

Mini-Project 4

Stat 212: Interim 2022

Question 1: Does the opinion of Northfield residents about equal employment opportunities for people of all races and ethnicities differ by race?

Question 2: Does the importance of residents believing that Northfield should be welcoming to various backgrounds impact how safe residents feel?

Introduction

In this project we intend to study the results of the NREEC survey performed with the residents of Northfield as the intended population. As we viewed the data we want to research if “Does the opinion of Northfield residents about equal employment opportunities for people of all races and ethnicities differ by race?” And “Does the importance of residents believing that Northfield should be welcoming to various backgrounds impact how safe residents feel?” . The data collection for this survey was broadcasted to Northfield residents through a variety of organizations and social media.

In line with the importance of Northfield being welcoming to various backgrounds impact their feeling of safety “Pedagogy of fear: toward a Fanonian theory of “safety” in race dialogue” in it Leonardo and Porter discuss the condition of ‘safety’ around public race dialogue. They reached their conclusion that people of color pose their thoughts and hurts about racism that is then followed by white dismissal. Related to employment opportunities and race we found “Race, gender and class in entrepreneurship”. This article by Wingfield and Taylor discusses how entrepreneurship is often seen as an economic opportunity that embodies American Ideals. They reached the conclusion that people of color use entrepreneurship as a way to support them economically and educationally.

Methods

For the first research question we looked at the survey to see how different employment opportunities are according to race. In order to test this we used an ANOVA test and a difference in means table(with graph). The main demographic for this study was provided by the survey. They split up races into five groups: Asian, American Indian, Hispanic, Black, and White. Although these are not anywhere close to all the races, it is a good summary in terms of Northfield(majority white population). We were able to perform these tests because the survey provided a question on how welcome people feel in business in Northfield. It will allow us to look for a difference in how people feel about employment. For our next research question we ran a hypothesis test and found an interval for that data. When we run the difference in means test we compare each of these. We wanted to see if there was a correlation between residents feeling safe in Northfield and how welcoming they thought that Northfield was. We used a pair t-test for these proportions. This allowed us to see if 0 was in the interval of the difference in means. We also wrangle the data from agree and disagree to numeric data. So disagree became -1, agree became 1, etc. This made the paired t-test easier to read.

Question 1:

Null hypothesis: The opinion of Northfield residents about equal employment opportunities for people of all races and ethnicities does not differ by race.

Alternative hypothesis: The opinion of Northfield residents about equal employment opportunities for people of all races and ethnicities does not differ by race.

Question 2:

Null hypothesis: The importance of residents believing that Northfield should be welcoming to various

backgrounds impacts how safe residents feel.

Alternative hypothesis: The importance of residents believing that Northfield should be welcoming to various backgrounds does not impact how safe residents feel.

Results

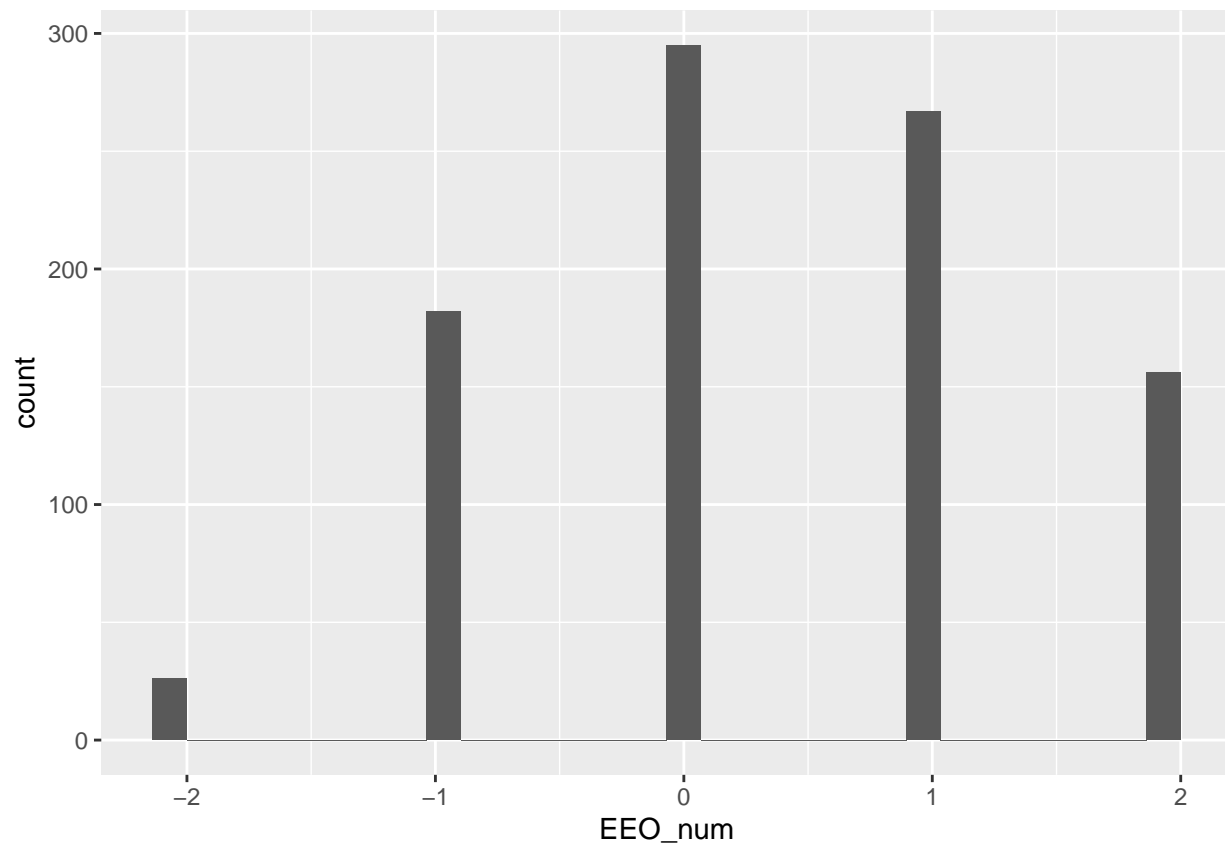
```
## Warning: Removed 8 rows containing non-finite values (stat_bin).
```

```
## Warning: Removed 1 rows containing non-finite values (stat_bin).
```

EDA:

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

```
## Warning: Removed 186 rows containing non-finite values (stat_bin).
```



Plot 1: Distribution of values for EEO

Above in plot 1 is the distribution of values for for EEO. We can see that the distribution follows nearly normal trend and is slightly left-skewed. That would be helpful in our case as we can achieve more precise results with ANOVA hypothesis testing if we have normally distributed data. The normal data distribution holds true within most of the groups, with the exception of

p-value for ANOVA hypothesis testing: $2.2e^{-16}$ (around 0)

```
## Tukey multiple comparisons of means
```

```
## 95% family-wise confidence level
```

```
##
```

```
## Fit: aov(formula = EEO_num ~ Race_resp, data = longer_survey)
```

```
##
```

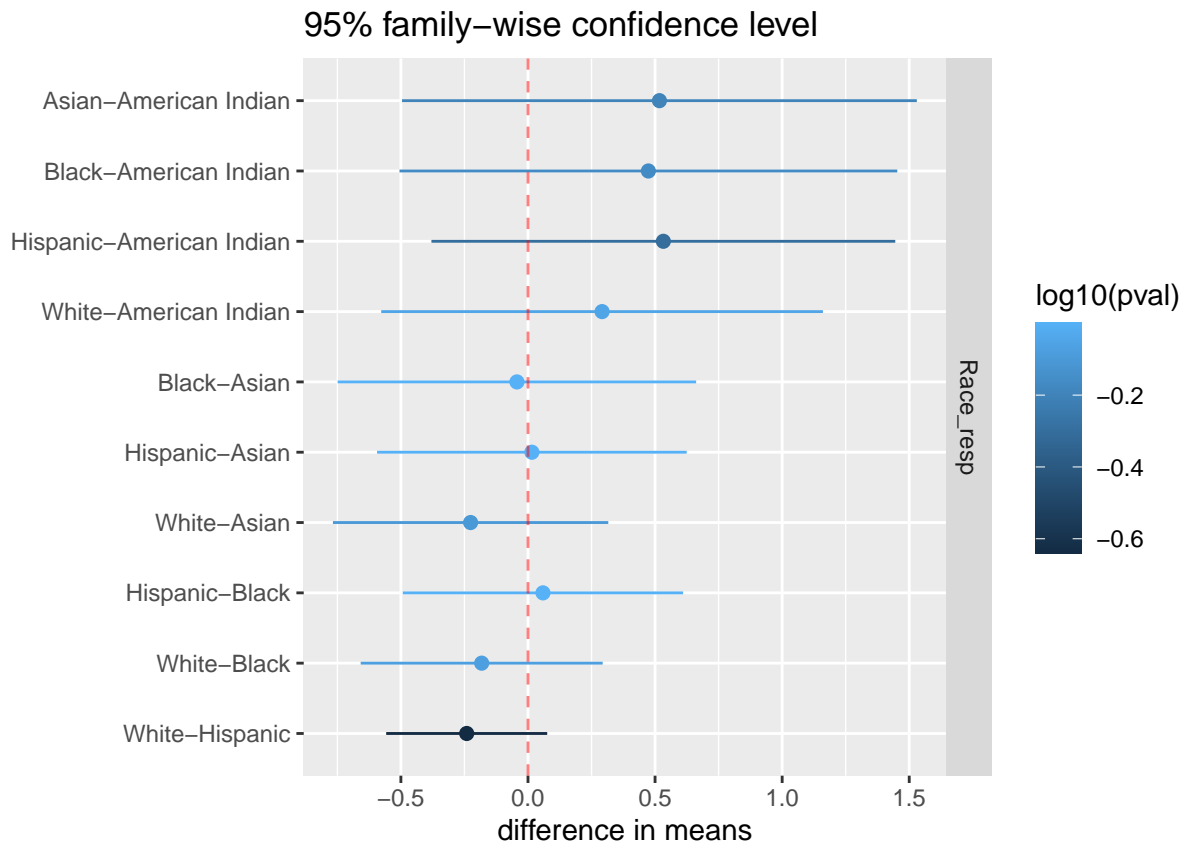
```
## $Race_resp
```

```
##
```

	diff	lwr	upr	p adj
--	------	-----	-----	-------

```
## Asian-American Indian      0.51724138 -0.4955690 1.53005176 0.6304321
## Black-American Indian      0.47368421 -0.5055879 1.45295633 0.6774425
## Hispanic-American Indian    0.53260870 -0.3798681 1.44508553 0.5006459
## White-American Indian       0.29149233 -0.5774746 1.16045928 0.8904259
## Black-Asian                 -0.04355717 -0.7488023 0.66168796 0.9998180
## Hispanic-Asian              0.01536732 -0.5937392 0.62447386 0.9999949
## White-Asian                 -0.22574905 -0.7675058 0.31600769 0.7857369
## Hispanic-Black              0.05892449 -0.4926186 0.61046758 0.9984131
## White-Black                 -0.18219188 -0.6583110 0.29392720 0.8338060
## White-Hispanic              -0.24111637 -0.5578646 0.07563191 0.2293055
```

Table 1: TukeyHSD hypothesis testing



Plot 2:

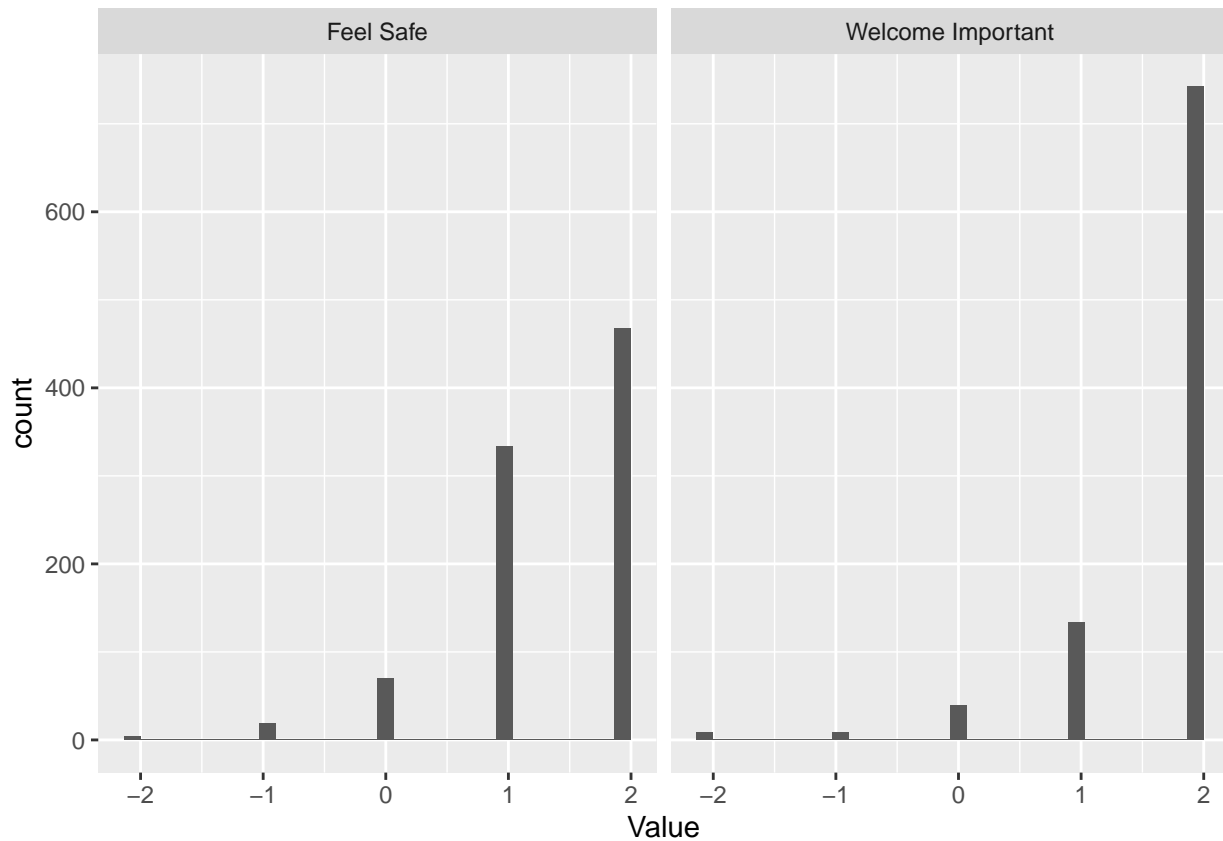
TukeyHSD with 95% confidence level

Above is the hypothesis testing using ANOVA and TukeyHSD. The plot 2 and the table 1 suggest that there is not enough evidence to reject the null hypothesis and we conclude that on average Northfield residents of all races feel similar about equal employment opportunities for people of all races and ethnicities. We can also see in table 1 that p-values for all possible pairs of races suggest that no pair can be considered to have significantly different EEO from each other.

Question 2:

EDA:

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## Warning: Removed 399 rows containing non-finite values (stat_bin).
```



Plot 3: Distribution of responses for Feel_safe and Welcome_important

We can see from the bar plot above that for both of the questions the majority of responses are positive with very low quantity of responses for negative answer. This can suggest that residents of Northfield mostly feel positive about those two questions. However we cannot yet make precise conclusions and state relationship between responses for that questions.

```
##
## Paired t-test
##
## data: survey_subset$Welcome_important_num and survey_subset$Feel_safe_num
## t = 11.75, df = 891, p-value < 2.2e-16
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  0.2792140 0.3911896
## sample estimates:
## mean of the differences
##           0.3352018
```

Table 2: t distribution test with difference of paired means

The hypothesis testing with t distribution returned p-value of approximately 0 and t statistic of 9.54, which is very strong evidence to conclude that the importance of residents believing that Northfield should be welcoming to various backgrounds does not impact how safe residents feel.

Discussion

From the results of the first research question we can see that there is a difference between white and non-whites in equal employment opportunities, while most non-white people compared to each other had similar results in thinking equal employment opportunities are not equal. This may be due to the largely

white population in Northfield which causes a difference in the responses and may also be a reason as to why it is less likely non-white people will be not given equal employment opportunity. In the second set of data which resulted in rejecting the null hypothesis as the p-value was less than .05, we are able to see that there is some correlation to residents feeling that being welcoming does impact feeling safe in Northfield. This disparity between the results may be due to areas in which they live or frequent causing less safety to be felt but wanting the city to feel welcoming could be a driving factor to why it feels safe. Though the survey itself is done as a retrospective observational study, which means we cannot make causal inferences from the data, the results from this sample show that the majority of the sample population does lean more towards one side than the other.

Limitations within this research project is the sample not being representative of the Northfield population. Though the survey is open to a large population of Northfield it is not done through random sample or assignment, but rather consists of volunteers or a group of residents from one area or institution which doesn't reflect the diversity within Northfield. Another limitation is with the method itself as a survey, though this allows more voices to be heard anonymously there are still chances of no responses as well as discrepancies in the answers whether due to wording of the survey itself or dishonest answers of participants.

In future research it would also be more effective if responses had a better scale to allow more room for opinion such as rating numerically and space for comments in each section. Another improvement would be specifying questions or terms such as in question one, which mentions equal employment opportunities which may be vague so specifying where and what types of equal or unfair treatment they receive would be good insight. Overall the results of these research questions and the survey have been able to give a push in the right direction of trying to understand balance of race, equity, and safety in Northfield, but future research would be better if there were more focus on details within and outside the communities with a representative sample which can speak to Northfield as a whole.

References

- Leonardo. (2010). Pedagogy of fear: toward a Fanonian theory of "safety" in race dialogue. *Race, Ethnicity and Education*, 13(2), 139–157. <https://doi.org/10.1080/13613324.2010.482898>
- Wingfield, & Taylor, T. (2016). Race, gender, and class in entrepreneurship: intersectional counterframes and black business owners. *Ethnic and Racial Studies*, 39(9), 1676–1696. <https://doi.org/10.1080/01419870.2016.1178789>

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Variable Codebook

Follow the same guidelines for previous projects. Remember:

- Only include variables that you are using in your analysis.
- If you create a new or alter an existing variable, have a row for both the original and new variables.

Variable name	Original name	Description	Type	Levels/Encoding	Original Levels/Encoding
EEO_num	EEO	There are equal employment opportunities in Northfield for people of all races and ethnicities.	categorical (ordinal)	-2, 1, 0, 1, 2	Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree
Welcome_important_num	Welcome_important	It is important for people of all racial and ethnic backgrounds to feel welcome in Northfield.	categorical (ordinal)	2, 1, 0, 1, 2	Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree

Variable name	Original name	Description	Type	Levels/Encoding	Original Levels/Encoding
Feel_safe_num	Feel_safe	I feel safe in Northfield.	categorical (ordinal)	2, 1, 0, 1, 2	Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree
AmericanIndian_AlaskaNative_bin	AmericanIndian_AlaskaNative	What is your race and/or ethnicity?	categorical	Yes, No	
AAPI	AAPI	What is your race and/or ethnicity?	categorical	Yes, No	
Black	Black	What is your race and/or ethnicity?	categorical	Yes, No	
Hispanic	Hispanic	What is your race and/or ethnicity?	categorical	Yes, No	
White	White	What is your race and/or ethnicity?	categorical	Yes, No	
TwoMore	TwoMore	What is your race and/or ethnicity?	categorical	Yes, No	
Other	Other	What is your race and/or ethnicity?	categorical	Yes, No	

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