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TRANSPORT FINDINGS

Using Behavioral Nudges and Incentives to Increase Affordability of Transit Systems through Donations

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Findings

This study relies on an experimental design framework to identify the behavioral nudges and incentives that can facilitate altruism for a transportation-related cause of the members of a university community. Our findings reveal the overall willingness to support transportation options for low-income community members either through financial contributions or, in the case of some of the students, donating their infrequently used student transit passes. We also found the positive effect of recognition on donating for students and male car commuters, as well as higher chances for a sunk cost of a contribution to increase the likelihood of a donation.

1. QUESTIONS

Meeting the travel needs of those who due to income, ability, or age, have limited transportation options is a matter of social responsibility (Lucas 2012). However, the public sector struggles to satisfy this existing need. Combined with the global trend of an increase in the proportion of older adults (Kim et al. 2023), it is likely that the demand will continue to grow, increasing the strain on existing limited resources. In this study, we turn our attention to one avenue of financial resource allocation to address the travel needs of transportation-disadvantaged populations on public transit (PT) – philanthropy. In particular, this study explored the personal motivations to contribute to PT assistance initiatives and how those can be facilitated to increase the mobility and accessibility of disadvantaged groups. Aside from a clear applied purpose of identifying ways to attract more resources for subsidized transportation services, this paper also has a broader academic agenda. Researchers agree that policies based on the findings of people's economically irrational choices (or, as some put it, behavioral insights) have the potential to improve the use of transportation systems (Kormos, Sussman, and Rosenberg 2021), however, there is also a consensus that such interventions should be context-specific (Ewert 2020), meaning that policies successful at nudging behavior in some fields (like personal finance, or healthcare) might not have the similar effect when applied in transportation. As such, this paper also adds empirical evidence on the use of behavioral insights in transportation.

2. METHODS

The study data was collected through an on-campus travel survey at the University of Alberta (41,000 students in 2023 (University of Alberta, n.d.)) in Edmonton, Canada in April 2023. The survey was distributed via emails that randomly targeted 50% of all faculty, staff, and students with no quotas

Table 1. Survey Scenarios and Respondents

Scenario	Prospective cost sample (n=1,072)	Prospective/Sunk cost sample (n=249)
Prospective costs		
Donate to a fund without a reward	•	•
Donate in exchange for public recognition	•	•
Donate in exchange for a tax credit	•	•
Sunk costs		
Donate a transit pass without a reward		•
Donate a transit pass in exchange for public recognition		•
Donate a transit pass in exchange for a reduced fee		•

in place. Removal of the incomplete responses resulted in a sample of 1,072 individuals. All of the participants provided their demographic information and were also asked to state their willingness to donate (using a 5-point Likert scale) to a hypothetical city transportation fund. That fund was described as an initiative to offset the cost of PT passes for low-income community members in three hypothetical scenarios presented in Table 1. These scenarios fall under the umbrella of prospective costs since the survey participants would experience the new expenditure if they agreed to donate to the cause.

We also used the institutional arrangement at the University of Alberta that charges all full-time students a fee and provides them with transit passes (U-Pass Program)[1] to evaluate the willingness to donate under a sunk cost condition. The sunk cost sample consisted of 249 survey participants who identified as full-time students but typically used a mode other than PT to get to campus and were additionally asked if they would be willing to donate their transit pass to a low-income community member in three hypothetical scenarios presented in Table 1. The demographics of both samples and their comparison to the population of the City of Edmonton (based on the 2021 Canadian Census) are presented in Table 2.

Analysis relied on two discrete choice models estimated jointly for which the dependent variable – willingness to donate, was treated in an ordered fashion. The Mixed Logit (ML) specification was used due to the necessity to account for participants responding to multiple scenarios (Train 2009). This means that ML specification for scenario-related variables was retained even in the cases when standard deviations were not significant. The other covariates were included based on their behavioral importance, statistical significance, and correct coefficient sign (Ben-Akiva and Lerman 2018). Estimation was performed using the maximum likelihood method in the Apollo package (Hess and Palma 2019) of the R statistical software (R Core Team 2013). For the random parameters generation, we relied on 1000 Sobol draws (Sobol' 1967).

1 A transit pass fee for the University of Alberta student is about ½ of the unlimited monthly transit pass cost in the city

Table 2. Characteristics of Survey Respondents

Variable	Prospective cost sample (n=1,072)	Prospective/Sunk cost sample (n=249)	City of Edmonton (n=1,010,899)
Gender identity			
Men	31.4%	31.7%	49.8%
Women	60.2%	59%	50.2%
Nonbinary	8.4%	9.2%	N/A[a]
Age			
Less than 18	0.1%	0.4%	N/A[b]
18-19	11.1%	16.1%	N/A[b]
20-24	30.9%	48.2%	6.6%
25-34	24.1%	25.3%	16.4%
35-44	13.9%	6.4%	15.8%
45-54	12.0%	3.2%	12.2%
55-64	6.6%	0.4%	18.2%
65 and over	1.3%	0.0%	13.7%
Population group			
White	72.2%	75.5%	57.2%
Nonwhite	27.8%	24.5%	42.8%
Household income			
No income	1.6%	3.2%	N/A
Under $19,999	7.5%	10.4%	3.9%
$20,000 to $39,999	9.8%	15.7%	12.6%
$40,000 to $59,999	6.7%	8.0%	13.4%
$60,000 to $79,999	8.5%	5.6%	13.7%
$80,000 to $99,999	7.0%	5.6%	12.2%
$100,000 to $199,999	30.6%	22.8%	33.9%
$200,000 or more	11.5%	8.0%	10.5%
Prefer not to answer	17.0%	20.5%	0.0%
University status			
Faculty	15.3%	0.0%	N/A
Staff	23.2%	0.0%	N/A
Student	60.3%	100%	N/A
Other	1.2%	0.0%	N/A
Attend only in person	57.6%	62.2%	N/A
Main mode of transport			
Car (driver)	28.5%	46.2%	78.4%
Car (passenger)	4.0%	9.2%	6.7%
Public transit	47.0%	0.0%	8.1%
Walking	13.2%	34.9%	3.5%
Bicycle/scooter	5.6%	6.4%	0.9%
Other	1.8%	3.2%	2.4%
Weekly avg. days of transit use	N/A	1.4	N/A
Responsible for housing costs	65.1%	52.2%	N/A
Donates to any charities	45.7%	30.9%	N/A

[a] The 2021 Canadian census has two gender categories – Men+ and Women+ that also include non-binary persons

[b] The 2021 Canadian census has an aggregate category of 15-19 year olds that accounts for 5.4% of Edmontonians

3. RESULTS

The coefficients of model estimation presented in Table 3 reveal that on average individuals are more likely to donate, as captured by the positive sign of alternative specific constants (ASC) in both models. On the other hand, males have lower odds of donating, which is consistent with previous research (Mesch et al. 2011). We also see both models pointing out that people who donate to any other charitable cause have about 70% higher odds of being altruistic when it comes to a transportation cause. While low-income individuals in the sample (mostly students) are less likely to donate, mature low-income individuals in the 35-54 age group of the prospective cost sample have almost 160% higher odds of donating to a transportation cause. This is something that has been observed in general charitable donation trends at least among low-income individuals in the US (Greve 2009).

Focusing on the prospective cost sample, we see the positive influence of in-person-only attendance, which is likely the effect of a larger sense of belonging to the community that has been found to foster altruism in other contexts (Drezner and Pizmony-Levy 2021). Shifting to the various donation scenarios we see that recognition decreases the odds of donating to a transportation fund among the general population, however, it has a positive effect on students (the odds are 69% higher) and male car commuters (an increase in odds of 45%). The effect on the first group is likely the results of how the scenario was framed in the survey, using *employer-acknowledged entry on a resume, or an honorable mention in a newsletter* as an example of recognition, which potentially appealed more to students. As for male commuters, previous research has found that men have a propensity for conspicuous consumption as a status signaling mean (e.g. purchase of an expensive car) (Sundie et al. 2011), so our finding regarding recognition for a donation adds one more facet to understanding male-specific behavior. Lastly, the effect of a financial incentive is positive, confirming the findings from other fields (Peloza and Steel 2005).

The coefficients for the prospective/sunk cost sample (n=249) generally corroborate the findings for the full survey group. This model's main contribution is the confirmation that donating a transit pass that is not always used but was paid for (i.e. sunk cost) has higher odds than a prospective cost (by 164%), though a significant standard deviation suggests that for some participants it is not the case.

While the findings were generated using information collected in an on-campus survey, the insights have broader policy implications. As a professor of behavioral economics, Dan Ariely puts it, our insights describe a general principle that can be extrapolated to the broader behavioral context (Ariely 2010). We present them to equip decision-makers with evidence on how more people can be encouraged to support the travel needs of transportation-disadvantaged populations through philanthropy. Nevertheless, it should be

Table 3. Model Results

Variable	Estimate	t-stat.	Odds Ratio	Odds Ratio 95% CI
Prospective Cost Sample (n=1,072)				
ASC	1.399	9.557	4.053	4.032, 4.073
Attends only in person	0.139	1.961	1.149	1.145, 1.151
Student	-0.221	-1.909	0.802	0.798, 0.805
Male	-0.184	-2.360	0.832	0.829, 0.834
Age 35-54	-0.378	-3.758	0.685	0.682, 0.687
Nonwhite population group	0.256	3.293	1.292	1.288, 1.295
Low-income (Ref: High-income)	-0.454	-3.883	0.635	0.632, 0.637
Medium-income (Ref: High-income)	-0.072	-0.789	0.931	0.927, 0.933
Income - no answer (Ref: High-income)	-0.319	-3.145	0.727	0.724, 0.729
Age 35-54 * Low-income	0.951	2.922	2.589	2.56, 2.618
Responsible for housing costs	-0.227	-2.511	0.797	0.794, 0.799
Car commuter	-0.258	-3.250	0.773	0.77, 0.775
Donates to any charities	0.511	6.678	1.667	1.662, 1.671
Donations Scenarios				
Recognition	-1.020	-8.401	0.361	0.359, 0.362
Std. Dev. of Recognition	-0.059	-0.302	0.943	0.936, 0.949
Student * Recognition	0.527	3.672	1.694	1.685, 1.702
Std. Dev. of Student * Recognition	-0.028	-0.113	0.972	0.963, 0.98
Car commuter * Recognition * Male	0.373	1.748	1.453	1.441, 1.463
Std. Dev. of Car mode * Recognition * Male	0.062	0.029	1.064	0.988, 1.145
Financial incentive	0.921	10.393	2.512	2.504, 2.519
Std. Dev. of Financial incentive	-1.062	-7.556	0.346	0.344, 0.347
Threshold 1	0.000	-	-	-
Threshold 2	0.971	26.368	-	-
Threshold 3	2.456	39.156	-	-
Threshold 4	4.234	37.411	-	-
Prospective/Sunk Cost Sample (n=249)				
ASC	1.114	6.347	3.048	3.02, 3.075
Male	-0.672	-4.260	0.511	0.506, 0.514
Low-income (Ref: High-income)	-0.414	-2.217	0.661	0.654, 0.667
Medium-income (Ref: High-income)	0.586	2.846	1.797	1.778, 1.815
Income - no answer (Ref: High-income)	0.327	1.596	1.387	1.372, 1.401
Transit used for non-school travel	0.134	2.700	1.143	1.14, 1.146
Donates to any charities	0.528	3.340	1.696	1.682, 1.709
Donations Scenarios				
Sunk cost	0.973	4.145	2.647	2.615, 2.678
Std. Dev. of Sunk cost	-1.920	-9.905	0.147	0.145, 0.148
Sunk cost * Days transit used	-1.006	-6.922	0.366	0.363, 0.368
Std. Dev. of Days transit used	0.440	2.641	1.552	1.539, 1.565
Recognition	-0.948	-6.042	0.388	0.384, 0.39
Std. Dev. of Recognition	-1.180	-6.006	0.307	0.304, 0.31
Financial incentive	0.945	5.300	2.574	2.55, 2.596
Std. Dev. of Financial incentive	-1.093	-5.860	0.335	0.332, 0.338
Financial incentive * Sunk cost	0.803	3.591	2.233	2.207, 2.258
Std. Dev. of Financial incentive * Sunk cost	-0.086	-0.184	0.917	0.895, 0.939
Threshold 1	0.000	-	-	-
Threshold 2	1.212	15.692	-	-
Threshold 3	2.882	22.715	-	-
Threshold 4	4.744	24.813	-	-

acknowledged that the findings are based on stated preference responses, which can diverge from real behavior (Wardman 1988), and thus have to be confirmed in a revealed preference setting.

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