**Analysis of Titanic Passenger Data**

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**Introduction**

The present study seeks to examine publicly available data from the Titanic exhibition of 1912. The information from passengers onboard the Titanic (*n* = 1309) includes age, sex, whether a passenger travelled alone or not, ticket fare, and whether a passenger survived the disaster or not. The goal of the present study is to examine whether passenger survival was related to sex, age (those 14 and under are considered children), ticket fare, and whether a passenger travelled alone or not. Regarding the Titanic disaster, previous research found that females were more likely to survive compared to men and that a passenger’s chances of survival increased with an increased social class, with social class being measured using the class of travel (Hall, 1986). It is hypothesized that women will have a higher survival rate compared to men, children (14 and under) will have a higher survival rate compared to non-children, more expensive ticket fare will be associated with a higher survival rate compared to lower ticket fare, and that those who travelled alone will have a higher survival rate compared to those who did not.

**Results**

**Chi-Squared Test**

**Figure 1**

*Bar Graph Displaying Frequency of Survival Between Males and Females*

Chart, bar chart

Description automatically generated

First, a Chi-Squared test was conducted to examine the association between passenger’s gender and survival rate. A significant association was found between the gender of a passenger and whether or not they would survive, χ2 (1) = 365.89, *p* < .001, *ϕ* = .529. The odds ratio indicates that women were 11.31 times more likely to survive compared to men (*p* < .001). The results of the Chi-Squared test indicate that, as can be seen in Figure 1, women were significantly more likely to survive the Titanic disaster compared to men.

**Figure 2**

*Bar Graph Displaying Frequency of Survival Between Children and Non-Children*

Chart

Description automatically generated

A second Chi-Squared test was conducted to examine the association between passenger’s age and survival rate, comparing children (age 0-14) and non-children (age 15+). A significant association was found between the age of a passenger and whether or not they would survive, χ2 (1) = 17.47, *p* < .001, *ϕ* = .116. The odds ratio indicates that children were 2.30 times more likely to survive compared to those aged 15 and older (*p* < .001). As Figure 2 shows, the results of the Chi-Squared test indicate that children were significantly more likely to survive the Titanic disaster compared to passengers who were 15 years old or older.

**Figure 3**

*Bar Graph Displaying Frequency of Survival Between Passengers who Travelled Alone and Passengers who Travelled with Others*

Chart, bar chart

Description automatically generated

A third Chi-Squared test was conducted to determine the association between whether a passenger travelled alone or not and survival rate. A significant association was found between whether a passenger travelled alone and their survival rate, χ2 (1) = 39.37, *p* < .001, *ϕ* = .173. The odds ratio indicates that passengers who did not travel alone were 2.27 times more likely to survive compared to those who travelled alone (p > .001). The results of the Chi-Squared test indicate that passengers who did not travel alone were significantly more likely to survive compared to those who travelled alone, as can be seen in Figure 3.

**Mann-Whitney U Test**

**Figure 4**

*Histogram Displaying Frequencies of Fare Prices Across all Passengers (n = 1309)*

Chart, histogram

Description automatically generated

Ticket fare across the entire sample follows a positively skewed, (*F* = 4.37, *SE* = .07), leptokurtic, (*F* = 27.03, *SE* = .14) distribution, as can be seen in Figure 4, with a large majority of the tickets costing under 100 dollars, very few costing between 100 and 300 dollars, and a small minority costing over 500 dollars. The Mann-Whitney U test was conducted to examine the association between ticket fare and survival across the entire sample. The test found that ticket fare was significantly higher for passengers who survived (*Mdn* = 26.00) compared to passengers who died (*Mdn* = 10.50), *T* = 272547.50, *z* = 10.63, *p* < .001, *r* = .29. The results of this test indicate that an increase ticket fare was significantly associated with an increased chance of survival in all passengers.

**Conclusion**

Examining the available date from the Titanic crash of 1912 revealed associations between survival, sex, age, ticket fare, and whether or not a passenger travelled alone. The hypothesis that women would have a higher survival rate compared to men was proven correct as it was found that women had a significantly higher rate of survival. The hypothesis that children would have a greater survivability compared to those aged 15 and older was also proven correct as it was found that children had a significantly higher survival rate. The hypothesis that passengers who travelled alone would have a greater survivability compared to passengers who did not was rejected as those who travelled alone had a lower survival rate compared to passengers who travelled with others. Finally, the hypothesis that ticket fare would be associated with survival was proven correct, as a significant association was found, indicating that higher ticket fare was associated with higher survivability.

The data indicate that all of the factors explored in the present study were associated with a passenger’s survival. While it seems intuitive and logical, based on the values at the time, that women and children would have a higher rate of survival, the association between ticket fare, whether a passenger travelled alone, and survival is indicative of the power of class aboard the Titanic. Women and children would have a high rate of survival because they were likely prioritized once the Titanic began to sink, but this does not explain the remaining associations. Those of a lower social class likely purchased cheaper tickets and were clearly discriminated against and excluded from survival efforts once the disaster began. Future research should examine the relationship between ticket fare and whether passengers travelled alone, as this would indicate if this same discrimination is responsible for the association between survival and whether a passenger travelled alone or not.

**References**

Hall, W. (1986). Social class and survival on the S.S. Titanic. *Social Science & Medicine*, *22*(6), 687–690. https://doi.org/10.1016/0277-9536(86)90041-9