=SUM(all)

=SUM(all)'s Eco-Equality project was built on the hypothesis that the effective promotion of cycling as a viable means of transport could reduce a city's fossil fuel emissions by 2030, a target set by many cities in the face of the current climate emergency. We started interrogating widely available data on transport then narrowed the scope of our own city, Edinburgh to see whether it supported our hypothesis.

=SUM(all) Project Team; Bageshri Hasabnis ,Beatriz Lazaro Pinto, Gabriele Janusonyte, Jay Kirkland, Jolene Russell, Zitha Nqobizithadube

In partnership with Codedivis/on codedivision.co.uk
Frank Duffy, Robert Henderson

INTRODUCTION

The City of Edinburgh has committed to significantly reducing its carbon emissions by 2030 and creating safe walking and cycling spaces for people. We interrogated some of its data relating to cycling and its recent "Spaces for People" project. We mapped this with data on areas of multiple deprivation in the city and data produced from its partnership with the Just Eat bike hire scheme. We also looked at literature produced online by Sustran with the aim of understanding how effective recent measures had been at changing behaviours around using bikes as alternative means of transport for leisure, health and work in the city.

OBJECTIVE

To gain insights on the extent the City of Edinburgh has changed attitudes to using bikes as a viable alternative transport

METHODOLOGY

We examined data and literature from global to local sources. This led to rich opportunities for discussion enabling =SUM(all) to form the hypothesis and narrow the scope of our task. We applied our coding, visualisation and data analytics skills to interrogate the data more granularly with tools including Python, Tableau, PowerBI, Excel. We can now present our findings using GitHub and Canva

RESULTS

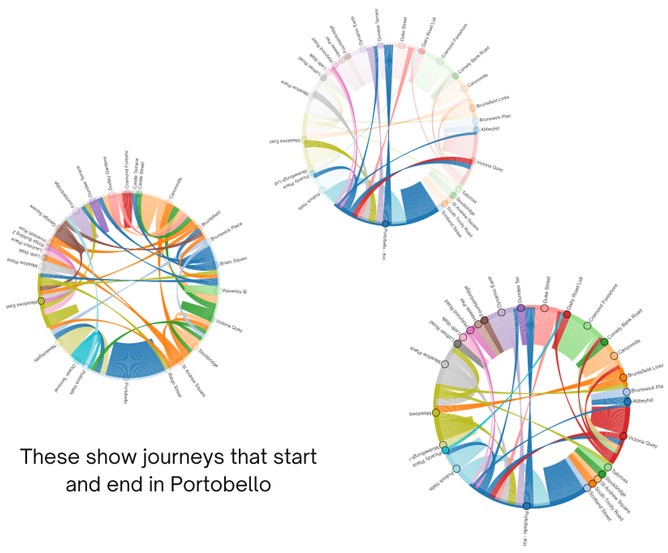
The results showed that the City of Edinburgh is effective in encouraging the use of bikes for leisure and sightseeing but has a way to go to encourage cycling as the main mode of transport too and from work. It showed cycling is popular with students and tourists but our evidence did not show much impact on outlying areas, particularly those already impacted by multiple deprivations

ANALYSIS

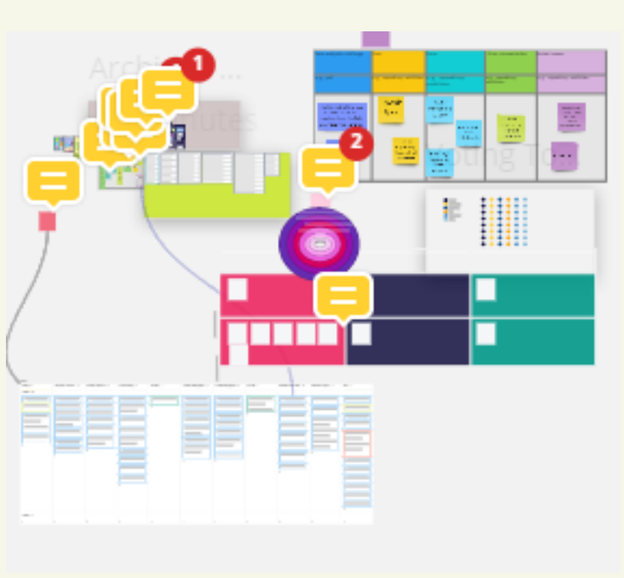
Key findings can be seen in the following charts:
1) The map shows that Just Eat bike stations are not located in areas affected by multiple deprivation, exacerbating existing transport inequalities linked to poverty and emphasising lack of access to green transport

2) The chord charts focus on journeys that start and end in Portobello showing the bike scheme benefits tourists and students rather than residents (2019 chart included as pre-Covid comparator)

This charts the city's map of its areas of multiple deprivation and Just Eat's map of its bike stations in Edinburgh



These show journeys that start and end in Portobello



Related literature:
https://github.com/blazaropinto/DS-2021---ENVIRONMENT-WOMEN-IN-TECH/blob/main/Data%20Sets/2106-Market_Research_Raw_Data_cleaned%20for%20analysis.ods

https://github.com/blazaropinto/DS-2021---ENVIRONMENT-WOMEN-IN-TECH/blob/main/Arquive/Initial%20list%20of%20interesting%20links.md

http://www.spokes.org.uk/documents/members-campaigning/edinburgh/edinburgh-covid-schemes/

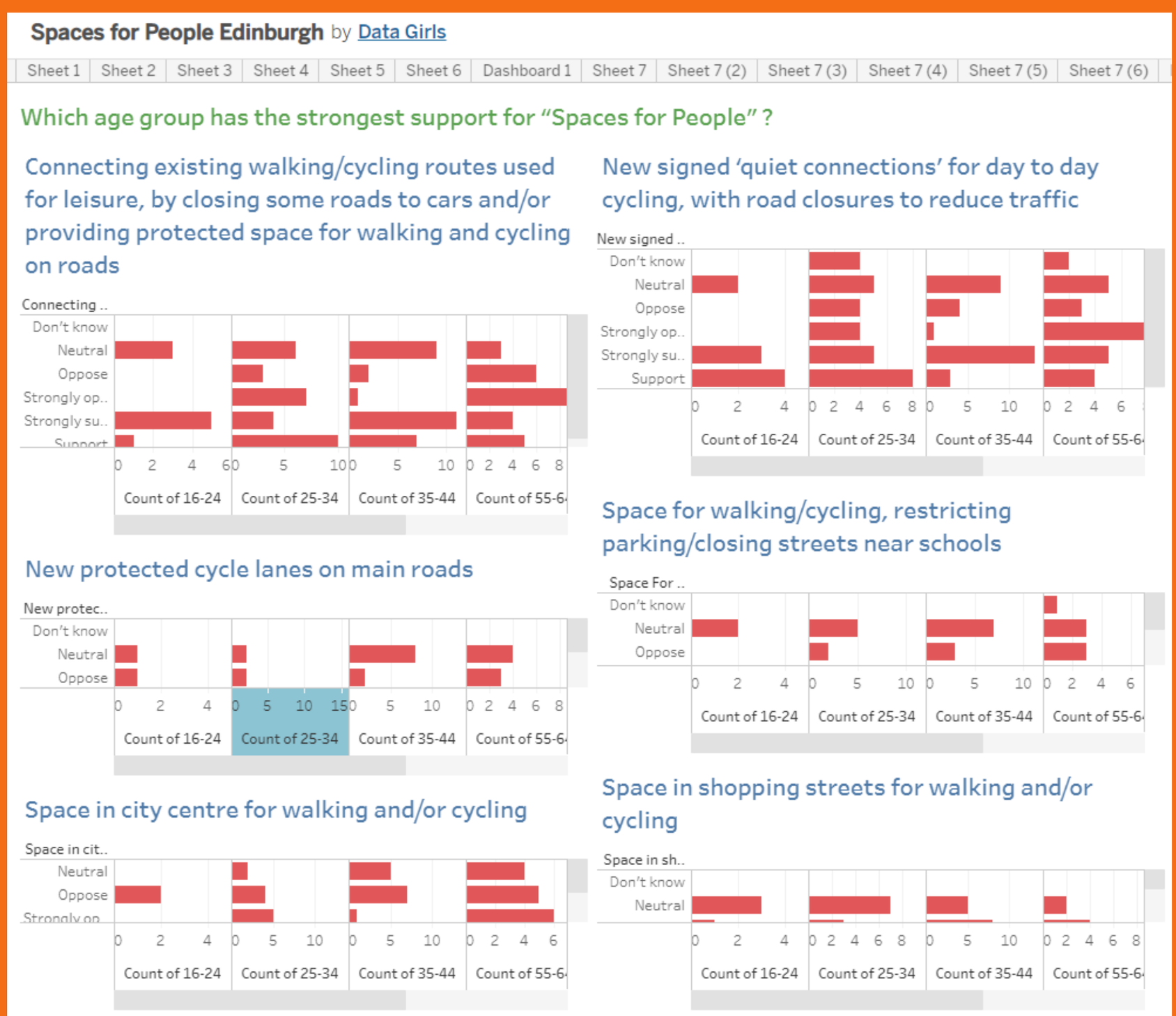
https://www.edinburgh.gov.uk/news/article/13218/spaces-for-people-feedback-published

https://www.sustrans.org.uk/for-professionals/infrastructure/?gclid=Cj0KCQjwxdSHBhCdARIsAG6zhlWZMnzRsHjKDgeEMEysFQXHL-XEhc9AGSF2wNq6jpsqFN0hQrPN4-IaAnsPEALw_wcB

CONCLUSION

In conclusion, green transport options are not widely accessible to all residents of Edinburgh - this should be taken into account when planning cycle routes and major transport works. The findings suggest that higher importance should be placed on developing equal and inclusive, community-wide access to bikes, as this is currently severely lacking.

CHARTS MADE BY TEAM MEMBERS



BAGESHRI HASABNIS

CHARTS MADE BY TEAM MEMBERS

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blazaropinto / DS-2021---ENVIRONMENT-WOMEN-IN-TECH Private

Code Issues Pull requests Actions Projects Security Insights

Correlation between number of private vehicles in a household and opinion on space in city centre for walking and/or cycling

Correlation between continuous variables

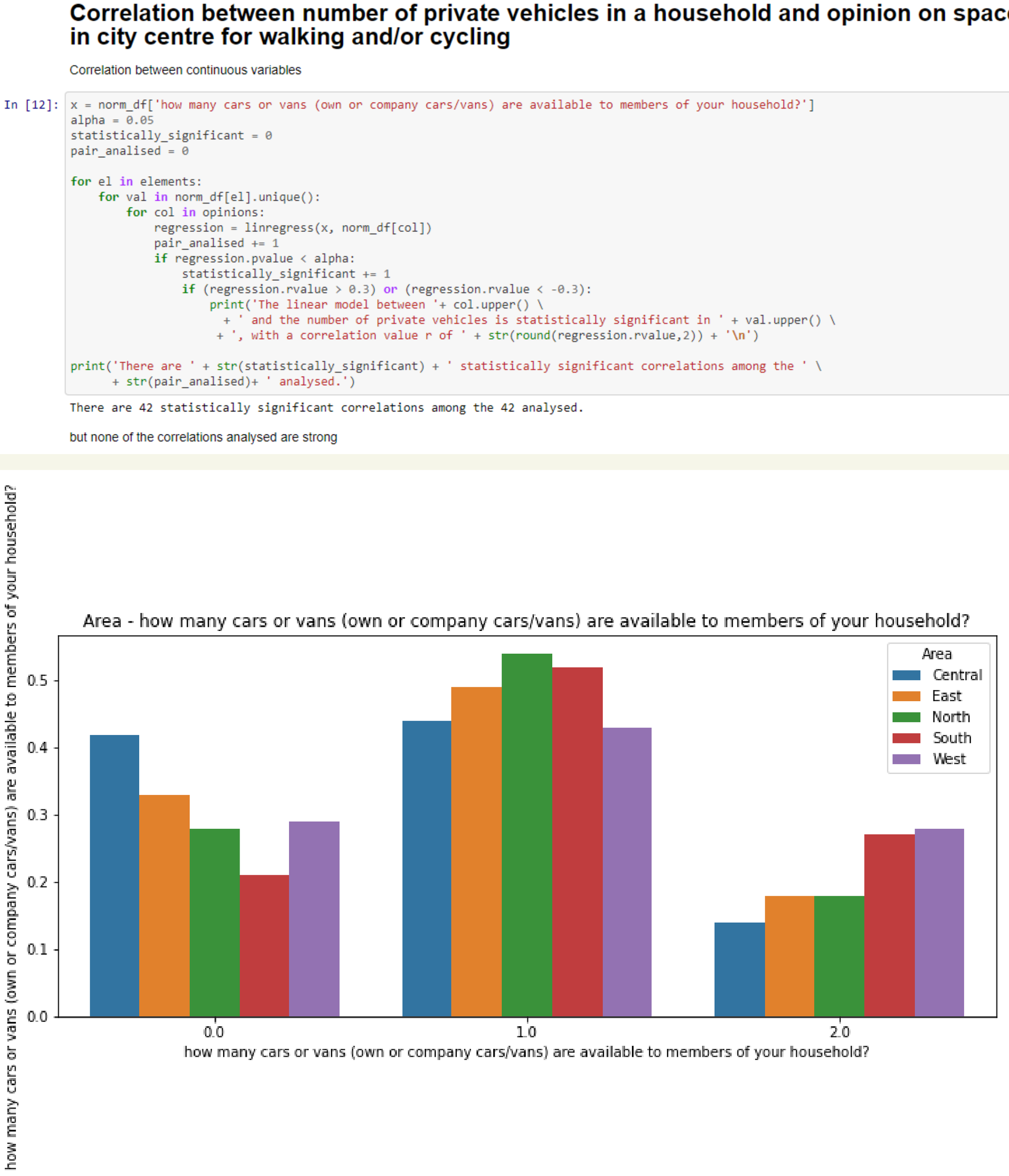
In [12]:
```
x = norm_df['how many cars or vans (own or company cars/vans) are available to members of your household?']
alpha = 0.05
statistically_significant = 0
pair_analised = 0

for el in elements:
    for val in norm_df[el].unique():
        for col in opinions:
            regression = linregress(x, norm_df[col])
            pair_analised += 1
            if regression.pvalue < alpha:
                statistically_significant += 1
                if (regression.rvalue > 0.3) or (regression.rvalue < -0.3):
                    print('The linear model between '+ col.upper() \
                      + ' and the number of private vehicles is statistically significant in ' + val.upper() \
                      + ', with a correlation value r of ' + str(round(regression.rvalue,2)) + '\n')

print('There are ' + str(statistically_significant) + ' statistically significant correlations among the ' \
      + str(pair_analised)+ ' analysed.')
```

```
There are 42 statistically significant correlations among the 42 analysed.
```

but none of the correlations analysed are strong



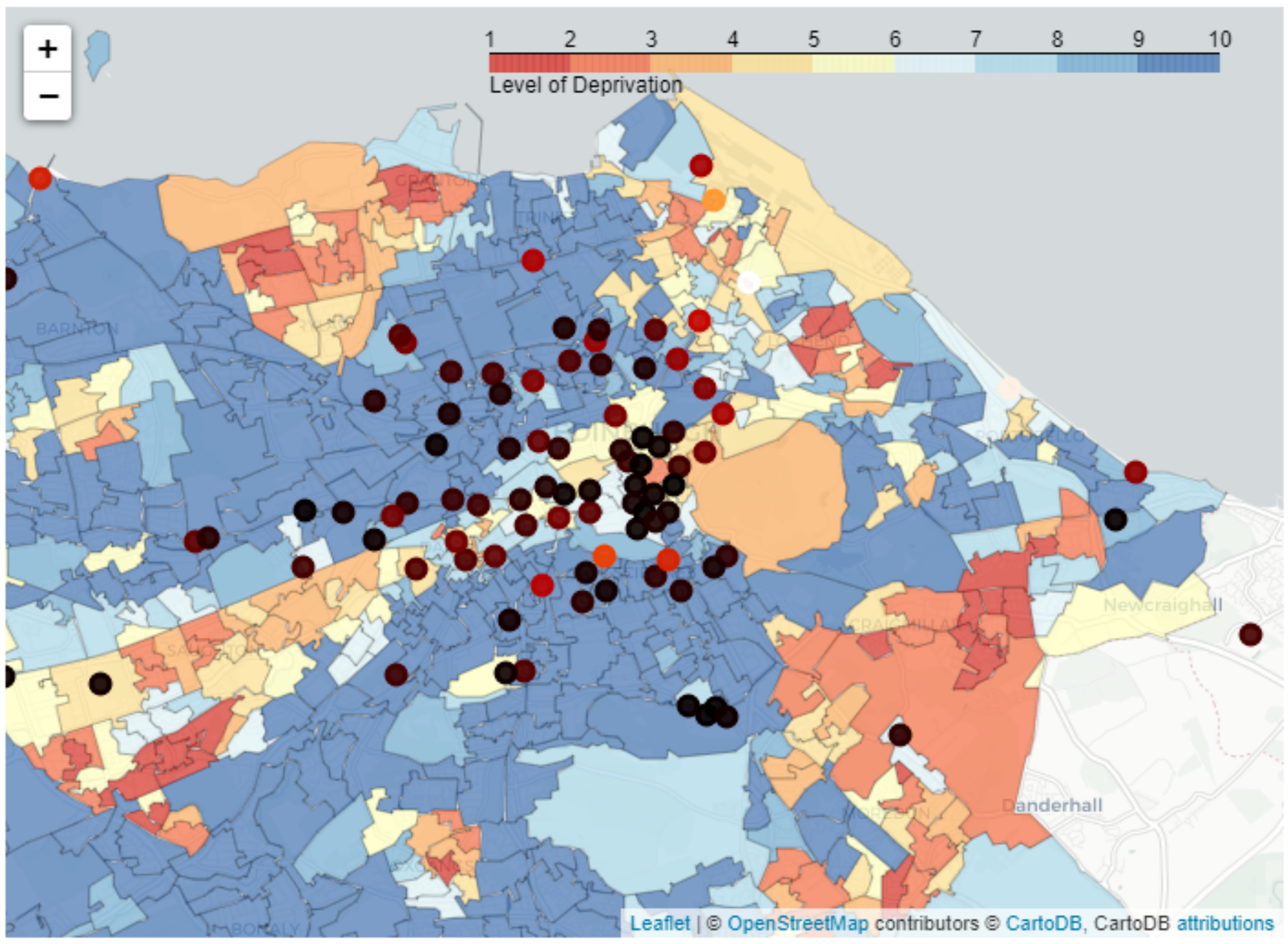
BEATRIZ LOZARO PINTO

CHARTS MADE BY TEAM MEMBERS

The Scottish Index of Multiple Deprivation (2020) and its data were used to map out the levels of deprivation throughout Edinburgh. For more information about SIMD, head to this website: https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/?utm_source=redirect&utm_medium=shorturl&utm_campaign=simd

The markers show where bikes were rented from (start stations) in a form of heat plotting. The lighter the colour of the marker (eg. white), the more a particular station was used. A colour closer to black would mean that the station was rarely used.

Clicking a marker will produce a pop up, which shows the name of the station and how many times a bike was rented from it.

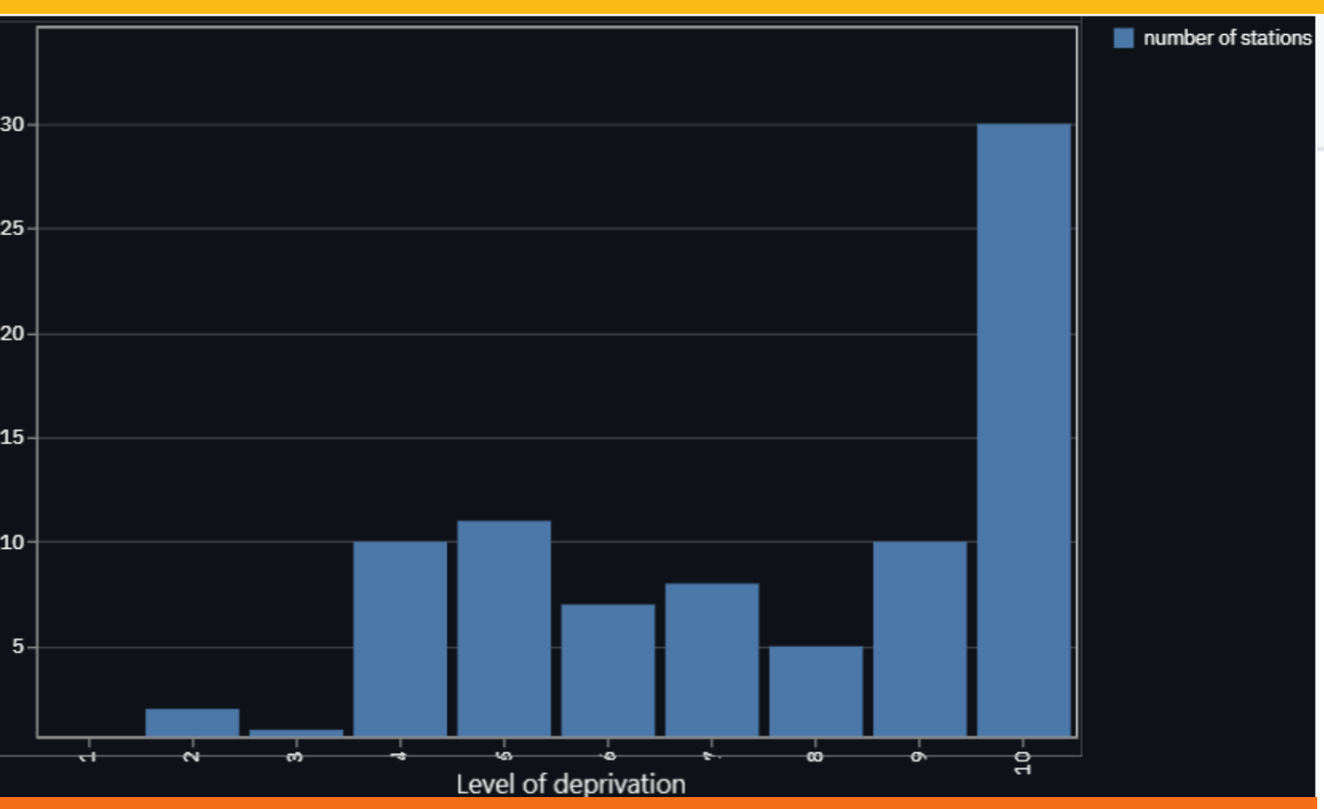


This data tells a two-part story: 1) where the bike hire stations are located 2) bike rental trends for the month and year that was selected.

It is natural, that the bike hire stations are located closer to the city centre, but a high number of stations are also located in areas of mid-to-high level of affluence.

Most striking is the complete absence (or near complete) of stations in Granton, Muirhouse, Craigmillar, Niddrie, and West of Edinburgh (Gorgie, Saughton, Slateford). A further investigation (below), will show that the level of deprivation of an area plays a big role in station placement throughout Edinburgh.

Link to app:
https://share.streamlit.io/janusonyte/edinburgh_just_eat_bikes/map-app.py

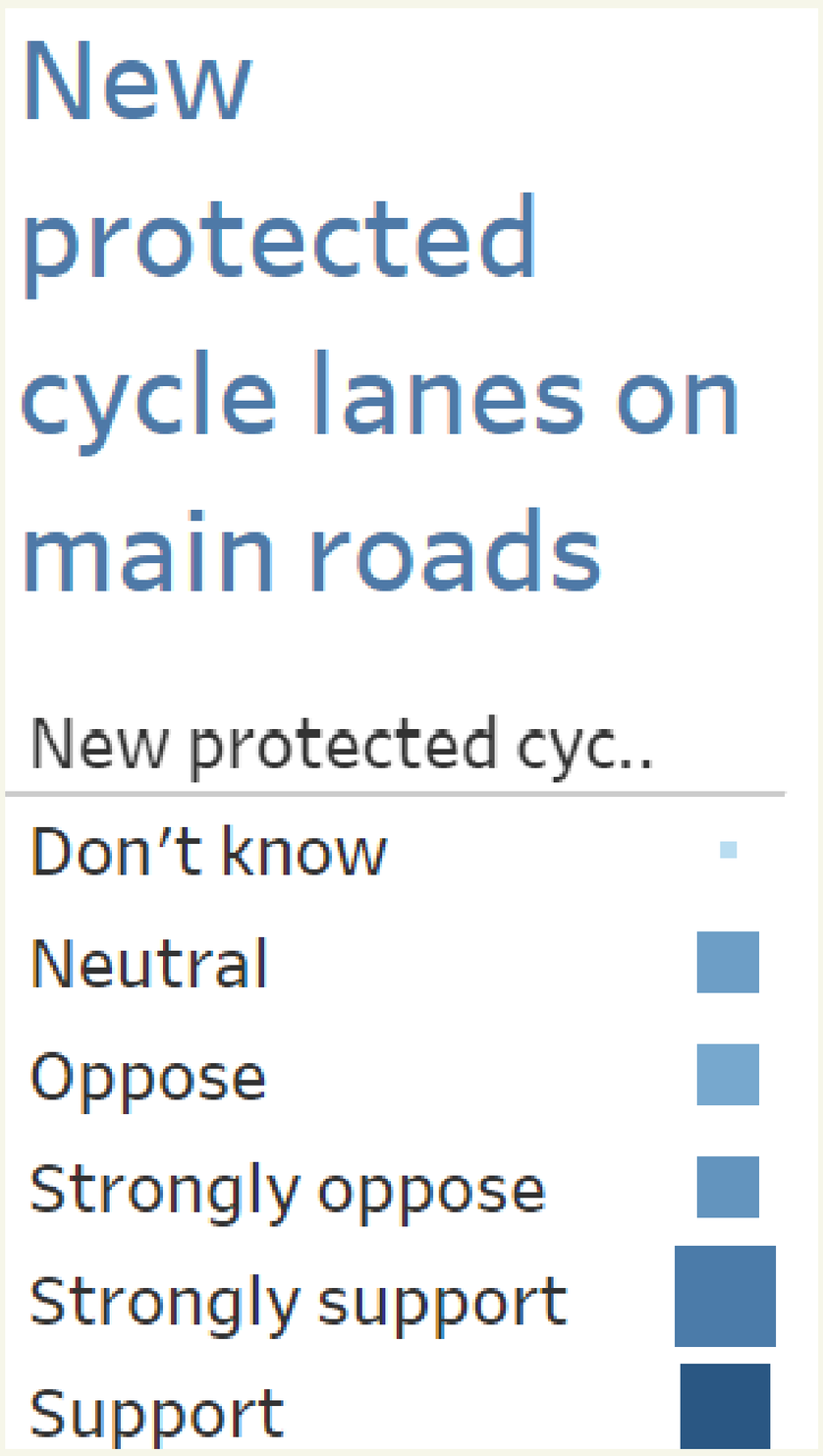


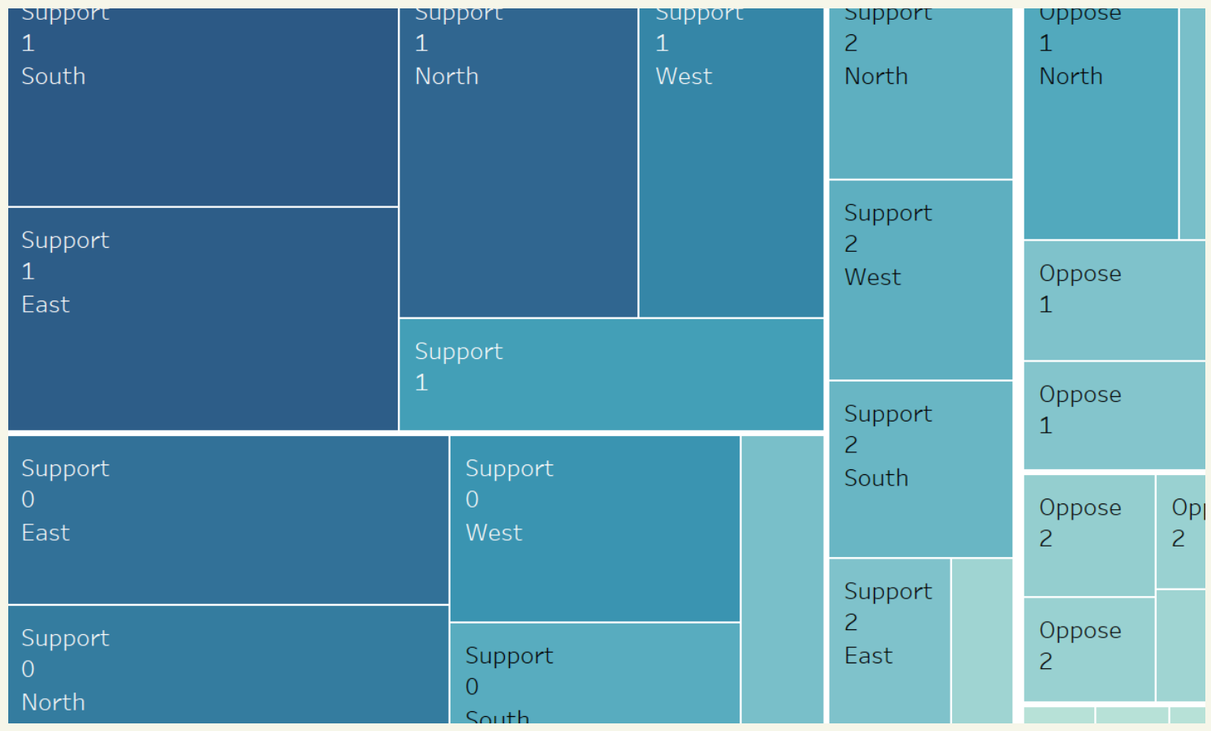
190 lines (164 sloc) | 9.17 KB

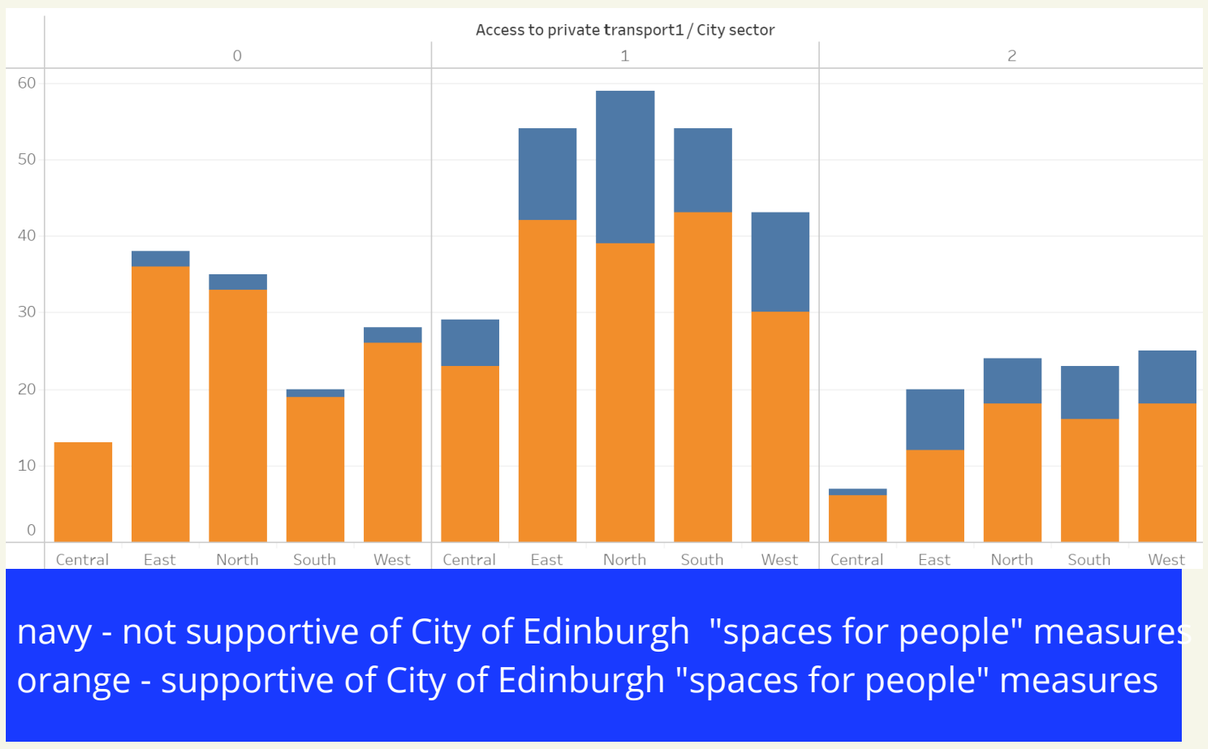
```
1   from matplotlib.pyplot import fill
2   import streamlit as st
3   from streamlit_folium import folium_static
4   import pandas as pd
5   import matplotlib
6   import matplotlib.cm as cm
7   import geopandas as gpd
8   import pyproj
9   import folium
10  import os.path
11
```

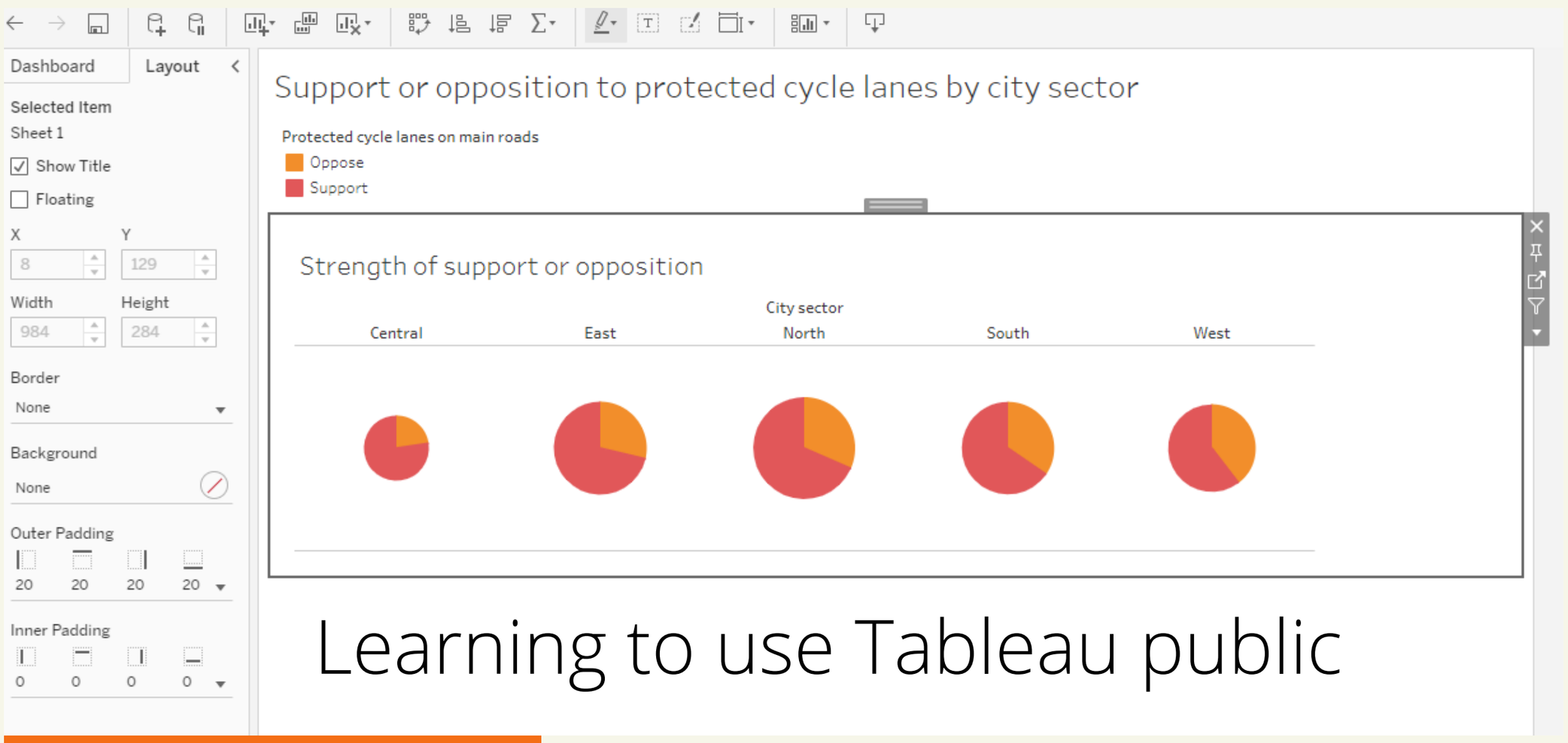
GABRIELE JANUSONYTE

CHARTS MADE BY TEAM MEMBERS





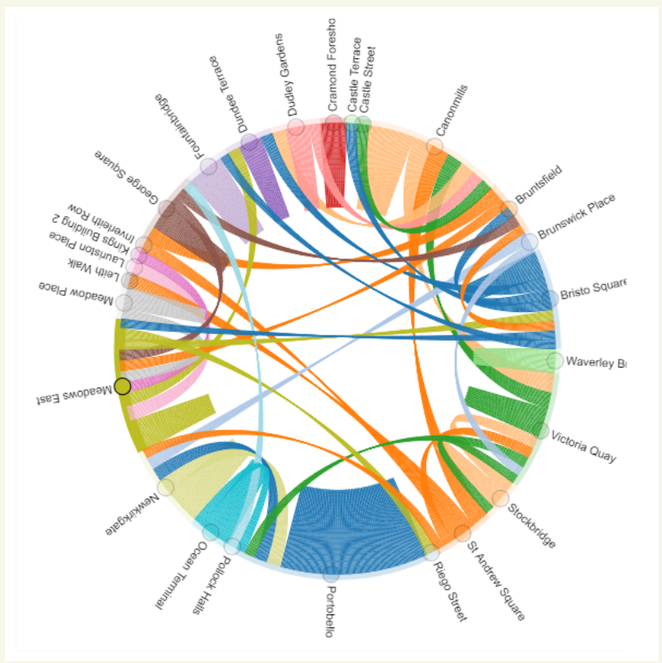


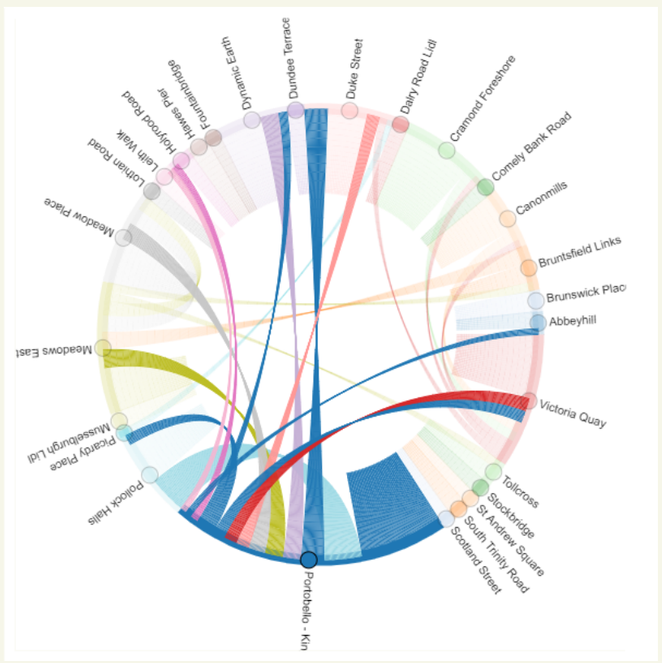


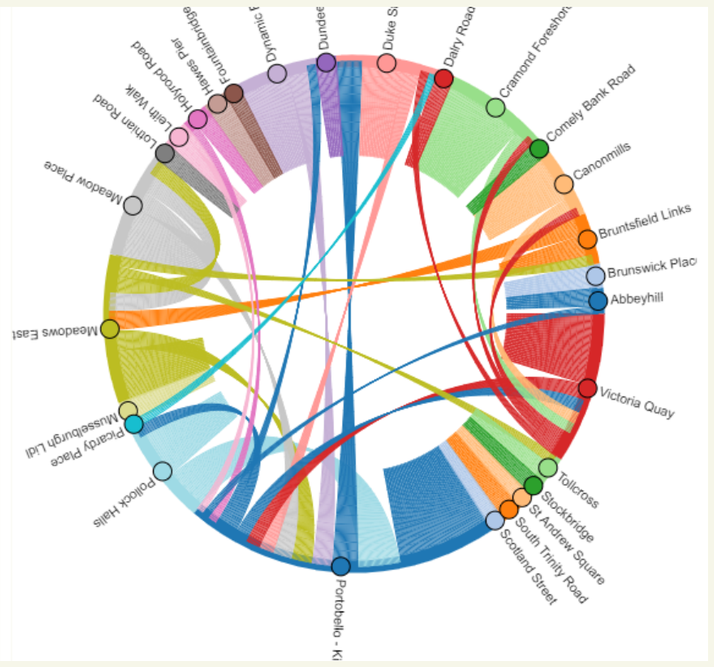
Learning to use Tableau public

JAY KIRKLAND

CHARTS MADE BY TEAM MEMBERS







Just Eat data shows that the bikes scheme set up in partnership with City of Edinburgh Council is mainly used by tourists. This can be seen on the Portobello chord chart and also in the big blocks of colour depicting journeys starting and ending in same location. It could be said that The 2021 diagram is distorted by Covid as not many people are commuting so Jojo added the 2019 chart to compare. The findings are similar but less prominent. Her analysis shows the scheme still needs to be made more accessible to local residents in all areas.

```
# Load libraries
import time  # timer
import numpy as np  # linear algebra
import pandas as pd
import seaborn as sns  # plot handling
import matplotlib.pyplot as plt  # plot handling
import folium
```

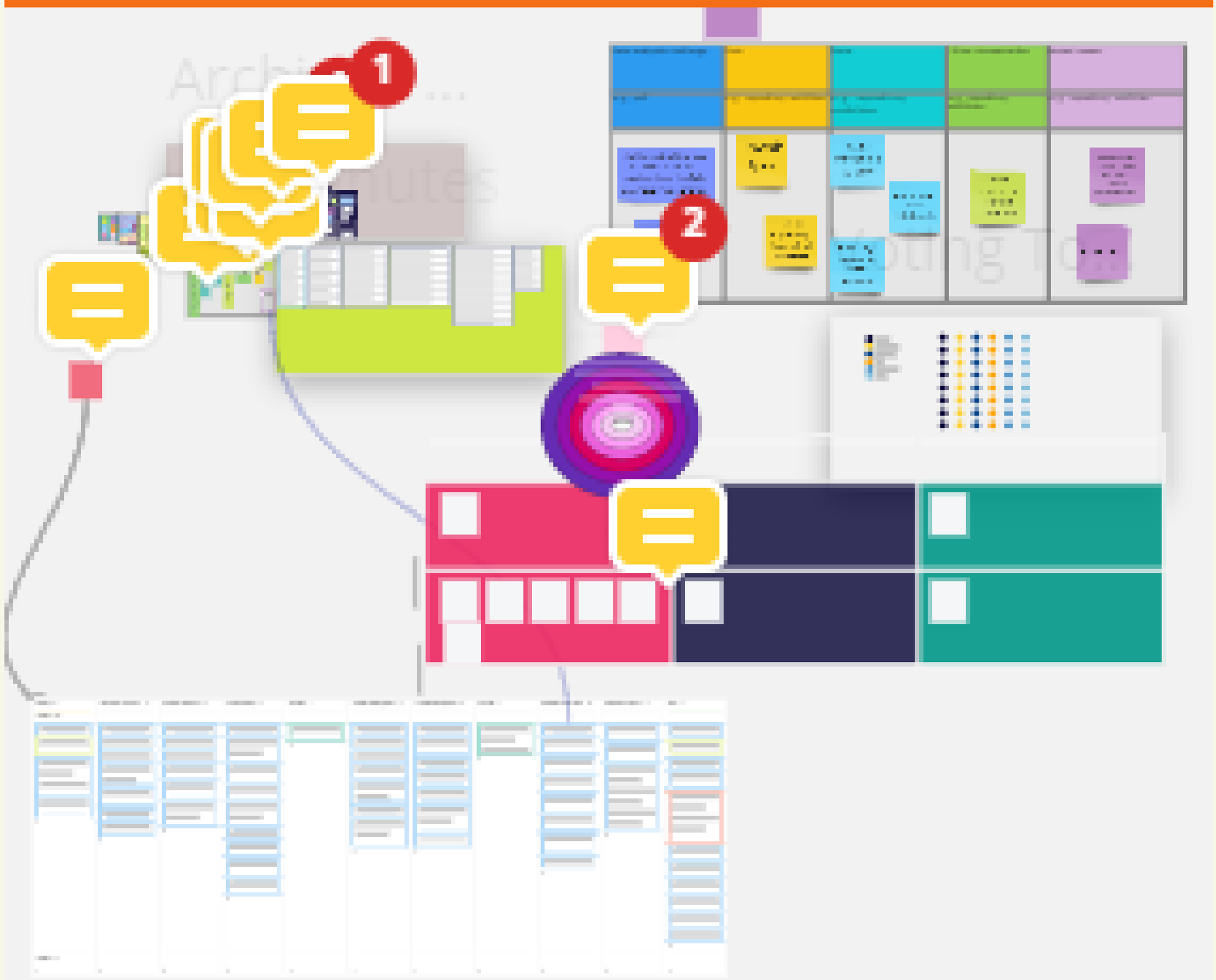
Can I show the locations of the bike stations on the SIMD - https://simd.scot/#/simd2020/BTTTFTT/13.666666666666671/-3.1872/55.9374/. to visualise accesibility of bike shares schemes in deprived area?
Is Climate change Inclusive - Poorer families - access to bikes - Fuel Poverty - Cannot afford to upgrade energy system
Hypothesis Ability to reduce carbon foot print linked to wealth inequality?

- **How Accessible are bike hire Schemes? Are they located in more affluent areas/student areas? (Tourists?)**
- **Fuel poverty -**
- **are the visualisations showing that instead of bikes being used to reduce footprint whilst commuting, instead used by tourists/students?**

1 Popular times of travel
Month Week Day/Time of Day
2 Popular stations and trip
most common start station most common end station most common route
3 Trip duration
total travel time average travel time
4 User info¶
counts of each user type counts of gender and age?
https://github.com/blazaropinto/DS-2021---ENVIRONMENT-WOMEN-IN-TECH/blob/main/Data%20Sets/jo-bike-data/Edinburgh_Bike_Hire.ipynb

JOLENE RUSSELL

CHARTS MADE BY TEAM MEMBERS



ZITHA NQOBIZITHADUBE

JOJO'S MAP SHOWS FEW JUST EAT BIKE STATIONS IN PORTOBELLO

BAGESHRI

THIS PROJECT PROVIDED A GREAT OPPORTUNITY TO IMPLEMENT DATA SCIENCE SKILLS I LEARNT DURING THE COURSE. IT WAS GREAT TO WORK IN A TEAM AND LEARN FROM EACH OTHER. TABLEAU IS SOMETHING NEW THAT I LEARNT FOR THIS PROJECT. GOT TO DEVELOP MY SKILLS FOR TOOLS LIKE GITHUB, MIROBOARD,

BEATRIZ

"THIS PROJECT HAS BEEN A GOOD FINAL TOUCH FOR THE DATA SCIENCE COURSE, AN OPPORTUNITY TO PRACTICE EVERYTHING LEARNED, AND TO EXPLORE A LOT MORE TOOLS; BOTH TO ANALYSE DATA AND TO COLLABORATE AND WORK AS A TEAM TO POLISH AND ACHIEVE OUR GOALS"

JAY

THIS PROJECT DEVELOPED MY CONFIDENCE WORKING IN A TEAM. I LEARNED TO USE NEW TOOLS INCLUDING GITHUB, TABLEAU, PYTHON AND EXCEL. I UNDERSTAND HOW TO MAKE VISUALISATIONS FROM RAW DATA AND I INTEND TO CONTINUE MY LEARNING. I I ENVISAGE THAT MY NEW SKILLS AND UNDERSTANDING WILL ENABLE ME TO CONTRIBUTE TO EXISTING KNOWLEDGE ABOUT WAYS INEQUALITY IMPACTS ON PEOPLE WHO ARE ALREADY DISADVANTAGED AS THE CLIMATE EMERGENCY ESCALATES

JOJO

GABRIELE

"DURING THE PROJECT I LEARNED HOW TO USE A WIDE RANGE OF COMMUNICATION, VISUALISATION AND ANALYSIS TOOLS, AS WELL AS HOW TO PROBLEM SOLVE ON THE GO – A COMPREHENSIVE LEARNING EXPERIENCE, THAT COULD ONLY BE TOPPED BY THOSE 'AHA!' MOMENTS WHEN I FOUND THE SOLUTION FOR A CODING ISSUE."

ZITHA

PROJECT TOOLS

Streamlit

Slack

Software

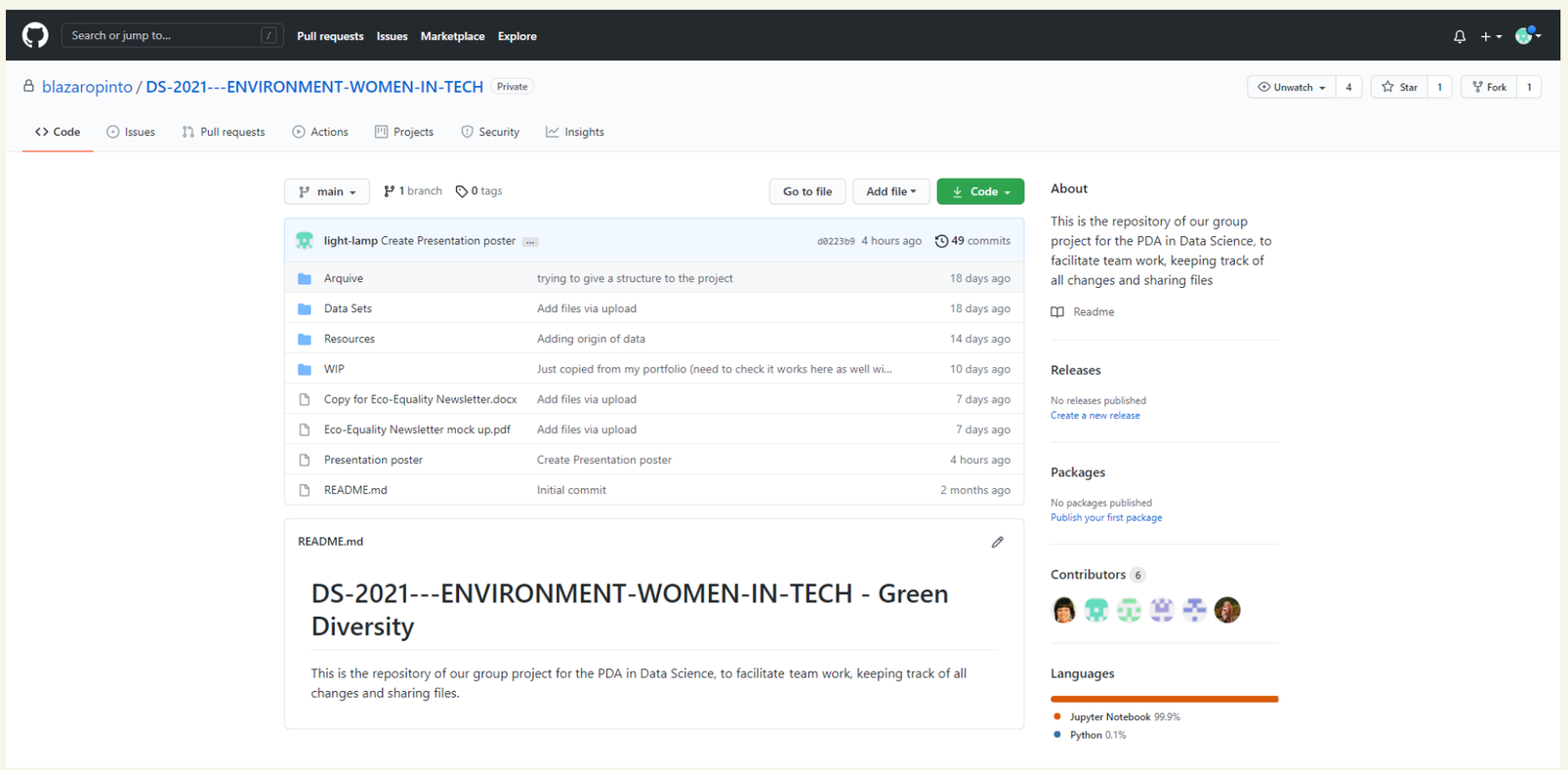
slack

Canva

Graphic design company

Canva

miro | DS 2021 - ENVIRONMENT/WOMEN IN TECH



Code Division + SUM(all)