

PSYR 6003: Assignment 1 on Superheros

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Abstract

Method

Participants in this study were acquired from registry records for avengers who fought within New York in 2023. Registry record includes information on physical capabilities, mental capabilities, location of fighting, injuries, and confirmed kills in combat. In order to be included within this study, participants could not have any missing data. With these registry records there are two objectives: (1) Examine combat in those who did not have superpower and died, comparing those in different areas of the battle ground. (2) The IQ between avengers with and without superpowers. Here I describe the analytics for these two objectives differently.

Objective one was purely an exploratory analysis of combat in dead, non-superheros between the north and south battlefield. Only individuals from the registry who had died and had no superpowers were included in this analysis. Information on injuries participants sustained and confirmed kills were extracted from the registry. In addition, to determine how effective participants are at combat, a new variable was created: Combat Effectiveness. This was a summation of information on hero agility, strength, speed, and willpower. Afterwards, the remaining people were grouped into those who were on the north side of the battlefield and those on the south. Summary statistics was then generated for combat effectiveness, kills, and injuries between the two groups for exploration.

Objective two included a statistical analysis on the IQ between avengers with and without superpowers. To determine if the registry had power for statistical significance and insignificance, power analyses were conducted. We first looked for articles on similar topics to find what effect sizes to appear in the literature. However, there is little literature on the IQ

between avengers with and without superheroes. For this reasoning, a power analysis for the smallest effect size of interest was conducted, at a significance of 0.05, two sided, power of 0.9, for Cohen's d 0.2. The same parameters were utilized for the power analysis of nonsignificance. The parameter of 0.05 was utilized to ensure that type 1 errors are made at a low chance. Two sided to ensure significant effects can be found either positive or negative. A Cohen's d of 0.2 for previous reasons of looking for the smallest effect size of interest. Lastly, a power of 0.9 to ensure that if the population amount is achieved that we are likely to find significance if the alternative hypothesis is true. A t-test was then conducted on IQ between avengers with and without superpowers.

Results

For objective one, summary stats were reported between the north and south battlefield for Combat Effectiveness (Table 1). For objective two, the power test for statistical significance revealed a necessary sample size of 562 for each group. The power test for nonsignificance required 542 people per group. The t-test on IQ between superheroes and non-superheros gave a Cohen's D of 0.3 (CI 95%: 0.16-0.44).

Discussion

For objective one, an exploratory analysis revealed that between the north and the south they overall had similar levels of combat effectiveness. In addition, the injuries were also comparable between the two groups. The only aspect that the north and the south differed in was kills, the south had a much higher amount of mean kills. However Combat Effectiveness may not be the best measure of combat effectiveness. Looking at the data (Table 2) it would appear that speed, agility, strength, and willpower are contributing to combat effectiveness in different

amounts, making those with particularly high strength having high combat effectiveness. This may make combat effectiveness an erroneous measurement.

For objective two, we did not appear to have the sample size required to actually ensure we have the power for this study. So results from this study should be interpreted with caution. Despite this, the t.test done between heroes with and without superpower gave a cohen's d of 0.3, which is a small but significant difference. With a confidence interval of 0.16-0.44, the results seem precise in that it is likely to be a small effect and the confidence interval is fairly narrow.

Table 1

north_south	meanCE	sdCE	minCE	maxCE	meanKILL	sdKILL	minKILL	maxKILL	meanINJ	sdINJ	minINJ	maxINJ
north	499.7815	174.0656	130.68	897.06	1.712329	4.565813	0	34	4.602740	0.6819035	2	5
south	491.6771	189.5299	67.25	946.89	4.750000	14.992900	0	79	4.428571	0.8789123	2	5

Table 2

CombatEffectiveness	speed	agility	strength	willpower
482.05	5.05	27	400	50
878.98	4.98	54	782	38
696.84	4.84	56	569	67
661.24	5.24	63	535	58
775.01	5.01	30	663	77