### **Proposal 1**

To what extent do demographic and socioeconomic factors impact loneliness scores, and how do these scores compare between participants from 2021 and 2022?

### **Key Variables**

* **Demographics**: Age, Gender
* **Socioeconomic Factors**: Income Level, Education Level
* **Outcome Variable**: Loneliness score (emotional loneliness subscale)

### **Visualizations**

1. **Boxplots** for loneliness scores by income and education.
2. **Histograms** of loneliness scores by year.
3. **Scatterplots** for age vs. loneliness score.

### **Analysis Plan**

### **Confidence Intervals**: Estimate range of loneliness score differences between cohorts.

### **Hypothesis and Expected Results**

* **Hypothesis**: Lower income, younger age, and lower education may correlate with higher loneliness scores. Cohort years may also show significant differences.
* **Relevance**: Significant findings would suggest that loneliness is influenced by demographic and socioeconomic factors, informing targeted mental health support.

### **Proposal 2**

How does social support from family and friends impact loneliness levels, and does this effect vary by income and education?

### **Key Variables**

* **Social Support**: Family, Friends, and Significant Other subscales from the social support survey
* **Socioeconomic Factors**: Income Level, Education Level
* **Outcome**: Emotional loneliness score

### **Planned Visualizations**

1. **Box Plots**: Display loneliness scores across different levels of social support categories (family, friends, significant others).
2. **Scatterplots**: Show relationships between social support scores and loneliness.
3. **Histograms**: Compare loneliness scores across income and education levels.

### **Analysis Plan**

* **Confidence Intervals**: Provide an estimate of the range of impact that social support could have on loneliness levels.

### **Hypothesis and Expected Results**

* **Expected Findings**: Higher social support may correlate with lower loneliness scores, especially for those with lower income or education.
* **Relevance**: Understanding how social support affects loneliness across socioeconomic groups could inform targeted support strategies to mitigate loneliness for vulnerable groups.

### **Proposal 3**

What is the relationship between mental health indicators (stress, anxiety, and life satisfaction) and loneliness levels, and does this relationship vary by age group?

### **Key Variables**

* **Mental Health Indicators**: Stress score, anxiety score, and life satisfaction score
* **Demographic Factor**: Age group (e.g., young adults, middle-aged, older adults)
* **Outcome**: Emotional loneliness score

### **Planned Visualizations**

1. **Box Plots**: Show loneliness scores across different age groups to observe general trends in loneliness by age.
2. **Scatterplots**: Visualize the relationship between each mental health indicator (stress, anxiety, life satisfaction) and loneliness.
3. **Grouped Bar Charts**: Compare average loneliness scores by age group for each mental health indicator.

### **Analysis Plan**

* **Multiple Linear Regression**: Examine the association between loneliness and mental health indicators, including age as a moderator. Assumptions include linearity, normally distributed residuals, and homoscedasticity.

### **Hypothesis and Expected Results**

* **Expected Findings**: Higher stress and anxiety may correlate with increased loneliness, while higher life satisfaction may relate to lower loneliness. These associations may be stronger in younger or older age groups.
* **Relevance**: Results could help tailor mental health interventions to address loneliness in age-specific ways, supporting the study’s goal of understanding how mental health factors interact with loneliness across age groups.