Seattle Mobility Index Project

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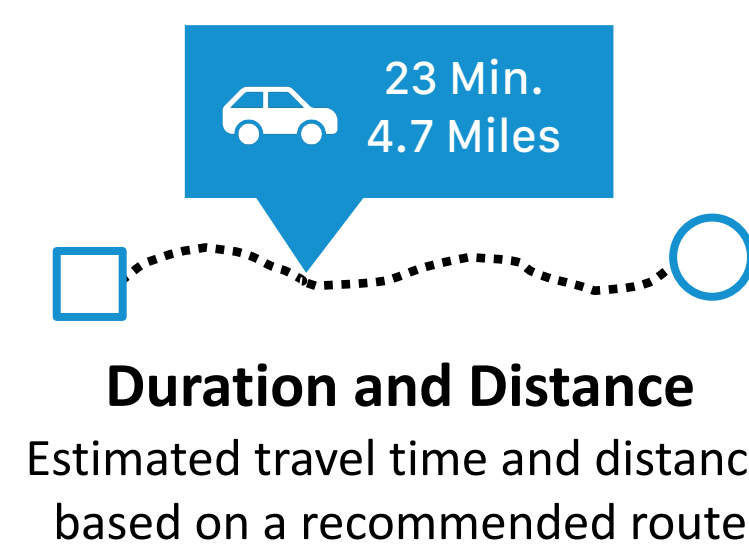
INTRODUCTION

- We define mobility as one's ability to reach a destination using their preferred transportation mode choice, both affordably and reliably.

- To measure mobility, we designed three indices: **Mode Choice**, **Affordability**, and **Reliability**.

- These indices can be used to find trends in Seattle's travel patterns, predict mode share, and identify areas where needs are not being met.
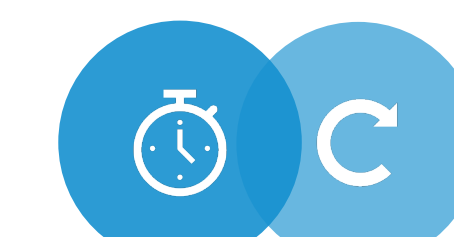
RAW MOBILITY DATA
Google Distance Matrix API
168,000 trips/day per mode

23 Min. 4.7 Miles

Duration and Distance
Estimated travel time and distance based on a recommended route

Modes of Transport
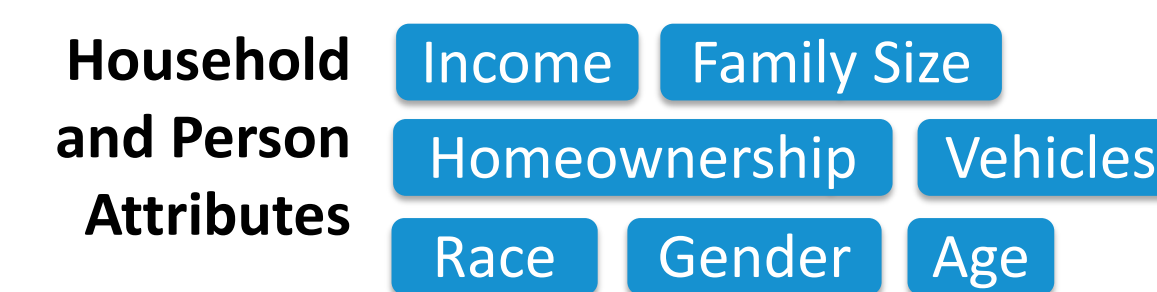Four modes, including transit wait and walking time

Traffic
Current and future travel time predictions

CALIBRATION AND TRAINING DATA
Puget Sound Regional Council (PSRC) Household Travel Survey
3,000 households; 50,000 trips

Trip Attributes: Time | Distance | Purpose | Mode | Origin | Destination

Household and Person Attributes: Income | Family Size | Homeownership | Vehicles | Race | Gender | Age

MOBILITY INDEX CALCULATIONS

The Seattle Mobility Indices are measured on the ability to reach a Market Basket of Destinations, or common travel categories derived from actual travel patterns, from each Block Group origin.
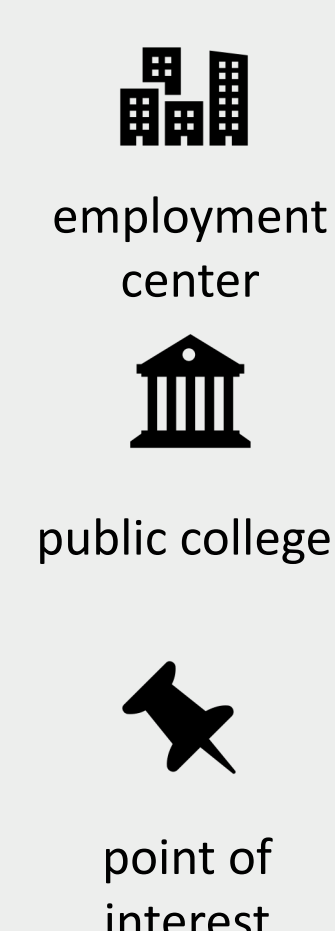
ORIGIN GEOGRAPHY

481
Census Block Groups

- Granular geographic division
- Typically 600-3000 people
- Supports data collaboration

BASKET of 25 DESTINATIONS

12 Localized Destinations
- 3 schools
- 2 supermarkets
- destination park
- urban village
- hospital
- library
- post office
- pharmacy
- cafe

13 Citywide Destinations
- employment center
- public college
- point of interest

MODE CHOICE

The **availability** of modes in to reach the destinations in the market basket
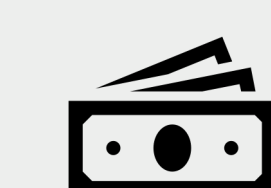
Travel Time Threshold
- 30 minutes (car)
- 60 minutes (transit)
- 45 minutes (bike)
- 45 minutes (walk)

AFFORDABILITY

The **relative cost** to reach destinations in the market basket
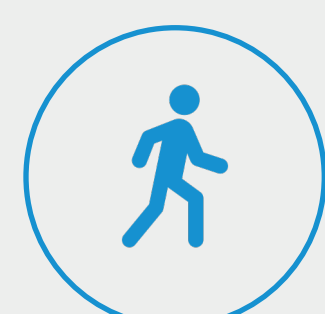
- $0.56 / mile + Parking Cost
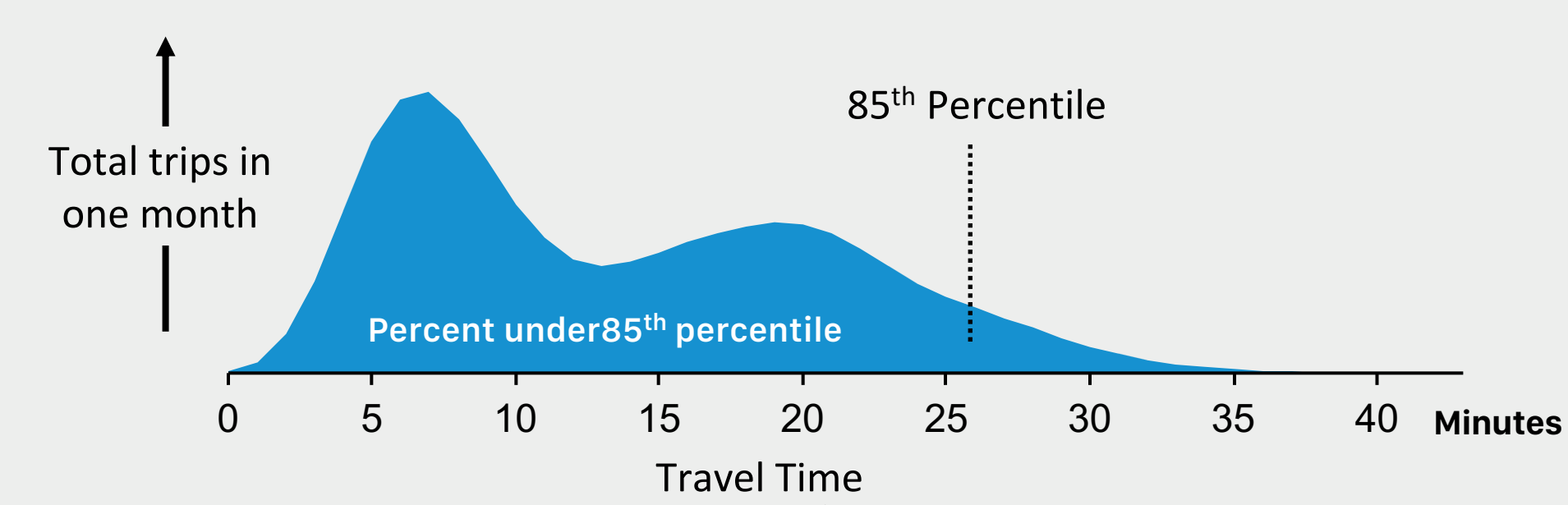- $2.75 / trip
- $0.15 / mile
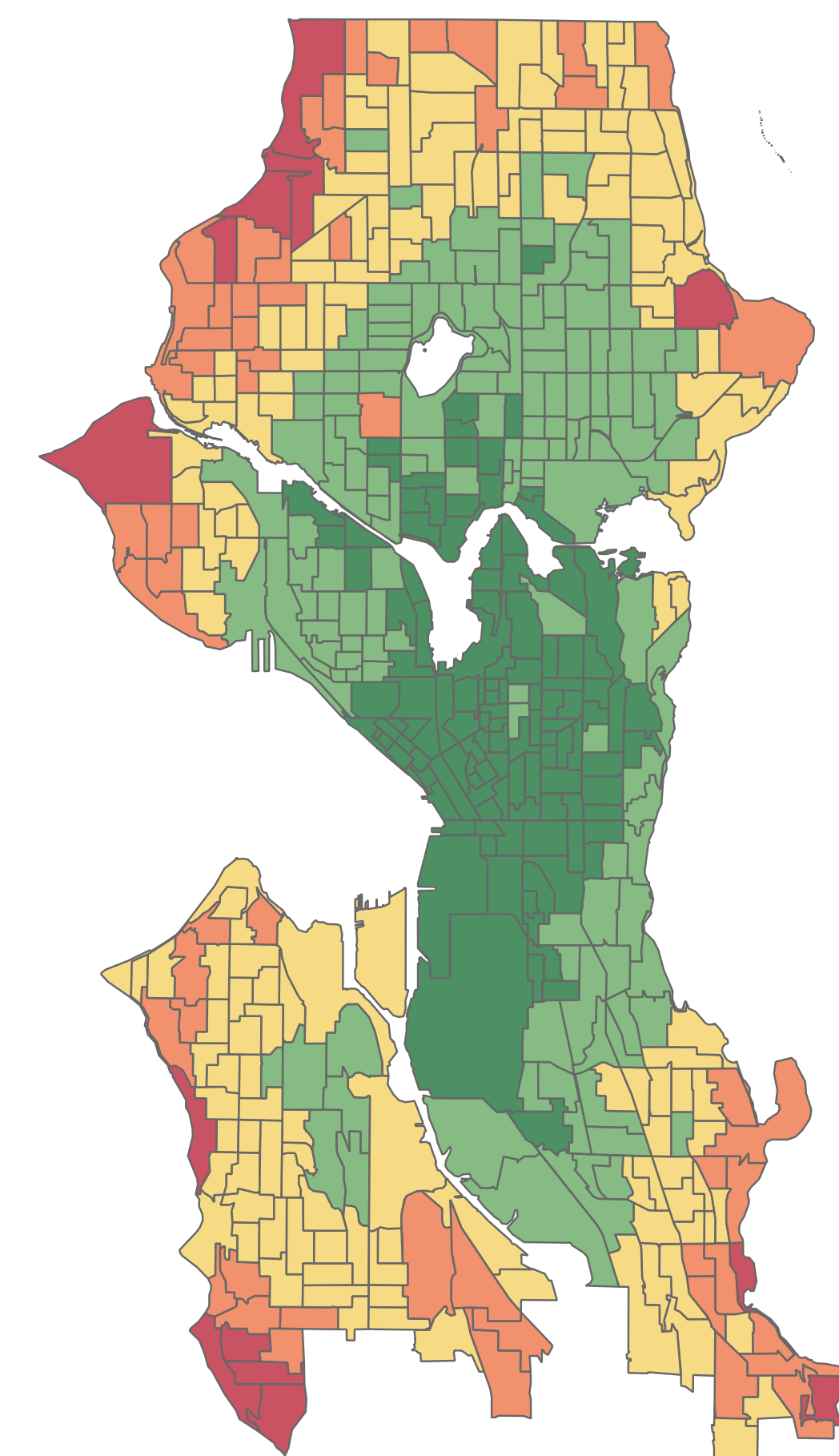- $0 / mile
- $14.10 / hr

RELIABILITY
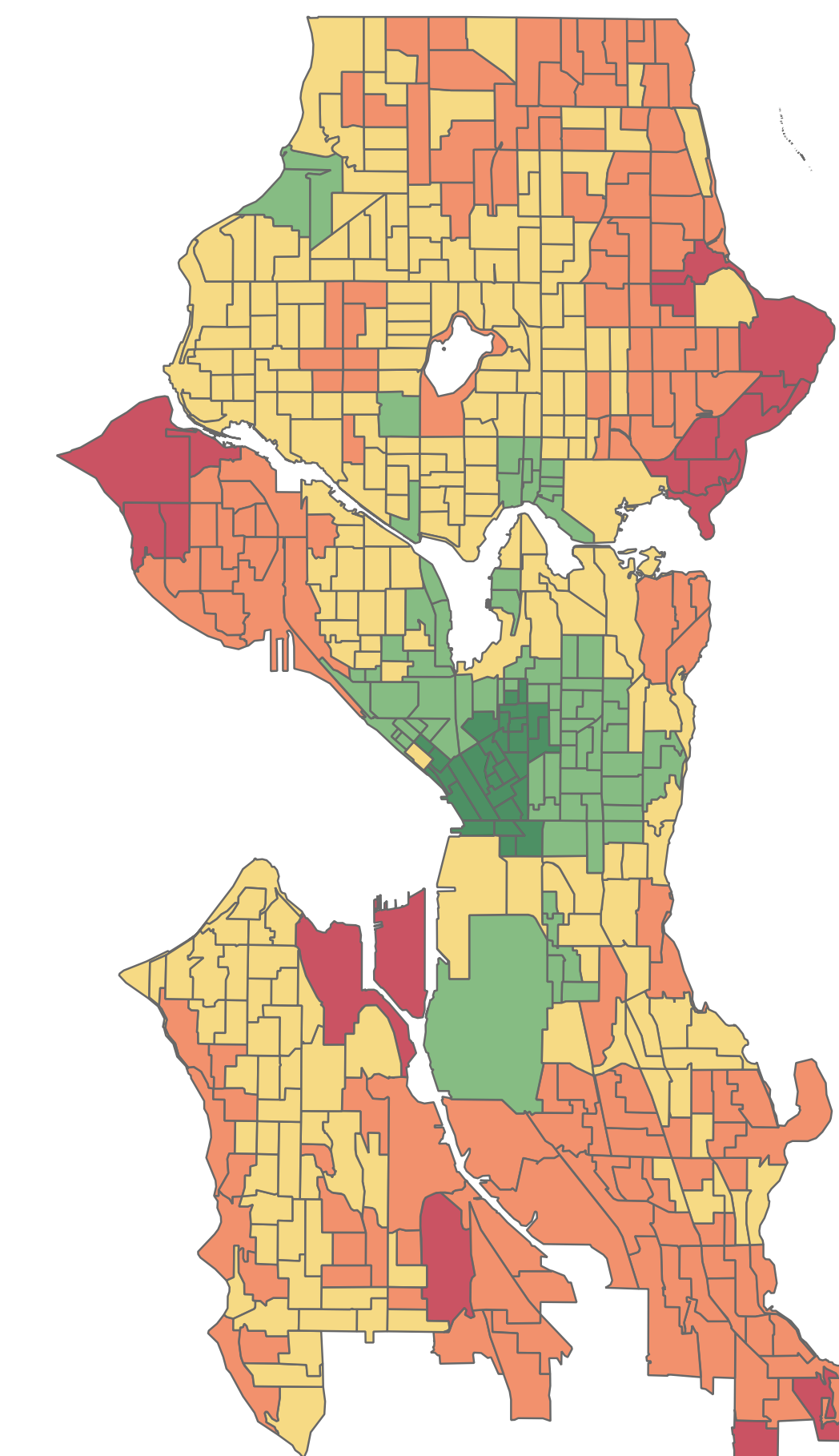
The **consistency** in travel duration over time

Total trips in one month

Percent under85th percentile

85th Percentile

0 5 10 15 20 25 30 35 40 Minutes
Travel Time

MODE CHOICE
0 — 100
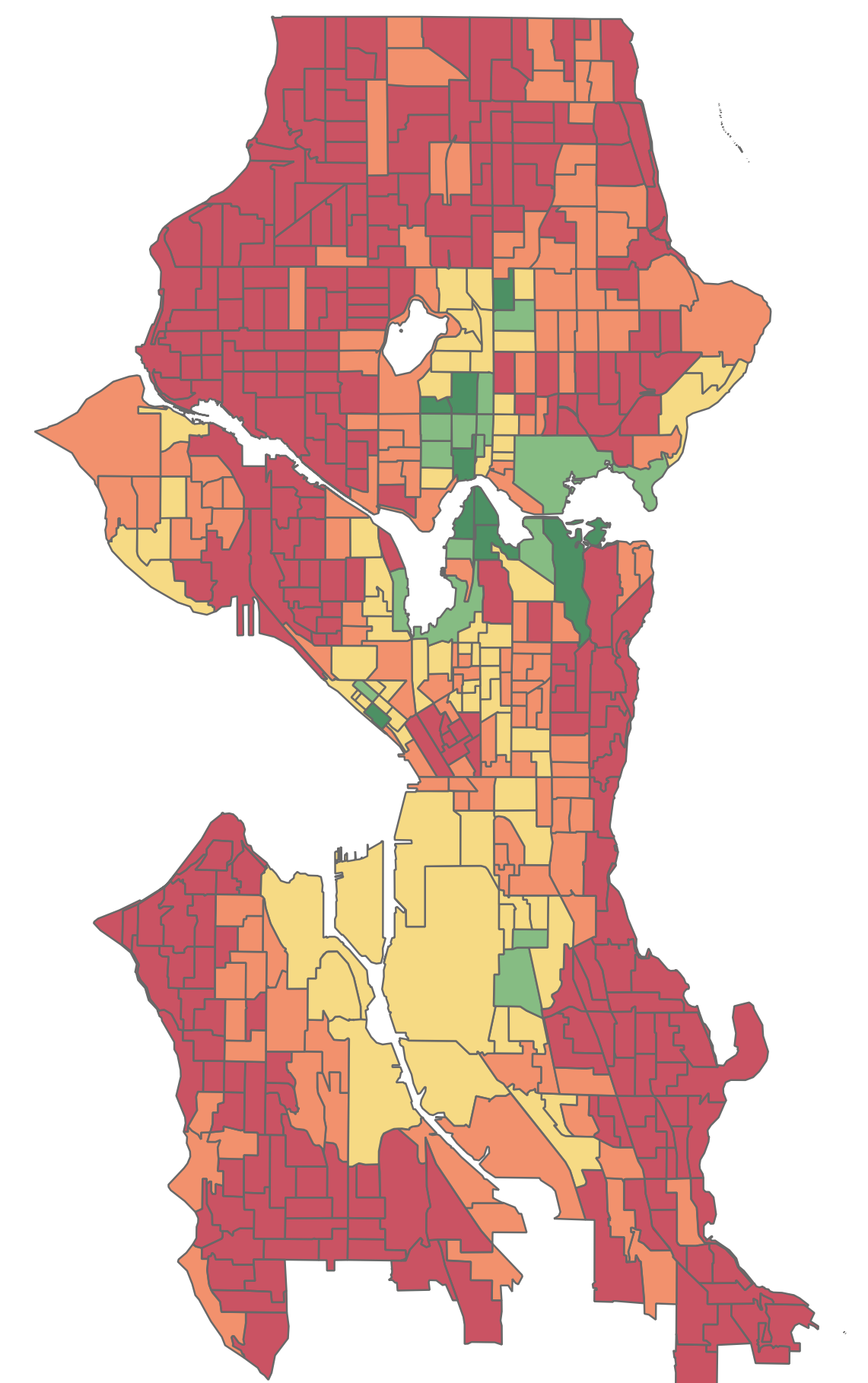**72**

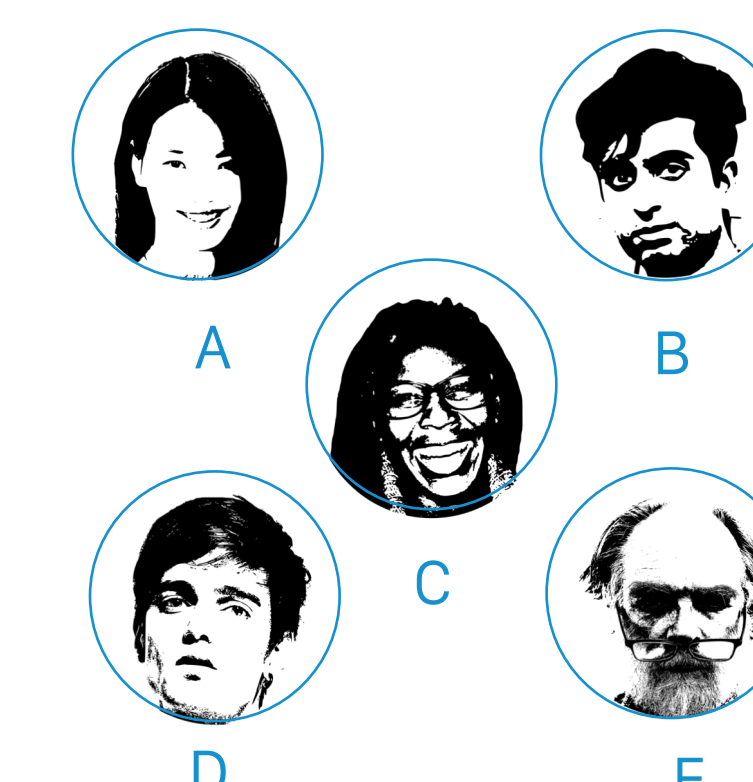## AFFORDABILITY
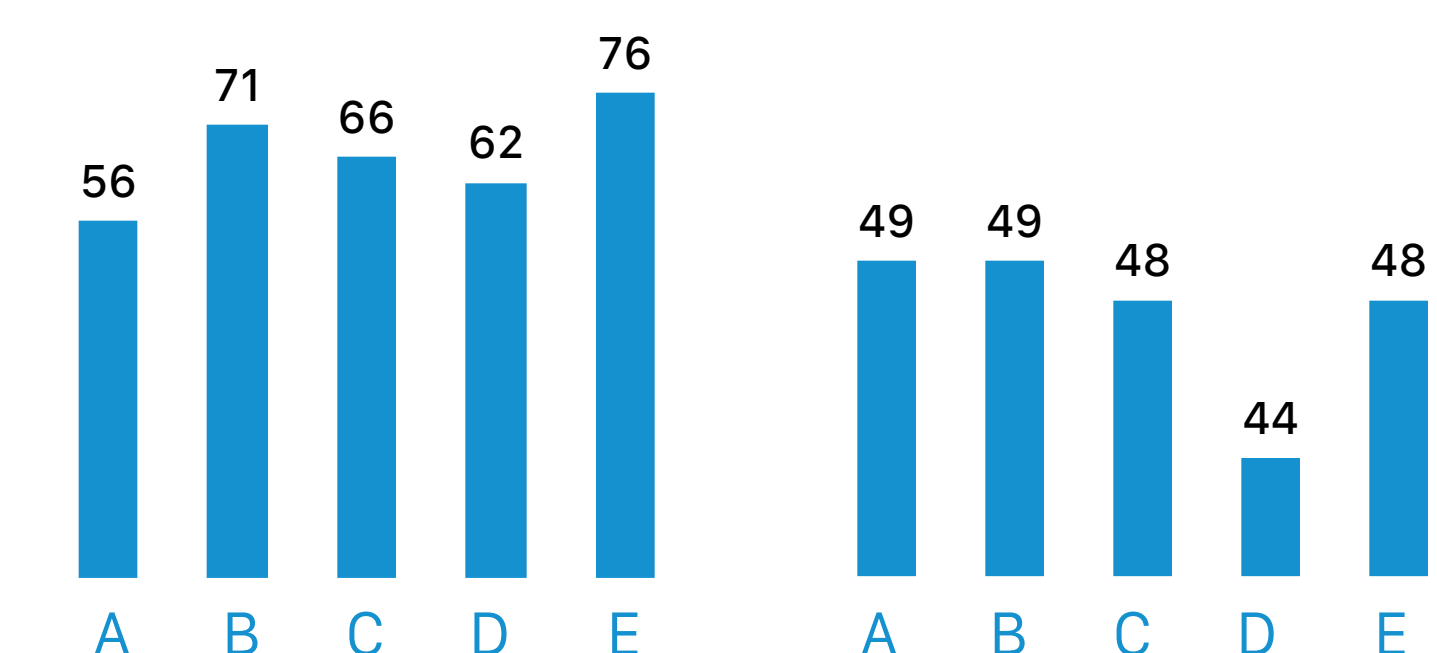0 — 100
48

RELIABILITY
0 — 100
24

TRAVEL PERSONA ADJUSTMENTS

Travelers may live in the same Block Group but have very different lifestyles. K-Means clustering helped develop personas that describe the needs, experiences, and travel patterns of distinct groups of people. The Mobility Indices can be tuned to reflect these personas.

Different Groups of People
A B C D E

Tuned Mode Choice
A 56 B 71 C 66 D 62 E 76

Tuned Affordability
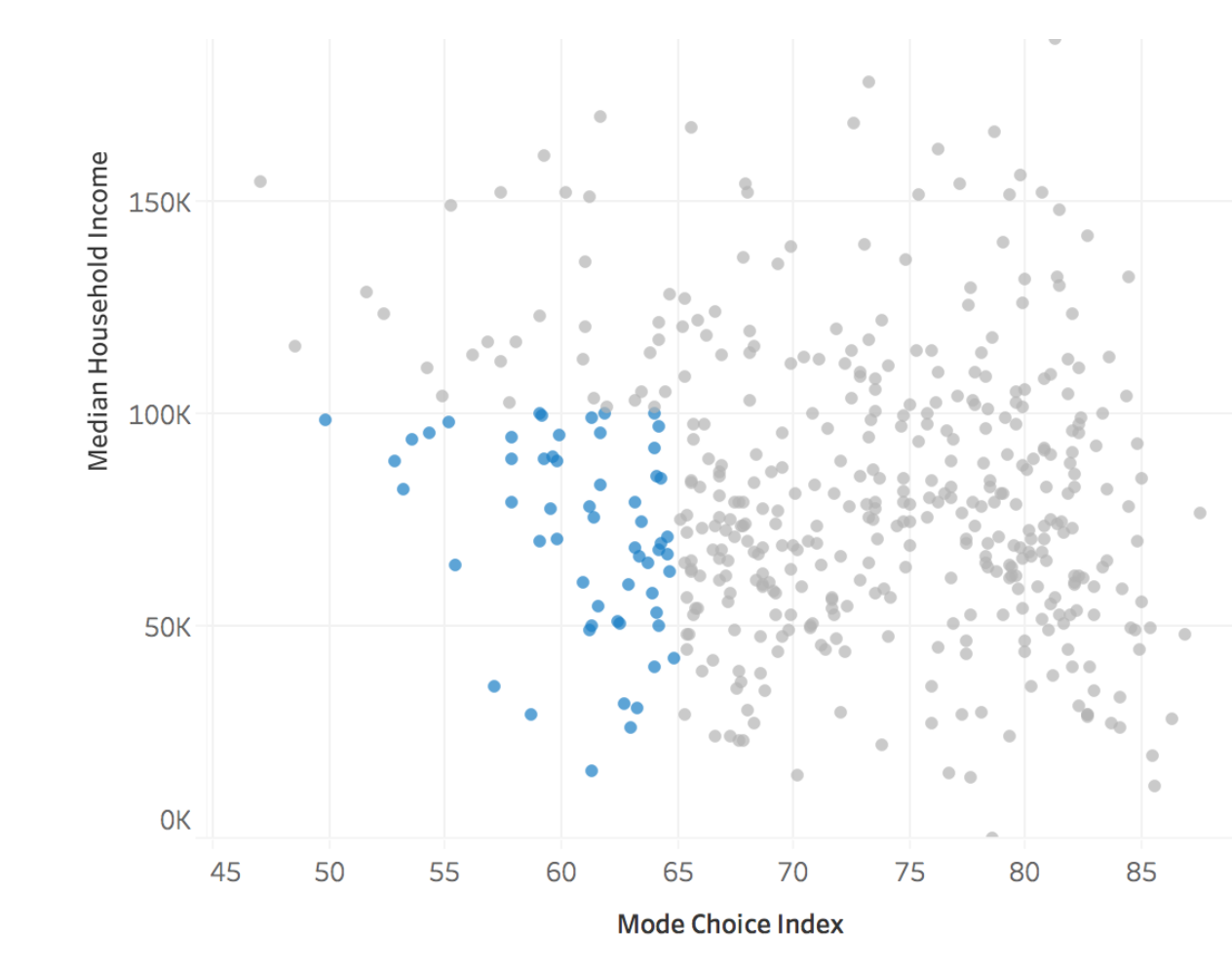A 49 B 49 C 48 D 44 E 48

USE CASES

Travel mode-share predictive model
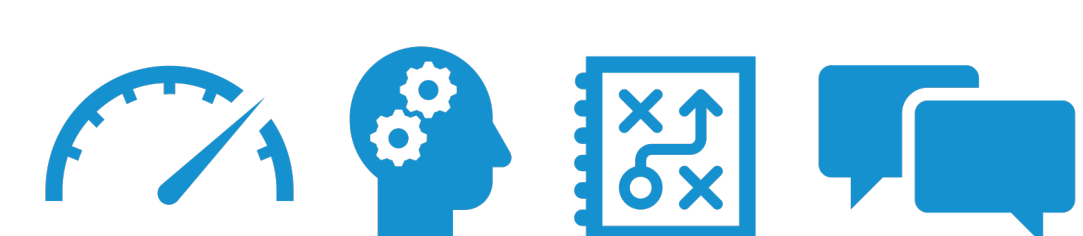
PSRC Travel Survey — **80% Accuracy**

Mode choice & affordability — **77% Accuracy**

Modeled drive-alone rates using only mobility indices as machine learning features scored comparatively to a similar approach that incorporates dozens of travel and household attributes from the PSRC Survey.

Identifying inequalities

Median Household Income
150K
100K
50K
0K
45 50 55 60 65 70 75 80 85
Mode Choice Index

Measuring System Impacts

The indicators will be baselined, tracked, and used to communicate the status and health of the transportation system, including before and after major system changes.

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Seattle Department of Transportation