Enhance Bravery and Self-Esteem: A study on Brave Enterprises through Advanced Data Analysis

Isabella Novo, Ellen Daily, Joseph Bagley, Lara Aitken, Joseph Bagley and Ravyn Edge

Affiliations: Brave Enterprises, New York; Department of Mathematics, Embry-Riddle Aeronautical University, Florida

GET MORE BRAVE

EMBRY-RIDDLE 1926 AERONAUTICAL UNIVERSITY

Abstract

BRAVE Enterprises is a data-based company that specializes in studying bravery to design and deliver programming that activates courageousness in people. Through motivational seminars called Project Brave, they assist individuals who understand they cannot eliminate their fears but want to manage them effectively and excel despite them.

Understanding what impacts an individuals confidence can help raise awareness on how to increase their bravery. Embry-Riddle Aeronautical University students were given the opportunity to work in partnership with BRAVE Enterprises to analyze a dataset of over 900 participants that completed a survey before and after their bravery workshops. In analyzing the data, correlations can be found between levels of bravery and confidence as well as which sessions were most effective.

Introduction

The study of bravery provides valuable insights into the factors that influence bravery and confidence levels in teammates and highlights the importance of developing interventions and strategies to support development in these domains. The Brave Research Project aims to quantify participant responses to aid Brave Enterprises in increasing levels of bravery. In analyzing overall levels of intrepidity in each session, we can evaluate the numerical data in each session to see which demographics were most affected each session. This analysis would provide numerical data which depicts the similarities found in the participants bravery levels.
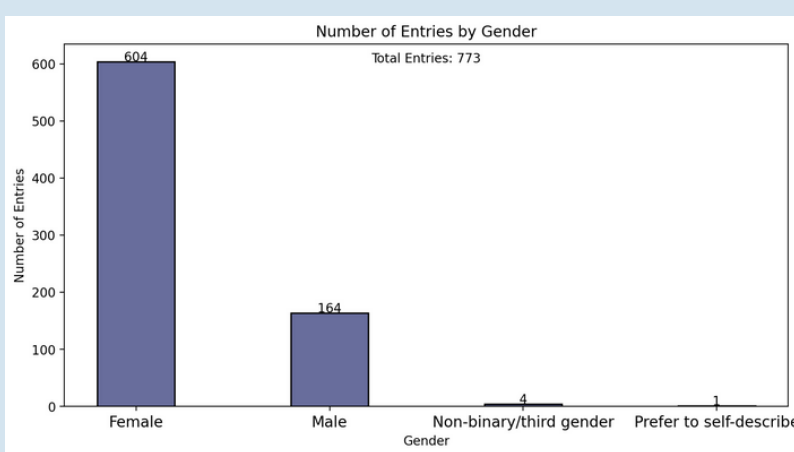
Figure 1: Gender Distribution
After extracting discrepancies between pre and post survey, the total entries were 773. The majority gender is Female, which is comprises of 78% of the population.
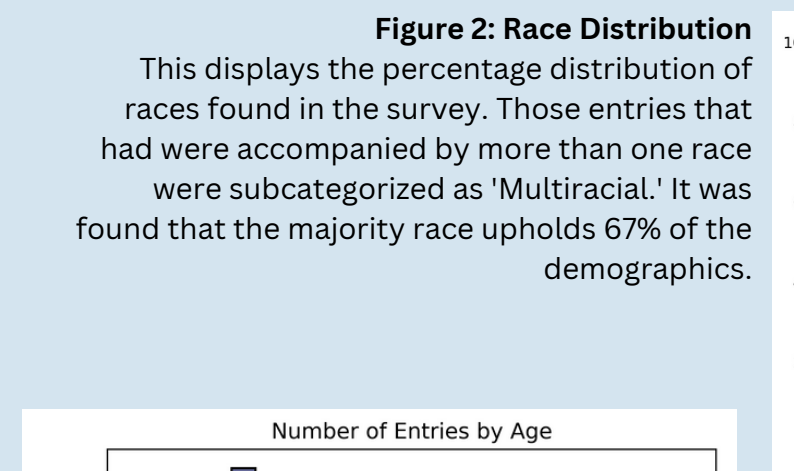
Figure 2: Race Distribution
This displays the percentage distribution of races found in the survey. Those entries that had were accompanied by more than one race were subcategorized as 'Multiracial.' It was found that the majority race upholds 67% of the demographics.
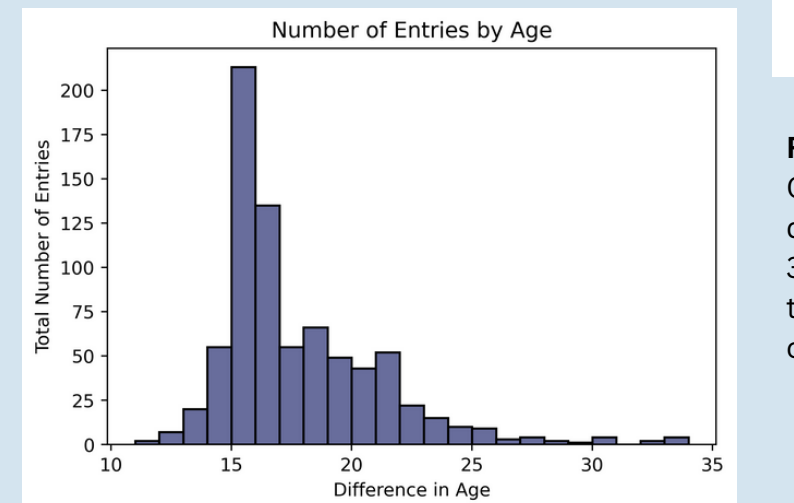
Figure 3: Age Distribution
Out of 773 entries, the distribution ranged from 11 to 34 years of age, with 27.5% of the population being 15 years old.

Objective

The Brave Research Project aims to find an objective correlation between participants' answers pre versus post survey that will provide Brave Enterprises with information to aid in increasing character strength in participants.

With the goals of proving confidence variance between sessions, genders, races, and ages, Embry-Riddle students can help Brave researchers focus on developing more refined bravery workshops for their audience.

Methodology

Using Python packages such as *pandas, seaborn, matplotlib, numpy,* and *xgboost*, multiple-variable regression models were constructed through data processing. Feature analysis in machine learning was used to choose relevant features in the surveys. Excel and Tableu were then used to create data visualization of correlations between bravery and confidence.
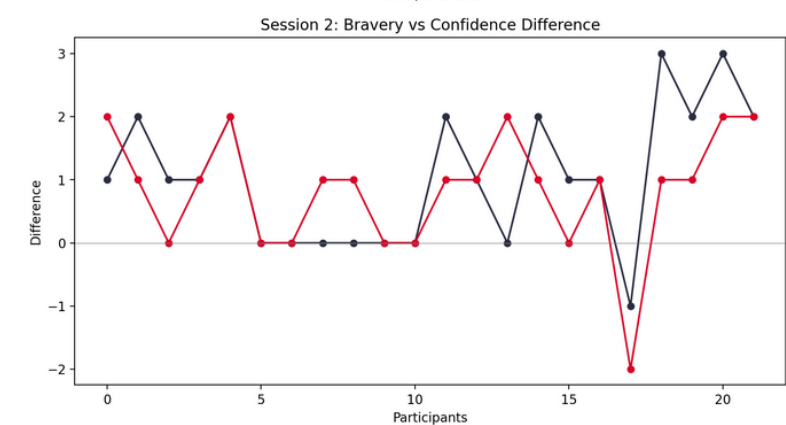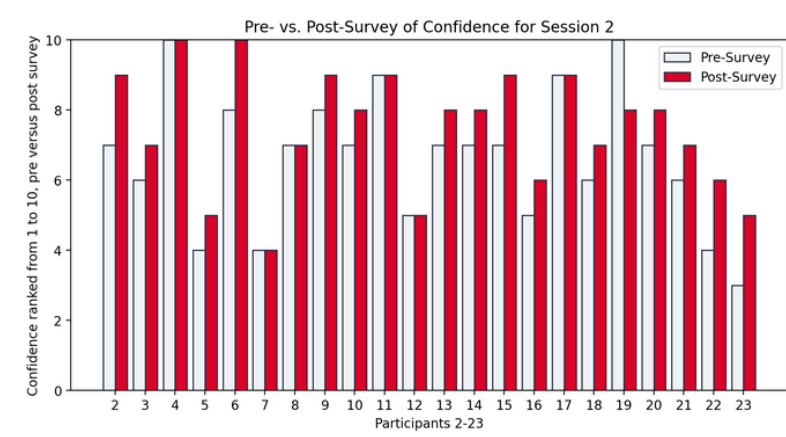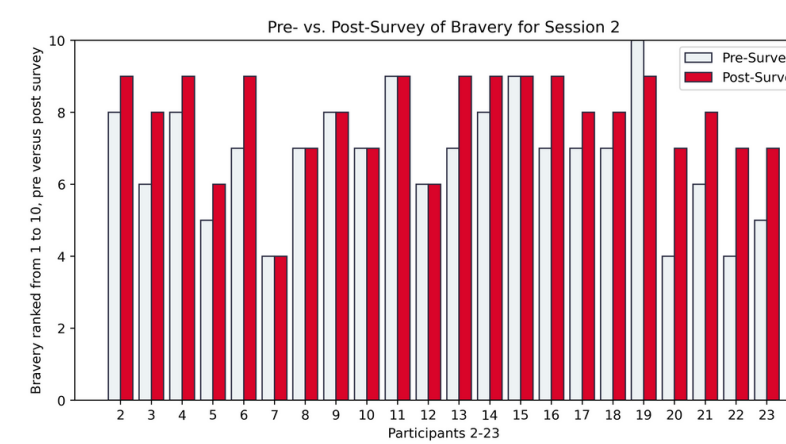
Analysis

The survey was categorically divided by session ID. Each session ID required the participants to input their gender, race, and age, as well as rank their confidence and bravery levels on a scale from 1 to 10. The participants were then asked to answer the following questions and more:

- Have you done something brave in the past month?
- How confident do you feel compared to your peers?
- Do you consider yourself to be more of an optimist or pessimist?

The graphics on the right show the difference in pre and post survey responses when asked to rank confidence and bravery on a scale from 1 to 10. This was completed for 12 sessions.

In session 2, there was an overall 62% increase in both bravery and confidence. Session 12 had the greatest display of growth in confidence and bravery, with an increase of 78% and 77%, respectively. Session 4, however, had the greatest decrease, with a difference of 31% change in bravery.

After conducting two paired t-tests to determine whether there was a statistically significant difference in bravery and confidence scores before and after the intervention. The results showed extremely low p-values for both tests. We can conclude that there is a significant difference in both bravery and confidence scores before and after the intervention.

Figures 4-6: Bravery vs. Confidence in Pre vs. Post Survey of Session 2

Two paired t-tests

Bravery Difference	5.65E-65
Confidence Difference	9.54E-74

Continued Analysis

The target variable used for the bravery feature importance was the bravery score. From this, referencing the graphic on the right, the feature determined to be the most relevant to the target variable was, "How confident do you feel compared to your peers?". The second most relevant feature was, "Do you think you can learn to be more brave?"

The target variable used for the confidence feature importance was the confidence score. From this, referencing the graphic on the left, the feature determined to be the most relevant to the target variable was, "How confident do you feel compared to your peers?".

Results/Findings

After our research, we concluded that the below questions were highly correlated:

- "Have you done something brave in the past month?" and "Have you seen someone do something brave in the past month?"
  - Females who answered 'no' to seeing someone do something brave in the past month were 40.6% more likely to answer 'no' to doing something brave themselves.
  - Females who answered 'yes' to seeing someone do something brave in the past month were 68.8% more likely to do something brave themselves.
  - Males who answered 'yes' to seeing someone do something brave were 25.5% more likely to doing something brave themselves.
- "How confident do you feel compared to your peers?" and "Do you consider yourself an optimist or pessimist?"
  - Females who are more of an optimist are 60.1% more likely to be as confident as their peers.
  - Males who are more of an optimist are 44.4% more likely to be more confident than their peers.
  - Females who are more of a pessimist are 41.8% more likely to be less confident than their peers.

Conclusion

Those who rated higher in bravery remained at that level while those who rated low saw a dramatic increase when the pre and post surveys were compared. Individuals who had experienced an act of bravery were more likely to do something brave.

Overall, when pre and post surveys were compared, a 50% increase in bravery was found in males and females who originally rated much lower.

- 60% of respondents increased their confidence scores throughout the pre and post survey

BRAVE Enterprises diligent work has displayed an increase in bravery and confidence. This data will help BRAVE Enterprises to accurately assess individuals and increase their bravery levels in a way best fitted to them.