MULTIMODAL ACCESS TO TWIN CITIES TRANSITWAYS

Source

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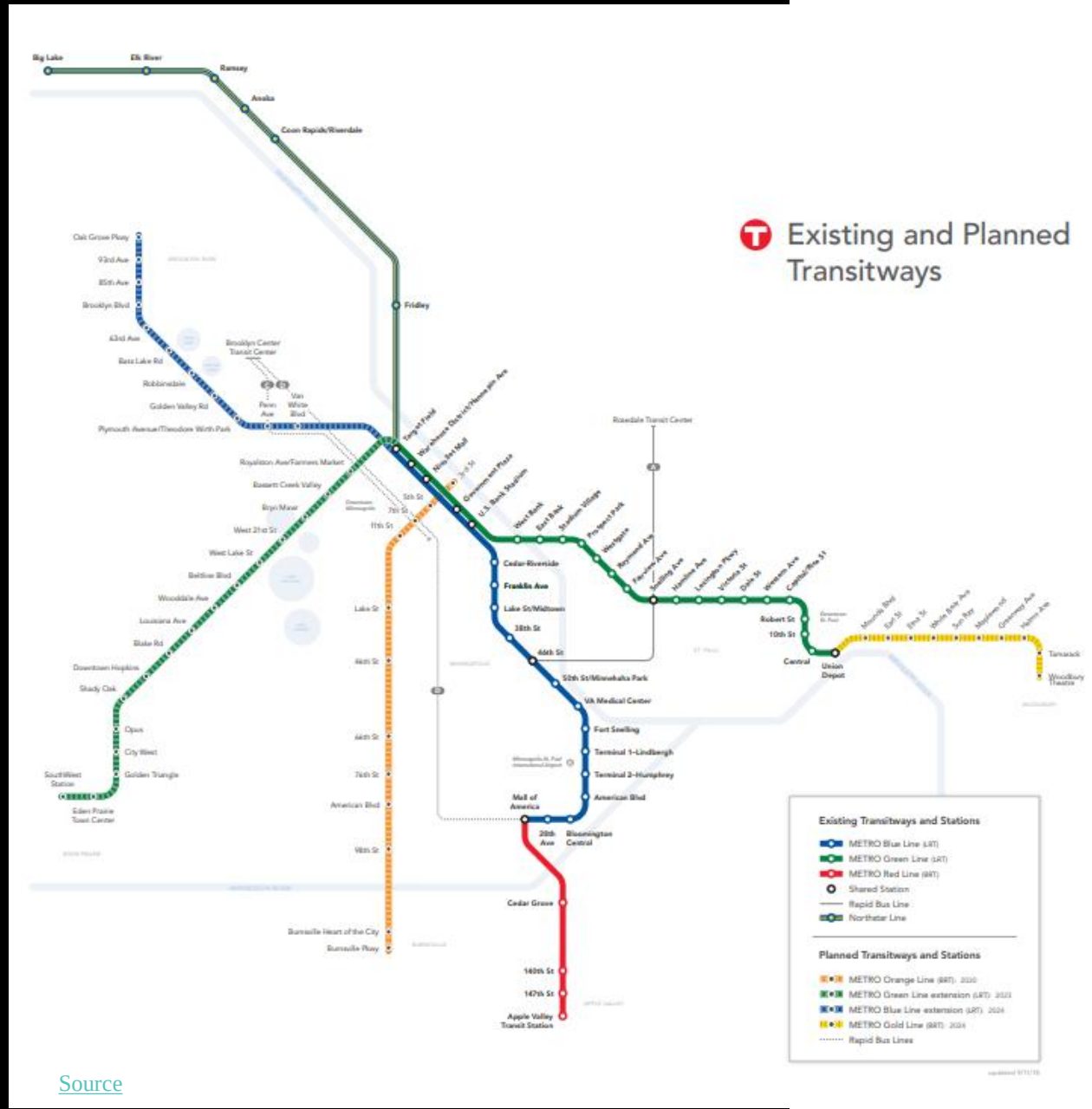
MOTIVATION

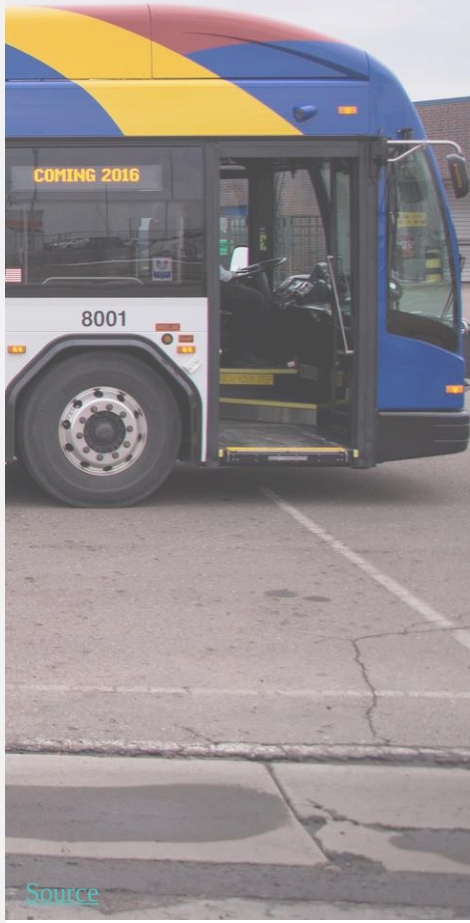


Source

OUTLINE

Modelling how transit customers choose to travel to Twin Cities Transitways

- Data
- Choice Set
- Models
- Results
- Takeaways



Source

TRAVEL BEHAVIOUR INVENTORY 2016 TRANSIT ONBOARD SURVEY

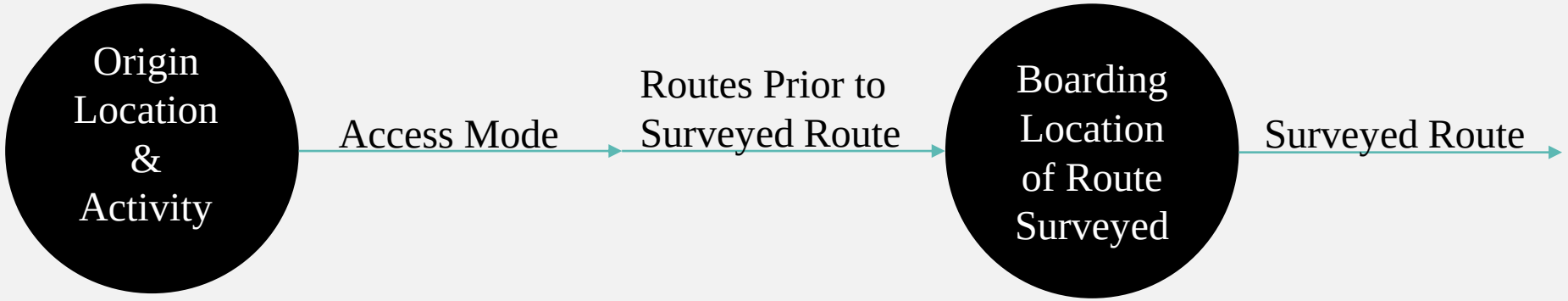
Overview

- Over 31,000 records
- Conducted in-person
- Complete trip information

Source

TRAVEL BEHAVIOUR INVENTORY 2016 TRANSIT ONBOARD SURVEY

Sample Record



TRAVEL BEHAVIOUR INVENTORY 2016 TRANSIT ONBOARD SURVEY

What choices did transitway riders have in terms of access mode?

Survey contains:

- Origin location
- Transitway boarding location
- Access mode from origin to boarding location
- Trip transfer information

What we need to infer:

- What would access to transitway boarding location using other modes look like:
  - Walking
  - Biking
  - Driving
  - Drop Off
  - Taxi/Transportation Network Company (TNC)
  - Local Transit

CHOICE SET GENERATION USING GOOGLE DIRECTIONS API

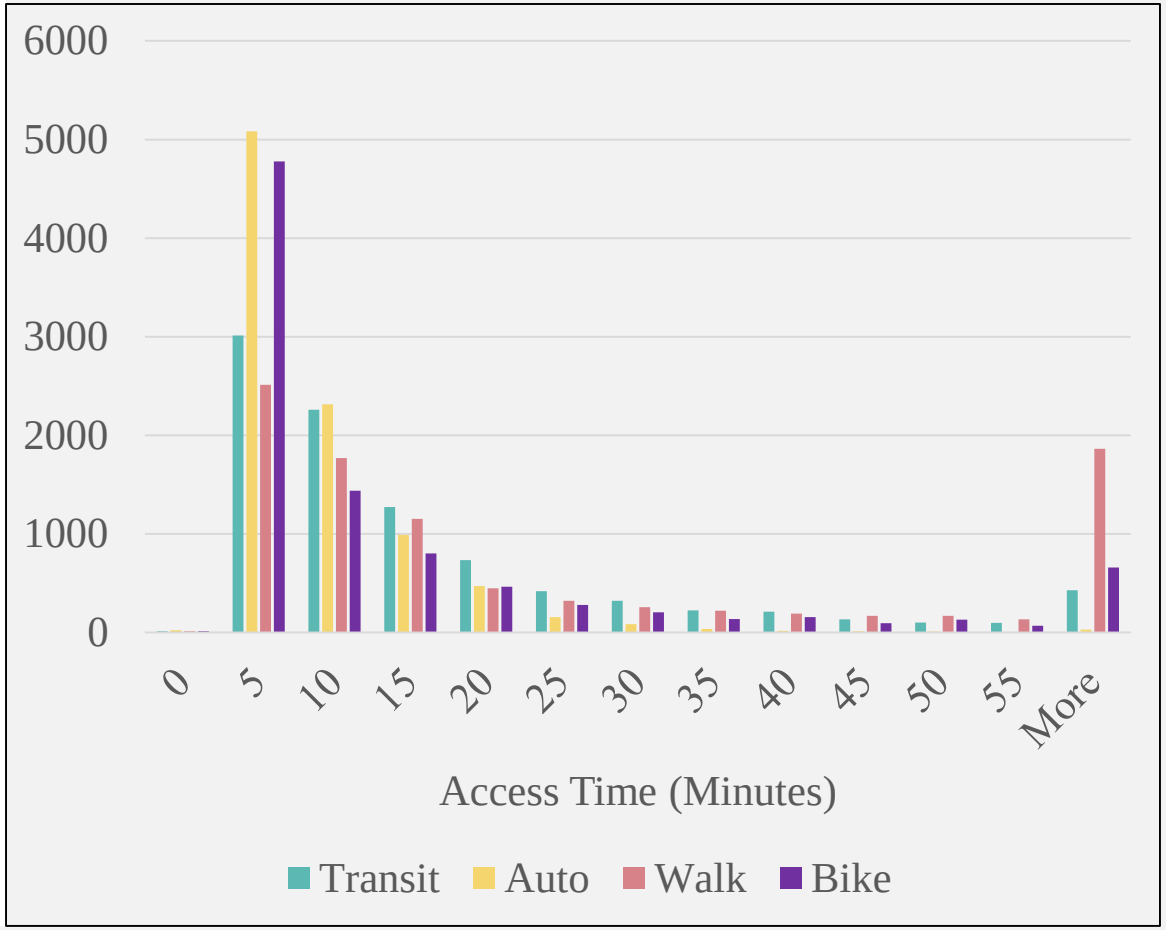
Input origin and destination coordinates and mode, return:

- trip time
- trip distance
- unfriendly format


```
{
   "routes" : [
      {
         "bounds" : {
            "northeast" : {
               "lat" : -33.8347115,
               "lng" : 140.8547058
            },
            "southwest" : {
               "lat" : -37.3511758,
               "lng" : 138.4951576
            }
         },
         "copyrights" : "Map data ©2014 Google",
         "legs" : [
            {
               "distance" : {
                  "text" : "139 km",
                  "value" : 139119
               },
               "duration" : {
                  "text" : "1 hour 51 mins",
                  "value" : 6648
               },
               "end_address" : "Clare SA 5453, Australia",
```

CHOICE SET GENERATION USING GOOGLE DIRECTIONS API

Distribution of Potential Transitway Access Times by Mode as Generated Using Google Directions API



MODEL SPECIFICATION: MULTINOMIAL LOGIT

Probability of Taking Mode 1 = exp(Utility of Mode 1)
/ sum of exp(Utility of all Modes)

BASE MODEL SPECIFICATION

Utility = Intercept
+ Time Coefficient * Time Cost
+ Distance Coefficient * Distance Cost
+ Monetary Coefficient * Monetary Cost

BASE MODEL RESULTS

	Base Model	P-value
Bike Constant	-2.07	0
Drive Constant	-1.79	0
Drop Off Constant	-2.78	0
Taxi/TNC Constant	-4.72	0
Walk Constant	1.3	0
Cost	0	1
Distance	-0.372	0
Time	-0.0525	0

INTERACTIVE TERM MODEL SPECIFICATION

Utility = Intercept
+ Time Coefficient * Time Cost
+ Distance Coefficient * Distance Cost
+ Monetary Coefficient * Monetary Cost * Stored Value Card Indicator
+ Gender Coefficient * Gender Indicator

INTERACTIVE TERM MODEL RESULTS

	Coefficients	P-value
Bike Constant	-1.85	0
Gender/Bike Constant	-0.853	0
Drive Constant	-1.95	0
Gender/Drive Constant	0.271	0.04
Drop Off Constant	-2.98	0
Gender/Drop Off Constant	0.34	0.05
Taxi/TNC Constant	-4.52	0
Walk Constant	1.26	0
Distance	-0.386	0
Stored Value Card/Cost	-0.0854	0
Time	-0.932	0

TAKEAWAYS

Interpretation of Model Results

- Walking has the highest baseline utility
- Biking has a lower baseline utility than local transit and is worse for women
- Driving has a lower baseline utility than local transit but is better for women
- Use of Stored Value card to pay for surveyed transit route results in access cost being significant

TAKEAWAYS

Interpretation of Model Results

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- Driving has a lower baseline utility than local transit but is better for women
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Policy Recommendations

- Continue to prioritize walking infrastructure improvements near transit stations
- Improve biking infrastructure improvements and address gender differences
- Consider what priority driving access to transitways should take

NEXT STEPS

- Incorporation of personal characteristics
- Testing different model structures