

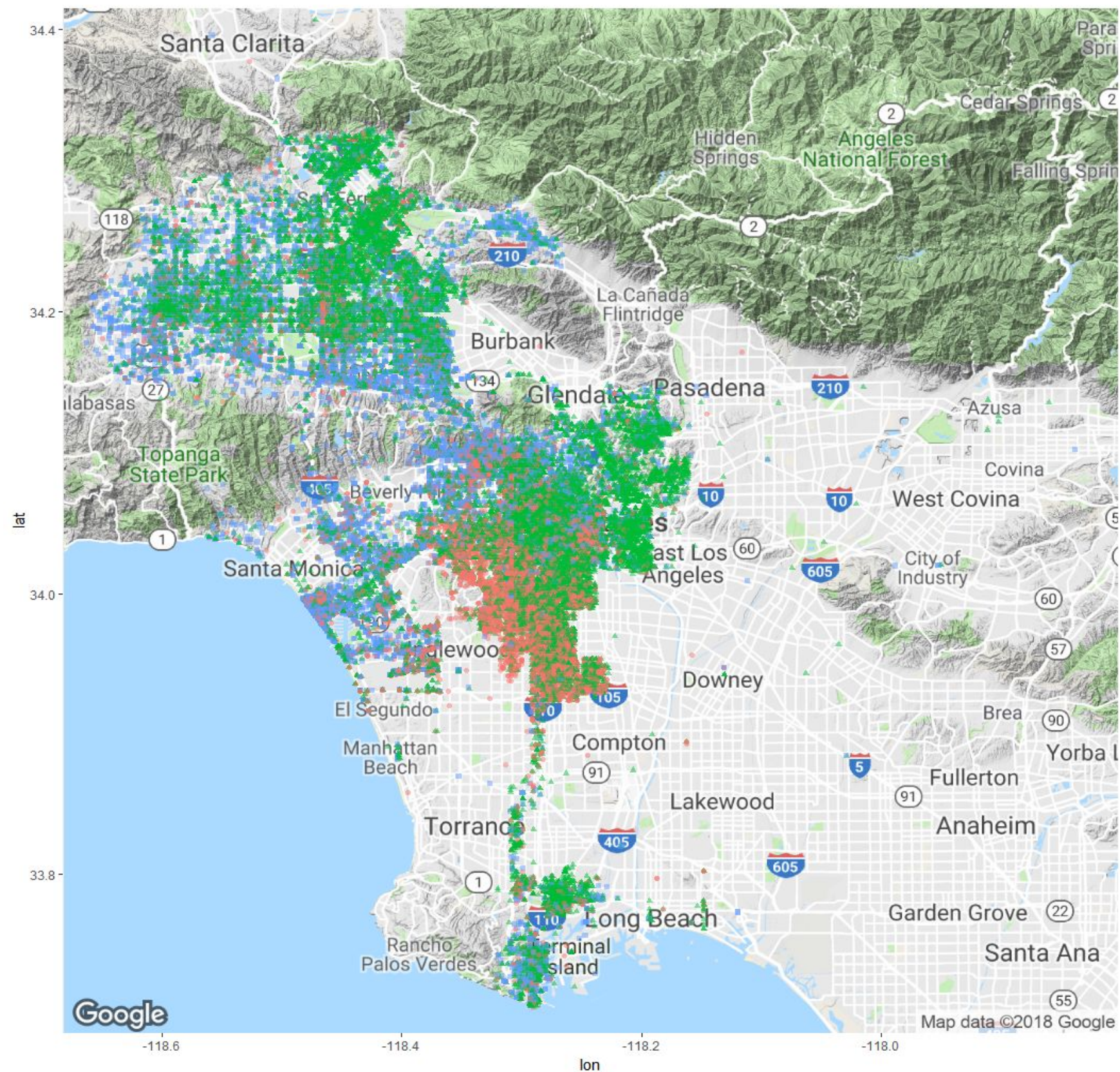
# Predictive Role of Geolocation Targeting Los Angeles Arrests

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## Introduction

**Is there a relationship between different geographical areas in Los Angeles and the demographic that is arrested?**

- In LA Times newspaper, crime stories are being more frequently covered than other topics [4]
- LA has history of using severe legal measures against specific ethnicities such as Indians [5]
- Prosecutions and funding of a citizens' police force used as response to problem of crime in LA [5]
- Number of crimes committed decreases after punishments implemented [5]
- Los Angeles latitude: 34.0522, longitude: 118.2437



## Method

Data Collection

- 1,048,576 original arrest reports in Los Angeles 2010-now found in data.gov [1]

Data Analysis

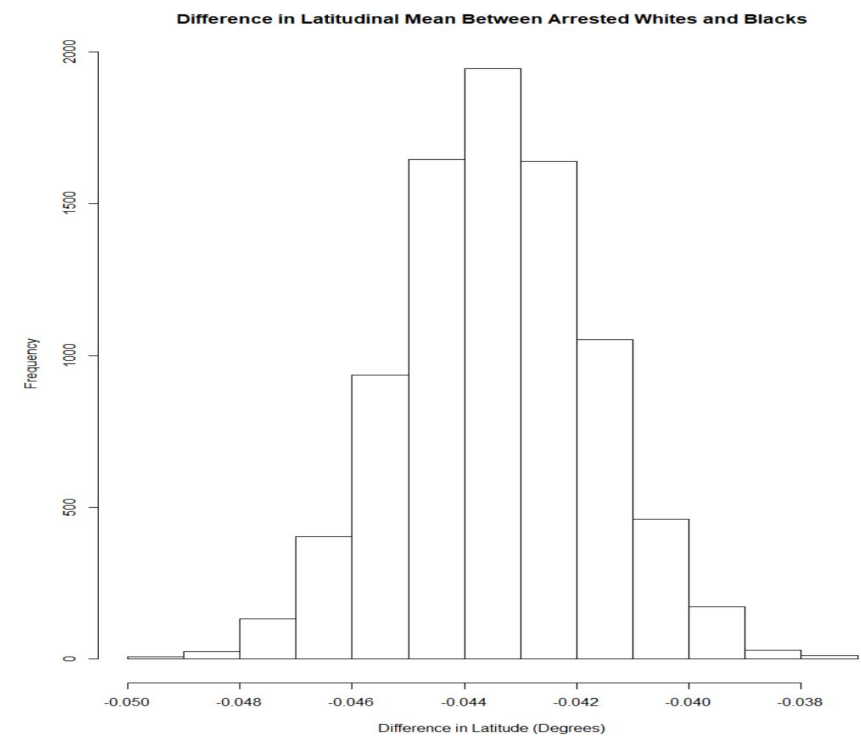
- Converted geolocation into separate variables, Longitude and Latitude.
- Converted time of arrest to hours difference from midnight
- Converted race code (Black, Hispanic, White) to numerical (0, 1, 2)
- Reviewed only Black, White, and Hispanic arrested persons
- Figures and analysis of data was performed in R-Studio
- Primarily used bootstrap resampling to consider significance

Notable Variables

- Age - Years, demographic mean [1]
- Gender - Male or Female, demographic proportion [1]
- Time - Hours difference from midnight, demographic mean [1]
- Ethnicity - Black, White, or Hispanic, demographic proportion [1]
- Longitude - West or East Degrees, geographical mean [1]
- Latitude - North or South Degrees, geographical mean [1]

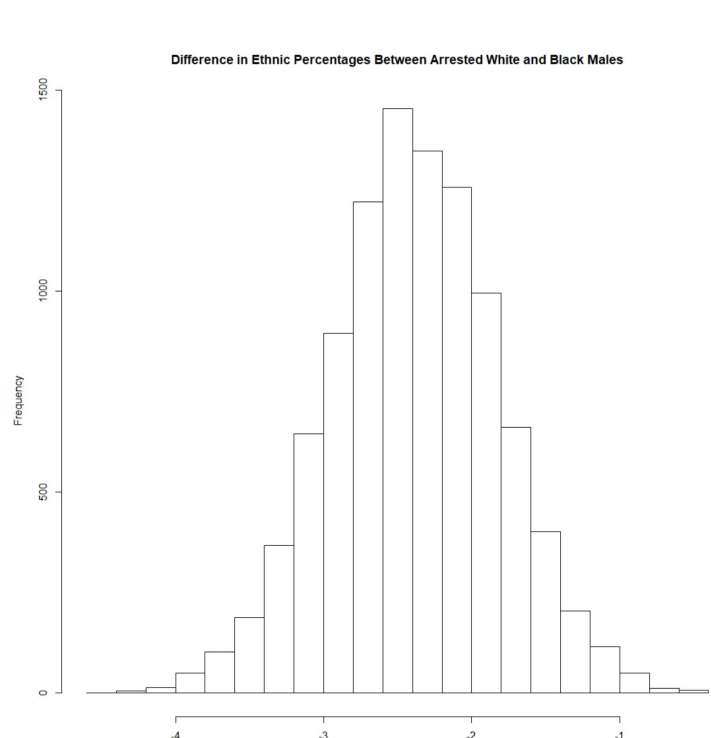
## Results

**How different latitudinally are the arrests locations between White and Black people?**



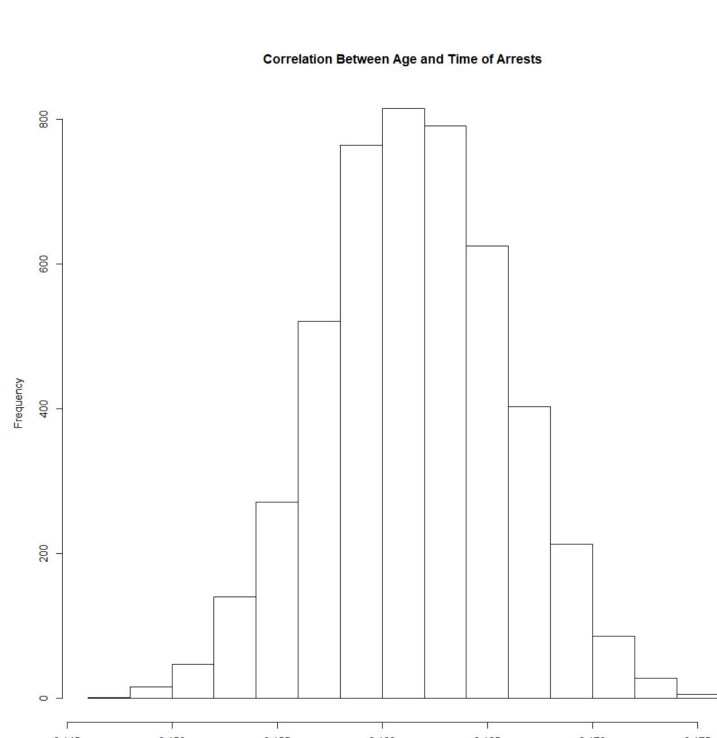
We are 95% confident that the true difference in means latitudinally between White and Black Los Angeles arrests occur between [-0.047, -0.040]. This was calculated using Bootstrapping.

**What is the percentage difference between arrested males across ethnicities?**



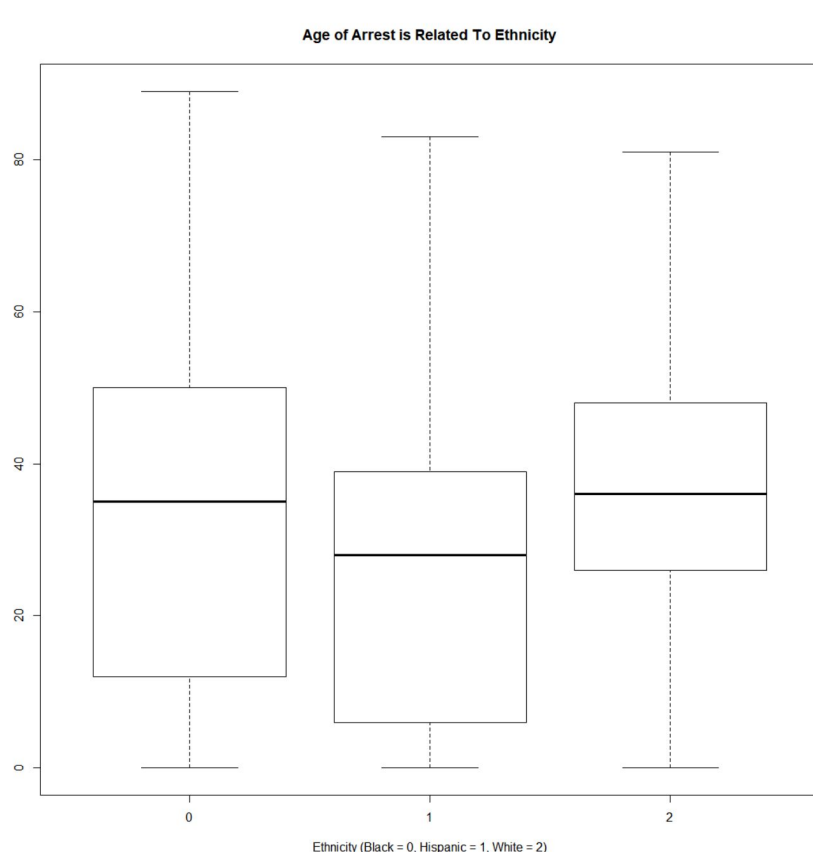
Through Bootstrapping, we are 95% confident that the true difference in percentages between White and Black Los Angeles males arrests occur between [-0.035, -0.013].

**Is there a relationship between the time of the arrest and the age of the person arrested?**



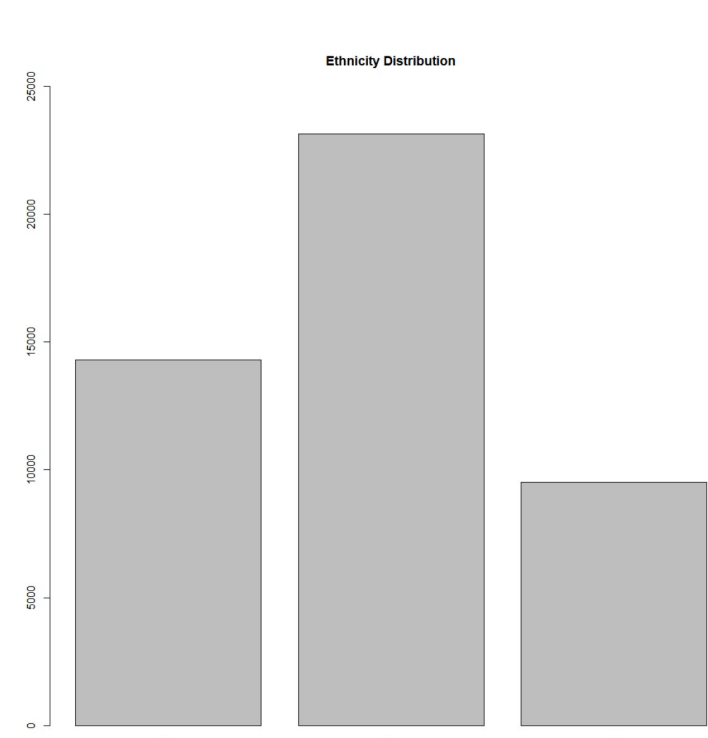
The 95% confidence interval of bootstrap distribution is [0.15, 0.17]. There is a weak positive correlation between time of arrest and age of individual arrested.

**What are the ages of the different ethnicities.**



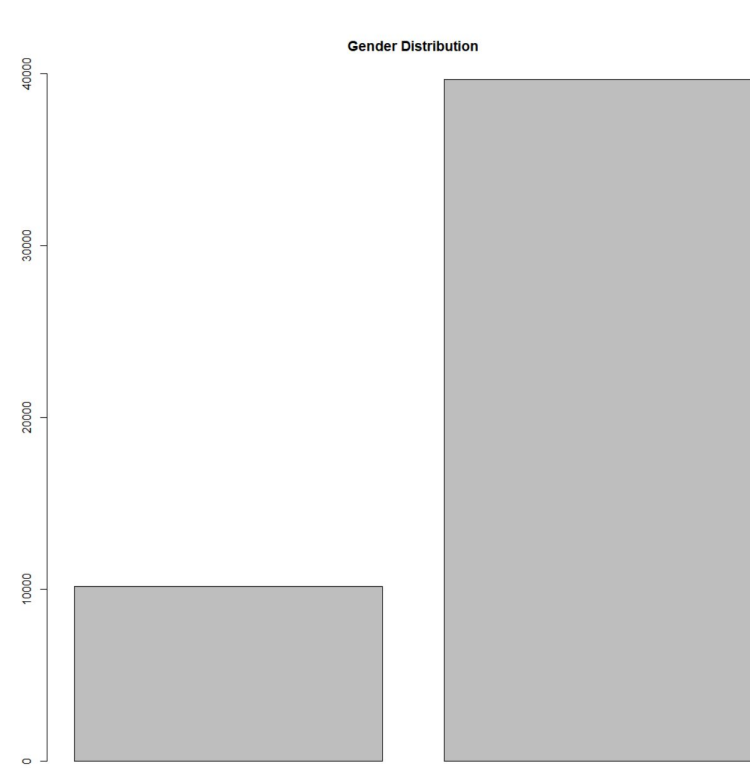
Degrees of Freedom: 2  
F-Value: 5.51  
MSG: 1021  
MSE: 160

**What is the proportion of ethnicities for individuals arrested in LA?**



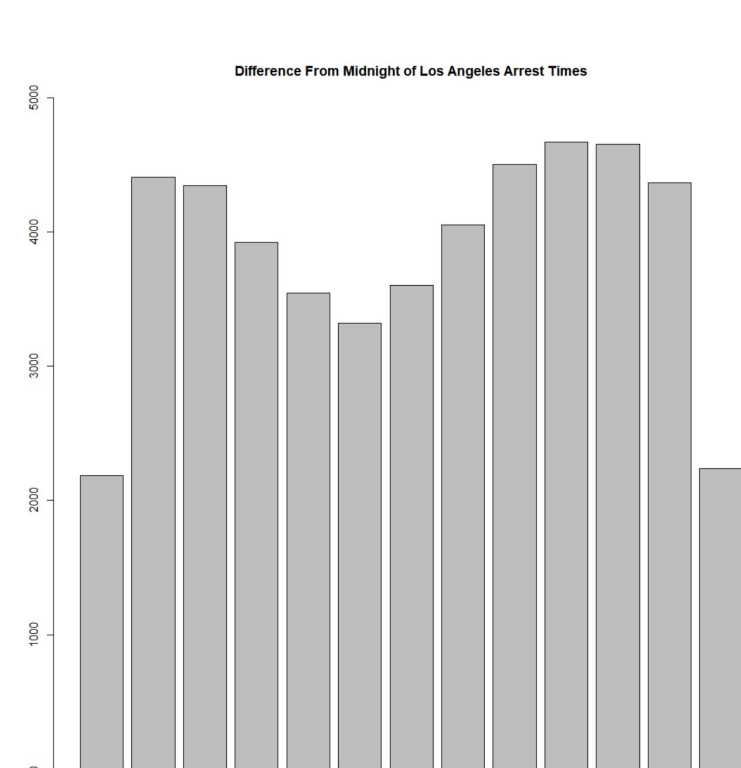
Black: 14305 : 28.7%  
Hispanic: 23158: 46.5%  
White: 9526: 19.1%

**What is the proportion of genders for individuals arrested in LA?**



79.6% of arrests are male and 20.4% are female.  
Female Count: 10144  
Male Count: 39691  
Male to Female: 4 to 1  
Visual showing higher proportion of males being arrested than females.

**What are the most common arrest times in LA?**



Mean: Min: Q1: Q2: Q3: Max  
6.13 0 3 6 9 12  
  
The bimodal visual is showing high count of arrests to occur at 1 AM and 9-10PM.

## Discussion

**Can arrested demographics be predicted to certain geolocations?**

1. What is the average time of the individual's arrested?

Individuals are arrested 6 hours from midnight  
Translated to 6AM or 6PM, indicative of early morning and early evening  
There exists windows in time where arrests occur more frequently

2. What percentage of the individuals arrested were male and female?

Male composition of arrests is approximately 80%  
Consistent percentages across Blacks, Hispanics, and Whites  
Statistically significant difference from the expectation of a 50%/50%

3. How different latitudinally are the arrests locations between White and Black persons?

Black arrest occur on average at a lower latitudes  
White arrest are more localized in the north  
Geographically there is a difference between where Black and Whites are arrested

4. What is the percentage difference between arrested White and Black gender proportions?

2.5% difference in Black male proportion of arrests relative to White males  
2.5% difference in White female proportion of arrests relative to Black females  
Black males are more represented in arrests percentages, considering similar male to female proportions

5. Is there a relationship between the time of the arrest and the age of the person arrested?

Positive statistically significant correlation between age and time  
A person's age can provide an idea of when they might be arrested  
Provides a relationship that can entail predictive modeling

## References

[1] City of Los Angeles. Arrest Data from 2010 to Present. Data.GOV.URL <https://catalog.data.gov/dataset/arrest-data-from-2010-to-present>

[2] D. Kahle and H. Wickham. ggmap: Spatial Visualization with ggplot2. The R Journal, 5(1), 144-161. URL. <http://journal.r-project.org/archive/2013-1/kahle-wickham.pdf>

[3] Radil, S., Flint, C., & Tita, G. (2010). Spatializing Social Networks: Using Social Network Analysis to Investigate Geographies of Gang Rivalry, Territorially, and Violence in Los Angeles. *Annals of the Association of American Geographers*, 100 (2), 307-326. Retrieved from <http://www.jstor.org/stable/40645356>

[4] Rogers, S., Thorson, E., (2010). The Reporting of Crime and Violence in the Los Angeles Times: Is There a Public Health Perspective? *Journal of Health Communication*, 6:2, 169-182. <https://doi.org/10.1080/10810730120636>

[5] Woolsey, R., (1979). Crime and Punishment: Los Angeles County, 1850-1856. *Southern California Quarterly*, 61 (1), 79-98. doi:10.2307/41170812