THAYER SCHOOL OF
ENGINEERING
AT DARTMOUTH

ENGS 93: Final Paper

A Study of Homelessness

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Background and Introduction

Growing up in Santa Cruz, California, homes and homelessness have always been on my mind and I know the causes are complex. Over the course of high school, the homeless population drastically increased and the economy unforgivingly affected the unemployment rate and rents in our county. Every day on my hour long commute to school we'd pass the homeless shelter and see homeless folks taking refuge from the rain on the chiropractor's porch. In 2010 there were close to 3,000 homeless people in Santa Cruz County – approximately the number of Dartmouth Undergraduates that graduated in 2016 and 2017 combined.

People sometimes forget to recognize that these homeless individuals have their own stories and backgrounds. And as I've gotten older, societal trends have become more apparent regarding the discussion of homelessness. I've personally witnessed both friends, family, and other Santa Cruzians repeatedly refer to homeless people as 'transients,' partnered with a distasteful remark. While Santa Cruz is known for its firm belief in equality and investment in local roots, the cultural tone surrounding those homeless often lacks empathy for these members of our community.

That being said, this study originated from *Freakonomics,* which triggered some personal heartstrings while reading it. In the book, there's a brief discussion about homeless individuals, death rates, and debunking a prior statistical estimate. The static, manner – of – fact and non-empathetic demeanor of the writing truly emphasized this aforementioned societal trend. In particular, the part where Snyder "admitted that it was a fabrication" of statistical values (Levitt 80). *Freakonomics* makes a valid point that "experts like Snyder can be self-interested to the point of deceit" and that "every day there are newspaper pages and television newscasts to be filled" (Levitt 81). This brings attention to the way information is relayed to the public along with driving motivations in garnering the data to back claims. Delivering a 'jarring piece of wisdom' can be impactful, however, if incorrectly produced this same wisdom can pose a harmful impact. As suggested, Snyder's figures created an initial draw of public attention to homelessness. But, the consequence of fabricating his data negates his entire argument, which subsequently effects the public's investment toward these homeless individuals' circumstances. This deems even more impactful the next time awareness is discussed, as people may be more hesitant to trust statistics surrounding the topic. While *Freakonomics* does a good job of

recognizing this potential degree of impact, it's ironic that Levitt and Dubner decided to discuss homelessness in the chapter: 'Drug Dealers Living with Their Moms'. While various reasons lead to homelessness, a common assumption remains that drugs are the key contribution. This is not always the case and makes the discussion more complex when attempting to simply compartmentalize individuals based upon predetermined categorical causes of their homelessness. In fact, studies conducted by the U.S. Department of Housing and Urban Development showed that loss of job and cost of rent are often higher contributors than drug usage (as communicated through the departments annual reports to Congress from 2006 to 2016).

Causal factors aside, the homeless population within the United States remains steadily growing along with a firm basis in California. Within the U.S. Department of Housing's (HUD) annual report, they list the top counties that have the highest ratio of homeless individuals to populous. As a local of Santa Cruz, it's no surprise that the top counties are all along the California coast line. Many Santa Cruzians attribute our 'transient' population to the mild coastal climate. However, this study hopes to illuminate this discussion further and in fact demonstrate the statistical significance contrasting California to other states. Additionally, when delving deeper into the county and jurisdiction level, patterns arise that may (when shared) morph the way locals see the 'transient' population.

State Level Comparison (Tier 1)

The first Annual Homeless Assessment Report (AHAR) to Congress took place in 2007 (consisting of data from both 2006 and 2007) and has acquired the reputation of being the most reliable source of figures regarding homelessness. It's important to identify that their methods have evolved over the past decade of practice, so the numbers used in this study may have various degrees of accuracy. Across the past decade of reports, four states consistently contribute the most to the overarching homeless population in the Unites States: California, New York, Florida, and Texas. The following figure provides a visual to help demonstrate the variance in magnitude of state contributions to the country's homeless population.

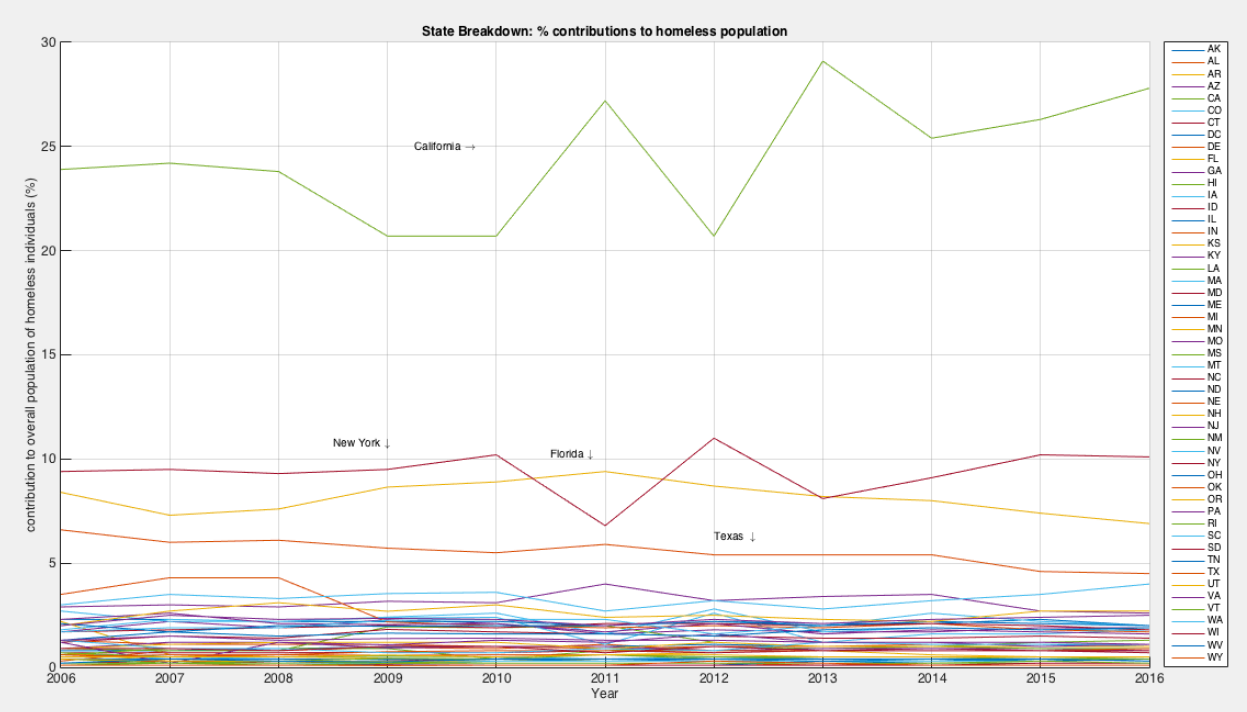

Figure 1

As displayed above, California is the lone line above the other states with a mean of approximately 24.5% contribution to the overall homeless population in the United States. The proceeding states (by degrees of magnitude) are New York (9.3%), Florida (8.1%), and Texas (5.5%). California contributes a little over 2.6 times the closest state does. Additionally, the box plot in Figure 2 below demonstrates this contrast further and illustrates the distribution of each state's data from the past decade.

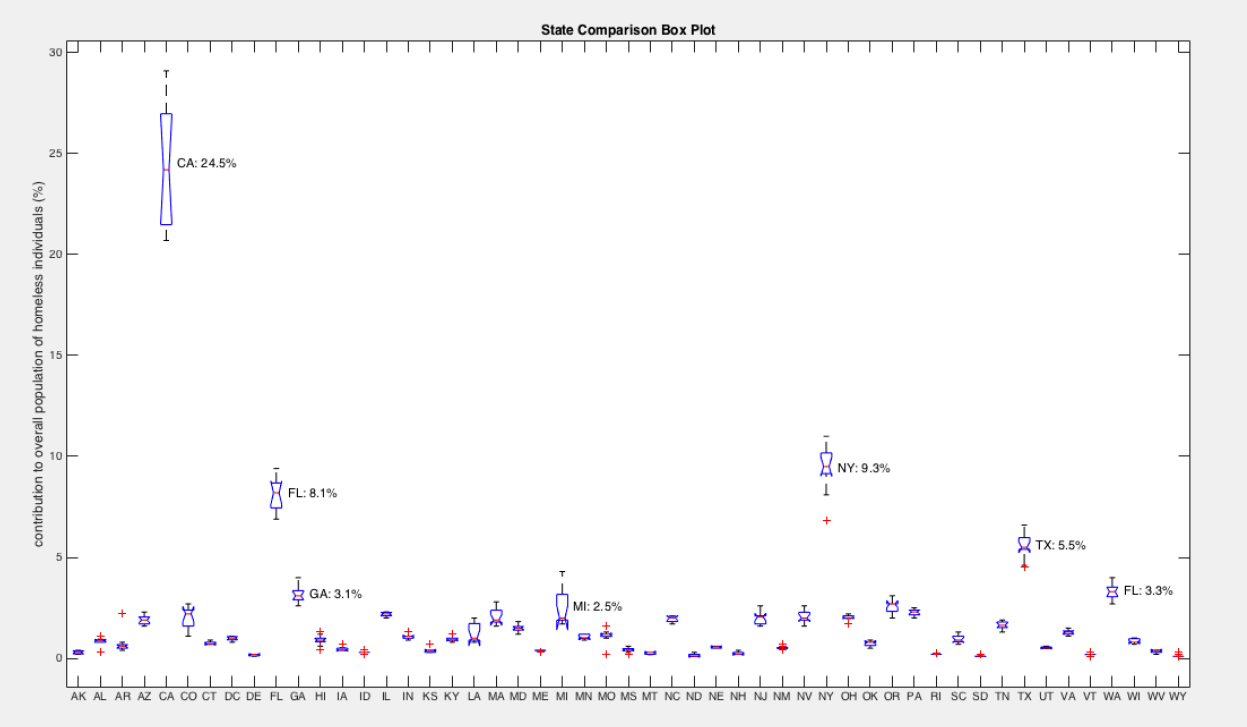

Figure 2

To further validate the difference in magnitude between state percentages, the top four contributing states' data was run through a MATLAB probability distribution test that would return the mean, standard deviation and the 95% confidence intervals for both. The probability distribution (pd) results for California, Florida, New York, and Texas are as follows:

```
CA_pd =

  NormalDistribution

  Normal distribution
       mu = 24.5273   [22.5384, 26.5161]
    sigma = 2.96044   [2.06851, 5.19537]
```

```
NY_pd =

  NormalDistribution

  Normal distribution
       mu = 9.38182   [8.6189, 10.1447]
    sigma = 1.13562   [0.793478, 1.99294]
```

```
FL_pd =

  NormalDistribution

  Normal distribution
       mu =  8.13182   [7.6153, 8.64834]
    sigma = 0.768854   [0.537211, 1.34929]
```

```
TX_pd =

  NormalDistribution

  Normal distribution
       mu =  5.55636   [5.14041, 5.97231]
    sigma = 0.619149   [0.43261, 1.08657]
```

As confirmed, the mean (mu) for California is significantly larger than the other three states. Furthermore, comparing mean confidence intervals, California's lower bound of 22.5384%

remains over double the upper bound of the other three states – even though California has a larger standard deviation compared to the others, the mean is so large that the sigma value remains negligible in comparison. Lastly in MATLAB, an ANOVA table and 'multcompare' plot were created to help connote the significance between California's data by producing a tangible representation:

ANOVA Table

Source	SS	df	MS	F	Prob>F
Columns	7515.76	50	150.315	539.11	0
Error	142.2	510	0.279		
Total	7657.96	560			

Figure 3

In the above figure, 'df' indicates the degrees of freedom, 'MS' the mean squared error, and 'Prob>F' represents 'p'. The 'p' value above justifies the statement that California is significantly different because it indicates that difference between groups' means are significant. In this case, the 'p' is so small that MATLAB changes it to a zero, meaning that there indeed exists significant differences amongst the groups. Furthermore, an interactive graph (Figure 4) was produced and it automatically returns the number of states that have a statistical difference to the selected state.

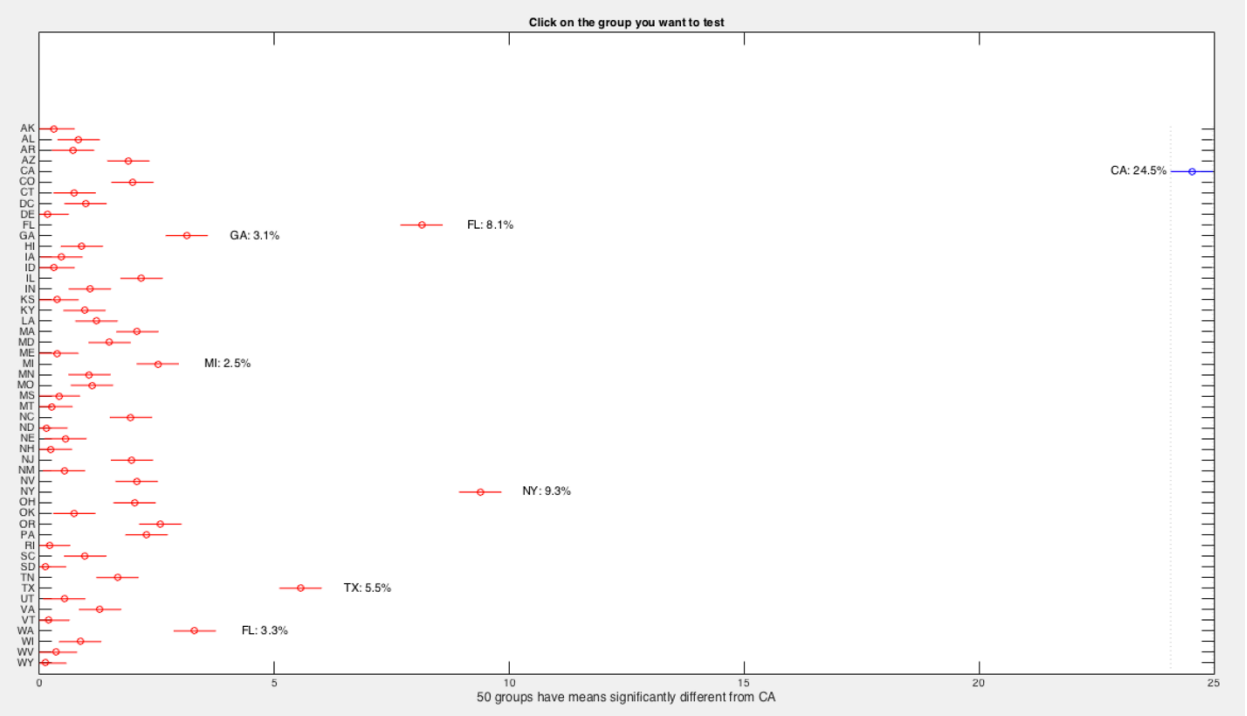

Figure 4

In Figure 3, the selection of California returns that '50 other groups have means significantly different' (including District of Columbia), again confirming the claim that California stands out in magnitude. While collectively California contributes the most to the overarching homeless population, specific regions (as highlighted in the AHAR) compose of a higher homeless density percentage.

County Level Comparison (Tier 2)

Zooming into Northern California, Santa Cruz County and San Francisco County both fall near the top of the AHAR list for having some of the largest homeless populations. To help interpret these numbers, two additional nearby counties were added to this second tier of analysis. Below is another visual to illustrate the magnitude of the counties' percent composition of homeless individuals (not including homeless families).

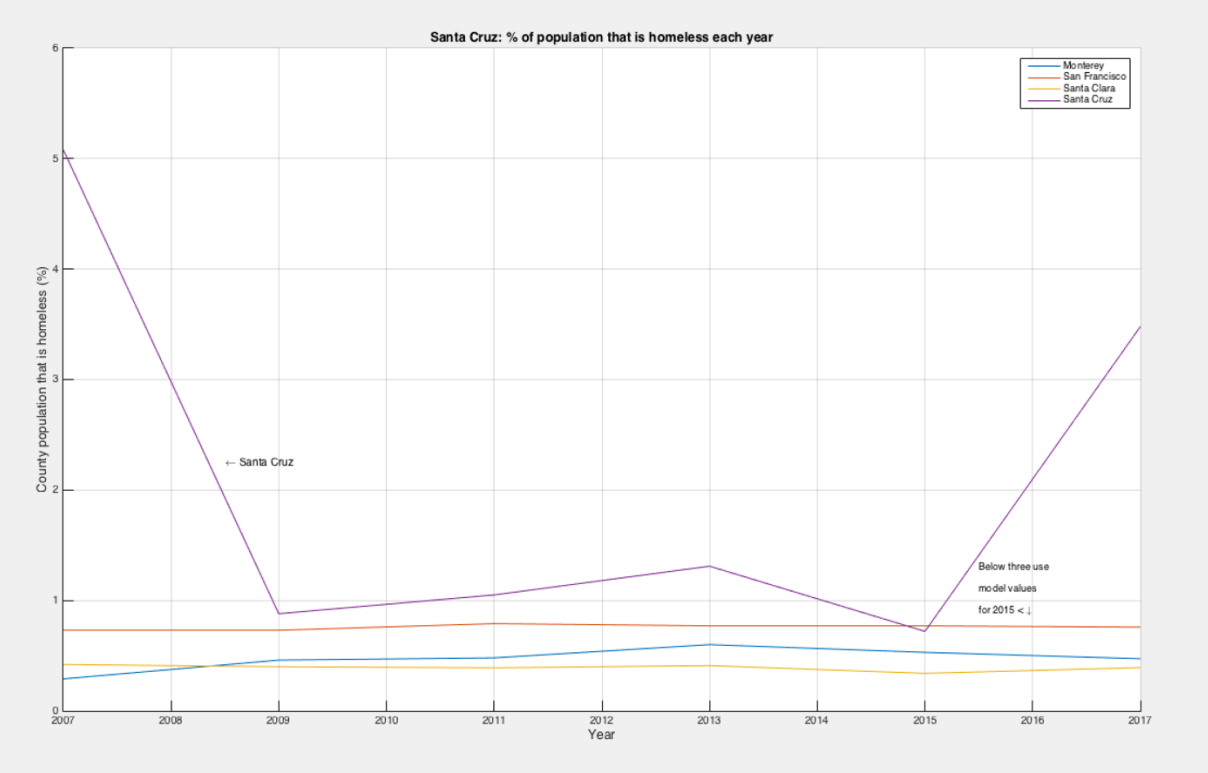

Figure 5

It's important to note that while Santa Cruz has already collected and submitted homeless figures for 2017, the other three counties are still in the collection process. Therefore, the values for Monterey, San Francisco, and Santa Clara are extrapolated based on their mean percentages and standard deviations from the previous decade. The reasoning for including all of the 2017 data is that Santa Cruz's numbers drastically rebound and fluctuate upward causing a large standard deviation – while also verifying that the 2007 data wasn't a rare instance. However, the other three counties remain very steady with much lower deviations. This fluctuation and large standard deviation becomes more apparent in the Figure 6 box plot along with the probability distribution analysis produced in MATLAB.

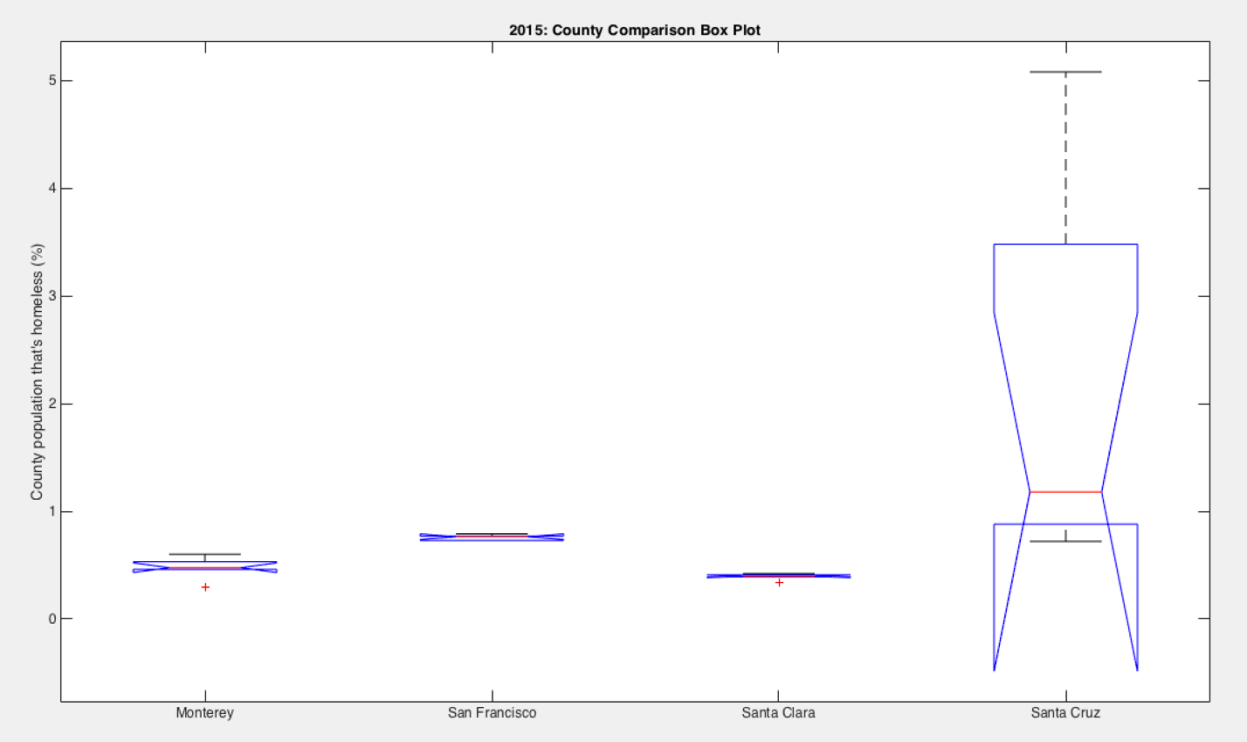

Figure 6

```
SCruz_pd =

  NormalDistribution

  Normal distribution
       mu = 2.08667   [0.21507, 3.95826]
    sigma = 1.78343   [1.11323, 4.37407]
```

```
SClara_pd =

  NormalDistribution

  Normal distribution
       mu =     0.392   [0.362766, 0.421234]
    sigma = 0.0278568   [0.0173884, 0.0683219]
```

```
Monterey_pd =

  NormalDistribution

  Normal distribution
       mu =     0.472   [0.363872, 0.580128]
    sigma = 0.103034   [0.0643146, 0.252703]
```

```
SF_pd =

  NormalDistribution

  Normal distribution
       mu = 0.758   [0.732814, 0.783186]
    sigma = 0.024   [0.014981, 0.0588627]
```

The above box plot and calculations demonstrates that while the means of the counties remain moderately close to each other, Santa Cruz's still rises above the other counties. To elaborate, when comparing the mean confidence intervals, Santa Cruz's upper boundary is at lease five times that of San Francisco (the second largest upper bound). However, while Santa Clara, San Francisco, and Monterey have very tight standard deviation confidence intervals, Santa Cruz's remains very large due to the fluctuation over the years. Nonetheless the proceeding ANOVA

analysis table and ‘multcompare’ plot aid the validation that while Santa Cruz possesses a larger span of deviation there exists a statistical significance between its mean and the other counties.

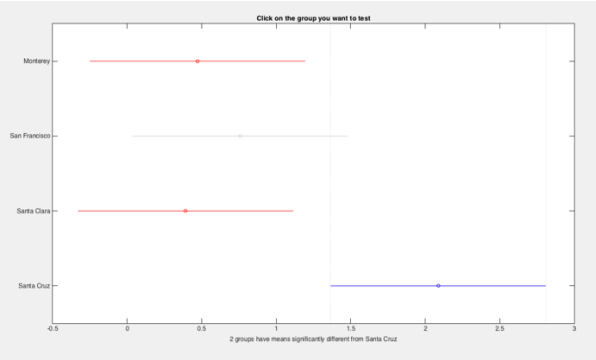

Figure 7

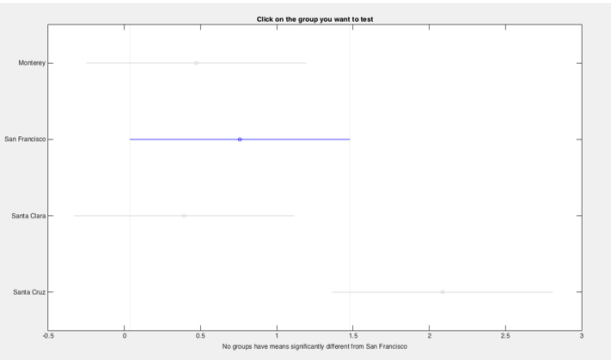

Figure 8

ANOVA Table

Source	SS	df	MS	F	Prob>F
Columns	11.1998	3	3.73328	4.68	0.0124
Error	15.963	20	0.79815		
Total	27.1628	23			

Figure 9

While the ‘p’ value (0.0124) of the cross-county comparison may not be as close to the returned zero of the state level ANOVA test, it does clarify that the counties’ differences in means are statistically significant. Additionally, the ‘multcompare’ plots return that: Santa Cruz (Figure 7) has a significantly different mean to Monterey and Santa Clara; San Francisco (Figure 8) doesn’t have significant difference between its mean and the other counties’. These results would surprise many Bay Area locals as they falsely believe that San Francisco County possesses a larger density of homeless people than the surrounding counties. However, Santa Cruz County itself has a larger ratio of homeless individuals to the county’s population.

Jurisdiction Level Comparison (Tier 3)

While Santa Cruz as a collective county retains a higher composition percentage of homeless individuals in comparison to San Francisco, the figures sorted by jurisdiction within these counties leads to some additional conclusions. The figures below illustrate the change of

percentages within these jurisdictions from 2009 to the present. The upper and lower left plots of Figure 10 depict Santa Cruz County and Santa Clara County's jurisdictions while the right most plot illustrates San Francisco's eleven districts (the breakdown of these districts by block can be found in Appendix A). In the Santa Cruz County plot, some data points are not included because after 2013 the reports neglected to include smaller sub-jurisdictions in the report's breakdown.

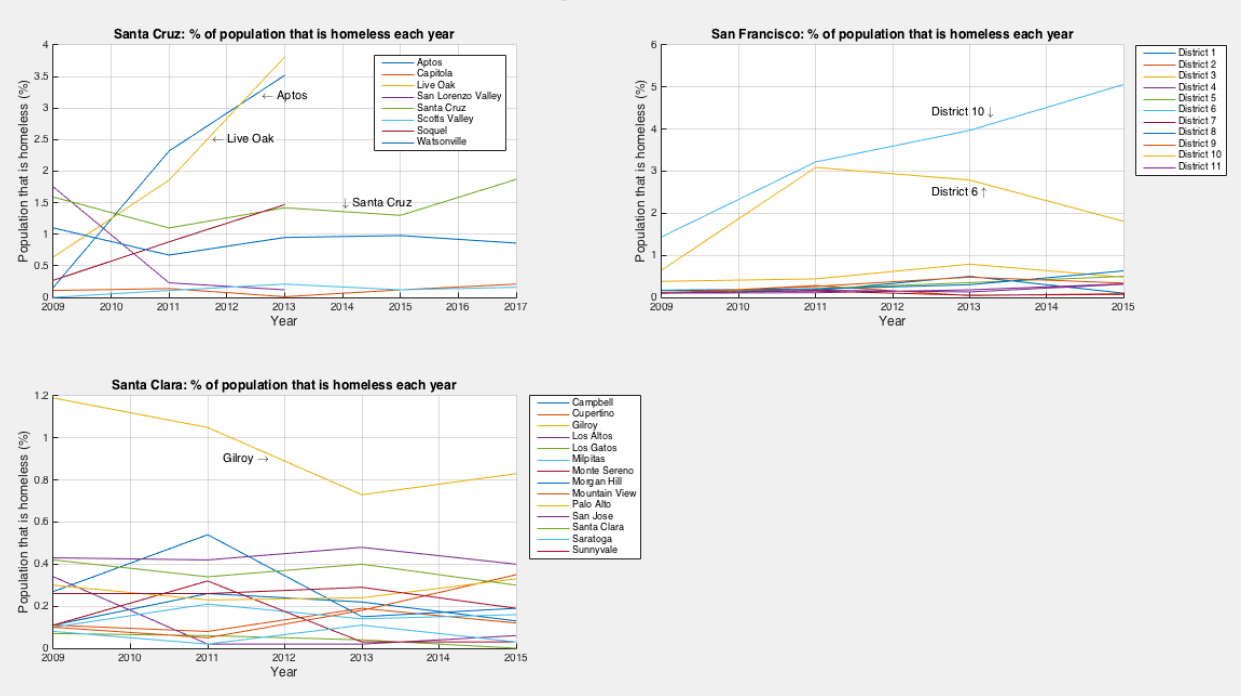

Figure 10

Within Santa Cruz County ('p' value = 0.1073) three jurisdictions stand out from the rest: Aptos, Live Oak and Santa Cruz. San Francisco ('p' value = 6.0798e-09) easily indicates Districts 6 and District 10 rising above the others. And Santa Clara ('p' value = 1.3119e-13) distinguishes Gilroy as the highest amongst their jurisdictions. (Additional MATLAB plots showing significant differences amongst jurisdictions can be found within the MATLAB coding in Appendix B).

```
SCruz_pd =

  NormalDistribution

  Normal distribution
       mu =     1.37   [0.751954, 1.98805]
    sigma = 0.248797   [0.129538, 1.56362]

Aptos_pd =

  NormalDistribution

  Normal distribution
       mu =      2   [-2.22975, 6.22975]
    sigma = 1.7027   [0.886527, 10.701]

LiveOak_pd =

  NormalDistribution

  Normal distribution
       mu = 2.10333   [-1.86867, 6.07534]
    sigma = 1.59895   [0.832505, 10.049]
```

```
D6_pd =

  NormalDistribution

  Normal distribution
       mu =  3.4225   [1.00013, 5.84487]
    sigma = 1.52233   [0.862385, 5.67608]

D10_pd =

  NormalDistribution

  Normal distribution
       mu =  2.085   [0.331788, 3.83821]
    sigma = 1.1018   [0.624159, 4.10812]
```

Although Santa Clara County distinguished a significant difference amongst the means (emphasizing Gilroy above the other jurisdictions), the magnitude in this county is much smaller than that of Santa Cruz and San Francisco and will be put to the side for now. Honing in on Santa Cruz and San Francisco, the means across the five recognized jurisdictions are relatively close in magnitude, but District 6 of San Francisco clearly has the greatest with 3.42% of the district's population being homeless. When looking at the confidence intervals, Aptos and Live Oak's upper bound for the mean closely relates to District 6's. One thing that stands out in the calculations is that Santa Cruz has by far the lowest standard deviation (sigma = 0.249), deeming itself the most consistent of the jurisdictions. Figure 11 below elaborates on this observation.

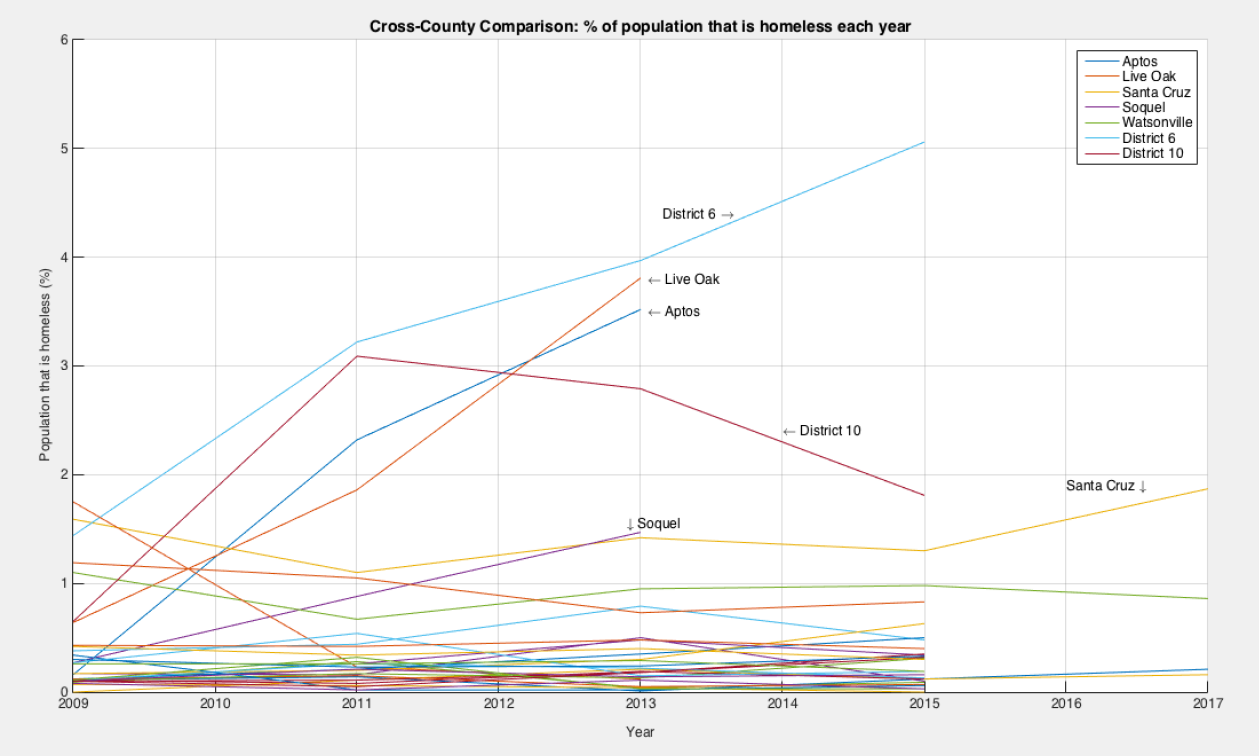

Figure 11

When the counties' jurisdictions are overlaid into the same plot, seven stand out the most amongst them: Aptos, Live Oak, Santa Cruz, Soquel, and Watsonville (of Santa Cruz County) and Districts 6 and District 10 (of San Francisco County). As depicted in the plot, Aptos, Live Oak, District 6 and District 10 all fluctuate and either increase or decrease drastically while Santa Cruz oscillates but still steadily grows. While all of these jurisdictions follow normal distribution (as confirmed in the MATLAB code above and attached more in depth in Appendix B), it's important to recognize that Santa Cruz has both the smallest standard deviation amongst its data points along with the tightest span for the standard deviation confidence interval (for 95% confidence). This helps validate the concern of a consistent homelessness influx in Santa Cruz, Santa Cruz County.

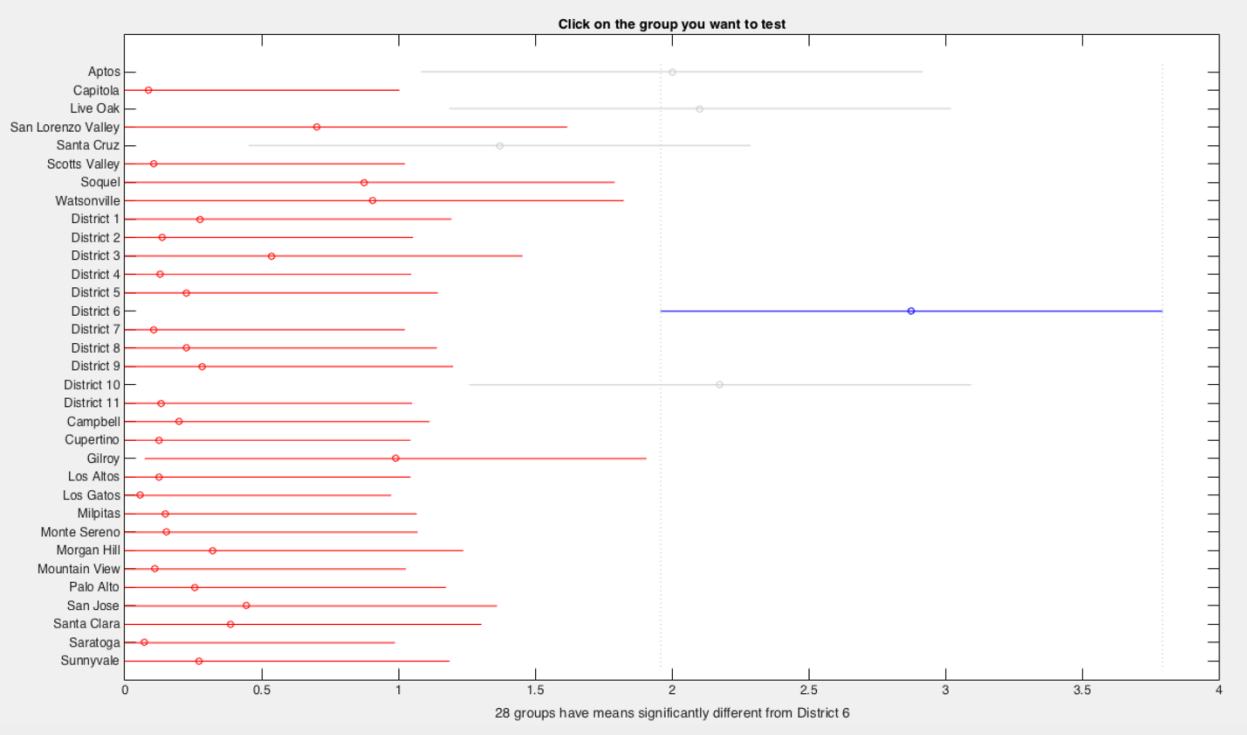

Figure 12

Upon running 'multcompare' in MATLAB of all the jurisdictions in the three counties (Santa Cruz, San Francisco, and Santa Clara), the returned 'p' value deemed difference amongst means to be exceedingly evident ('p' value = 2.123e-08). This is illustrated in Figure 12 above where District 6 is currently selected in blue (as it possesses the largest percentage of homeless individuals on average). As the returned statement indicates, "28 groups have means significantly different from District 6," indicating that four jurisdictions do not have significant difference between their means and District 6's. Therefore, Aptos, Live Oak, Santa Cruz, District 6 and District 10 all have means that have some relatability to one another. Overall, it can be concluded that these jurisdictions have a growing percentage of their populous that is homeless and needs to be addressed.

Call to Action

Clearly then, the significance of the influx in the homeless population validates reasons of concern. On the general first tier of analysis, California contributes a whopping 24.5% to the total homeless population in the United States. When broken down to a regional basis, Santa Cruz and San Francisco are not only recognized within the AHAR to Congress regularly as some

of the top contributing counties, but, their figures in relation to the surrounding areas remain staggering as well. Lastly, the jurisdiction level of analysis poses a focal point of density within these counties which helps garner such high results.

While significance appears clear amongst data and in textual form, there appears to be a lack of investment from locals themselves. Of course, certain legislature has been brought up in the past regarding homeless individuals and where they seek refuge daily. However, one such proposed discussion that has been presented involved building shelters thirty minutes outside of Santa Cruz and bussing homeless individuals out to said shelters. What's so surprising remains the lack of empathy and removal of humanity when considering such solutions. A certain emphasis may be provided to validate concerns but there's opportunity to help shape the narrative that comes up while discussing 'solutions'. For example, when reviewing data at the county level, AHAR and a side study that the HUD contracted out to Applied Survey Research (ASR) shed some light which may inspire local perspectives to change. ASR has begun conducting additional surveys in tandem with their usual data collection regarding homeless populations. While still an early iteration of studies (some originating in 2015), the results are breathtaking to a Bay Area local such as myself. As some counties were more recently incorporated into the ASR's studies, the below bar graph is a glimpse of the results from 2015.

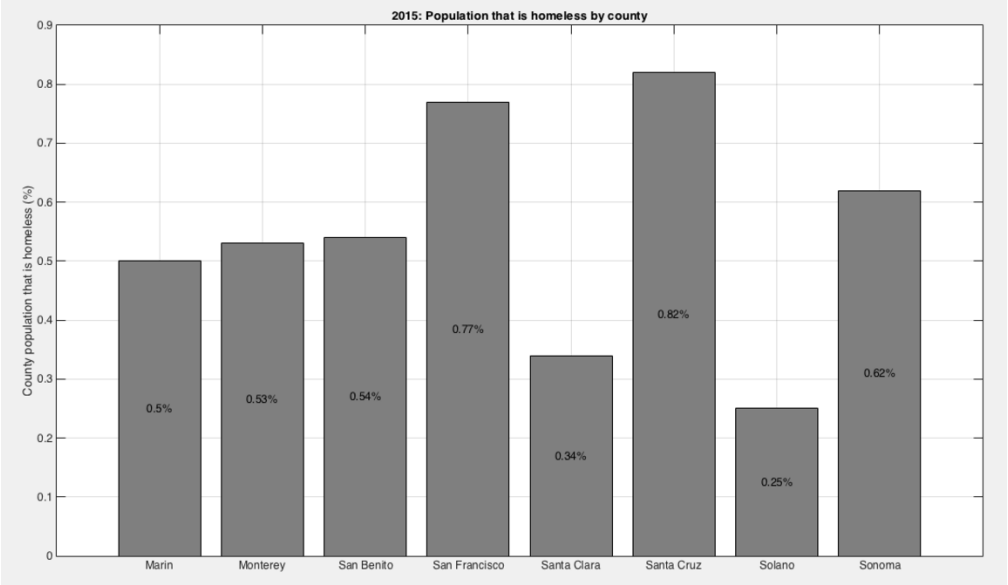

Figure 13

To preface, Figure 13 consists of the eight counties immediately surrounding the collective Bay Area. The values labelled in the graph illustrate the percentage of the county's population that is homeless – some of these counties were not included in the prior analysis, as ASR recently added them in 2015. As deemed in the earlier discussion, there indeed exists a reason for concern in the rise in numbers regarding homeless populations. That being said, ASR now incorporates some additional questions within their more recent studies. When pooling various reports together and compiling data points regarding these new questions, the following table and graph take form.

2015	Marin	Monterey	San Benito	San Jose	San Francisco	Santa Clara	Santa Cruz	Solano	Sonoma
Resident in county when became homeless	71%	78%	86%	84%	71%	84%	84%	88%	86%

Table 1

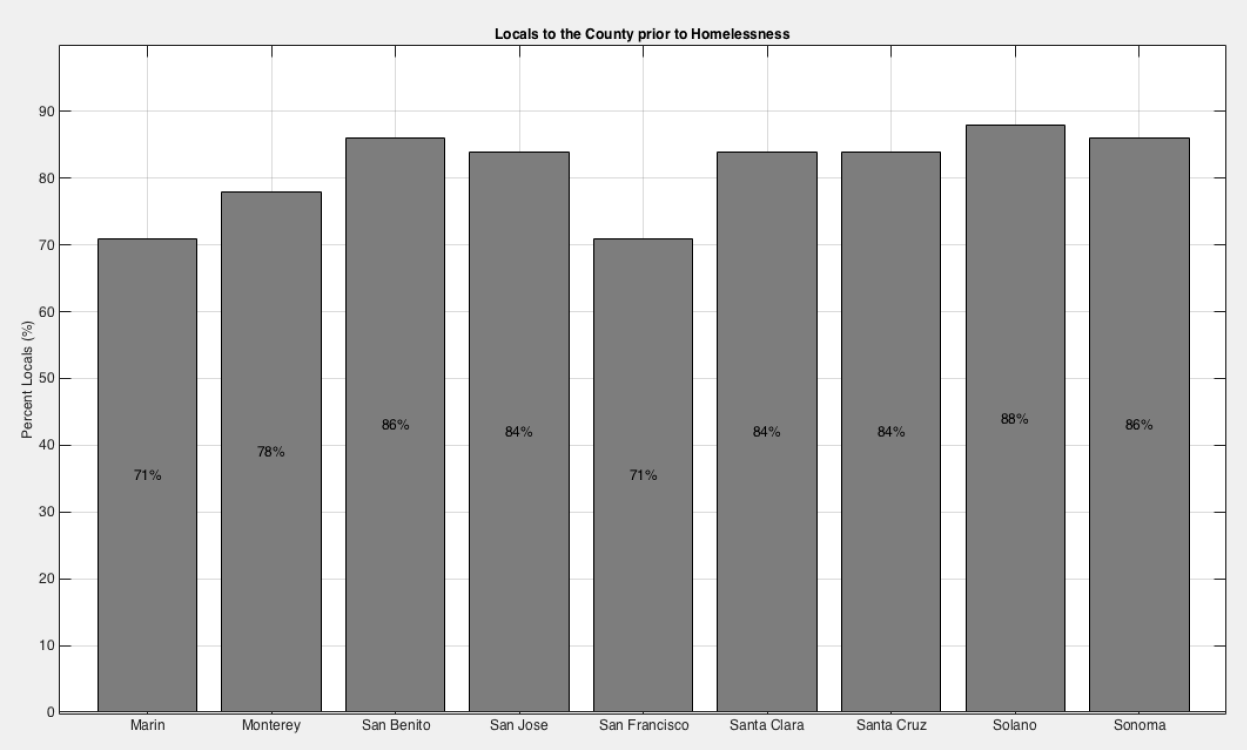

Figure 14

The data above illuminates the fallacy of the current narrative in the Bay Area. What many locals fail to realize, including myself, is that our homeless population consists primarily of individuals who were originally residents. Although this may seem intuitive, the description of the homeless population typically goes back to the term 'transient'. This now deems to be a misconception, as the above table and figure illustrate that these homeless individuals were not 'transients' at all, but, residents to their respective counties. In fact, based on normal distribution (Appendix B) the mean across these eight counties remains approximately 81.33% with a standard deviation of 6.46. This indicates that ~81.33% of the homeless individuals in the Bay Area were previous residents (with a 95% confidence interval range of 76.36% to 86.3%). Additionally, ASR provides an even greater breakdown of this information as they collected data regarding an individual's duration of residency prior to becoming homeless. The following table and graph help illustrate this further by highlighting ten years of residency or more (green) and less than a year (purple).

<table>
<tr><th>2015</th><th>Marin</th><th>Monterey</th><th>San Benito</th><th>San Jose</th><th>San Francisco</th><th>Santa Clara</th><th>Santa Cruz</th><th>Solano</th><th>Sonoma</th></tr>
<tr><td>Lived in county for 10+ yrs</td><td>39%</td><td>57%</td><td>62%</td><td>77%</td><td>49%</td><td rowspan="3">50%</td><td>60%</td><td>47%</td><td>58%</td></tr>
<tr><td>Lived in county for 5-9 yrs</td><td>19%</td><td>14%</td><td>15%</td><td rowspan="3">23%</td><td rowspan="2">40%</td><td>14%</td><td>22%</td><td>13%</td></tr>
<tr><td>Lived in county for 1-4 yrs</td><td>30%</td><td>21%</td><td>11%</td><td>21%</td><td>19%</td><td>17%</td></tr>
<tr><td>Lived in county for < 1 yrs</td><td>12%</td><td>7%</td><td>13%</td><td>11%</td><td>50%</td><td>5%</td><td>12%</td><td>12%</td></tr>
</table>

Table 2

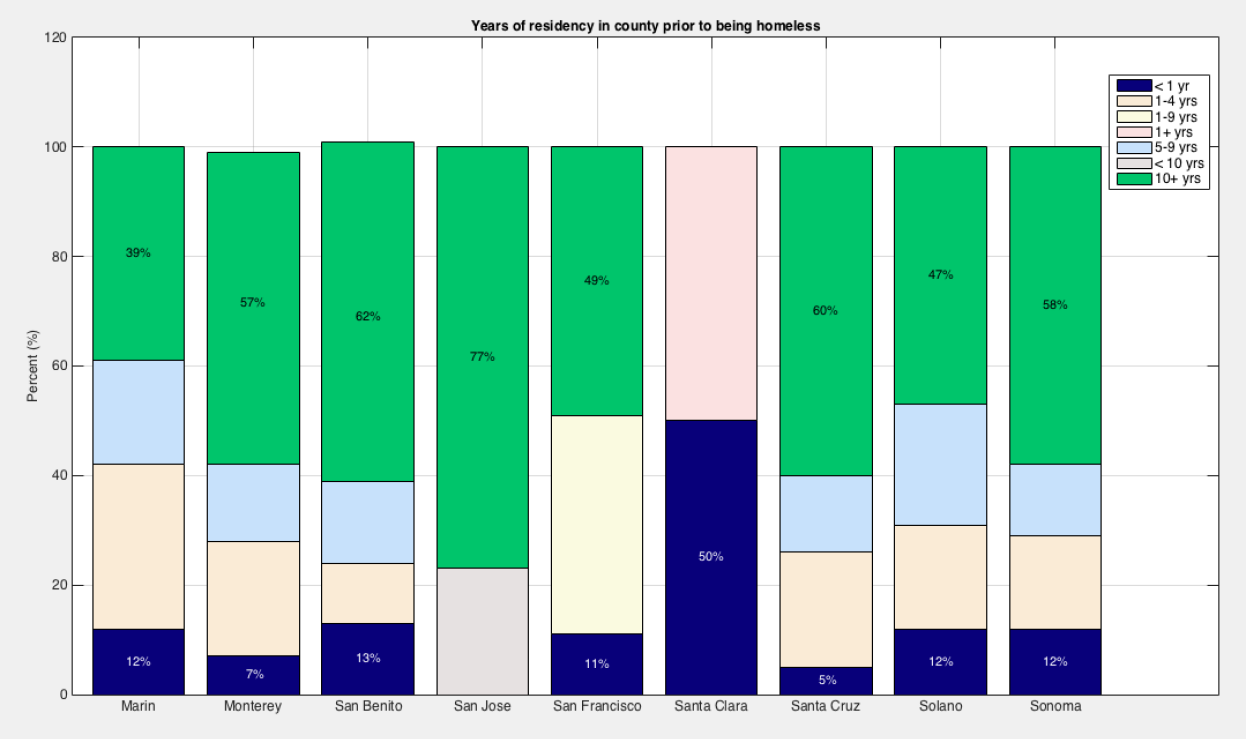

Figure 15

The focal point of the graph is primarily these two previously described regions (ten or more years and less than a year). The significance of these two categories comes back to the societal narrative. Currently 'transient' is superfluously used to describe the entire homeless populous. However, based on the above figure, only the purple data points fall into this category (less than a year of residency). In majority of these counties only around 12% of the entire homeless population can be considered 'transient'. Meanwhile, the individuals who've lived in these counties for ten or more years (green) should without question be considered locals. Currently this is a misconception and untold story. When running these figures in MATLAB the return is as follows:

```
PD_TenAndUp =

  NormalDistribution

  Normal distribution
       mu =  56.125    [46.557, 65.693]
    sigma = 11.4447    [7.56697, 23.2932]
```

At least 56.125% of the homeless individuals across these counties have been locals for ten or more years. Looking at the upper bound of the mean confidence interval (95% confidence), this could even range up to 65.69% of the homeless population. This is staggering, especially for a community as driven to preserve local roots as Santa Cruz.

Conclusion and Next Steps

Opportunity to reshape the current societal narrative remains present. Currently, approximately 56.125% of the homeless population in the Bay Area have been residents for ten or more years prior to becoming homeless. In Santa Cruz County, this number rises even further to 60% of the homeless individuals in our community. Clearly, there exists statistical significance that makes California and these additional counties and jurisdictions stand out amongst the collective United States. The real question presents itself in the context of next steps. Significance clearly exists and it's now time to bring attention to this issue and help re-create the narrative. However, additional analysis regarding cause and effect would be helpful – as to not repeat Snyder's sheepish mistake of fabricating figures. One important factor to delve into would be the fact that majority of the homeless population have lived in these regions for more than a few years. A common misnomer remains that the coastal environment attracts homeless individuals seeking more moderate climates. While this may be valid in some cases, this now appears to not be as large of a reason as the community suggests it to be. So what exactly is causing this influx of locals becoming homeless in our community? Currently, this is the million-dollar question that we should be asking and subsequently seeking to answer. It's time for the perspective of our community to shift and identify these homeless people for who they are, members of our beloved community.

Resources

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Appendices

Appendix A: Jurisdictions in each County

Marin	Monterey	San Benito	San Jose	San Francisco	Santa Clara	Santa Cruz	Solano	Sonoma
Belvedere	Monterey	Aromas	San Jose	District 1	Campbell	Capitola	Benicia	Cloverdale
Corte Madera	Salinas	San Juan Batista		District 2	Cupertino	Santa Cruz	Dixon	Healdsburg
Fairfax	Marina	Hollister		District 3	Gilroy	Scotts Valley	Fairfield	Town of Windsor
Larkspur	Seaside	Tres Pinos		District 4	Los Altos	Watsonville	Rio Vista	Cotati
Mill Valley	Sand City	San Benito		District 5	Los Gatos	Aptos	Suisun City	Petaluma
Novato	Gonzales	Panoche		District 6	Milpitas	Live Oak	Vacaville	Rohnert Park
San Anselmo	Pacific Grove	Bitterwater		District 7	Monte Sereno	North Coast	Vallejo	Sebastopol
San Rafael	King City	Paicines		District 8	Morgan Hill	San Lorenzo Valley		Sonoma
Sausalito	Greenfield			District 9	Mountain View	Soquel		Santa Rosa
Alto	Del Rey Oaks			District 10	Palo Alto	South County		
Kentfield	Carmel			District 11	San Jose			
Lagunitas	Soledad			Golden Gate Park	Santa Clara			
Marin	Pajaro				Saratoga			
Point Reyes	Prunedale				Sunnyvale			
Stawberry					San Martin			
Tamalpais								
Woodacre								
Richardson Bay								

Table 3: List of jurisdictions in each county

Appendix B: MATLAB Code

B.1: General Tier – State Level Comparison

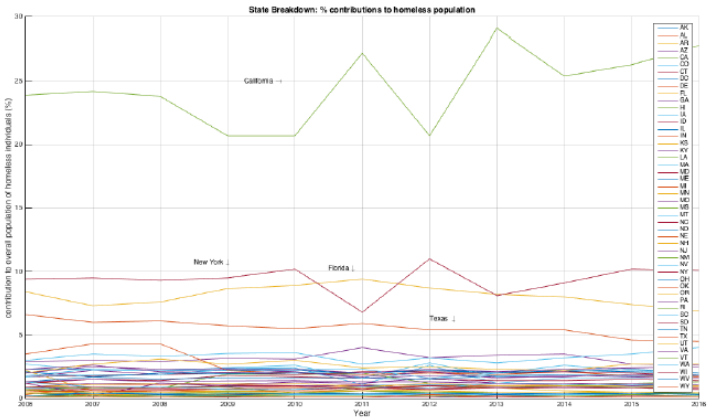
```
%ENGS 93 - Kendall Ronzano
%General Tier - State Level Comparison

clear;
close all;

%Years
Years = [2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016];

%State Names
States =
 {'AK','AL','AR','AZ','CA','CO','CT','DC','DE','FL','GA','HI','IA','ID','IL','IN',

%States Vectors 2006 - 2016

%(state contribution to the overall populus of homeless individuals)
% AK (Alaska)
AK = [0.2 0.2 0.2 0.31 0.3 0.3 0.3 0.4 0.3 0.4 0.4];
% AL (Alabama)
AL = [0.3 0.8 0.8 0.95 0.9 1.1 0.8 0.899999999999999 0.9 0.8
 0.8999999999999999];
% AR (Arkansas)
AR = [2.1999999999999997 0.6 0.5 0.44 0.4 0.6 0.7 0.8 0.6 0.5 0.5];
%AZ (Arizona)
AZ = [1.7000000000000002 2.1999999999999997 1.9 2.29 2.1 1.6 1.8
 1.7000000000000002 1.7 1.9 1.9];
%CA (California)
CA = [23.9 24.2 23.799999999999997 20.7 20.7 27.2 20.7
 29.099999999999998 25.4 26.3 27.800000000000004];
%CO (Colorado)
CO = [2.7 2.1999999999999997 2.1999999999999997 2.37 2.4 1.1 2.6 1.2
 1.6 1.6 1.7999999999999998];
%CT (Connecticut)
CT = [0.7000000000000001 0.7000000000000001 0.7000000000000001 0.72
 0.7 0.8 0.7 0.8 0.9 0.8 0.7000000000000001];
%DC (District of Columbia)
DC = [0.8 0.8 0.8999999999999999 0.97 1 1 1.1 1 1.1 1.0999999999999999
 1];
%DE (Delaware)
DE = [0.1 0.2 0.1 0.18 0.2 0.2 0.2 0.1 0.2 0.2 0.2];
%FL (Florida)
FL = [8.4 7.3 7.6 8.65 8.9 9.4 8.7 8.200000000000001 8
 7.3999999999999995 6.9];
%GA (Georgia)
GA = [2.9000000000000004 3 2.9000000000000004 3.17 3.1 4 3.2
 3.4000000000000004 3.5 2.7 2.6];
%HI (Hawaii)
HI = [0.6 0.8999999999999999 0.8999999999999999 0.9 0.4 0.8 1
 0.8999999999999999 1 1.2 1.3];
%IA (Iowa)
IA = [0.7000000000000001 0.4 0.5 0.53 0.5 0.4 0.5 0.4 0.4 0.4 0.4];
%ID (Idaho)
ID = [0.2 0.3 0.2 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.4];
```

```
%IL (Illinois)
IL = [2.3 2.3 2.1999999999999997 2.19 2.2 2 2.2 2.1 2.1 2.3 2];
%IN (Indiana)
IN = [1.3 1.0999999999999999 1.0999999999999999 1.09 1 0.9 1 1 1.1
 1.0999999999999999 1.0999999999999999];
%KS (Kansas)
KS = [0.7000000000000001 0.3 0.3 0.29 0.3 0.4 0.4 0.4 0.4 0.4 0.3];
%KY (Kentucky)
KY = [0.8999999999999999 1.2 1.2 0.93 1 1 0.8 0.8999999999999999 0.9
 0.8999999999999999 0.8];
%LA (Louisiana)
LA = [0.8999999999999999 0.8 0.8 1.94 1.9 2 1.2 1 1 0.8999999999999999
 0.8999999999999999];
%MA (Massachusetts)
MA = [1.7999999999999998 2.3 2.1999999999999997 2.41 2.6 1.6 2.8
 1.7000000000000002 1.9 1.7999999999999998 1.7999999999999998];
%MD (Maryland)
MD = [1.2 1.5 1.4000000000000001 1.82 1.7 1.6 1.5 1.4000000000000001
 1.4 1.5 1.4000000000000001];
%ME (Maine)
ME = [0.4 0.4 0.4 0.38 0.4 0.3 0.4 0.4 0.4 0.3 0.4];
%MI (Michigan)
MI = [3.5000000000000004 4.3 4.3 2.18 2 1.9 2 1.9 2.1
 1.7999999999999998 1.7000000000000002];
%MN (Minnesota)
MN = [0.8999999999999999 1.0999999999999999 1.2 1.2 1.2 0.9 1.2 1 1 1
 1];
%MO (Missouri)
MO = [1.2 0.2 1.2 1.08 1.3 1.2 1.6 1.2 1.2 1 1.0999999999999999];
%MS (Mississippi)
MS = [0.4 0.2 0.3 0.43 0.4 0.6 0.4 0.5 0.5 0.4 0.4];
%MT (Montana)
MT = [0.2 0.2 0.2 0.19 0.3 0.3 0.3 0.3 0.3 0.3 0.2];
%NC (North Carolina)
NC = [1.7000000000000002 1.7999999999999998 1.9 2.01 1.9 2.1 2.1 2 2.1
 2 1.7999999999999998];
%ND (North Dakota)
ND = [0.1 0.1 0.1 0.12 0.1 0.1 0.1 0.3 0.2 0.2 0.2];
%NE (Nebraska)
NE = [0.6 0.5 0.6 0.58 0.6 0.6 0.6 0.5 0.5 0.5 0.5];
%NH (New Hampshire)
NH = [0.4 0.3 0.3 0.26 0.2 0.2 0.2 0.2 0.2 0.2 0.2];
%NJ (New Jersey)
NJ = [2.3 2.6 2.1 2.05 2.1 1.7 2.1 1.6 1.8 1.7000000000000002 1.6];
%NM (New Mexico)
NM = [0.7000000000000001 0.5 0.5 0.54 0.5 0.6 0.5 0.5 0.5 0.5 0.4];
%NV (Nevada)
NV = [1.7000000000000002 1.9 1.9 2.25 2.3 2.3 1.6 2 2.6
 2.1999999999999997 2];
%NY (New York)
NY = [9.4 9.5 9.3 9.5 10.2 6.8 11 8.1 9.1 10.2 10.100000000000001];
%OH (Ohio)
OH = [2.1 1.7000000000000002 2 1.97 2 2 2.2 2 2.2 2.1 2];
%OK (Oklahoma)
```

```
OK = [0.5 0.6 0.6 0.75 0.8 0.8 0.8 0.8 0.8 0.8 0.8999999999999999];
%OR (Oregon)
OR = [2 2.7 3.1 2.69 3 2.4 2.5 2.3 2.2 2.7 2.7];
%PA (Pennsylvania)
PA = [2 2.5 2.3 2.35 2.3 2 2.3 2.1 2.3 2.4 2.5];
%RI (Rhode Island)
RI = [0.2 0.2 0.2 0.25 0.2 0.2 0.2 0.2 0.2 0.2 0.2];
%SC (South Carolina)
SC = [1.3 0.8999999999999999 0.8999999999999999 0.7 0.7 0.9 0.8 1.2
 1.1 1.0999999999999999 1.0999999999999999];
%SD (South Dakota)
SD = [0.1 0.1 0.1 0.11 0.1 0.1 0.1 0.1 0.1 0.2 0.2];
%TN (Tennessee)
TN = [1.3 1.7000000000000002 1.5 1.64 1.6 1.6 1.5 1.7999999999999998
 1.9 1.7999999999999998 1.9];
%TX (Texas)
TX = [6.6000000000000005 6 6.1 5.72 5.5 5.9 5.4 5.4 5.4 4.6 4.5];
%UT (Utah)
UT = [0.5 0.5 0.5 0.59 0.5 0.6 0.6 0.5 0.5 0.5 0.5];
%VA (Virginia)
VA = [1.3 1.5 1.3 1.38 1.4 1.3 1.3 1.2 1.2 1.2 1.0999999999999999];
%VT (Vermont)
VT = [0.1 0.2 0.1 0.19 0.2 0.2 0.2 0.2 0.2 0.3 0.2];
%WA (Washington)
WA = [3 3.5000000000000004 3.3000000000000003 3.54 3.6 2.7 3.2
 2.8000000000000003 3.2 3.5000000000000004 4];
%WI (Wisconsin)
WI = [0.8999999999999999 0.8999999999999999 0.8 1.01 1 0.7 1 0.8 0.8
 0.8 0.8];
%WV (West Virginia)
WV = [0.2 0.4 0.3 0.26 0.4 0.4 0.4 0.4 0.4 0.4 0.3];
%WY (Wyoming)
WY = [0.1 0.1 0.1 0.08 0.1 0.1 0.3 0.2 0.1 0.1 0.1];

%Plots state variation over the years
figure(1)
hold on;
plot(Years, AK);
plot(Years, AL);
plot(Years, AR);
plot(Years, AZ);
plot(Years, CA);
plot(Years, CO);
plot(Years, CT);
plot(Years, DC);
plot(Years, DE);
plot(Years, FL);
plot(Years, GA);
plot(Years, HI);
plot(Years, IA);
plot(Years, ID);
plot(Years, IL);
plot(Years, IN);
plot(Years, KS);
```

```
plot(Years, KY);
plot(Years, LA);
plot(Years, MA);
plot(Years, MD);
plot(Years, ME);
plot(Years, MI);
plot(Years, MN);
plot(Years, MO);
plot(Years, MS);
plot(Years, MT);
plot(Years, NC);
plot(Years, ND);
plot(Years, NE);
plot(Years, NH);
plot(Years, NJ);
plot(Years, NM);
plot(Years, NV);
plot(Years, NY);
plot(Years, OH);
plot(Years, OK);
plot(Years, OR);
plot(Years, PA);
plot(Years, RI);
plot(Years, SC);
plot(Years, SD);
plot(Years, TN);
plot(Years, TX);
plot(Years, UT);
plot(Years, VA);
plot(Years, VT);
plot(Years, WA);
plot(Years, WI);
plot(Years, WV);
plot(Years, WY);

%figure 1 info
set(gcf, 'Units', 'Normalized', 'OuterPosition', [0, 0.04, 1, 0.96]);
xlabel('Year', 'fontsize', 12);
ylabel('contribution to overall population of homeless individuals
 (%)', 'fontsize', 12);
legend('AK','AL','AR','AZ','CA','CO','CT','DC','DE','FL','GA','HI','IA','ID','IL'
title('State Breakdown: % contributions to homeless
 population', 'fontsize', 12);
grid on

%CA Label
CAl = 'California \rightarrow';
text(2009.25,25,CAl)

%NY Label
NYl = 'New York \downarrow';
text(2008.5,10.75,NYl)

%FL Label
```

```
FL1 = 'Florida \downarrow';
text(2010.5,10.25,FL1)

%TX Label
TX1 = 'Texas  \downarrow';
text(2012,6.3,TX1)
```

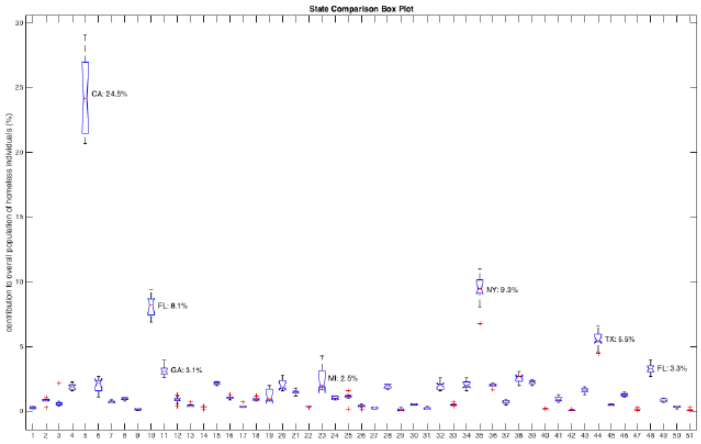



```
%Set up Matrix for One-way ANOVA
test = [AK; AL; AR; AZ; CA; CO; CT; DC; DE; FL; GA; HI; IA; ID; IL;
 IN; KS; KY; LA; MA; MD; ME; MI; MN; MO; MS; MT; NC; ND; NE; NH; NJ;
 NM; NV; NY; OH; OK; OR; PA; RI; SC; SD; TN; TX; UT; VA; VT; WA; WI;
 WV; WY];
%transpose for next steps
test = test';

%ANOVA - One Way Analysis of Variance
figure(2)
[p,tbl,stats] = anova1(test) %figure 2 produced (BOXPLOT)
%properly labelled one attached
set(gcf, 'Units', 'Normalized', 'OuterPosition', [0, 0.04, 1, 0.96]);
title('State Comparison Box Plot', 'fontsize', 12);
ylabel('contribution to overall population of homeless individuals
 (%)', 'fontsize', 12);
% Labels
Labels = {'CA: 24.5%','FL: 8.1%','GA: 3.1%','MI: 2.5%','NY: 9.3%','TX:
 5.5%','FL: 3.3%'};
text(6-0.5,24.5,Labels(1),'HorizontalAlignment','left','FontSize',11);
text(11-0.5,8.13,Labels(2),'HorizontalAlignment','left','FontSize',11);
text(12-0.5,3.13,Labels(3),'HorizontalAlignment','left','FontSize',11);
text(24-0.5,2.51,Labels(4),'HorizontalAlignment','left','FontSize',11);
text(36-0.5,9.38,Labels(5),'HorizontalAlignment','left','FontSize',11);
text(45-0.5,5.55,Labels(6),'HorizontalAlignment','left','FontSize',11);
text(49-0.5,3.3,Labels(7),'HorizontalAlignment','left','FontSize',11);
```

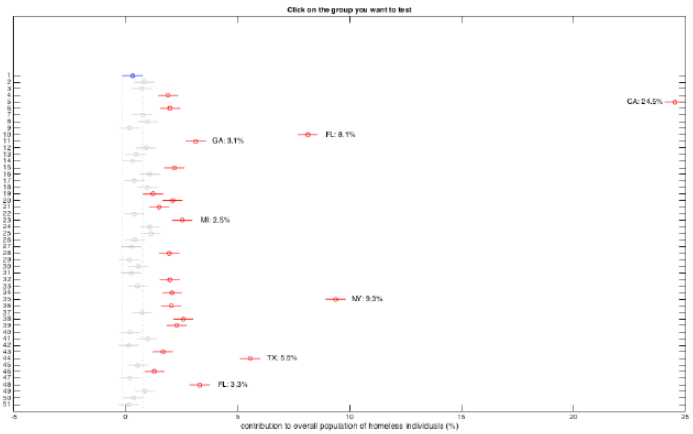
```
%df: degrees of freedom
%SS: sum of squares
%MS: mean squared error => SS/df for each source of variation``
%F: ratio of the mean squared errors
%Small P value: indicates that differences between column means are
 significant


p =

     0


tbl =

    'Source'      'SS'             'df'     'MS'          'F'
 'Prob>F'
    'Columns'     [7.5158e+03]     [ 50]    [150.3151]    [539.1094]
 [     0]
    'Error'       [  142.1988]     [510]    [  0.2788]            []
      []
    'Total'       [7.6580e+03]     [560]            []            []
      []


stats =

    gnames: [51x2 char]
         n: [1x51 double]
    source: 'anova1'
     means: [1x51 double]
        df: 510
         s: 0.5280
```

ANOVA Table

Source	SS	df	MS	F	Prob>F
Columns	7515.76	50	150.315	539.11	0
Error	142.2	510	0.279		
Total	7657.96	560			




```
%Multcompare
%Interactive chart that shows states significance in relation to
 others
figure(3)
[c,~,~,gnames] = multcompare(stats); %figure 3 produced
%properly labelled one attached
set(gcf, 'Units', 'Normalized', 'OuterPosition', [0, 0.04, 1, 0.96]);

% Labels
Labels2 = {'CA: 24.5%','FL: 8.1%','GA: 3.1%','MI: 2.5%','NY:
 9.3%','TX: 5.5%','FL: 3.3%'};
xlabel('contribution to overall population of homeless individuals
 (%)', 'fontsize', 12);
text(24.5-0.5,51-4,Labels2(1),'HorizontalAlignment','right','FontSize',11);
text(8.1+1.5,51-9,Labels2(2),'HorizontalAlignment','center','FontSize',11);
text(3.1+1.5,51-10,Labels2(3),'HorizontalAlignment','center','FontSize',11);
text(2.5+1.5,51-22,Labels2(4),'HorizontalAlignment','center','FontSize',11);
text(9.3+1.5,51-34,Labels2(5),'HorizontalAlignment','center','FontSize',11);
text(5.5+1.5,51-43,Labels2(6),'HorizontalAlignment','center','FontSize',11);
text(3.3+1.5,51-47,Labels2(7),'HorizontalAlignment','center','FontSize',11);
```




```
%Probability Distribution and Confidence Interval

%Normal Distribution
CA_pd = fitdist(test(:,5),'Normal') %CA
%for 95% confidence
%lower and upper CI bounds are in [ ] beside mu and sigma

NY_pd = fitdist(test(:,35),'Normal') %NY
FL_pd = fitdist(test(:,10),'Normal') %FL
TX_pd = fitdist(test(:,44),'Normal') %TX

%Compare low confidence interval bound of CA and high CI bounds of
 other
%states that are the closest - CA is over double their upper bound
```

```
CA_pd =

  NormalDistribution

  Normal distribution
       mu = 24.5273   [22.5384, 26.5161]
    sigma = 2.96044   [2.06851, 5.19537]


NY_pd =

  NormalDistribution

  Normal distribution
       mu = 9.38182   [8.6189, 10.1447]
    sigma = 1.13562   [0.793478, 1.99294]
```

```
FL_pd =

  NormalDistribution

  Normal distribution
       mu =  8.13182   [7.6153, 8.64834]
    sigma = 0.768854   [0.537211, 1.34929]


TX_pd =

  NormalDistribution

  Normal distribution
       mu =  5.55636   [5.14041, 5.97231]
    sigma = 0.619149   [0.43261, 1.08657]
```

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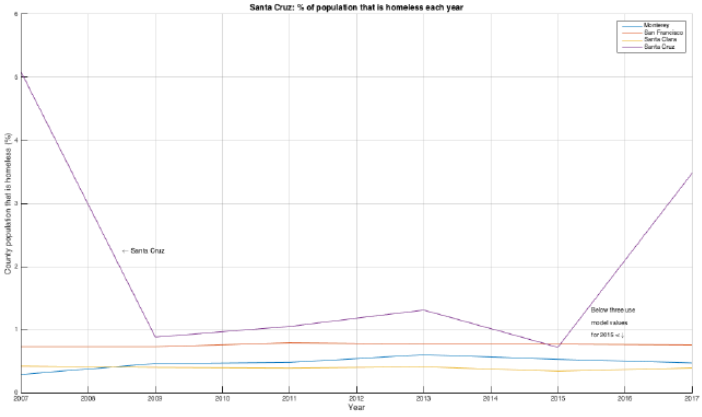
B.2: Second Tier – County Level Comparison

```
%ENGS 93 - Kendall Ronzano
%Second Tier - County Level Comparison

clear;
close all;

%Visual Comparison over span (2007 - 2015 bi-annual)

%Years
Years = [2007 2009 2011 2013 2015 2017];

%County Vectors
%Values: % of population that is homeless

Monterey = [0.29; 0.46; 0.48; 0.6; 0.53; 0.472]; %Monterey
SF = [0.73; 0.73; 0.79; 0.77; 0.77; 0.758]; %San Francisco
SClara = [0.42; 0.4; 0.39; 0.41; 0.34; 0.392]; %Santa Clara
SCruz = [5.08; 0.88; 1.05; 1.31; 0.72; 3.48]; %Santa Cruz
%values corresponding to 2017 are predictions
%Santa Cruz: (Jan 2017 homeless count / Dec 2016 population)
%Other 3 counties modelled on mean from prior

%Plots state variation over the years
figure(1)
hold on;
plot(Years, Monterey);
plot(Years, SF);
plot(Years, SClara);
plot(Years, SCruz);

%figure 1 info
set(gcf, 'Units', 'Normalized', 'OuterPosition', [0, 0.04, 1, 0.96]);
xlabel('Year', 'fontsize', 12);
ylabel('County population that is homeless (%)', 'fontsize', 12);
legend('Monterey','San Francisco','Santa Clara','Santa
 Cruz', 'fontsize', 12);
title('Santa Cruz: % of population that is homeless each
 year','fontsize', 12);
grid on

%SC Label
SCl = '\leftarrow Santa Cruz';
text(2008.5,2.25,SCl)
%Model Values Label
Model1 = 'Below three use ';
text(2015.5,1.3,Model1,'fontsize',9)
%Model Values2 Label
Model2l = 'model values ';
text(2015.5,1.1,Model2l,'fontsize',9)
%Model Values Down Arrow Label
ModelDAl = 'for 2015 < \downarrow';
text(2015.5,0.9,ModelDAl,'fontsize',9)
```

```
%Extrapolating data reasoning: Santa Cruz data for 2017 has already
 been
%collected and shared however the other counties only have up until
 2015 as
%of now. Important to include SC's 2017 data as the numbers fluctuate
 and
%have a somewhat large standard deviation. However, San Francisco,
 Santa
%Clara, and Monterey remain very steady with much lower SDs. Therefore
 the
%data for 2017 for these three counties is extrapolated based on the
 prior
%trend of data preceeding 2017.
```

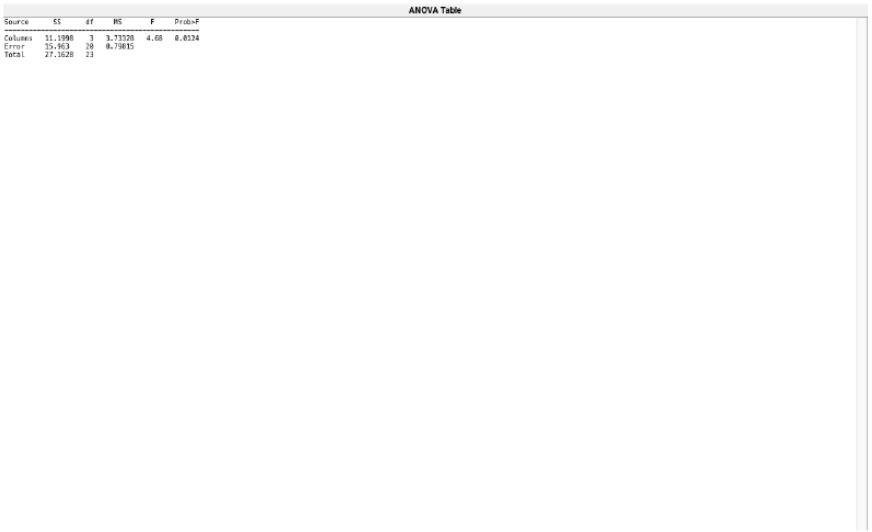
Warning: Ignoring extra legend entries.

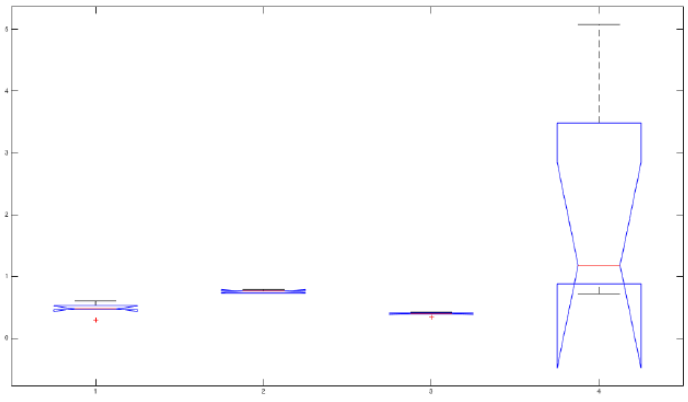



```
%Set up Matrix for One-way ANOVA
matrix = [Monterey SF SClara SCruz];

%ANOVA - One Way Analysis of Variance
[p,tbl,stats] = anova1(matrix) %figure 2 produced (BOXPLOT)
%properly labelled one attached
set(gcf, 'Units', 'Normalized', 'OuterPosition', [0, 0.04, 1, 0.96]);
%df: degrees of freedom
%SS: sum of squares
%MS: mean squared error => SS/df for each source of variation``
%F: ratio of the mean squared errors
%Small P value: indicates that differences between column means are
 significant
```

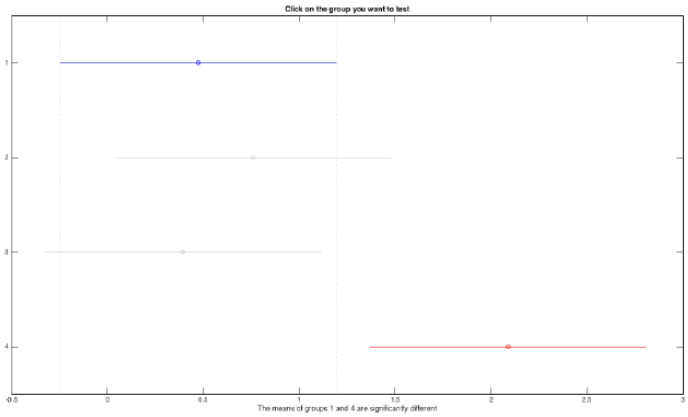
p =

```
    0.0124


tbl =

    'Source'      'SS'          'df'     'MS'         'F'          'Prob>F'
    'Columns'     [11.1998]     [ 3]     [3.7333]     [4.6774]     [0.0124]
    'Error'       [15.9630]     [20]     [0.7981]           []           []
    'Total'       [27.1628]     [23]           []           []           []


stats =

    gnames: [4x1 char]
         n: [6 6 6 6]
    source: 'anova1'
     means: [0.4720 0.7580 0.3920 2.0867]
        df: 20
         s: 0.8934
```





```
%Multcompare
%Interactive chart that shows states significance in relation to
 others
[c,~,~,gnames] = multcompare(stats); %figure 3 produced
%properly labelled one attached
set(gcf, 'Units', 'Normalized', 'OuterPosition', [0, 0.04, 1, 0.96]);
```




```
%Probability Distribution and Confidence Interval

%Normal Distribution
SCruz_pd = fitdist(matrix(:,4),'Normal') %Santa Cruz
%for 95% confidence
%lower and upper CI bounds are in [ ] beside mu and sigma
```

```
Monterey_pd = fitdist(matrix(:,1),'Normal') %Monterey
SClara_pd = fitdist(matrix(:,3),'Normal') %Santa Clara
SF_pd = fitdist(matrix(:,2),'Normal') %San Francisco

%Notice the difference between means amongst the counties - in
 particular,
%Santa Cruz's much larger % composition of homeless individuals
 overall as
%a county in contrast to the others. However, take note of the
 confidence
%intervals and how Santa Cruz's spans a farther range than the others.
```

```
SCruz_pd =

  NormalDistribution

  Normal distribution
       mu = 2.08667   [0.21507, 3.95826]
    sigma = 1.78343   [1.11323, 4.37407]


Monterey_pd =

  NormalDistribution

  Normal distribution
       mu =    0.472   [0.363872, 0.580128]
    sigma = 0.103034   [0.0643146, 0.252703]


SClara_pd =

  NormalDistribution

  Normal distribution
       mu =     0.392   [0.362766, 0.421234]
    sigma = 0.0278568   [0.0173884, 0.0683219]


SF_pd =

  NormalDistribution

  Normal distribution
       mu = 0.758   [0.732814, 0.783186]
    sigma = 0.024   [0.014981, 0.0588627]
```

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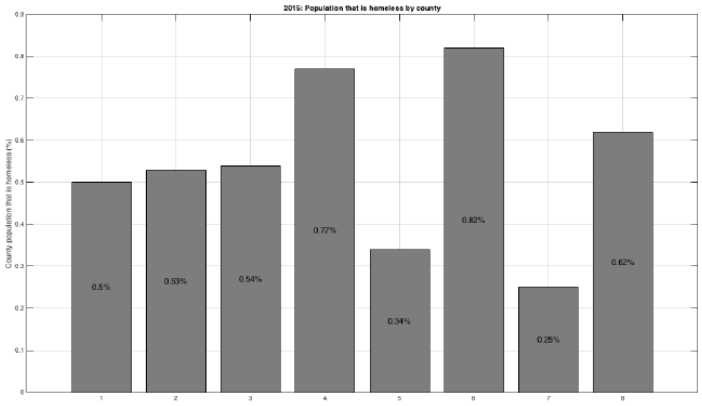
B.3: Second Tier – County Level Comparison – Bar Graphs

```
%ENGS 93 - Kendall Ronzano
%Second Tier - Bar Graphs - County Level Comparison

clear;
close all;

%Bar Chart 2015
%Counties
Counties = categorical({'Marin','Monterey', 'San Benito', 'San
 Francisco', 'Santa Clara', 'Santa Cruz', 'Solano', 'Sonoma'});

%County Data: Homeless Individuals; County Population; % Composition
Marin = [1309 261221 0.5];
Monterey = [2308 433898 0.53];
San_Benito = [315 58792 0.54];
San_Francisco = [6686 864816 0.77];
Santa_Clara = [6556 1918000 0.34];
Santa_Cruz = [2249 274146 0.82];
Solano = [1082 436092 0.25];
Sonoma = [3107 502146 0.62];

% Percent of population that was homeless in 2015
Percentages = [Marin(3); Monterey(3); San_Benito(3); San_Francisco(3);
 Santa_Clara(3); Santa_Cruz(3); Solano(3); Sonoma(3)];

figure(1)
% Bar Graph
colors1 = [0.5 0.5 0.5];
a = bar(Percentages);
a(1).Parent.Parent.Colormap = colors1;

% Plot Info
set(gcf, 'Units', 'Normalized', 'OuterPosition', [0, 0.04, 1, 0.96]);
ylabel('County population that is homeless (%)');
title('2015: Population that is homeless by county');
grid on

% Percentage Labels
PHomeless =
 {'0.5%','0.53%','0.54%','0.77%','0.34%','0.82%','0.25%','0.62%'};
% Plot county x-axis spacing
spacing1 = [1 2 3 4 5 6 7 8];
text(spacing1(1),0.5/2,PHomeless(1),'HorizontalAlignment','center','FontSize',12);
text(spacing1(2),0.53/2,PHomeless(2),'HorizontalAlignment','center','FontSize',12)
text(spacing1(3),0.54/2,PHomeless(3),'HorizontalAlignment','center','FontSize',12)
text(spacing1(4),0.77/2,PHomeless(4),'HorizontalAlignment','center','FontSize',12)
text(spacing1(5),0.34/2,PHomeless(5),'HorizontalAlignment','center','FontSize',12)
text(spacing1(6),0.82/2,PHomeless(6),'HorizontalAlignment','center','FontSize',12)
text(spacing1(7),0.25/2,PHomeless(7),'HorizontalAlignment','center','FontSize',12)
text(spacing1(8),0.62/2,PHomeless(8),'HorizontalAlignment','center','FontSize',12)
```

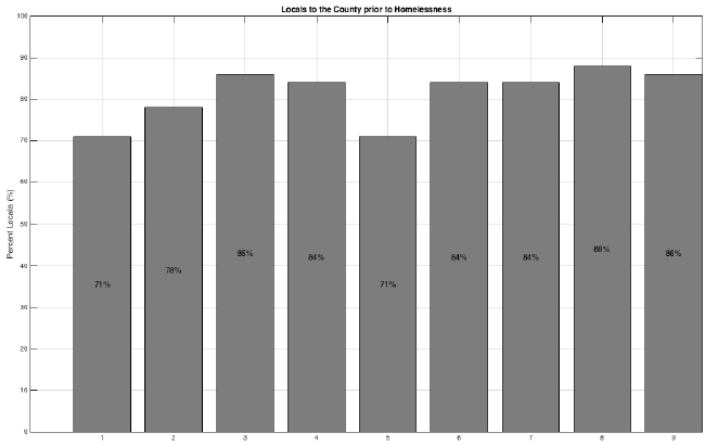


Bar Chart Residency

```
Locals = [71 78 86 84 71 84 84 88 86];

figure(2)
colors2 = [0.5 0.5 0.5];
b = bar(Locals,'stacked');
b(1).Parent.Parent.Colormap = colors2;

% Plot Info
set(gcf, 'Units', 'Normalized', 'OuterPosition', [0, 0.04, 1, 0.96]);
ylabel('Percent Locals (%)','fontsize', 12);
title('Locals to the County prior to Homelessness','fontsize', 12);
grid on
axis([0 inf 0 100])

% Percentage Labels
PResident = {'71%','78%','86%','84%','71%','84%','84%','88%','86%'};
% Plot county x-axis spacing
spacing2 = [1 2 3 4 5 6 7 8 9];
text(spacing2(1),71/2,PResident(1),'HorizontalAlignment','center','FontSize',12);
text(spacing2(2),78/2,PResident(2),'HorizontalAlignment','center','FontSize',12);
text(spacing2(3),86/2,PResident(3),'HorizontalAlignment','center','FontSize',12);
text(spacing2(4),84/2,PResident(4),'HorizontalAlignment','center','FontSize',12);
text(spacing2(5),71/2,PResident(5),'HorizontalAlignment','center','FontSize',12);
text(spacing2(6),84/2,PResident(6),'HorizontalAlignment','center','FontSize',12);
text(spacing2(7),84/2,PResident(7),'HorizontalAlignment','center','FontSize',12);
text(spacing2(8),88/2,PResident(8),'HorizontalAlignment','center','FontSize',12);
text(spacing2(9),86/2,PResident(9),'HorizontalAlignment','center','FontSize',12);

%Alter matrix for fitdist
Locals2 = Locals';

%Probability Distribution: Mean, Sigma, and CIs
```

```
PD_Locals= fitdist(Locals2(:,:),'Normal')

%Exceedingly high mean overall with pretty tight confidence interval
 with
%low standard deviation.
```

```
PD_Locals =

  NormalDistribution

  Normal distribution
       mu = 81.3333   [76.3666, 86.3]
    sigma = 6.46142   [4.36441, 12.3786]
```



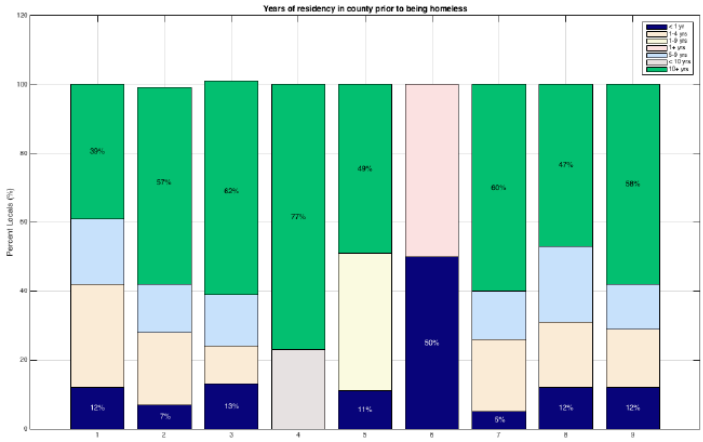
Stacked Bar Chart

```
figure(3)
set(gcf, 'Units', 'Normalized', 'OuterPosition', [0, 0.04, 1, 0.96]);
% Years of Residency: <1, 1-4, 1-9, 1+, 5-9, <10, 10+
% Added (1-9, 1+, and <10) additional morphed sections to accomodate
 for
% the data (hence why some filler zeros have been added to the
 vectors)
marin = [12 30 0 0 19 0 39];
monterey = [7 21 0 0 14 0 57];
san_benito = [13 11 0 0 15 0 62];
san_jose = [0 0 0 0 0 23 77];
san_francisco = [11 0 40 0 0 0 49];
santa_clara = [50 0 0 50 0 0 0];
santa_cruz = [5 21 0 0 14 0 60];
solano = [12 19 0 0 22 0 47];
```

```
sonoma = [12 17 0 0 13 0 58];

% Plot county x-axis spacing
spacing3 = [1 2 3 4 5 6 7 8 9];
% Bar Colors
colors3 = [0.0462 0.0344 0.4898; 0.9971 0.9387 0.8456; 0.9935 0.9916
 0.8863; 0.9948 0.8955 0.8994; 0.7871 0.8952 0.9947; 0.9102 0.889
 0.8960; 0.0462 0.7655 0.4456];

% Plot & Match Color scheme
c = bar(spacing3,[marin; monterey; san_benito; san_jose;
 san_francisco; santa_clara; santa_cruz; solano; sonoma],'stacked');
c(1).Parent.Parent.Colormap = colors3;

% Plot Info
ylabel('Percent Locals (%)','fontsize', 12);
title('Years of residency in county prior to being
 homeless','fontsize', 12);
grid on
legend('< 1 yr','1-4 yrs','1-9 yrs','1+ yrs','5-9 yrs','< 10 yrs','10+
 yrs','fontsize',12);
axis auto;

% Percentage Labels for 10+ years residency
TenUp = {'39%','57%','62%','77%','49%','60%','47%','58%'};
text(spacing3(1),100-39/2,TenUp(1),'HorizontalAlignment','center','FontSize',11);
text(spacing3(2),100-57/2,TenUp(2),'HorizontalAlignment','center','FontSize',11);
text(spacing3(3),100-62/2,TenUp(3),'HorizontalAlignment','center','FontSize',11);
text(spacing3(4),100-77/2,TenUp(4),'HorizontalAlignment','center','FontSize',11);
text(spacing3(5),100-49/2,TenUp(5),'HorizontalAlignment','center','FontSize',11);
text(spacing3(7),100-60/2,TenUp(6),'HorizontalAlignment','center','FontSize',11);
 Santa Clara: Not precise for 10+
text(spacing3(8),100-47/2,TenUp(7),'HorizontalAlignment','center','FontSize',11);
text(spacing3(9),100-58/2,TenUp(8),'HorizontalAlignment','center','FontSize',11);
% Percentage Labels for <1 years residency
OneDown = {'12%',' 7%','13%','11%','50%',' 5%','12%','12%',};
t1 =
 text(spacing3(1),6,OneDown(1),'HorizontalAlignment','center','FontSize',11);
t2 =
 text(spacing3(2),3.5,OneDown(2),'HorizontalAlignment','center','FontSize',11);
t3 =
 text(spacing3(3),6.5,OneDown(3),'HorizontalAlignment','center','FontSize',11);
t4 =
 text(spacing3(5),5.5,OneDown(4),'HorizontalAlignment','center','FontSize',11); %
 San Jose: Not precise for <1
t5 =
 text(spacing3(6),25,OneDown(5),'HorizontalAlignment','center','FontSize',11);
t6 =
 text(spacing3(7),2.5,OneDown(6),'HorizontalAlignment','center','FontSize',11);
t7 =
 text(spacing3(8),6,OneDown(7),'HorizontalAlignment','center','FontSize',11);
t8 =
 text(spacing3(9),6,OneDown(8),'HorizontalAlignment','center','FontSize',11);
% Change font color to white so it shows up
```

```
s1 = t1.Color;
t1.Color = 'w';
s2 = t2.Color;
t2.Color = 'w';
s3 = t3.Color;
t3.Color = 'w';
s4 = t4.Color;
t4.Color = 'w';
s5 = t5.Color;
t5.Color = 'w';
s6 = t6.Color;
t6.Color = 'w';
s7 = t7.Color;
t7.Color = 'w';
s8 = t8.Color;
t8.Color = 'w';
```

```
Warning: Ignoring extra legend entries.
```



Probability Distribution for 10+ years residency prior (- Santa Clara since not complete data set)

```
% Set up matrix for fitdist
TenAndUp = [marin(7); monterey(7); san_benito(7); san_jose(7);
 san_francisco(7); santa_cruz(7); solano(7); sonoma(7)];
TenAndUp2 = [monterey(7); san_benito(7); san_jose(7);
 san_francisco(7); santa_cruz(7); solano(7); sonoma(7)];
% Probability Distribution: Mean, Sigma, and CIs
PD_TenAndUp= fitdist(TenAndUp(:,:),'Normal')

% Same PD test but minus Marin County as it had a drastic extreme (see
 if
% it affects the mean and SD)
PD_TenAndUp_MinusMarin= fitdist(TenAndUp2(:,:),'Normal')
```

```
%Definitely changes a bit when removing Marin from the PD analysis
 but,
%still close to the prior mean, sigma, and CIs


PD_TenAndUp =

  NormalDistribution

  Normal distribution
       mu =  56.125   [46.557, 65.693]
    sigma = 11.4447   [7.56697, 23.2932]


PD_TenAndUp_MinusMarin =

  NormalDistribution

  Normal distribution
       mu = 58.5714   [49.465, 67.6779]
    sigma = 9.84644   [6.34498, 21.6825]
```

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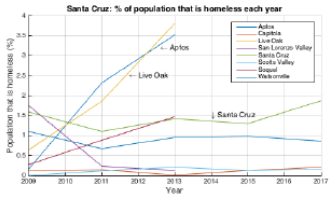
B.4: Third Tier – Jurisdiction Level Comparison

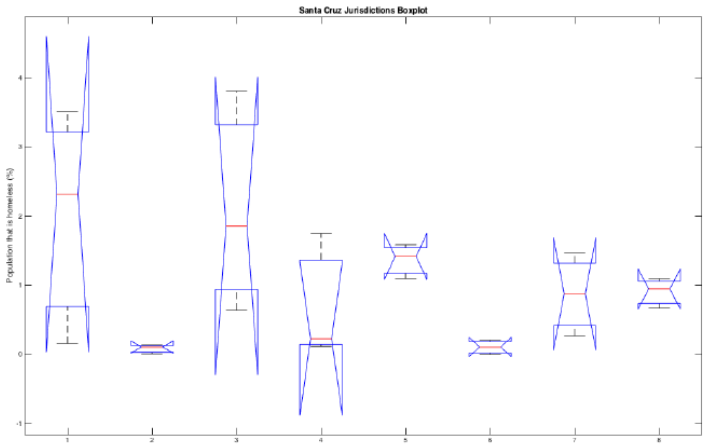
```
%ENGS 93 - Kendall Ronzano
%Third Tier - Jurisdiction Level Comparison

clear;
close all;

%Years Vector
Years = [2009 2011 2013 2015];

%Santa Cruz County- Jurisdiction Comparison
%Visual Comparison over span (2009 - 2017 bi-annual)

%Years (different vector to accomodate for a few sub-jurisdictions)
SCruz_Years = [2009 2011 2013];
SCruz_Years2 = [2009 2011 2013 2015 2017];

Aptos = [0.16; 2.32; 3.52]; %Aptos
Capitola = [0.11; 0.14; 0.01]; %Capitola
Capitola2 = [0.11; 0.14; 0.01; 0.12; 0.21];
Live_Oak = [0.64; 1.86; 3.81]; %Live Oak
SLV = [1.75; 0.23; 0.12]; %San Lorenzo Valley
Santa_Cruz = [1.59; 1.1; 1.42]; %Santa Cruz
Santa_Cruz2 = [1.59; 1.1; 1.42; 1.3; 1.87];
Scotts_Valley = [0; 0.11; 0.21]; %Scotts Valley
Scotts_Valley2 = [0; 0.11; 0.21; 0.12; 0.16];
Soquel = [0.27; 0.88; 1.47]; %Soquel
Watsonville = [1.1; 0.67; 0.95]; %Watsonville
Watsonville2 = [1.1; 0.67; 0.95; 0.98; 0.86];

%Plots state variation over the years
figure(1)
subplot(2,2,1);
hold on;
plot(SCruz_Years, Aptos);
plot(SCruz_Years2, Capitola2);
plot(SCruz_Years, Live_Oak);
plot(SCruz_Years, SLV);
plot(SCruz_Years2, Santa_Cruz2);
plot(SCruz_Years2, Scotts_Valley2);
plot(SCruz_Years, Soquel);
plot(SCruz_Years2, Watsonville2);

%figure info
xlabel('Year','fontsize',12);
ylabel('Population that is homeless (%)', 'fontsize', 12);
legend('Aptos', 'Capitola', 'Live Oak', 'San Lorenzo Valley', 'Santa
 Cruz', 'Scotts Valley', 'Soquel', 'Watsonville');
title('Santa Cruz: % of population that is homeless each
 year','fontsize',12);
grid on
%Aptos Label
AptosL = '\leftarrow Aptos ';
text(2012.6,3.2,AptosL,'fontsize', 11)
```

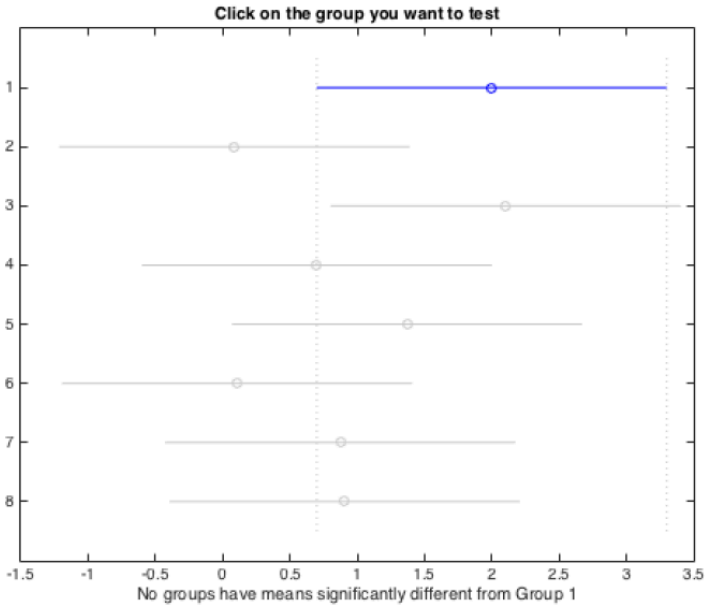
```
%Live Oak Label
LiveOakL = '\leftarrow Live Oak ';
text(2011.75,2.5,LiveOakL,'fontsize', 11)
%Santa Cruz Label
SCL = '\downarrow Santa Cruz ';
text(2014,1.5,SCL,'fontsize', 11)
set(gcf, 'Units', 'Normalized', 'OuterPosition', [0, 0.04, 1, 0.96]);
```




```
%Set up Matrix for One-way ANOVA
SCruzMatrix = [Aptos Capitola Live_Oak SLV Santa_Cruz Scotts_Valley
 Soquel Watsonville];

figure(2)
%ANOVA - One Way Analysis of Variance
[p,tbl,stats1] = anova1(SCruzMatrix) %(BOXPLOT)
%properly labelled one attached
ylabel('Population that is homeless (%)', 'fontsize', 12);
title('Santa Cruz Jurisdictions Boxplot', 'fontsize', 12);


figure(3)
%Multcompare
%Interactive chart that shows states significance in relation to
 others
[c,~,~,gnames] = multcompare(stats1);
%properly labelled one attached


%Probability Distribution and Confidence Interval

%Normal Distribution
SCruz_pd = fitdist(SCruzMatrix(:,5),'Normal') %Santa Cruz
%for 95% confidence
%lower and upper CI bounds are in [ ] beside mu and sigma
```

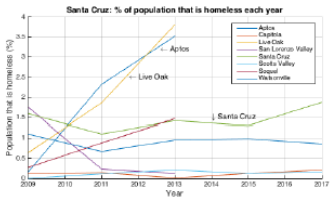
```
Aptos_pd = fitdist(SCruzMatrix(:,1),'Normal') %Aptos
LiveOak_pd = fitdist(SCruzMatrix(:,3),'Normal') %Live Oak


p =

    0.1073


tbl =

    'Source'     'SS'          'df'     'MS'         'F'          'Prob>F'
    'Columns'    [12.2956]     [ 7]     [1.7565]     [2.0753]     [0.1073]
    'Error'      [13.5419]     [16]     [0.8464]           []           []
    'Total'      [25.8375]     [23]           []           []           []


stats1 =

    gnames: [8x1 char]
         n: [3 3 3 3 3 3 3 3]
    source: 'anova1'
     means: [2 0.0867 2.1033 0.7000 1.3700 0.1067 0.8733 0.9067]
        df: 16
         s: 0.9200


SCruz_pd =

  NormalDistribution

  Normal distribution
       mu =     1.37   [0.751954, 1.98805]
    sigma = 0.248797   [0.129538, 1.56362]


Aptos_pd =

  NormalDistribution

  Normal distribution
       mu =      2   [-2.22975, 6.22975]
    sigma = 1.7027   [0.886527, 10.701]


LiveOak_pd =

  NormalDistribution

  Normal distribution
       mu = 2.10333   [-1.86867, 6.07534]
    sigma = 1.59895   [0.832505, 10.049]
```

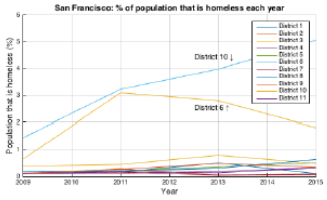

Santa Cruz Jurisdictions Boxplot
Population that is homeless (%)
4
3
2
1
0
-1
1
2
3
4
5
6
7
8




```
%San Francisco County- Jurisdiction Comparison
%Visual Comparison over span (2009 - 2017 bi-annual)

D1 = [0.17; 0.16; 0.5; 0.1]; %District 1
D2 = [0.09; 0.28; 0.04; 0.09]; %District 2
D3 = [0.38; 0.44; 0.79; 0.48]; %District 3
D4 = [0.1; 0.11; 0.18; 0.32]; %District 4
D5 = [0.12; 0.21; 0.35; 0.5]; %District 5
D6 = [1.44; 3.22; 3.97; 5.06]; %District 6
D7 = [0.12; 0.15; 0.05; 0.07]; %District 7
D8 = [0.17; 0.2; 0.3; 0.63]; %District 8
D9 = [0.11; 0.26; 0.48; 0.34]; %District 9
D10 = [0.65; 3.09; 2.79; 1.81]; %District 10
D11 = [0.1; 0.17; 0.13; 0.31]; %District 11

%Plots state variation over the years
figure(1)
subplot(2,2,2);
hold on;
plot(Years, D1);
plot(Years, D2);
plot(Years, D3);
plot(Years, D4);
plot(Years, D5);
plot(Years, D6);
plot(Years, D7);
```

```
plot(Years, D8);
plot(Years, D9);
plot(Years, D10);
plot(Years, D11);

%figure info
xlabel('Year','fontsize',12);
ylabel('Population that is homeless (%)', 'fontsize', 12);
legend('District 1', 'District 2', 'District 3', 'District
 4', 'District 5', 'District 6', 'District 7', 'District 8', 'District
 9', 'District 10','District 11');
title('San Francisco: % of population that is homeless each
 year','fontsize',12);
grid on
%District 6 Label
DSixL = 'District 6 \uparrow ';
text(2012.5,2.5,DSixL,'fontsize', 11)
%District 10 Label
DTenL = 'District 10 \downarrow ';
text(2012.5,4.4,DTenL,'fontsize', 11)
```

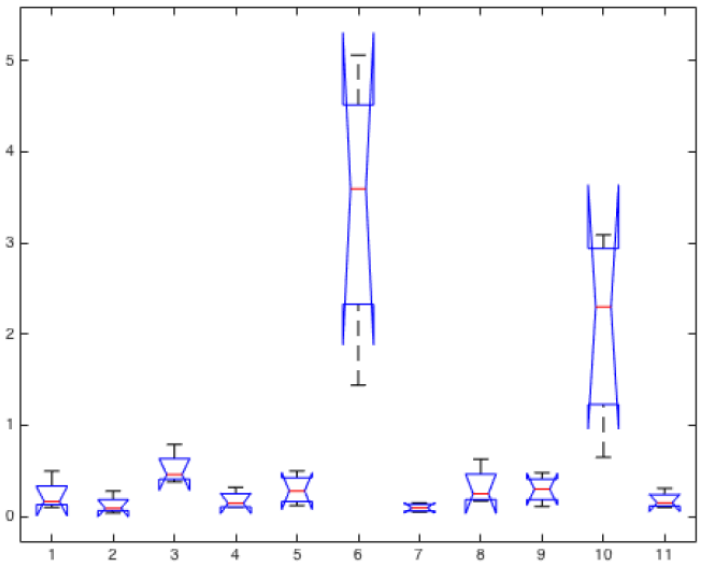


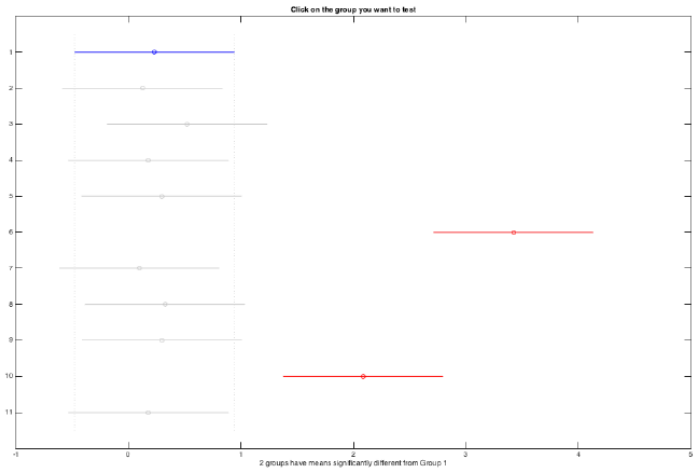



```
%Set up Matrix for One-way ANOVA
SFMatrix = [D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11];

figure(4)
%ANOVA - One Way Analysis of Variance
[p,tbl,stats2] = anova1(SFMatrix) %(BOXPLOT)
%properly labelled one attached
ylabel('Population that is homeless (%)', 'fontsize', 12);
title('San Francisco Jurisdictions Boxplot', 'fontsize', 12);


figure(5)
%Multcompare
```

```
%Interactive chart that shows states significance in relation to
 others
[c,~,~,gnames] = multcompare(stats2);
%properly labelled one attached


%Probability Distribution and Confidence Interval

%Normal Distribution
D6_pd = fitdist(SFMatrix(:,6),'Normal') %District 6
%for 95% confidence
%lower and upper CI bounds are in [ ] beside mu and sigma

D3_pd = fitdist(SFMatrix(:,3),'Normal') %District 3
D10_pd = fitdist(SFMatrix(:,10),'Normal') %District 10


p =

   6.0798e-09


tbl =

    'Source'     'SS'          'df'    'MS'         'F'
 'Prob>F'
    'Columns'    [45.1452]    [10]    [4.5145]    [13.3282]
 [6.0798e-09]
    'Error'      [11.1777]    [33]    [0.3387]           []
    []
    'Total'      [56.3229]    [43]          []           []
    []


stats2 =

    gnames: [11x2 char]
         n: [4 4 4 4 4 4 4 4 4 4 4]
    source: 'anova1'
     means: [1x11 double]
        df: 33
         s: 0.5820


D6_pd =

  NormalDistribution

  Normal distribution
       mu =  3.4225   [1.00013, 5.84487]
    sigma = 1.52233   [0.862385, 5.67608]


D3_pd =
```

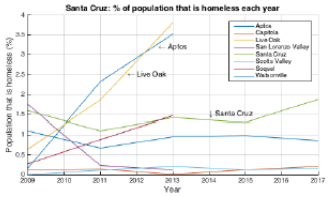
```
  NormalDistribution

  Normal distribution
       mu =   0.5225   [0.231295, 0.813705]
    sigma = 0.183007   [0.103672, 0.682351]


D10_pd =

  NormalDistribution

  Normal distribution
       mu =  2.085   [0.331788, 3.83821]
    sigma = 1.1018   [0.624159, 4.10812]
```

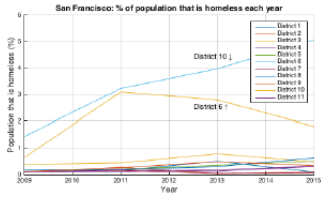


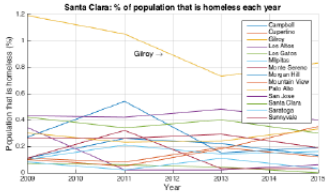



```
%Santa Clara County- Jurisdiction Comparison
%Visual Comparison over span (2009 - 2015 bi-annual)

 SCl1 = [0.11; 0.26; 0.22; 0.13]; % Campbell
 SCl2 = [0.11; 0.08; 0.19; 0.12]; % Cupertino
 SCl3 = [1.19; 1.05; 0.73; 0.83]; % Gilroy
 SCl4 = [0.34; 0.02; 0.02; 0.06]; % Los Altos
 SCl5 = [0.07; 0.06; 0.04; 0]; % Los Gatos
 SCl6 = [0.1; 0.21; 0.14; 0.16]; % Milpitas
 SCl7 = [0.11; 0.32; 0.03; 0.03]; % Monte Sereno
 SCl8 = [0.27; 0.54; 0.15; 0.19]; % Morgan Hill
 SCl9 = [0.1; 0.05; 0.18; 0.35]; % Mountain View
 SCl10 = [0.3; 0.23; 0.24; 0.33]; % Palo Alto
 SCl11 = [0.43; 0.42; 0.48; 0.4]; % San Jose
 SCl12 = [0.42; 0.34; 0.4; 0.3]; % Santa Clara
 SCl13 = [0.08; 0.02; 0.11; 0.03]; % Saratoga
 SCl14 = [0.26; 0.26; 0.29; 0.19]; % Sunnyvale

%Plots state variation over the years
figure(1)
subplot(2,2,3);
hold on;
plot(Years, SCl1);
plot(Years, SCl2);
plot(Years, SCl3);
plot(Years, SCl4);
plot(Years, SCl5);
plot(Years, SCl6);
plot(Years, SCl7);
plot(Years, SCl8);
plot(Years, SCl9);
```

```
plot(Years, SCl10);
plot(Years, SCl11);
plot(Years, SCl12);
plot(Years, SCl13);
plot(Years, SCl14);

%figure info
xlabel('Year','fontsize',12);
ylabel('Population that is homeless (%)', 'fontsize', 12);
title('Santa Clara Jurisdictions Boxplot', 'fontsize', 12);
legend('Campbell', 'Cupertino', 'Gilroy', 'Los
 Altos', 'Los Gatos', 'Milpitas', 'Monte Sereno', 'Morgan
 Hill', 'Mountain View', 'Palo Alto', 'San Jose', 'Santa
 Clara', 'Saratoga', 'Sunnyvale');
title('Santa Clara: % of population that is homeless each
 year','fontsize',12);
grid on
%Gilroy Label
GL = 'Gilroy \rightarrow ';
text(2011.2,0.9,GL,'fontsize', 11)
```

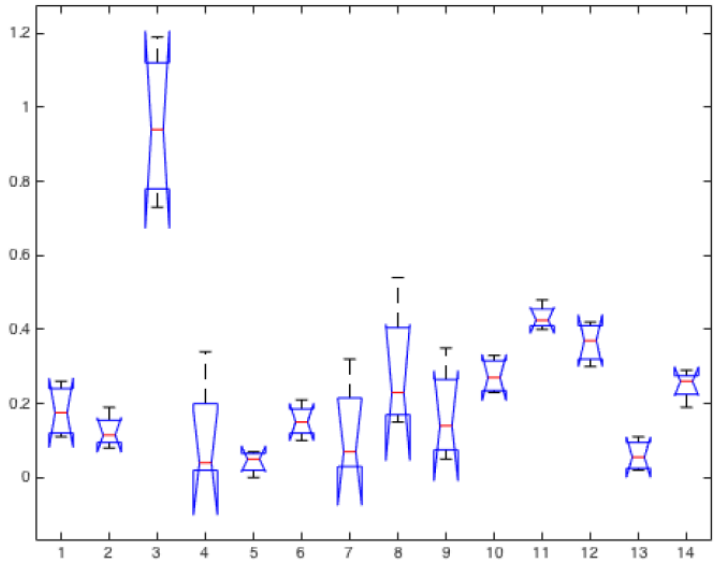


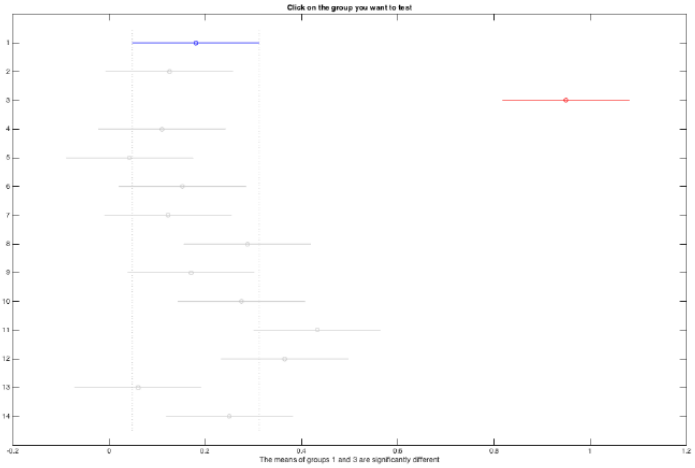





```
%Set up Matrix for One-way ANOVA
SClMatrix = [SCl1 SCl2 SCl3 SCl4 SCl5 SCl6 SCl7 SCl8 SCl9 SCl10 SCl11
 SCl12 SCl13 SCl14];

figure(6)
%ANOVA - One Way Analysis of Variance
[p,tbl,stats3] = anova1(SClMatrix) %(BOXPLOT)
%properly labelled one attached
ylabel('Population that is homeless (%)', 'fontsize', 12);
title('Santa Clara Jurisdictions Box Plot','fontsize',12);


figure(7)
```

```
%Multcompare
%Interactive chart that shows states significance in relation to
 others
[c,~,~,gnames] = multcompare(stats3);
%properly labelled one attached


p =

   1.3119e-13


tbl =

    'Source'     'SS'        'df'    'MS'        'F'           'Prob>F'

    'Columns'    [2.7599]    [13]    [0.2123]    [19.2219]
 [1.3119e-13]
    'Error'      [0.4639]    [42]    [0.0110]          []
   []
    'Total'      [3.2238]    [55]          []          []
   []


stats3 =

    gnames: [14x2 char]
         n: [4 4 4 4 4 4 4 4 4 4 4 4 4 4]
    source: 'anova1'
     means: [1x14 double]
        df: 42
         s: 0.1051
```





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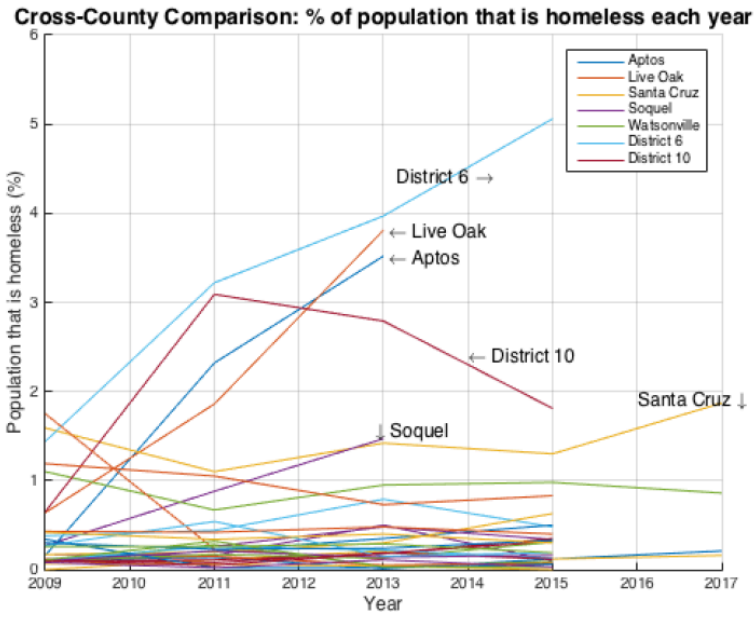
B.5: Third Tier – All Jurisdiction Overlay Comparison

```
%ENGS 93 - Kendall Ronzano
%Third Tier - All Jurisdiction Overlay Comparison

clear;
close all;

%Years Vector
Years = [2009 2011 2013 2015];

%Santa Cruz County- Jurisdiction Comparison
%Visual Comparison over span (2009 - 2017 bi-annual)

%Years (different vector to accomodate for a few sub-jurisdictions)
SCruz_Years = [2009 2011 2013];
SCruz_Years2 = [2009 2011 2013 2015 2017];

Aptos = [0.16; 2.32; 3.52]; %Aptos
Capitola = [0.11; 0.14; 0.01]; %Capitola
Capitola2 = [0.11; 0.14; 0.01; 0.12; 0.21];
Live_Oak = [0.64; 1.86; 3.81]; %Live Oak
SLV = [1.75; 0.23; 0.12]; %San Lorenzo Valley
Santa_Cruz = [1.59; 1.1; 1.42]; %Santa Cruz
Santa_Cruz2 = [1.59; 1.1; 1.42; 1.3; 1.87];
Scotts_Valley = [0; 0.11; 0.21]; %Scotts Valley
Scotts_Valley2 = [0; 0.11; 0.21; 0.12; 0.16];
Soquel = [0.27; 0.88; 1.47]; %Soquel
Watsonville = [1.1; 0.67; 0.95]; %Watsonville
Watsonville2 = [1.1; 0.67; 0.95; 0.98; 0.86];

%San Francisco County- Jurisdiction Comparison
%Visual Comparison over span (2007 - 2013 bi-annual)

D1 = [0.17; 0.16; 0.5; 0.1]; %District 1
D2 = [0.09; 0.28; 0.04; 0.09]; %District 2
D3 = [0.38; 0.44; 0.79; 0.48]; %District 3
D4 = [0.1; 0.11; 0.18; 0.32]; %District 4
D5 = [0.12; 0.21; 0.35; 0.5]; %District 5
D6 = [1.44; 3.22; 3.97; 5.06]; %District 6
D7 = [0.12; 0.15; 0.05; 0.07]; %District 7
D8 = [0.17; 0.2; 0.3; 0.63]; %District 8
D9 = [0.11; 0.26; 0.48; 0.34]; %District 9
D10 = [0.65; 3.09; 2.79; 1.81]; %District 10
D11 = [0.1; 0.17; 0.13; 0.31]; %District 11

%Santa Clara County- Jurisdiction Comparison
%Visual Comparison over span (2009 - 2015 bi-annual)

 SCl1 = [0.11; 0.26; 0.22; 0.13]; % Campbell
 SCl2 = [0.11; 0.08; 0.19; 0.12]; % Cupertino
 SCl3 = [1.19; 1.05; 0.73; 0.83]; % Gilroy
 SCl4 = [0.34; 0.02; 0.02; 0.06]; % Los Altos
 SCl5 = [0.07; 0.06; 0.04; 0]; % Los Gatos
 SCl6 = [0.1; 0.21; 0.14; 0.16]; % Milpitas
```

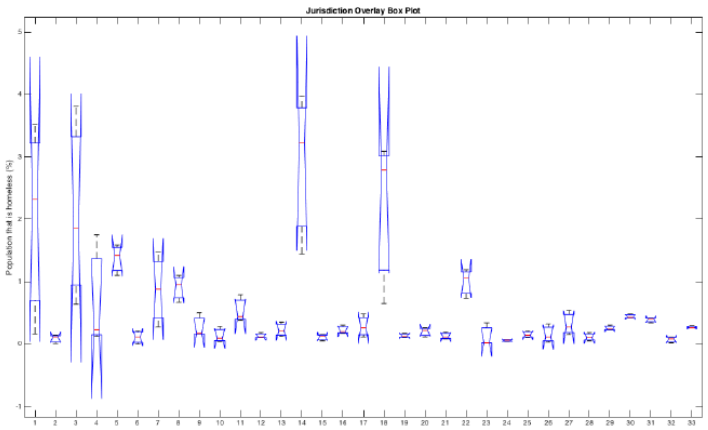
```
 SCl7 = [0.11; 0.32; 0.03; 0.03]; % Monte Sereno
 SCl8 = [0.27; 0.54; 0.15; 0.19]; % Morgan Hill
 SCl9 = [0.1; 0.05; 0.18; 0.35]; % Mountain View
 SCl10 = [0.3; 0.23; 0.24; 0.33]; % Palo Alto
 SCl11 = [0.43; 0.42; 0.48; 0.4]; % San Jose
 SCl12 = [0.42; 0.34; 0.4; 0.3]; % Santa Clara
 SCl13 = [0.08; 0.02; 0.11; 0.03]; % Saratoga
 SCl14 = [0.26; 0.26; 0.29; 0.19]; % Sunnyvale

%Cross-County- Jurisdiction Comparison
%Visual Comparison over span

%Plots state variation over the years
figure(1)

hold on;

%Want in legend
plot(SCruz_Years, Aptos); %Aptos
plot(SCruz_Years, Live_Oak); %Live Oak
plot(SCruz_Years2, Santa_Cruz2); %Santa Cruz
plot(SCruz_Years, Soquel); %Soquel
plot(SCruz_Years2, Watsonville2); %Watsonville
plot(Years, D6); % District 6
plot(Years, D10); % District 10

%Santa Cruz
plot(SCruz_Years2, Capitola2);
plot(SCruz_Years, SLV);
plot(SCruz_Years2, Scotts_Valley2);

%San Francisco
plot(Years, D1);
plot(Years, D2);
plot(Years, D3);
plot(Years, D4);
plot(Years, D5);
plot(Years, D7);
plot(Years, D8);
plot(Years, D9);
plot(Years, D11);

%Santa Clara
plot(Years, SCl1);
plot(Years, SCl2);
plot(Years, SCl4);
plot(Years, SCl3);
plot(Years, SCl5);
plot(Years, SCl6);
plot(Years, SCl7);
plot(Years, SCl8);
plot(Years, SCl9);
plot(Years, SCl10);
plot(Years, SCl11);
```

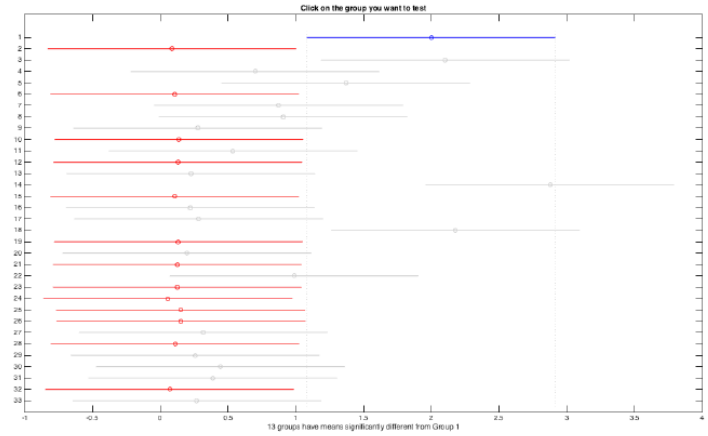
```
plot(Years, SCl12);
plot(Years, SCl13);
plot(Years, SCl14);

%figure info
xlabel('Year','fontsize', 12);
ylabel('Population that is homeless (%)', 'fontsize', 12);
legend('Aptos','Live Oak','Santa
 Cruz','Soquel','Watsonville','District 6','District 10');
title('Cross-County Comparison: % of population that is homeless each
 year','fontsize', 14);
grid on

%Aptos Label
AptosL = '\leftarrow Aptos ';
text(2013.05,3.5,AptosL,'fontsize', 12)

%Live Oak Label
LOL = '\leftarrow Live Oak ';
text(2013.05,3.8,LOL,'fontsize', 12)

%Santa Cruz Label
SCL = 'Santa Cruz \downarrow';
text(2016,1.9,SCL,'fontsize', 12)

%Soquel Label
SoquelL = '\downarrow Soquel ';
text(2012.9,1.55,SoquelL,'fontsize', 12)

%District 6 Label
SixL = 'District 6 \rightarrow';
text(2013.15,4.4,SixL,'fontsize', 12)

%District 10 Label
TenL = '\leftarrow District 10';
text(2014,2.4,TenL,'fontsize', 12)
```




```
%Set up Matrix for One-way ANOVA
OverlayMatrix = [Aptos Capitola(1:3) Live_Oak SLV Santa_Cruz(1:3)
 Scotts_Valley(1:3) Soquel Watsonville(1:3) D1(1:3) D2(1:3) D3(1:3)
 D4(1:3) D5(1:3) D6(1:3) D7(1:3) D8(1:3) D9(1:3) D10(1:3) D11(1:3)
 SCl1(1:3) SCl2(1:3) SCl3(1:3) SCl4(1:3) SCl5(1:3) SCl6(1:3) SCl7(1:3)
 SCl8(1:3) SCl9(1:3) SCl10(1:3) SCl11(1:3) SCl12(1:3) SCl13(1:3)
 SCl14(1:3)];

figure(2)
%ANOVA - One Way Analysis of Variance
[p,tbl,stats4] = anova1(OverlayMatrix) %(BOXPLOT)
%properly labelled one attached
ylabel('Population that is homeless (%)', 'fontsize', 12);
title('Jurisdiction Overlay Box Plot','fontsize',12);
set(gcf, 'Units', 'Normalized', 'OuterPosition', [0, 0.04, 1, 0.96]);

figure(3)
%Multcompare
%Interactive chart that shows states significance in relation to
 others
[c,~,~,gnames] = multcompare(stats4);
%properly labelled one attached
set(gcf, 'Units', 'Normalized', 'OuterPosition', [0, 0.04, 1, 0.96]);


p =
```

```
   2.1230e-08


tbl =

    'Source'     'SS'         'df'    'MS'        'F'         'Prob>F'

    'Columns'    [50.6604]    [32]    [1.5831]    [4.9442]
 [2.1230e-08]
    'Error'      [21.1333]    [66]    [0.3202]          []
   []
    'Total'      [71.7937]    [98]          []          []
   []


stats4 =

    gnames: [33x2 char]
         n: [1x33 double]
    source: 'anova1'
     means: [1x33 double]
        df: 66
         s: 0.5659
```





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Appendix C: Excel Data

C.1: State Level Excel Sheet – Original Numbers Gathered

	2006			2007			2008			2009	2010	2011	2012	2013			2014	2015			2016		
	Individuals		(%)	Individuals		(%)	Individuals		(%)	%	%	%	%	Individuals		(%)	(%)			(%)			(%)
AK	1,642	0.00220434	0.2	1,642	0.00248337	0.2	1,646	0.00249366	0.2	0.31	0.3	0.3	0.3	1,362	0.00355025	0.4	0.3	1,342	0.00379226	0.4	1,527	0.00435194	0.4
AL	2,027	0.00272119	0.3	5,452	0.00824564	0.8	5,387	0.00816119	0.8	0.95	0.9	1.1	0.8	3,387	0.0088287	0.9	0.9	2,868	0.00810447	0.8	3,019	0.00860413	0.9
AR	16665	0.02237231	2.2	3836	0.00580159	0.6	3255	0.00493126	0.5	0.44	0.4	0.6	0.7	3174	0.00827349	0.8	0.6	1833	0.00517974	0.5	1838	0.00523829	0.5
AZ	12699	0.01704806	1.7	14646	0.0221507	2.2	12488	0.01891906	1.9	2.29	2.1	1.6	1.8	6510	0.01696925	1.7	1.7	6548	0.0185035	1.9	6659	0.01897811	1.9
CA	177722	0.23858697	23.9	159732	0.24157968	24.2	157277	0.23827141	23.8	20.7	20.7	27.2	20.7	111732	0.29124558	29.1	25.4	93156	0.26324252	26.3	97660	0.27833036	27.8
CO	20134	0.02702935	2.7	14225	0.02151398	2.2	14747	0.0223414	2.2	2.37	2.4	1.1	2.6	4664	0.01215739	1.2	1.6	5729	0.01618915	1.6	6450	0.01838246	1.8
CT	5175	0.0069473	0.7	4482	0.0067786	0.7	4627	0.00700981	0.7	0.72	0.7	0.8	0.7	3101	0.0080832	0.8	0.9	2719	0.00768342	0.8	2570	0.00732448	0.7
DC	5633	0.00756215	0.8	5320	0.008046	0.8	6044	0.00915654	0.9	0.97	1	1	1.1	3696	0.00963416	1	1.1	3821	0.01079748	1.1	3683	0.01049653	1
DE	1089	0.00146195	0.1	1061	0.00160466	0.2	933	0.00141348	0.1	0.18	0.2	0.2	0.2	575	0.00149882	0.1	0.2	602	0.00170115	0.2	753	0.00214605	0.2
FL	62229	0.08354075	8.4	48069	0.07269986	7.3	50158	0.07598833	7.6	8.65	8.9	9.4	8.7	31359	0.08174176	8.2	8	26325	0.07438983	7.4	24201	0.06897269	6.9
GA	21793	0.02925651	2.9	19639	0.02970215	3	19095	0.02892853	2.9	3.17	3.1	4	3.2	12880	0.03357358	3.4	3.5	9702	0.02741615	2.7	9265	0.02640519	2.6
HI	4583	0.00615255	0.6	6070	0.00918031	0.9	6061	0.00918229	0.9	0.9	0.4	0.8	1	3355	0.00874529	0.9	1	4307	0.01217083	1.2	4590	0.01308147	1.3
IA	5173	0.00694461	0.7	2734	0.00413492	0.4	3346	0.00506912	0.5	0.53	0.5	0.4	0.5	1524	0.00397253	0.4	0.4	1501	0.00424156	0.4	1543	0.00439754	0.4
ID	1451	0.00194793	0.2	1749	0.0026452	0.3	1464	0.00221793	0.2	0.3	0.4	0.3	0.3	1084	0.0028256	0.3	0.3	1172	0.00331187	0.3	1284	0.00365939	0.4
IL	17133	0.02300059	2.3	15487	0.02342264	2.3	14724	0.02230656	2.2	2.19	2.2	2	2.2	7958	0.02074368	2.1	2.1	8152	0.02303612	2.3	6986	0.01991005	2
IN	9730	0.01306226	1.3	7358	0.01112829	1.1	7395	0.01120327	1.1	1.09	1	0.9	1	3751	0.00977752	1	1.1	3914	0.01106028	1.1	3824	0.01089837	1.1
KS	5082	0.00682245	0.7	2111	0.00319269	0.3	1738	0.00263303	0.3	0.29	0.3	0.4	0.4	1480	0.00385783	0.4	0.4	1466	0.00414266	0.4	1228	0.00349979	0.3
KY	7045	0.00945772	0.9	8061	0.01219151	1.2	8137	0.01232739	1.2	0.93	1	1	0.8	3302	0.00860714	0.9	0.9	3151	0.00890417	0.9	2949	0.00840463	0.8
LA	6937	0.00931273	0.9	5494	0.00830916	0.8	5481	0.0083036	0.8	1.94	1.9	2	1.2	3908	0.01018677	1	1	3217	0.00909068	0.9	3176	0.00905158	0.9
MA	13647	0.01832073	1.8	15127	0.02287817	2.3	14506	0.02197629	2.2	2.41	2.6	1.6	2.8	6694	0.01744888	1.7	1.9	6378	0.01802311	1.8	6434	0.01833686	1.8
MD	8697	0.01167549	1.2	9628	0.01456145	1.5	9219	0.01396659	1.4	1.82	1.7	1.6	1.5	5221	0.01360929	1.4	1.4	5383	0.01521141	1.5	4983	0.01420152	1.4
ME	2638	0.00354144	0.4	2638	0.00398973	0.4	2632	0.00398743	0.4	0.38	0.4	0.3	0.4	1563	0.00407419	0.4	0.4	1219	0.00344468	0.3	1321	0.00376484	0.4
MI	25736	0.03454988	3.5	28295	0.04279354	4.3	28248	0.04279514	4.3	2.18	2	1.9	2	7236	0.01886168	1.9	2.1	6546	0.01849785	1.8	5803	0.01653851	1.7
MN	6865	0.00921608	0.9	7323	0.01107535	1.1	7644	0.0115805	1.2	1.2	1.2	1.2	0.9	3728	0.00971757	1	1	3622	0.01023514	1	3669	0.01045663	1
MO	8798	0.01181108	1.2	1150	0.00173927	0.2	7687	0.01164565	1.2	1.08	1.3	1.2	1.6	4652	0.01212611	1.2	1.2	3434	0.00970388	1	3810	0.01085848	1.1
MS	3181	0.00427041	0.4	1377	0.00208258	0.2	1961	0.00297087	0.3	0.43	0.4	0.6	0.4	1753	0.00456945	0.5	0.5	1475	0.00416809	0.4	1299	0.00370214	0.4
MT	1331	0.00178683	0.2	1150	0.00173927	0.2	1417	0.00214673	0.2	0.19	0.3	0.3	0.3	1211	0.00315665	0.3	0.3	1127	0.0031847	0.3	844	0.00240539	0.2
NC	12414	0.01666546	1.7	11802	0.01784942	1.8	12411	0.01880241	1.9	2.01	1.9	2.1	2.1	7530	0.01962803	2	2.1	7156	0.0202216	2	6396	0.01822856	1.8
ND	614	0.00082428	0.1	636	0.00096189	0.1	615	0.00093171	0.1	0.12	0.1	0.1	0.1	1230	0.00320617	0.3	0.2	864	0.00244151	0.2	662	0.0018867	0.2
NE	4108	0.00551488	0.6	3531	0.00534031	0.5	3985	0.00603719	0.6	0.58	0.6	0.6	0.6	1892	0.00493177	0.5	0.5	1720	0.00486042	0.5	1880	0.00535799	0.5
NH	3081	0.00413616	0.4	2248	0.00339989	0.3	2019	0.00305874	0.3	0.26	0.2	0.2	0.2	798	0.0020801	0.2	0.2	778	0.00219849	0.2	827	0.00235694	0.2
NJ	16959	0.022767	2.3	17314	0.0261858	2.6	13832	0.02095519	2.1	2.05	2.1	1.7	2.1	6093	0.01588228	1.6	1.8	6189	0.01748903	1.7	5540	0.01578896	1.6
NM	5256	0.00705604	0.7	3015	0.0045599	0.5	3015	0.00456766	0.5	0.54	0.5	0.6	0.5	1786	0.00465547	0.5	0.5	1666	0.00470782	0.5	1556	0.00443459	0.4
NV	12990	0.01743872	1.7	12526	0.0189444	1.9	12610	0.01910389	1.9	2.25	2.3	2.3	1.6	7597	0.01980268	2	2.6	7858	0.02220533	2.2	6853	0.01953101	2
NY	69930	0.09387913	9.4	62601	0.09467814	9.5	61125	0.09260311	9.3	9.5	10.2	6.8	11	31235	0.08141854	8.1	9.1	36135	0.10211117	10.2	35315	0.10064752	10.1
OH	15435	0.02072107	2.1	11264	0.01703574	1.7	12912	0.01956141	2	1.97	2	2	2.2	7611	0.01983917	2	2.2	7565	0.02137736	2.1	6946	0.01979605	2
OK	3449	0.00463019	0.5	4221	0.00638387	0.6	3846	0.00582661	0.6	0.75	0.8	0.8	0.8	3179	0.00828652	0.8	0.8	2781	0.00785862	0.8	2997	0.00854143	0.9
OR	15171	0.02036666	2	17590	0.02660323	2.7	20653	0.03128887	3.1	2.69	3	2.4	2.5	8994	0.02344416	2.3	2.2	9461	0.02673513	2.7	9379	0.02673009	2.7
PA	14817	0.01989142	2	16220	0.02453123	2.5	15378	0.02329735	2.3	2.35	2.3	2	2.3	7973	0.02078278	2.1	2.3	8605	0.02431622	2.4	8599	0.02450709	2.5
RI	1440	0.00193316	0.2	1372	0.00207502	0.2	1196	0.00181192	0.2	0.25	0.2	0.2	0.2	862	0.00224693	0.2	0.2	706	0.00199503	0.2	859	0.00244814	0.2
SC	9614	0.01290653	1.3	5660	0.00856022	0.9	5660	0.00857478	0.9	0.7	0.7	0.9	0.8	4736	0.01234507	1.2	1.1	3934	0.01111679	1.1	3758	0.01071028	1.1
SD	1029	0.0013814	0.1	579	0.00087568	0.1	579	0.00087717	0.1	0.11	0.1	0.1	0.1	557	0.0014519	0.1	0.1	630	0.00178027	0.2	548	0.0015618	0.2
TN	9560	0.01283404	1.3	11210	0.01695407	1.7	9705	0.01470287	1.5	1.64	1.6	1.6	1.5	6909	0.01800931	1.8	1.9	6516	0.01841307	1.8	6652	0.01895816	1.9
TX	49242	0.06610605	6.6	39788	0.06017562	6	40190	0.06088702	6.1	5.72	5.5	5.9	5.4	20758	0.05410872	5.4	5.4	16265	0.04596204	4.6	15959	0.04548305	4.5
UT	3681	0.00494164	0.5	3011	0.00455386	0.5	3434	0.00520244	0.5	0.59	0.5	0.6	0.6	1959	0.00510642	0.5	0.5	1809	0.00511192	0.5	1828	0.00520979	0.5
VA	9755	0.01309582	1.3	9746	0.01473991	1.5	8469	0.01283036	1.3	1.38	1.4	1.3	1.3	4532	0.01181331	1.2	1.2	4190	0.01184021	1.2	3959	0.01128312	1.1
VT	989	0.00132771	0.1	1035	0.00156534	0.2	954	0.00144529	0.1	0.19	0.2	0.2	0.2	701	0.00182726	0.2	0.2	910	0.0025715	0.3	655	0.00186675	0.2
WA	22180	0.02977605	3	23379	0.03535855	3.5	21954	0.03325986	3.3	3.54	3.6	2.7	3.2	10617	0.02767474	2.8	3.2	12526	0.03539628	3.5	13900	0.03961491	4
WI	6509	0.00873816	0.9	5648	0.00854207	0.9	5449	0.00825512	0.8	1.01	1	0.7	1	3005	0.00783297	0.8	0.8	2992	0.00845487	0.8	2886	0.00822508	0.8
WV	1307	0.00175461	0.2	2409	0.00364339	0.4	2016	0.0030542	0.3	0.26	0.4	0.4	0.4	1544	0.00402466	0.4	0.4	1414	0.00399572	0.4	1039	0.00296114	0.3
WY	529	0.00071017	0.1	537	0.00081216	0.1	751	0.00113775	0.1	0.08	0.1	0.1	0.3	677	0.0017647	0.2	0.1	500	0.00141291	0.1	517	0.00147345	0.1

Table 4: Original State Data

C.2: County Level Excel Sheet – % of Population Homeless

Counties	Marin	Monterey	San Benito		San Francisco	Santa Clara	Santa Cruz	Solano	Sonoma
2007		1159			5799	7202	2789		
2009		1881			5965	7086	2265		3247
2011		2022	~193-fam		6455	7067	2771		4539
2013		2590	252		6436	7631	3536		4280
2015	1309	2308	315		6686	6556	1964	1082	3107
2017		2837					2249		

2015	Marin	Monterey	San Benito	San Francisco	Santa Clara	Santa Cruz	Solano	Sonoma
Homeless Individuals	1309	2308	315	6686	6556	2249	1082	3107
County Populations	261221	433898	58792	864816	1918000	274146	436092	502146
H.I. / C.P. (%)	0.5	0.53	0.54	0.77	0.34	0.82	0.25	0.62

Table 5 & 6: County Population Numbers

C.3: County Level Excel Sheet – Residency Data

2015	Marin	Monterey	San Benito	San Jose	San Francisco	Santa Clara	Santa Cruz	Solano	Sonoma
Resident in county when became homeless	71%	78%	86%	84%	71%	84%	84%	88%	86%
Lived in county for 10+ yrs	39%	57%	62%	77%	49%	50%	60%	47%	58%
Lived in county for 5-9 yrs	19%	14%	15%	23%	40%		14%	22%	13%
Lived in county for 1-4 yrs	30%	21%	11%				21%	19%	17%
Lived in county for < 1 yrs	12%	7%	13%		11%	50%	5%	12%	12%

Table 7: County Residence Data

C.4: Jurisdiction Level Excel Sheet – San Francisco

Jurisdictions	District 1	District 2	District 3	District 4	District 5	District 6	District 7	District 8	District 9	District 10	District 11
2009	120	60	189	74	115	1167	45	92	132	444	43
2011	115	179	218	83	199	2611	57	108	309	2121	69
2013	364	24	393	136	344	3257	19	163	571	1934	52
2015	77	60	242	7	492	4191	29	342	410	1272	130

2009	District 1	District 2	District 3	District 4	District 5	District 6	District 7	District 8	District 9	District 10	District 11	
Homeless Individuals	120	60	189	74	115	1167	45	92	132	444	43	
Jurisdiction Populations	71993	64238	49249	73746	95855	81079	39046	53488	117120	68654	41043	~ -0.1% Pop. Change from 2013
H.I. / C.P. (%)	0.17	0.09	0.38	0.1	0.12	1.44	0.12	0.17	0.11	0.65	0.1	

2011	District 1	District 2	District 3	District 4	District 5	District 6	District 7	District 8	District 9	District 10	District 11	
Homeless Individuals	115	179	218	83	199	2611	57	108	309	2121	69	
Jurisdiction Populations	72066	64303	49299	73820	95951	81161	39086	53542	117238	68723	41085	~ -1% Pop. Change from 2013
H.I. / C.P. (%)	0.16	0.28	0.44	0.11	0.21	3.22	0.15	0.2	0.26	3.09	0.17	

2013	District 1	District 2	District 3	District 4	District 5	District 6	District 7	District 8	District 9	District 10	District 11	
Homeless Individuals	364	24	393	136	344	3257	19	163	571	1934	52	
Jurisdiction Populations	72794	64953	49797	74566	96921	81981	39481	54083	118423	69418	41500	~ -1% Pop. Change from 2015
H.I. / C.P. (%)	0.5	0.04	0.79	0.18	0.35	3.97	0.05	0.3	0.48	2.79	0.13	

2015	District 1	District 2	District 3	District 4	District 5	District 6	District 7	District 8	District 9	District 10	District 11	
Homeless Individuals	77	60	242	242	492	4191	29	342	410	1272	130	
Jurisdiction Populations	73530	65610	50300	75320	97900	82810	39880	54630	119620	70120	41920	Actual Pop. Data
H.I. / C.P. (%)	0.1	0.09	0.48	0.32	0.5	5.06	0.07	0.63	0.34	1.81	0.31	

2015 Control Pop. Values for above	73530	65610	50300	75320	97900	82810	39880	54630	119620	70120	41920
	Inner Richmond 35330	Marina 21240	Chinatown 10000	Outer Sunset 47460	Haight Ashbury 21380	Downtown 42900	Lakeshore 19580	Castro-Upper Market 19820	Bernal Heights 25940	Potrero Hill 12440	Ocean View 28670
	Outer Richmond 36440	Pacific Heights 19020	Financial District 6160	Parkside 27860	Inner Sunset 25320	South of Market 39910	W of Twin Peaks 20300	Diamond Heights 2450	Excelsior 38300	Bayview 33990	Crocker Amazon 13250
	Seacliff 1760	Presidio Heights 7770	Nob Hill 21900		Western Addition 51200			Glen Park 6460	Mission 55380	Visitacion Valley 23690	
		Russian Hill 17580	North Beach 12240					Noe Valley 18930			
								Twin Peaks 6970			

Table 8: SF Jurisdiction Data

C.5: Jurisdiction Level Excel Sheet – Santa Cruz

Jurisdictions	Capitola	Santa Cruz	Scotts Valley	Watsonville	Aptos	Live Oak	North Coast	San Lorenzo Valley	Soquel	South County
2009	11	901	0	561	15	109	148	410	26	43
2011	14	676	13	344	211	322	60	90	143	252
2013	1	892	25	497	218	687	30	159	137	141
2015	12	831	14	440	522					
2017	21	1204	19	463	542					

2009	Capitola	Santa Cruz	Scotts Valley	Watsonville	Aptos	Live Oak	San Lorenzo Valley	Soquel
Homeless Individuals	11	901	0	561	15	109	410	26
Jurisdiction Populations	9781	56810	11266	51053	9216	17158	23452	9634
H.I. / J.P. (%)	0.11	1.59	0	1.1	0.16	0.64	1.75	0.27

2011	Capitola	Santa Cruz	Scotts Valley	Watsonville	Aptos	Live Oak	San Lorenzo Valley	Soquel
Homeless Individuals	14	676	13	344	211	322	60	90
Jurisdiction Populations	9970	61442	11631	51580	9100	17290	26580	10220
H.I. / J.P. (%)	0.14	1.1	0.11	0.67	2.32	1.86	0.23	0.88

2013	Capitola	Santa Cruz	Scotts Valley	Watsonville	Aptos	Live Oak	San Lorenzo Valley	Soquel
Homeless Individuals	1	892	25	497	218	687	30	159
Jurisdiction Populations	10070	62769	11758	52412	6200	18019	24817	10827
H.I. / J.P. (%)	0.01	1.42	0.21	0.95	3.52	3.81	0.12	1.47

2015	Capitola	Santa Cruz	Scotts Valley	Watsonville
Homeless Individuals	12	831	14	522
Jurisdiction Populations	10169	64112	11925	53519
H.I. / J.P. (%)	0.12	1.3	0.12	0.98

2017	Capitola	Santa Cruz	Scotts Valley	Watsonville
Homeless Individuals	21	1204	19	463
Jurisdiction Populations	10180	64465	11928	53796
H.I. / J.P. (%)	0.21	1.87	0.16	0.86

Table 9: Santa Cruz Jurisdiction Data

C.6: Jurisdiction Level Excel Sheet – Santa Clara

Jurisdictions	Campbell	Cupertino	Gilroy	Los Altos	Los Gatos	Milpitas	Monte Sereno	Morgan Hill	Mountain View	Palo Alto	San Jose	Santa Clara	Saratoga	Sunnyvale
2009	44	61	599	97	20	70	4	104	76	178	4193	474	23	349
2011	103	49	520	5	18	139	11	211	37	151	4034	396	7	374
2013	91	112	379	6	11	95	1	61	139	157	4770	478	35	425
2015	53	73	439	18	1	122	1	81	276	219	4063	377	10	288

2009	Campbell	Cupertino	Gilroy	Los Altos	Los Gatos	Milpitas	Monte Sereno	Morgan Hill	Mountain View	Palo Alto	San Jose	Santa Clara	Saratoga	Sunnyvale
Homeless Individuals	44	61	599	97	20	70	4	104	76	178	4193	474	23	349
Jurisdiction Populations	38889	54278	50207	28622	29501	67895	3657	38547	74066	60171	964695	111997	30657	133963
H.I. / C.P. (%)	0.11	0.11	1.19	0.34	0.07	0.1	0.11	0.27	0.1	0.3	0.43	0.42	0.08	0.26

2011	Campbell	Cupertino	Gilroy	Los Altos	Los Gatos	Milpitas	Monte Sereno	Morgan Hill	Mountain View	Palo Alto	San Jose	Santa Clara	Saratoga	Sunnyvale
Homeless Individuals	103	49	520	5	18	139	11	211	37	151	4034	396	7	374
Jurisdiction Populations	39825	59213	49649	29462	29852	67145	3418	38763	75235	65398	970823	117934	30342	143868
H.I. / C.P. (%)	0.26	0.08	1.05	0.02	0.06	0.21	0.32	0.54	0.05	0.23	0.42	0.34	0.02	0.26

2013	Campbell	Cupertino	Gilroy	Los Altos	Los Gatos	Milpitas	Monte Sereno	Morgan Hill	Mountain View	Palo Alto	San Jose	Santa Clara	Saratoga	Sunnyvale
Homeless Individuals	91	112	379	6	11	95	1	61	139	157	4770	478	35	425
Jurisdiction Populations	40698	60226	51833	29999	30441	69956	3499	40945	76260	66654	1002000	120570	30938	148089
H.I. / C.P. (%)	0.22	0.19	0.73	0.02	0.04	0.14	0.03	0.15	0.18	0.24	0.48	0.4	0.11	0.29

2015	Campbell	Cupertino	Gilroy	Los Altos	Los Gatos	Milpitas	Monte Sereno	Morgan Hill	Mountain View	Palo Alto	San Jose	Santa Clara	Saratoga	Sunnyvale
Homeless Individuals	53	73	439	18	1	122	1	81	276	219	4063	377	10	288
Jurisdiction Populations	40955	60324	53008	30546	30578	77269	3536	42764	77973	66567	1023000	125697	30842	151119
H.I. / C.P. (%)	0.13	0.12	0.83	0.06	0	0.16	0.03	0.19	0.35	0.33	0.4	0.3	0.03	0.19

Table 10: Jurisdiction Data Santa Clara