Note in the Pocket Exploratory Data Analysis Report

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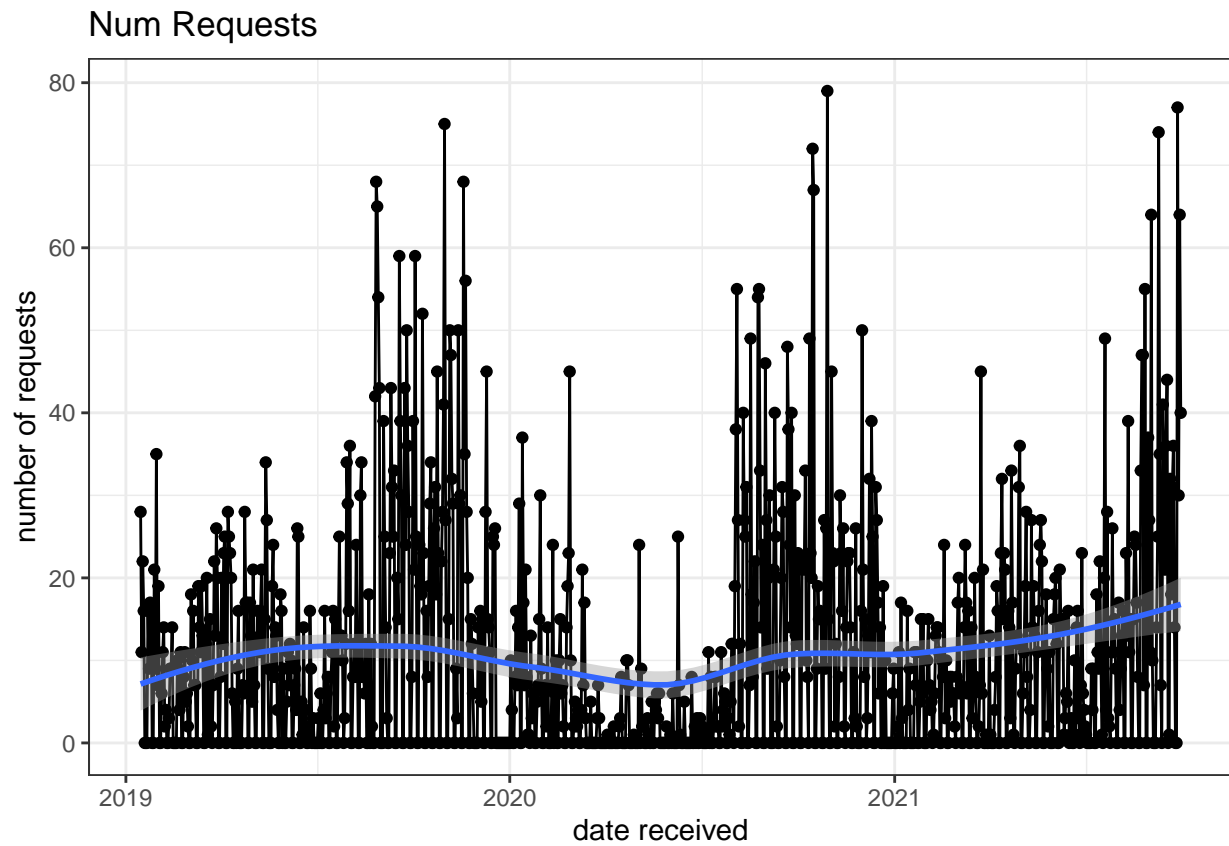**Abstract**

This report contains an exploratory data analysis of the requests filled by Note in the Pocket from 2019 to the present.
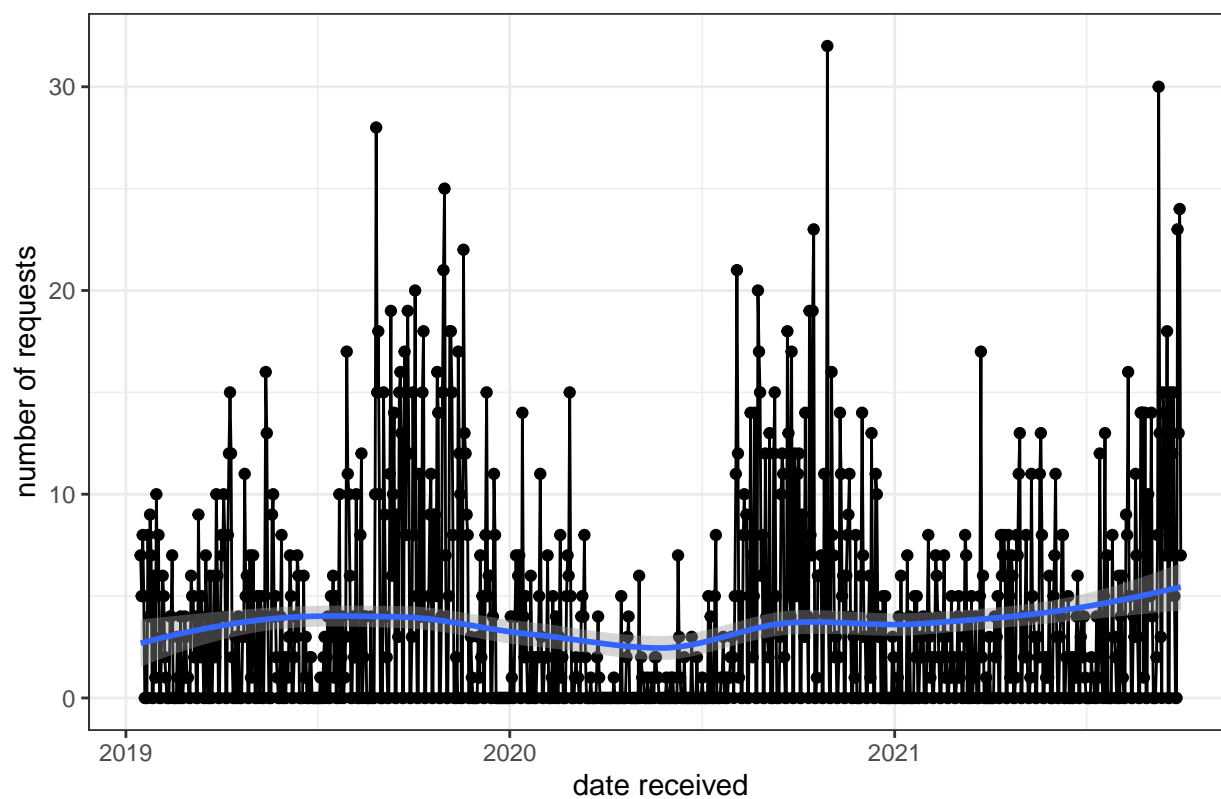
Contents

1 Count plots for requests given to Note in the Pocket

1.1 Plot of Items by Date

Num Requests

Female Small
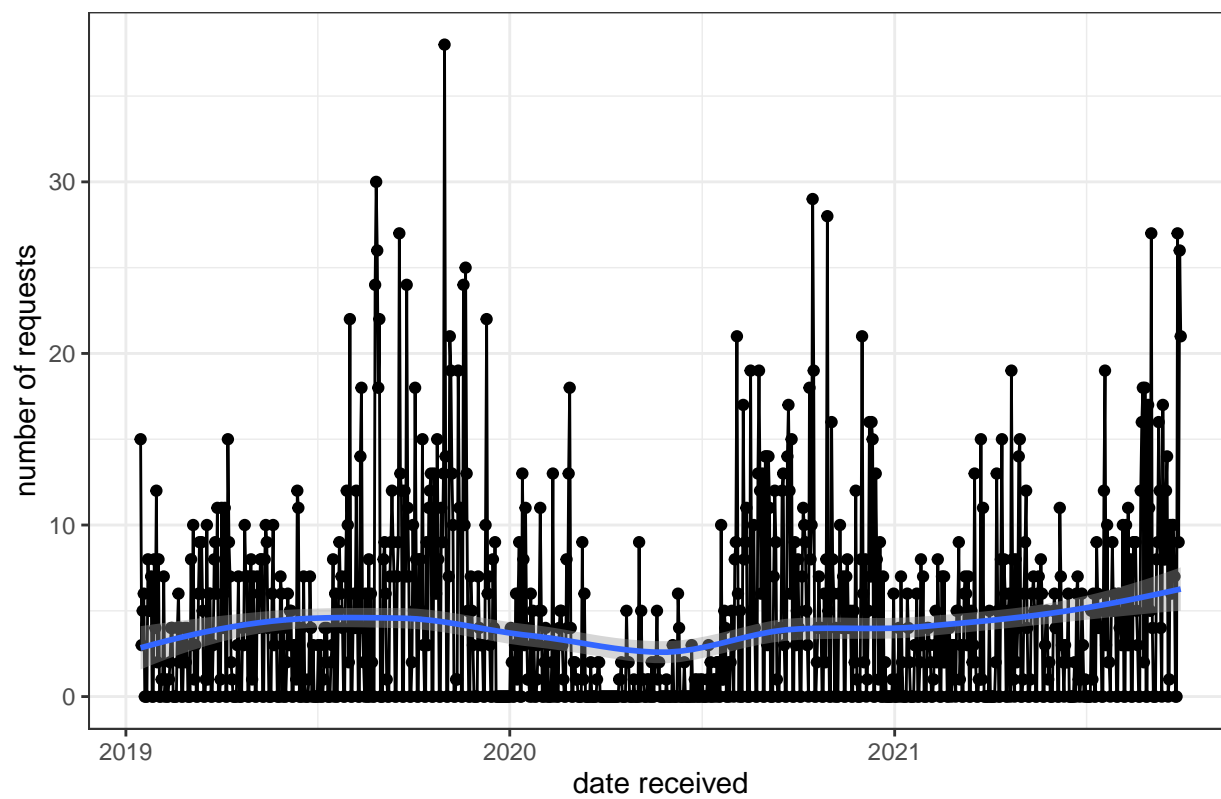
Male Small
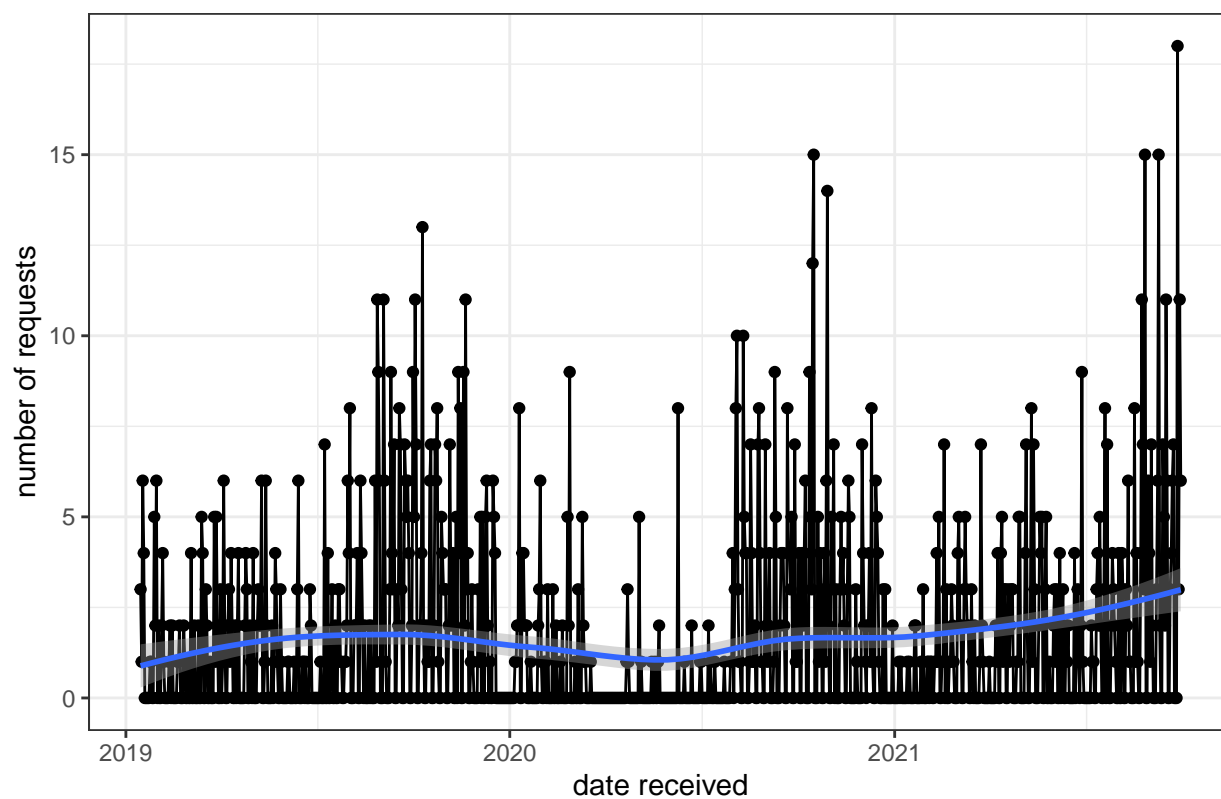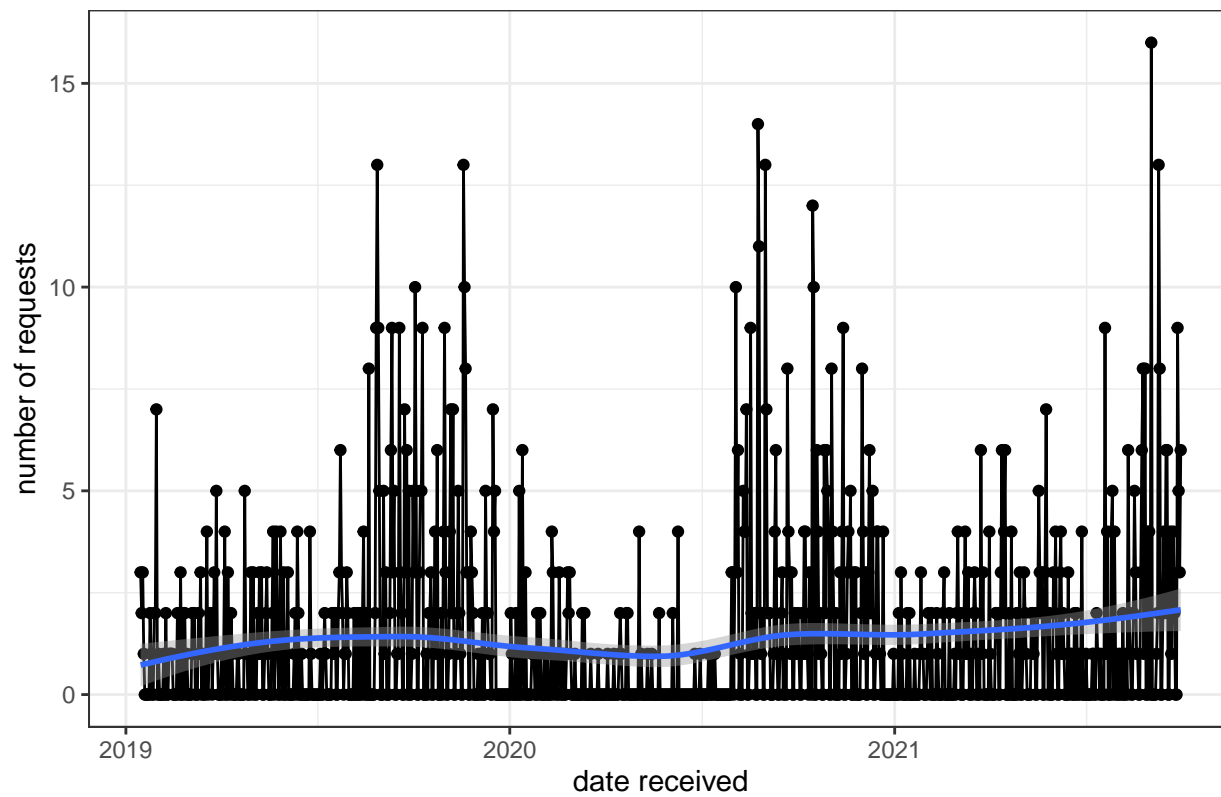
Female Large

Male Large

- Based on the time plots for each clothing item (female small, male small, female large, male large), there is a recurring pattern each year. A small peak in spring, and a larger peak in fall, presumably reflecting the start of school semester.

- The small peak in spring is less apparent in 2020 for all clothing items, because of COVID starting around that time of year.

1.2 Plot of Total Number of Requests and Student Status

Total Number of Requests and Student Status

5
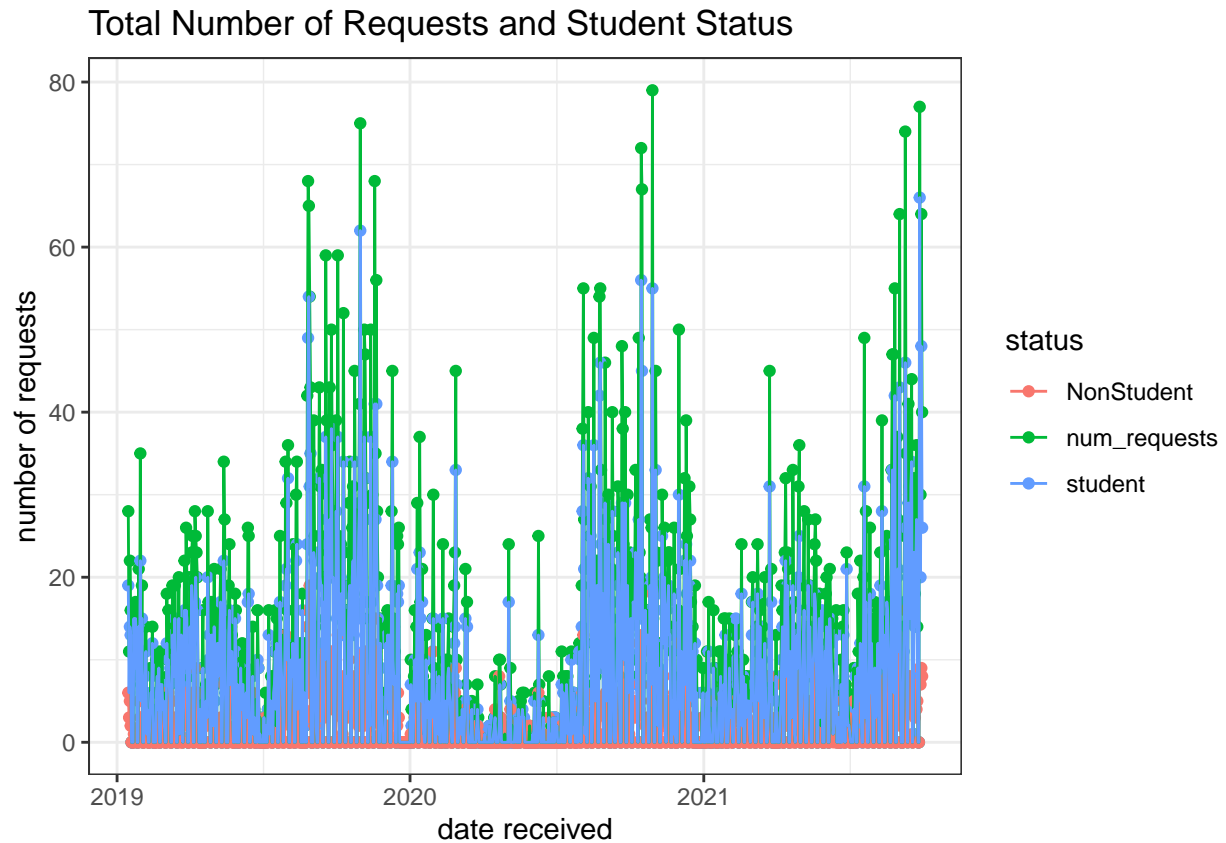
2 Request Lag Plots

Understanding the trends in the **lag time** is the first step towards improving order turnaround speed. The lag time is the number of days between an order being received and fulfilled. For example, if an order was received on March 2 and fulfilled on March 10, the lag time would be 8 days. To get view of how the lag time has changed over time, we plot lag time on the y-axis against the date the orders were received on the x-axis. If an order was received on March 2 2020 and filled on March 10 2020 that point would show up at March 2 2020 on the x-axis with a y-value of 8. We also stratified by gender to get a sense of if the lag time distributions was different for males and females. Because points can over lap, e.x. two orders were received on March 2 and both were filled in 8 days, we also adjusted the transparency of the points. A darker point means that there are actually many orders stacked at the same value. The vertical line at March 15, 2020 is to give a general date for when COVID may have started to affect operations.
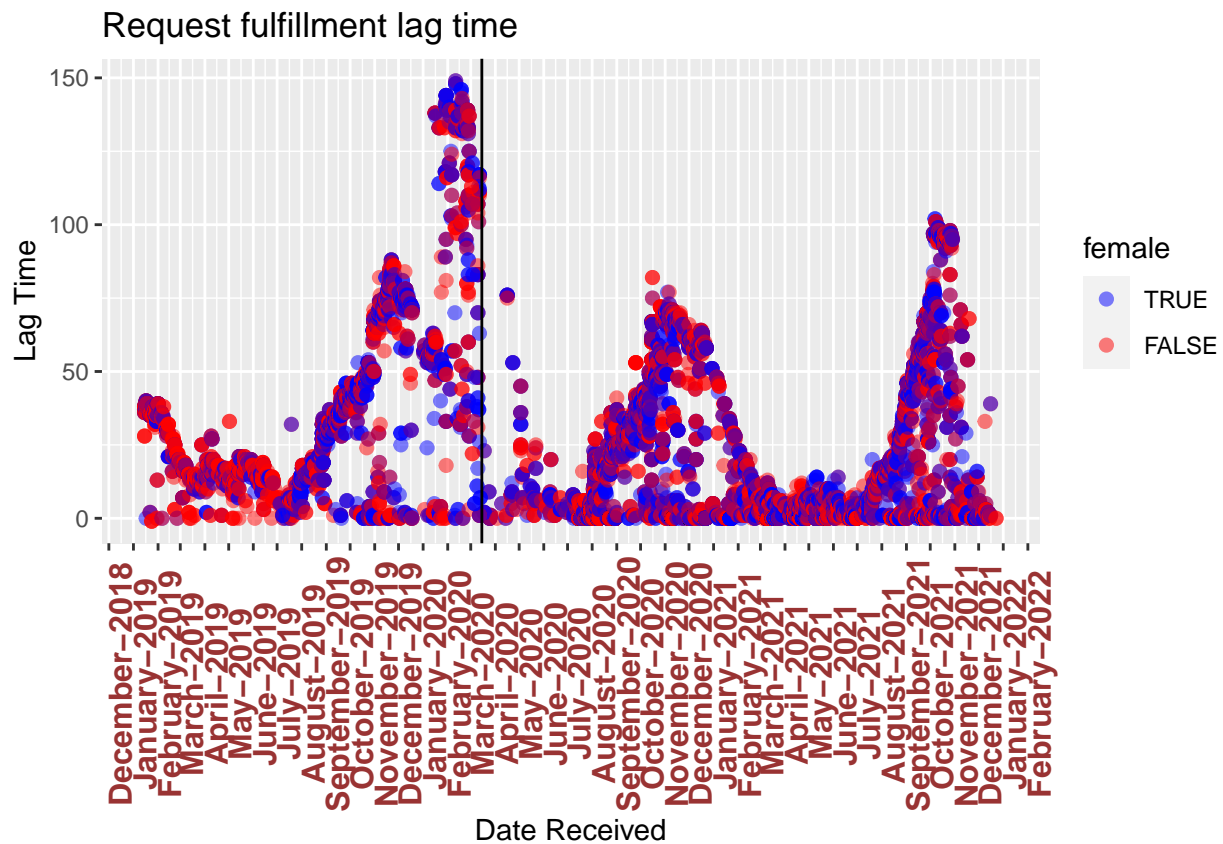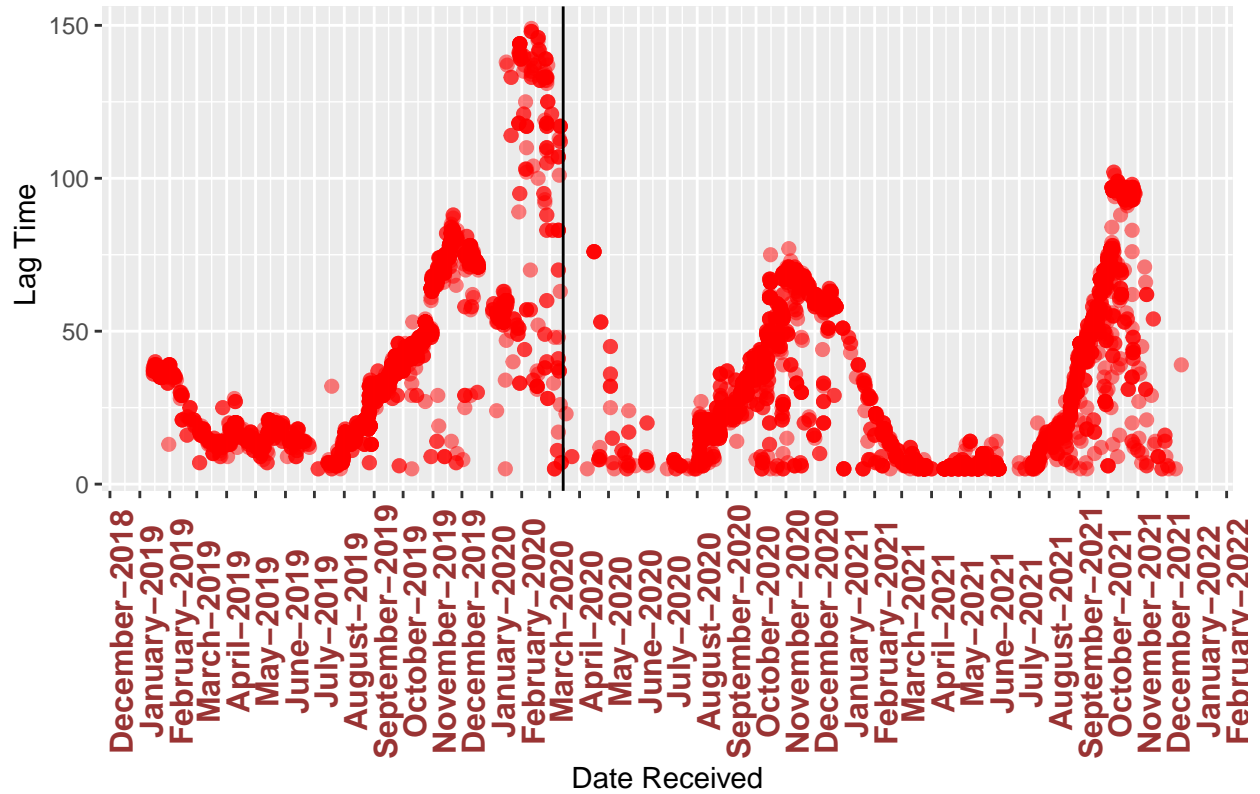

Next we filter out any orders that take less than 5 days to fulfill. This helps remove emergency orders that needed immediate attention and focus on more standard orders.
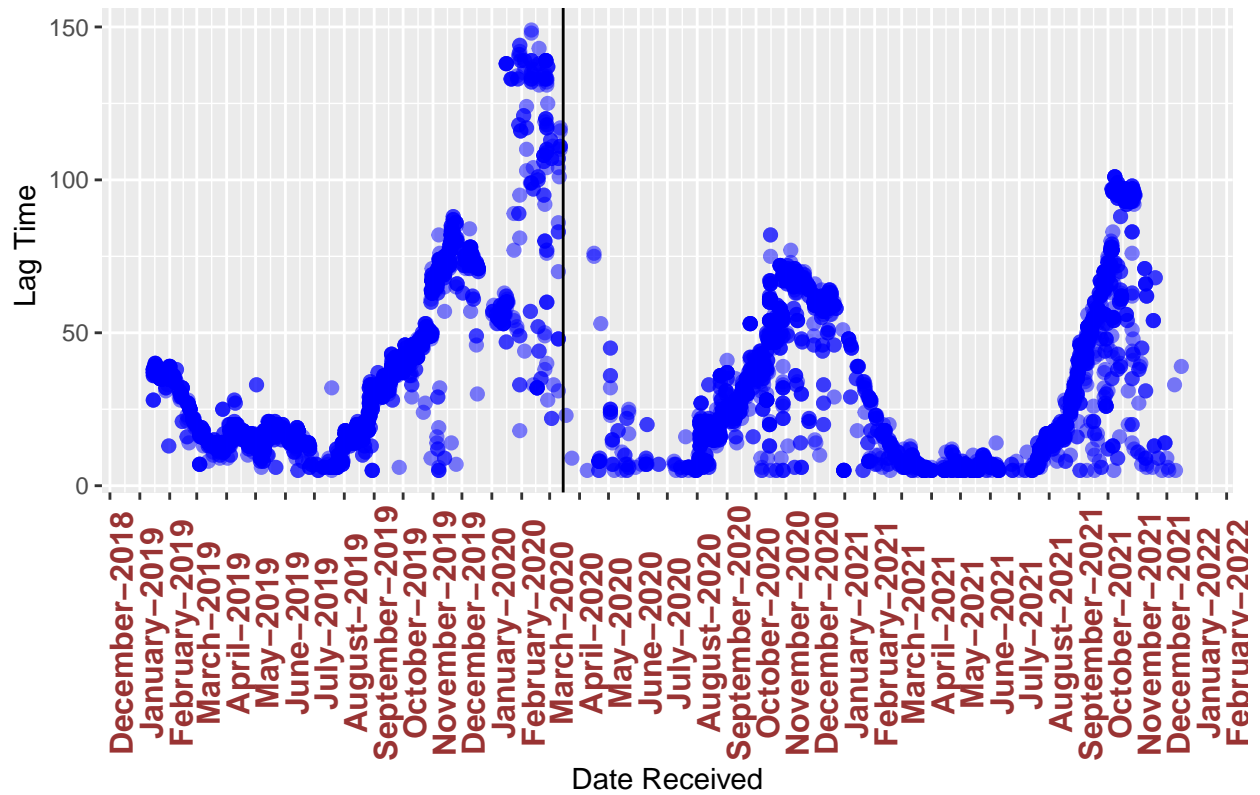
Request fulfillment lag time > 5 days
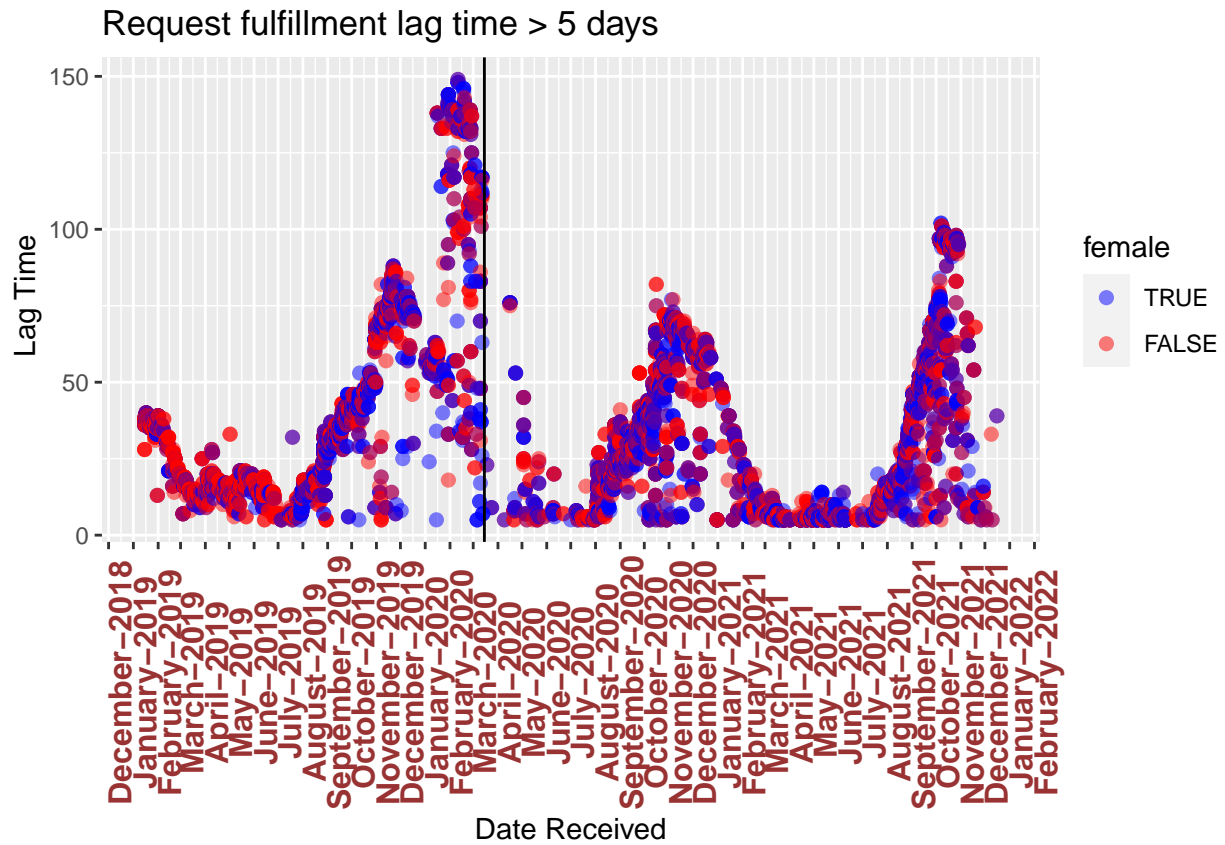
To reduce clutter, we also plot the requests for each gender separately.

Request fulfillment for females

Request fulfillment for males

8

The request distributions look similar for both males and females. There is a clear spike in request fulfillment time around the onset of COVID, when Note in the Pocket had to temporarily close and volunteering was not allowed

Finally, we stack all of the data up by month. This more easily visualizes trends that occur throughout a year.
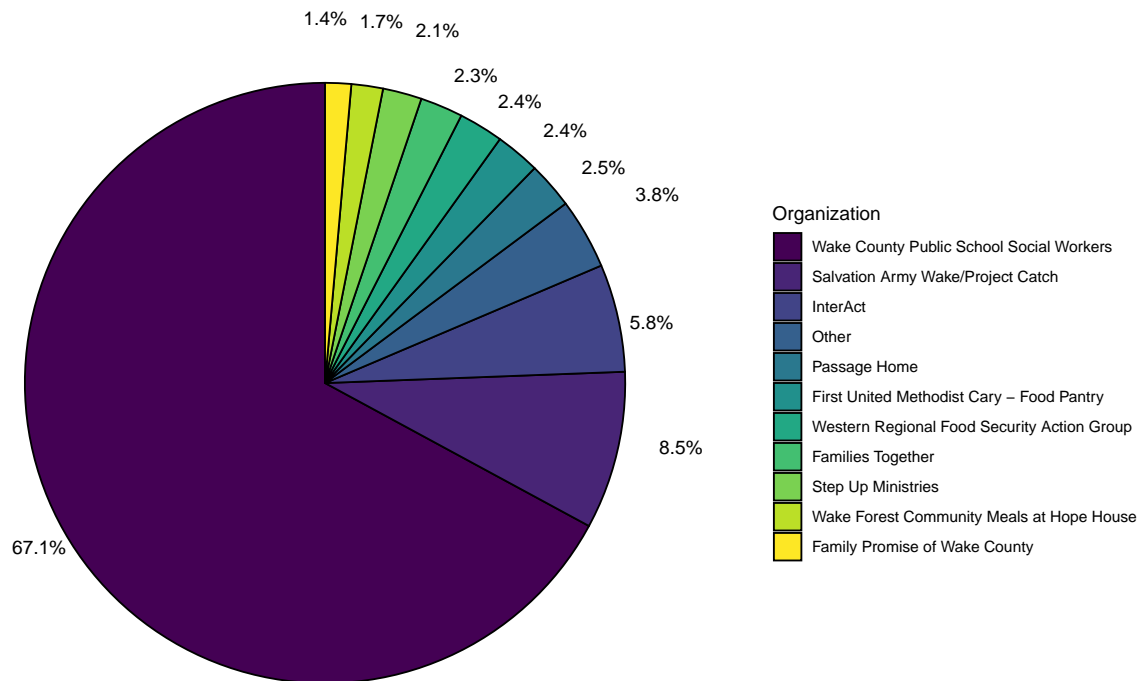

Request fulfillment lag time stacked monthly
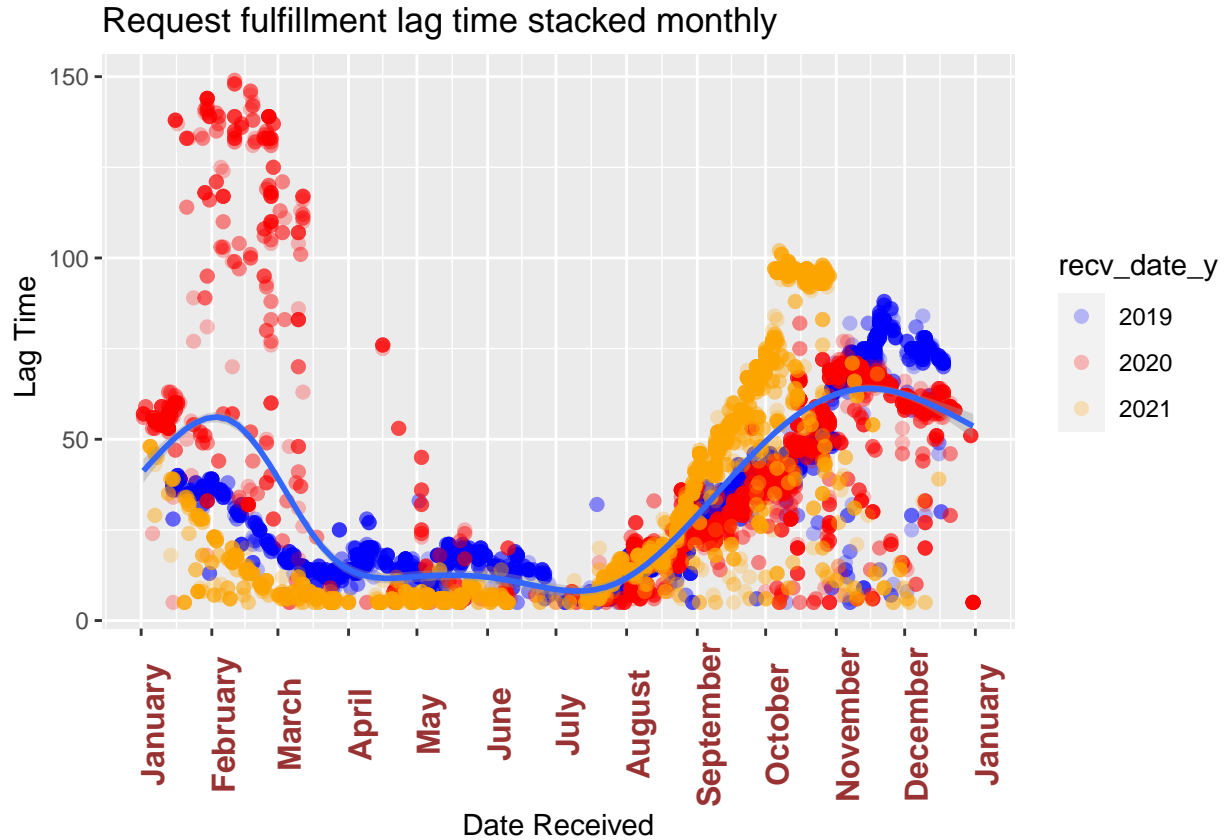
As expected, the summer months have fewer request and also less lag with requests ramping back up at the beginning of the academic year. We can clearly see the effect of the onset of COVID at the beginning of 2020 compared to the rest of the years.
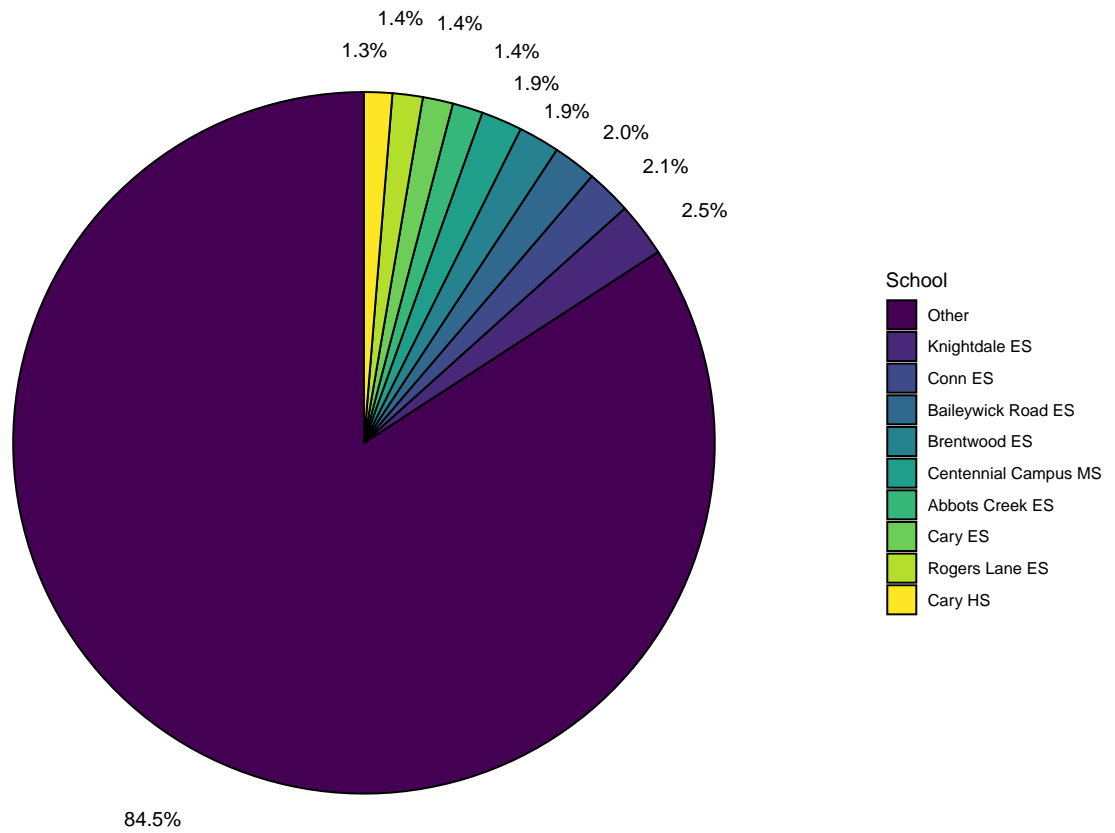
3 Exploratory data analysis for the categorical variables

We selected three categorical variables to explore: Organization, School, and City. We first calculated the number of individuals served by each organization/school/city. Then, based on the total number of individuals served, we calculated the proportion of service by each organization/school/city. We can find the top 10 organizations/schools/cities that mostly collaborated with the Note-in-pocket. Meanwhile, we mapped all the zipcode information except for missing value and outside North Carolina's zipcode. Combining the information from the pie chart, it is not surprising to see the Raleigh, Cary, Garner areas are the top three cities for the proportion. More service may be provided to the individuals in the Apex area, considering the influence of distance.
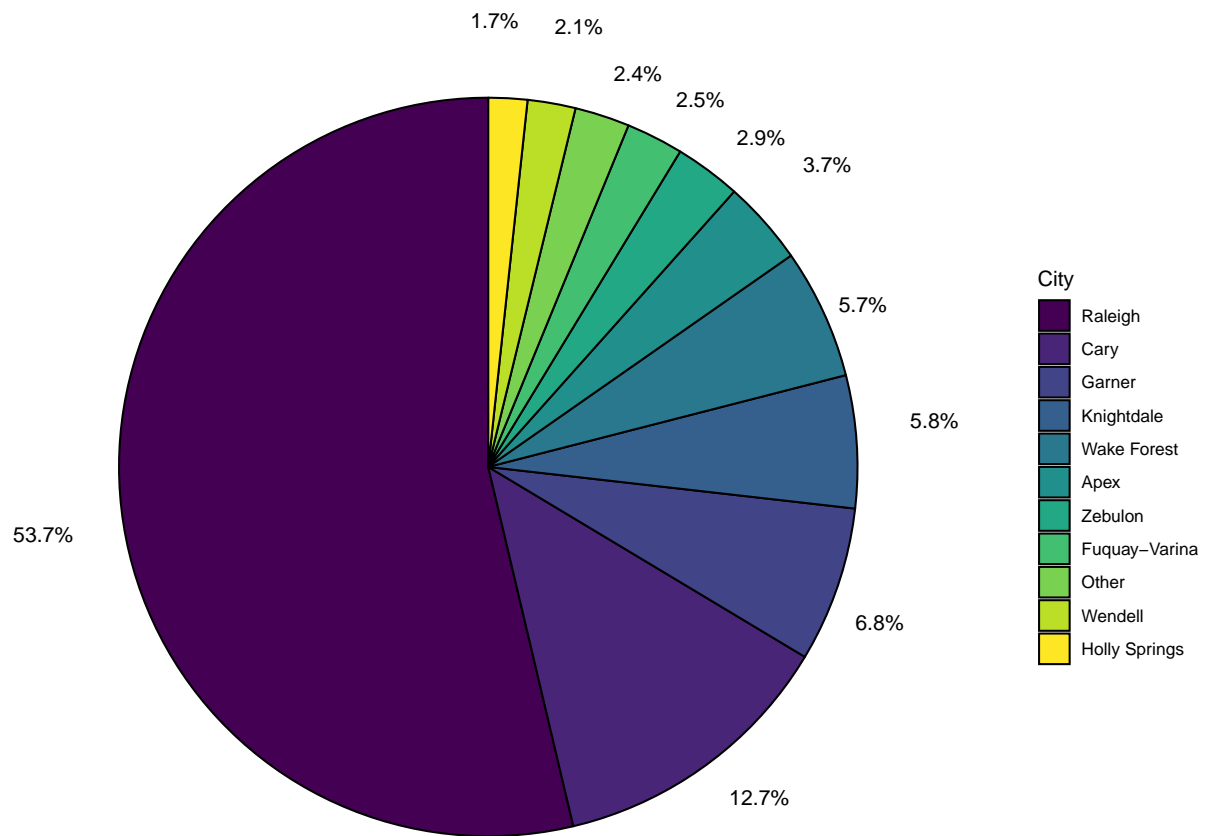
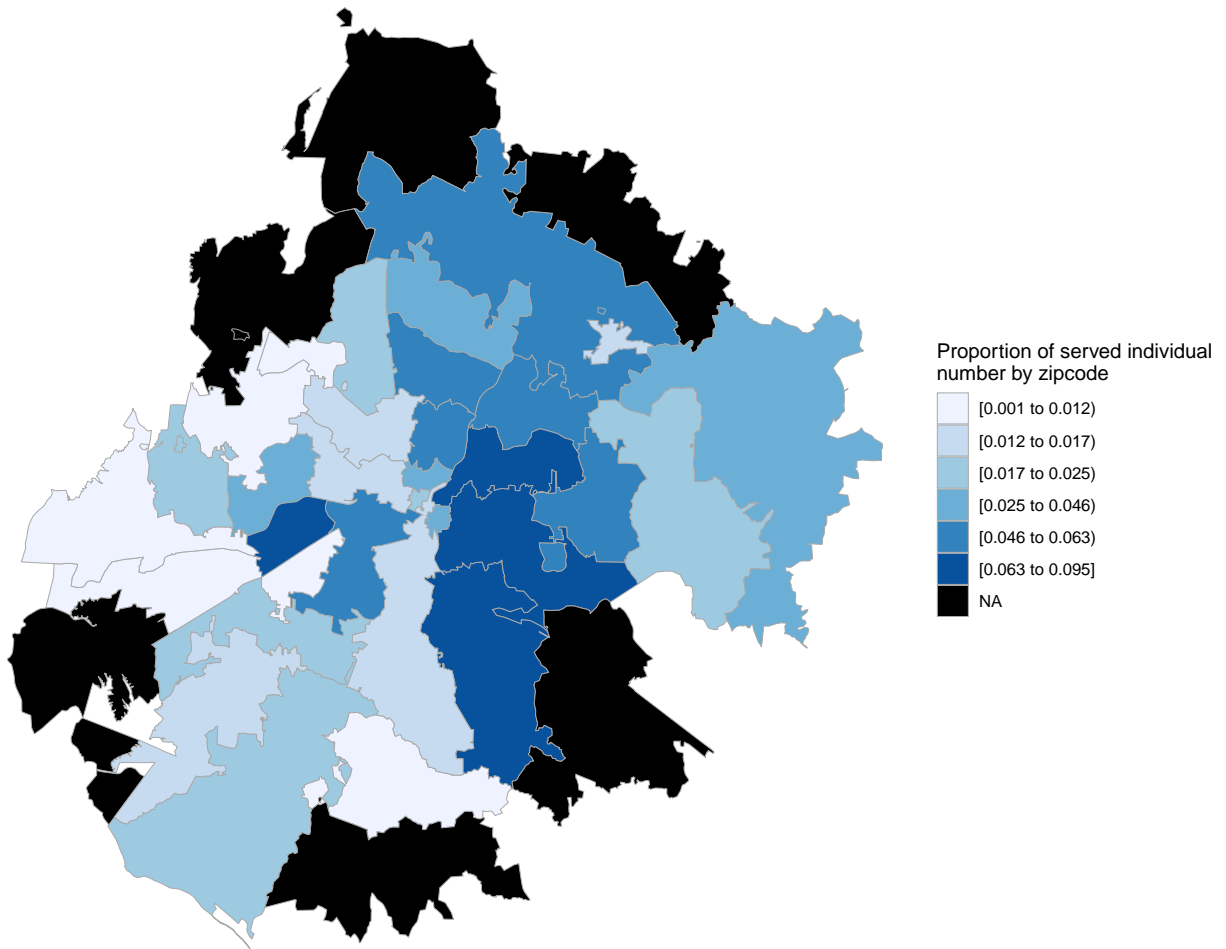Proportion of served individual number by organization

Proportion of served individual number by school

School
- Other
- Knightdale ES
- Conn ES
- Baileywick Road ES
- Brentwood ES
- Centennial Campus MS
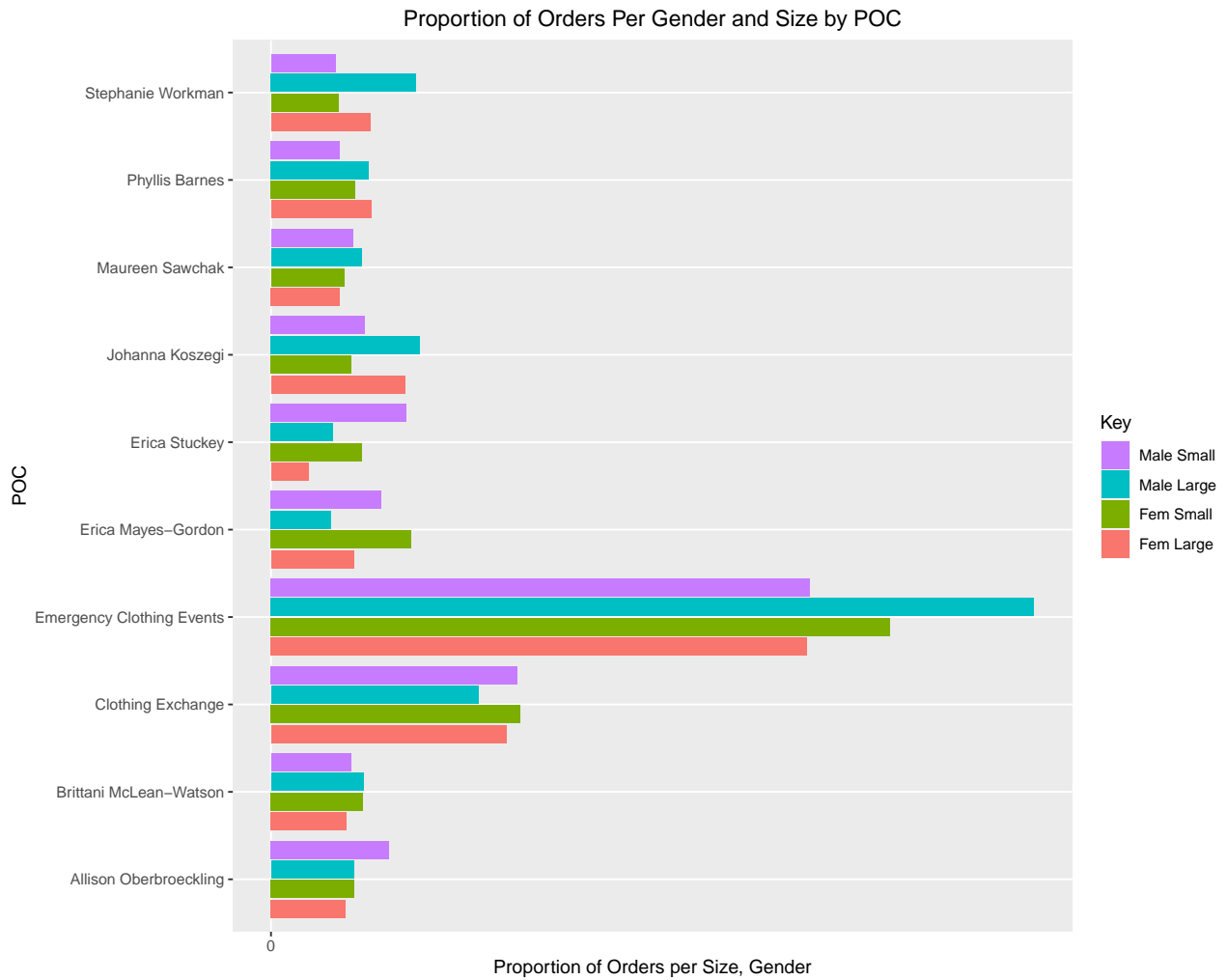- Abbots Creek ES
- Cary ES
- Rogers Lane ES
- Cary HS

Proportion of served individual number by city

Note in pocket_Request order zipcode information map

Proportion of served individual
number by zipcode

[0.001 to 0.012)
[0.012 to 0.017)
[0.017 to 0.025)
[0.025 to 0.046)
[0.046 to 0.063)
[0.063 to 0.095]
NA

4 EDA for Character Variables–By Size and Gender

Proportion of Orders Per Gender and Size by POC

Proportion of Orders Per Gender and Size by School

Proportion of Orders Per Gender and Size by Organization

Proportion of Orders Per Gender and Size for ZipCode

Proportion of Orders Per Gender and Size for Adult v Non–Adult

Adult(1) v Non–Adult(0)

Key
- Male Small
- Male Large
- Fem Small
- Fem Large

Proportion of Orders per Size, Gender
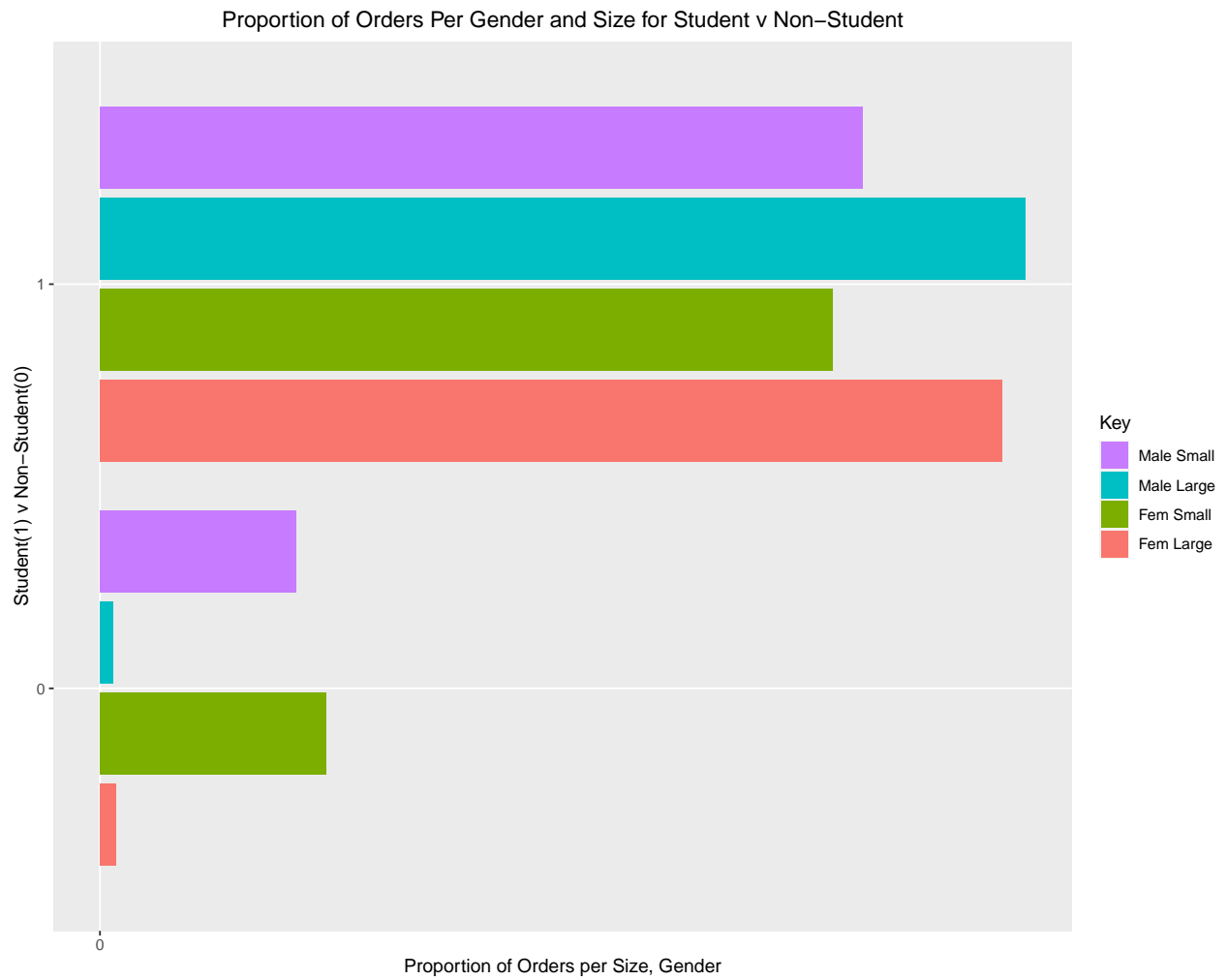
Proportion of Orders Per Gender and Size for Student v Non-Student

5 Forecasting Future Donations and Requests

Observed and warpDLM Forecasted Counts, BOY−TOP−10