings. Kirubi obtained data on global and regional video game sales from Gregory Smith's Video Games Sales dataset, which was compiled through a web scraping of VGChartz, a popular website used to track video game sales [3]. Kirubi extended Smith's video game sales data by adding critic and user score data from a web

[1] https://www.did.ie/content/blog/history-of-video-game-consoles
[2] https://www.kaggle.com/rush4ratio/video-game-sales-with-ratings
[3] https://www.kaggle.com/gregorut/videogamesales

scraping of Metacritic.com, which is a review and rating website that gives ratings to video games.

To make the video game sales and ratings dataset more suitable for my study, I performed data cleaning to remove missing critic scores. A majority of video games released before 2001 had missing critic scores in the dataset. This is because Metacritic did not start rating video games until it was founded in 2001[4]. Therefore, I needed to remove all games that did not have critic scores to prevent skewed results. I also filtered the platforms column so that the dataset would only contain the platforms that are important to the study which includes "Wii", "PS3" and "X360". Lastly, I removed all games that had a critic score under 20.0 since there were only 8 entries within that interval and could skew the results of this study. Before cleaning, the dataset contained 16,719 data entries. After cleaning, the dataset contained 766 entries.

Variables

To analyze the association between critic scores among gaming console platforms, I will use critic score observations and the platforms column that will only contain data of Wii, PS3 and X360 video games.

Critic Score

The critic score data used in this study was taken from the "Metascore" on Metacritic's website. To determine the Metascore of a video game, Metacritic takes the weighted average of all critic scores and creates a final score on a 100-point scale[5]. Initially, the critic score variable in the dataset was a nominal variable that gave the raw critic score ranging from 0-100.00. For this study, I converted the nominal variable to a

Table 1: Univariate summaries for video game critic score and platform

Category	Frequency	Percentage
Critic Score		
Generally Unfavorable	41	5.4 %
Average	173	22.6 %
Generally Favorable	378	49.3 %
Universal Acclaim	174	22.7 %
Platform		
PS3	280	36.6 %
Wii	178	23.2 %
X360	308	40.2 %

[4] https://www.metacritic.com/about-metacritic
[5] https://www.metacritic.com/about-metascores

categorical variable based on Metacritic's General Meaning of Score labels: generally unfavorable (20-40), average (40-60), generally favorable (60-80), and universal acclaim (80-100)[5]. From the univariate summary of the critic score variable in table 1, We can see that almost half of all video games in this study fall under the generally favorable category with a percentage of 49.3%. We can also see that critics mostly give scores greater than 40 as the percentage for generally unfavorable is only 5.4%. The frequencies of the average and universal acclaim categories are also extremely close, with only a one game difference between them (173 and 174 respectively).

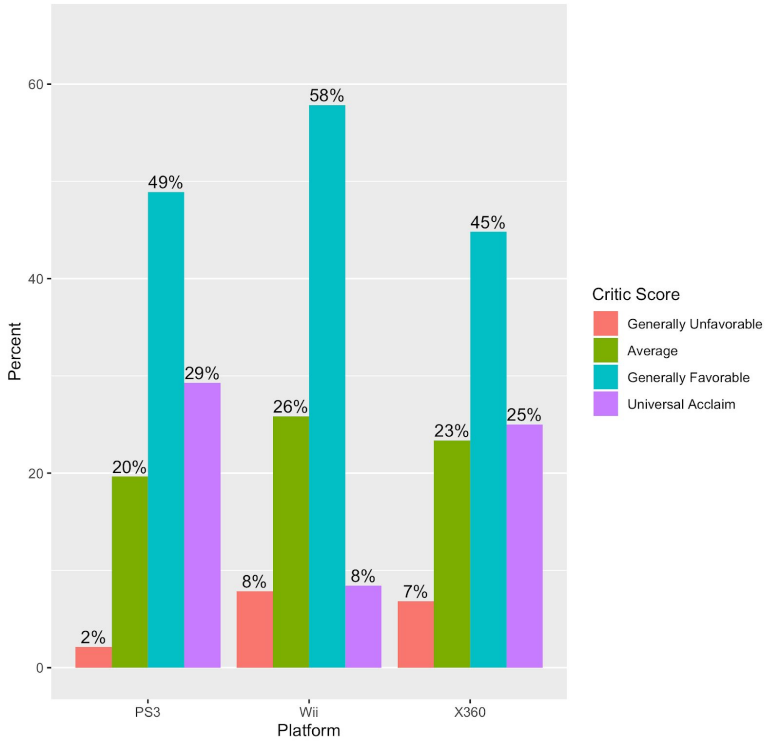
Platform

In this study, I only wanted to study seventh generation gaming consoles which included the PS3, Wii and Xbox 360. Therefore, I filtered the dataset by platform to only account for video games played on these consoles. From table 1, we can see that the Xbox 360 has the largest game library with a percentage of 40.2% and the Wii has the smallest game library with a percentage of only 23.2%. We can also see that the game libraries of the Xbox 360 and PS3 are relatively close with percentages of 36.6% and 40.2% respectively.

Multivariate Analysis

To examine the substantive difference between critic scores by video game platform, I created a grouped bar chart to show the grouped distribution of video game critic scores by video game platform. Examining the graph in figure 1, We can see that the generally favorable category holds the largest proportions for all three platforms, with the Nintendo Wii having the largest proportion at 58%. This is predictable because we already concluded from table 1 that the generally favorable category is the most populated category (49.3%).

Figure 1: Percentage of Critic Score Frequencies by Platform



On the other hand, the Wii is substantially lower in the universal acclaim category (8%) while the PS3 (29%) and Xbox 360 (25%) have similar proportions. There is little substantive difference in proportion of the generally unfavorable and average categories since the largest difference between platforms in those categories is between PS3 (2%) and Wii (8%) in the generally unfavorable category which is only 6%.

Then, I calculated the statistical significance of the difference between critic scores by platform. Using an alpha value of 0.05, I obtained the results $X^2(6) = 36.662$ and $p = 2.05e\text{-}6$, which allows me to reject the null hypothesis since the p-value is smaller than alpha and the observed chi-squared value is greater than the critical chi-squared value, which is 12.59 in this case. I can therefore conclude that there may be an associative relationship between video game platform and critic score. Looking back at the bar chart, we can also see that the significantly large differences between critic scores by platform also supports our statistical result that the relationship between platform and critic score is substantively significant.

Table 2: Association between critic score and platform

	Critic Score				
Platform	Generally Unfavorable	Average	Generally Favorable	Universal Acclaim	***Total***
PS3	6 2.1 % 0.8 %	55 19.6 % 7.2 %	137 48.9 % 17.9 %	82 29.3 % 10.7 %	280 100 % 36.6 %
Wii	14 7.9 % 1.8 %	46 25.8 % 6 %	103 57.9 % 13.4 %	15 8.4 % 2 %	178 100 % 23.2 %
X360	21 6.8 % 2.7 %	72 23.4 % 9.4 %	138 44.8 % 18 %	77 25 % 10.1 %	308 100 % 40.2 %
Total	41 5.4 % 5.4 %	173 22.6 % 22.6 %	378 49.3 % 49.3 %	174 22.7 % 22.7 %	766 100 % 100 %

χ^2=36.662 · df=6 · Cramer's V=0.155 · p=0.000

To obtain the effect size related to the chi-squared test of independence, I performed a Cramer's V test to get a value of 0.155 which falls under the small/medium substantive effect size. This implies that the results obtained are only slightly substantively significant. With my sample size of 766, I have a power of 0.88, which puts my data comfortably above a power level of 0.8. To make a general statement on the sample size needed to obtain a power of 0.8, I would need a sample size of at least 630 samples in my dataset.

Conclusion

In all, I conclude that there is substantive and significant association between 7th generation gaming platform and video game critic score. Examining the specific differences in frequency between categories from the grouped bar graph, we can draw the practical conclusion that video games made for the Wii platform are more likely to be generally favorable, and are less likely to be universally acclaimed than other 7th generation consoles.

By cleaning and filtering the dataset of this study to only include video games released on the Wii, PS3 and Xbox 360, and the removal of all video games with a critic score less than 20, my dataset was very comprehensive and allows me to apply the results of this study to the larger population. One small error that may have skewed my data may be the inclusion of the generally unfavorable category which includes video games with a critic score between 20 and 40. The frequency of generally unfavorable Xbox 360 games is only 21 and is even smaller for the Wii (14) and PS3 (6). Removing games that are in the generally unfavorable critic score category would help strengthen my analysis.