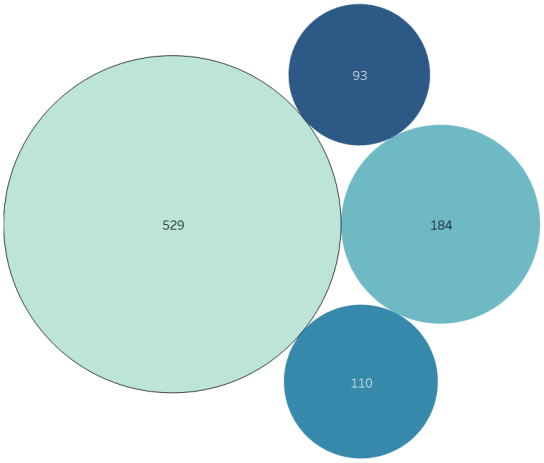
Validating and Explaining Food Desert Status – Our Research Method

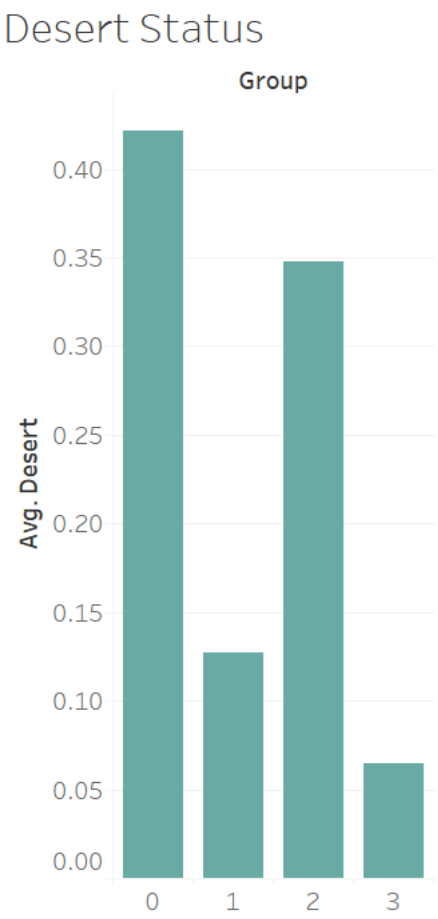
We aimed to both validate the concept of food desert status and to uncover the factors that drive whether a household belongs to a "food desert" designated census tract, particularly in Arizona.

Using data from the USDA Food Access Research Atlas, we considered several economic factors (i.e., poverty levels within the census tract), demographic factors (children, elders, or specific ethnicities in the population), and practical factors like number of grocery stores, percent of households with no vehicle, and number of bus stops within a tract.

Using KMeans clustering, our analyses of all the census tracts in Maricopa County revealed four distinct groups of census tracts, the largest consisting of 529 tracts.



Statistical tests (Multivariate Analysis of Variance) confirmed that the differences between these groups are significant on at least *some* variables on our list. Our next step was to determine which ones those are, using Analysis of Variance (ANOVA) for each variable. For example, we examined what percent of a group of census tracts contained households in poverty, versus each of the other groups. Then, we conducted *post hoc analyses* to determine how each group compared to each of the others.

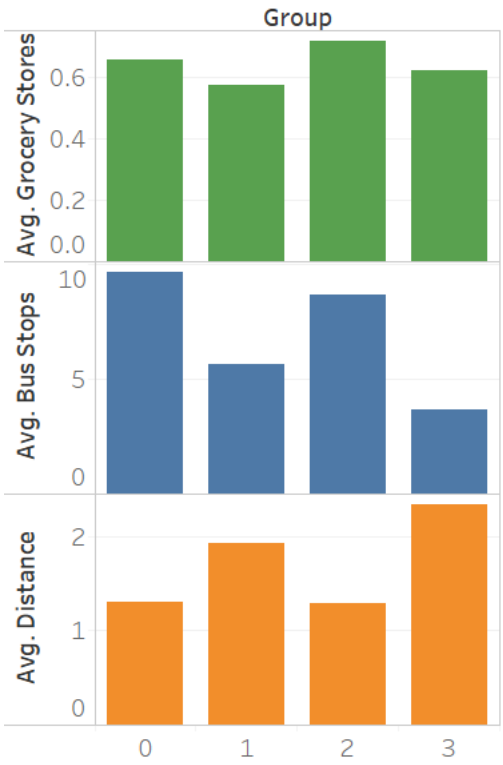


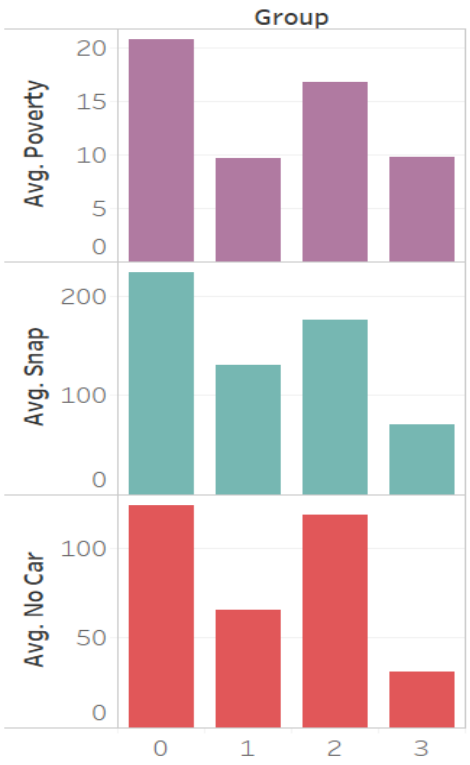
In a nutshell, we indeed did find that two of the four groups (Groups 0 and group 2, above) contained significantly more food deserts than the others. This bolsters the argument that food desert status is a coherent concept representing a real facet of people's experience.

But what, more specifically, characterizes the groups of census tracts that fall into food desert status?

We predicted food deserts would be distinguished by fewer grocery stores, lower access to vehicles, and fewer bus stops – all factors limiting households' access to fresh food. We undertook this project with the theory that adding more bus stops, specifically, within census tracts might alleviate the low access problem.

Surprisingly, our analyses revealed that the groups with higher numbers of food deserts (Groups 0 and 2) contained as many, if not more, grocery stores than the other groups. This is unexpected given that low access to groceries is a central feature of food desert status. Also a surprise, we found that the two groups high in food desert tracts contained more bus stops than the other groups, and that bus stops tended to be nearer to grocery stores within them.





Factors that *did* contribute to food desert status include poverty rates, SNAP access, and lack of access to a vehicle (See above).

Our initial hypothesis that policy makers might alleviate low food access through public transit is **not** supported by our analyses. We suggest it may be more useful to address poverty itself, perhaps through reconsidering the minimum wage. Another possibility is that residents cannot afford the time and strategizing necessary to use public transit for grocery shopping. Time, after all, is money, especially when one works an hourly wage. The hardship that comes with food desert status may, therefore, be driven not only by what one can afford to spend on food, but also whether it's feasible to get to that food in a convenient and cost-efficient way. If it is not feasible, people can turn instead to cheaper, plentiful, unhealthy fast food alternatives. Given the relationship between nutrition and many well-being indicators (like health) the ramifications may be a vicious cycle where poor nutrition serves to further exacerbate poverty status.

In sum, we were surprised by the lack of support for our theory that food access policy should focus on public transit. Yet, we are grateful for the opportunity to build on USDA research to clarify the concept of food desert status and to make better recommendations based on the data. We suggest that future research should examine at what threshold of income people are able to make consistent, healthy

nutritional choices. Finally, we were unable to determine the average distance between residents' homes and their nearest bus stop. We presume that the distance is shorter within food deserts given that more bus stops exist within them, but future research should seek to confirm this.