Eliciting Ridesourcing Drivers' Preferences for and perception of Battery Electric Vehicles

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Research objectives

1. Shed light on the preferences for electric vehicle adoption among those driving for ride-sourcing platforms, specifically - Lyft and Uber. Specifically:

   - What are some of the key correlates of a stated preference for adopting or not-adopting an EV in the future?
   - How do these correlates differ relative to those for comparison group of high mileage but non-ride sourcing vehicle owners?
   - Shed light on the general socio-economic and demographic attributes and work patterns for drivers for Lyft and Uber in Los Angeles

2. What are some lessons for public policy?

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Approach

Two sets of surveys

1. Survey of lyft and uber drivers
   - Hail rides on lyft and uber and recruit drivers to take a 10-15 minute structured survey in exchange for a cash incentive of $10
     - On the spot survey - Survey administered on tablets (iPads) with a back up option of a paper survey or alternatively an option to take the survey via email (to be launched)
     - Email survey – For drivers unable to respond on the spot but willing to later, we email out surveys on Qualtrics

2. Control group survey – survey of non-rideshare drivers who drive more than 60 miles per day. This is conducted online using ProA

Data collection - details

- Identified six specific routes within a 5 mile radius around UCLA

- Each of the 5 RAs undertake two shifts of 3-4 hours each and cover the different routes at different times for roughly equal coverage

- Hail rides on uber and lyft roughly equally (stats shown next)

- Shifts spread through the day – decided to avoid peak rush hours after trials because of excess time delays, high cost and low response rate

- Also avoid very early and late hours for safety reasons

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Route # 1 - Example
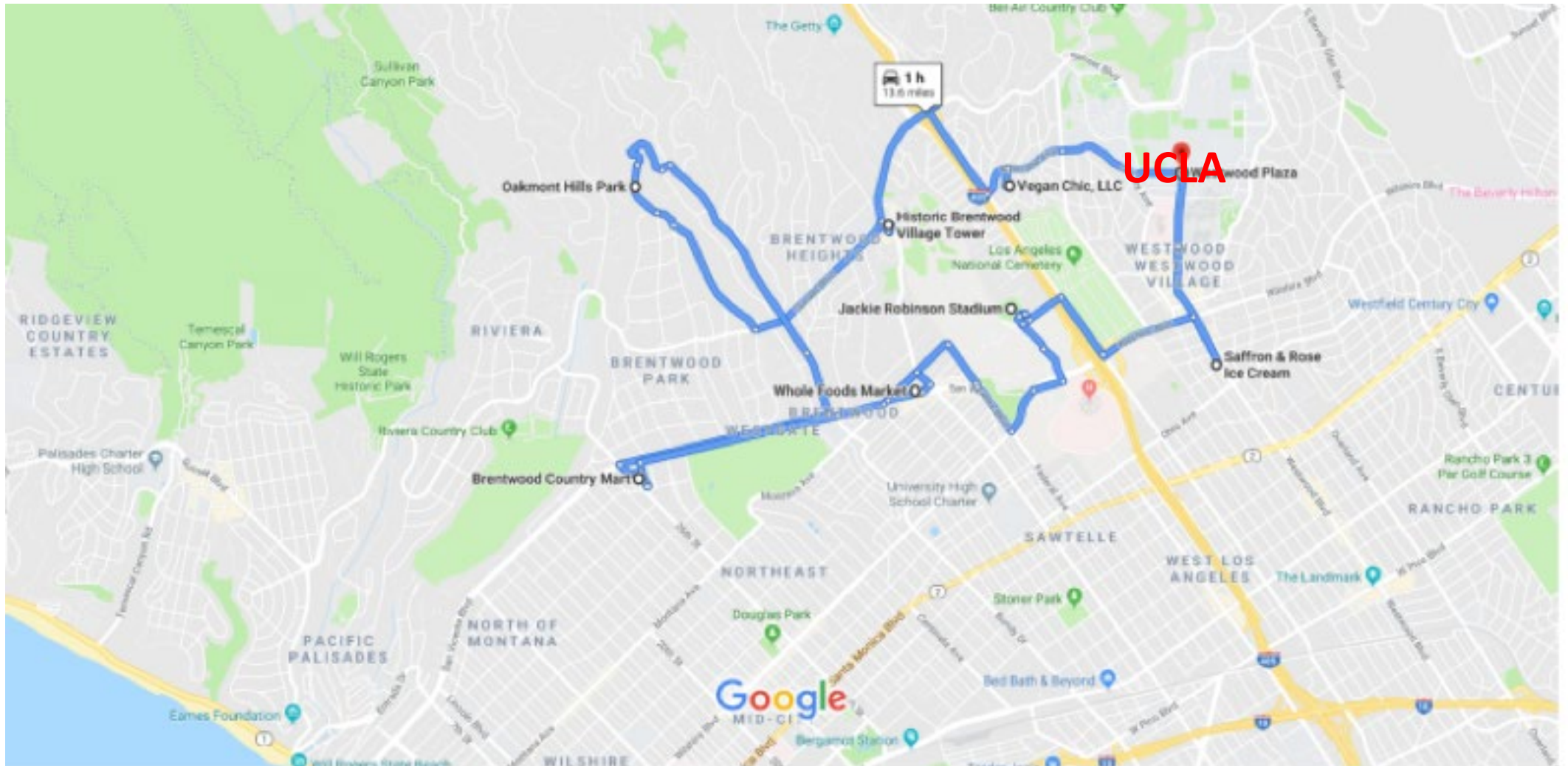
Data collected via ride hailing

N Rides	405
N YES Ride	175
N Yes Paper	19
N YES Email	49
N No - Refusal	73
N No - Ineligible	82
N No - Missing reason	7

Total # valid responses that passed attention checks = 148

Rides per YES	2.09
N Ride Hours	127
Avg. Rides per hour	3.2
Avg. $ per ride	8.9
Avg. minutes per ride	19
Total Student Shifts	57
Total Student Shift Hours	196
Avg. Hours per Shift	3.4
Avg. Rides per shift hour	2.1
Avg. YES per shift hour	1.0
Student wage rate $/hour	18
Avg cost per YES	**47**

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Data collected via online survey for comparison group

- An online survey of high mileage drivers > 60 miles per day
- Total of 396 valid responses collected

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Summary stats – ridesourcing drivers

Question	Mean (Std. dev)
How likely your next purchase is EV? (1- Ext. Unlikely, … 7- Ext. Likely)	4.15 (2.12)
How likely you will rent an EV? (1- Ext. Unlikely, … 7- Ext. Likely)	3.88 (2.28)
Pay more or less for EV (1-much less, … 7- much more)	4.08 (1.58)
Hours of driving per week on the platform (Hours)	37 (19)
Miles drive per week on the platform (miles)	929 (1849)
Percent of annual miles driven is on the platform	75% (20%)
How much you enjoy this work? (1 –Strongly disagree, … 7- Strongly agree)	5.20 (1.58)
How long exp. continue this work? (1 <1mo., 4 – 7 to12 mo., 5 > 1year)	4.12 (1.17)
Annual Income Bracket (1<$10K, 5-$35K to $50K, 7–$75K to $99K)	5.413 (1.68)

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Given this information which vehicle are you more likely to purchase?
(1) Electric vehicle
(2) Gasoline vehicle

Response:
Mean (Std dev) = 1.23 (0.42)

A

Electric Vehicle	
Price	$29,990
Fuel	Electric Energy
Range	150 miles
CO2 emissions	0 g/km

B

Gasoline Vehicle	
Price	$21,845
Fuel	Gasoline
Range	425 miles
CO2 emissions	172 g/km

*Range refers to the distance the car can travel before needing to refuel

5-year Estimated Costs

	Electric Vehicle	Gasoline Vehicle
Fuel	$9,206	$20,660
Repairs	$773	$1,183
Maintenance	$3,405	$4,438
Insurance	$7,850	$6,966

The graph above shows the estimated 5-year costs of owning each vehicle. These include the cost of fuel, repairs, maintenance and insurance.

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Comparing means for ridesourcing and comparison group

Question	Ridesourcing drivers	(Online) Comparison group
How likely your next purchase is EV	4.15	3.586
Pay more or less for EV	4.082	4.183
Miles per Week	929.424	399.084
How risk taking are you?	6.959	6.157
Do you act environment friendly?	5.721	4.953
Like to try out cutting edge technology	5.279	4.437
Time to charge is limiting	4.565	4.761
Importance of speed of charging	5.993	5.929
How many minutes will you wait for charging?	93.528	51.908
Does your home parking space have Electrical outlet	1.614	1.38
Relative to gas vehicle – cost purchase an EV	3.741	3.963
Relative to gas vehicle – fuel cost for EV	2.548	2.27
Relative to gas vehicle – maint. cost for EV	3.295	3.465

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Comparing means for ridesourcing and comparison group

Question	Ridesourcing drivers	(Online) Comparison group
Relative to gas vehicle – maint. cost for EV	3.295	3.465
How much do you worry about credit?	3.388	2.775
Your education level (1-No high sch.,… 5- grad. deg)	3.322	3.69
Sex (1-Male, 2-Female)	1.219	1.437
Primary Res (1-Single fam, 2 – Mult, 3 – Duplex…)	1.719	1.44
Do you Own(1) or rent (2)?	1.842	1.437
Do you have dedicated Parking space (1-Yes,)	1.158	1.149
Annual Income bracket	5.413	6.092
Political_Affiliation (1- Very Lib. …, 7 – Very Cons.)	3.57	3.178

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Disaggregated comparison between ride-sourcing and comparison group based on interest in EV

Think about your next vehicle purchase or lease. How likely are you to purchase or lease an EV?

○ Extremely unlikely

○ Moderately unlikely

Unlikely (N= 52*)

○ Slightly unlikely

○ Neither likely nor unlikely

Middle (N= 48*)

○ Slightly likely

○ Moderately likely

Likely (N= 48*)

○ Extremely likely

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* - # of responses for rider-sourcing drivers

	Likely to get EV		Unlikely to get EV	
	TNC drivers	Comp. grp.	TNC drivers	Comp. grp.
Pay more to buy an EV	5.769	5.625	2.979	1.966
Likely to rent an EV	4.667	4.373	2.778	2.419
Miles driven per week	765.333	223.012	753.37	696.176
Hours of driving per week	40	NA	35	NA
Credit concern	3.769	2.735	3.021	2.851
Range anxiety	4.885	4.699	5.787	5.66
Time one is willing to wait for charging	156.154	68.783	51.652	40.673
Time need for charging would limit EV use	3.942	4.277	5.021	5.02
Importance of charging speed in your consideration to use an EV	5.923	5.867	6.191	5.918
Continue ride share driving in future	3.9	NA	4.23	NA

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	Likely to get EV		Unlikely to get EV	
	TNC drivers	Comp. grp.	TNC drivers	Comp. grp.
Relative to gas vehicle – cost purchase an EV	3.442	3.904	4	3.959
Relative to gas vehicle – fuel cost for EV	2.275	1.976	2.851	2.405
Relative to gas vehicle – maint. cost for EV	3	2.976	3.34	3.709
Education Level	3.481	3.831	3.37	3.531
Annual Income category	5.481	6.398	5.41	5.816
Risk loving	7.118	6.687	6.383	5.804
Willing to try new tech.	5.808	5.289	4.83	3.939
Act environment friendly	6.077	5.614	5.426	4.507
Political Affiliation	3.571	2.904	3.444	3.306

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Responses to some open ended questions

Where should EV chargers be sited (e.g. any particular locations in LA or Southern California more broadly?

- gas stations (52)
- grocery stores (21)
- malls (21)
- parking lots (15)
- everywhere (13)
- airports (13)
- parks (9)
- Other responses – recreation areas, nightclubs, cafes, metro stations, gyms

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Responses to some open ended questions

What other policy or TNC incentives would make you more likely to drive an EV?

- more money per mile/bonus pay (29)
- discount on car rental/purchase (14)
- I don't know (10)
- tax incentives (8)
- help with maintenance costs (5)
- paid charging time (3)
- nothing (17)
- Other responses – more rides, unsure, priority ride despatch

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Summary and take aways

- On average TNC drivers clock > 3X average miles per day compared to high mileage non-TNC drivers, are poorer, slightly less educated but rate themselves as tech savvy, environmentally and socially conscious but seem to have less complete information on EV cost, incentives, and fuel costs

- The likely and unlikely adopters among TNC drivers appear similar in most other attributes (not really surprising!)

- Range anxiety and access to as well as time to charging is high concern across both likely and unlikely adopters (and this is similar to the same sub-groups in the comparison group)

- Little or no familiarity with EV rental programs in LA such as Maven or Blue LA among TNC drivers

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Some Key Policy Implications

- **Currently no policies exist targeting high mileage users** - This research is timely given decline in federal tax credit for major automakers[*] and given latest gas price outlook demand for EVs is likely to fall without an increase in subsidies. It is really important to target EV adoption among high mileage users as these users will recoup the cost soon but they face other constraints.

- **Charging infrastructure and Raising awareness seems key** - Roughly 35% of TNC drivers express likelihood of purchasing or leasing EV but are worried about ease of accessing chargers and speed of charging. Investment in charging infrastructure, more public support for leasing and creating more awareness among TNC drivers about all aspects of EV could help faster EV adoption.

- **Mandating Uber, Lyft and other large commercial fleets to go electric is key –** California already has a law SB 1014

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[*] The $7500 federal tax credit is currently only applicable to the first 200,000 EVs sold by a given automaker

Outreach efforts and plans

- PI Rajagopal has shared some insights at a Public Workshop on incentives of electric vehicles at the California Air Resources Board (CARB) on Sacramento Mar 12 and is in regular touch with the CARB Working Group on the Clean Vehicle Rebate Project (CVRP)

- We will be sharing this presentation and the final report (to be completed this month) with the CVRP working group and continue to participate in their meetings

- Additionally, this information will be shared with CARB's team tasked with implementing the Clean Miles Standard (SB1014 Skinner Bill) which will regulate ride-hailing and e-delivery service vehicles

- **We welcome other suggestions for disseminating this work and further research**

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Questions?
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