The Buy-In Effect:

When increasing initial effort motivates behavioral follow-through

Holly Dykstra[1] Shibeal O' Flaherty[2] Ashley Whillans[3]

[1]University of Konstanz
[2]Harvard Kennedy School, King's College London
[3]Harvard Business School

EEA-ESEM 2024 Rotterdam
August 26, 2024

Preview

- Partnership with the Oregon Department of Transportation
  - They transitioned to a new carpool platform and wanted to increase usage
- Overall research question:
  - Can *adding friction* upfront – by making the sign-up process more effortful – increase follow-through usage of a carpooling platform?
- *Results:* yes! More effort leads to…
  - Fewer-sign ups
  - But more trips per day, both conditional on sign-up as well as in the full ITT sample

Background

Motivation

- Taking action to tackle the climate crisis and reduce global warming is critical; U.S. policy priority to reduce greenhouse gas emissions to 50-52% below 2005 levels by 2030 (The White House, 2023)
- Transportation is the largest single source of CO_2 emissions in the U.S.: 38% in 2021 (CBO, 2021)
- One potential avenue is to nudge people away from single occupancy vehicles (i.e., driving alone), and toward more sustainable modes, e.g., carpooling, public transportation
- However, changing commuting behavior is difficult (Kristal & Whillans, 2020)

Behavioral interventions often focus on reducing friction

- Auto-enrollment and retirement savings (Madrian and Shea 2001)
- Defaults and organ donations (Johnson & Goldstein, 2003)
- Making applications easier can increase uptake of social benefits (Bhargava & Manoli, 2015)
- Making things easy is a key component of applying BI to policy (Behavioural Insights Team, 2014)

Why *reducing* friction might not work

- In the context of pro-environmental decisions, using defaults has been found to be less effective (Jachimowicz, Duncan, Weber, & Johnson, 2019)
- Interventions aiming to reduce friction are typically in contexts where behavior is *"set and forget"*
- For actions that require more consistent commitment—e.g., carpooling instead of driving alone—we argue that **making an initial sign up process more difficult** can more effectively encourage people to follow through with their intended actions

Why might *adding* friction work?

Exerting more effort during an initial action might cause someone to:

- Value the action more
  - Increase psychological ownership (Norton, Mochon, & Ariely, 2012; Shu & Peck, 2011)
  - Increase intrinsic motivation and commitment (Pons, 2017; Ryan & Deci, 2000)
  - Self-signaling (Bénabou & Tirole, 2006; Bryan et al. 2016)
  - Enhance self-efficacy (Bandura, 1977; John & Orkin, 2022)
  - Activate sunk cost fallacy (Arkes & Blumer, 1985)
  - Increase perception of the quality of the program (Kamenica, 2008; Cohen & Dupas, 2010)
- Increase attention
  - System 2 deliberation (Kahneman, 2011; Milkman et al., 2009)
  - Ability to recall action (Rogers & Milkman, 2016)

Research question

Can adding friction upfront – by making a sign-up process more effortful – increase rates of carpooling?

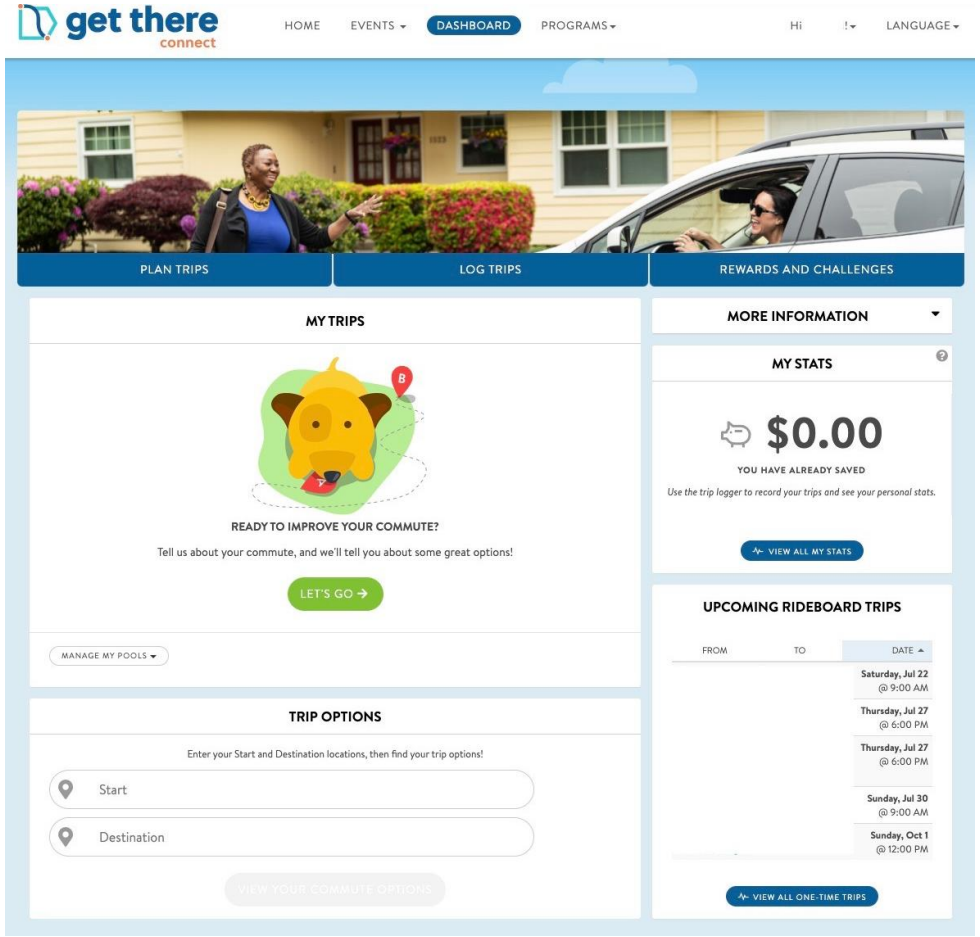
- Does more work upfront cause people to be more “bought in” to the decision?

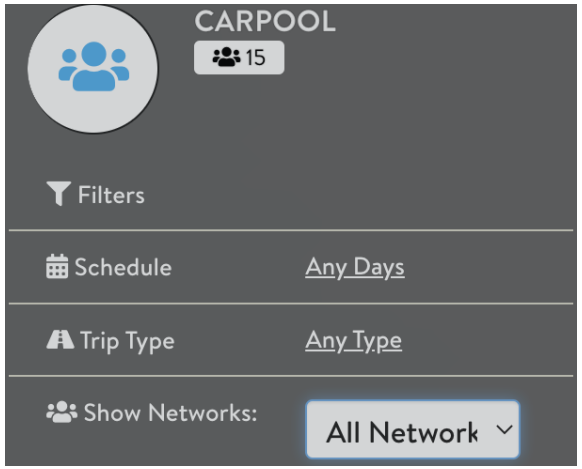
Experimental design

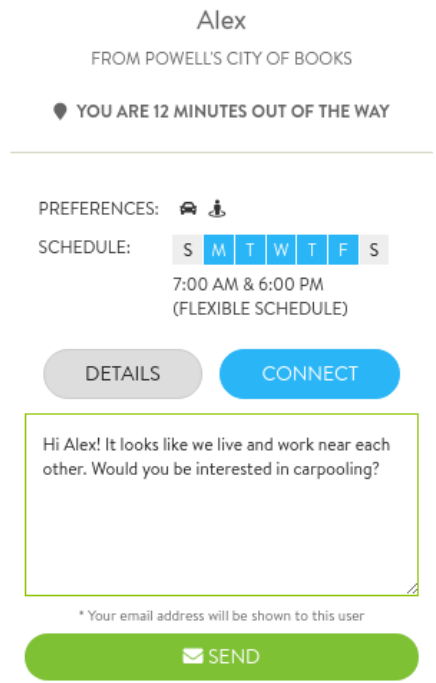
Field setting and context

- Partnership with the Oregon Department of Transportation (ODOT)
  - Transition from an existing carpool platform to a new one
  - The platform helps match individuals with others driving in a similar direction
  - It is available to everyone who lives or works in the state and is incentivized by major employers
- *Pre-specification:* hypothesis, sample, treatments, and outcomes
- *Study period:* four months between June 2019 and October 2019
- *Sample:* people with accounts on old carpool platform who were inactive, i.e., had not used the platform in at least 6 months
  - 87% of users, *N* = 27,227
  - They did not know they were part of an experiment
- *Outcomes:* account sign-ups, days on platform, trips taken, miles driven

Get There Platform







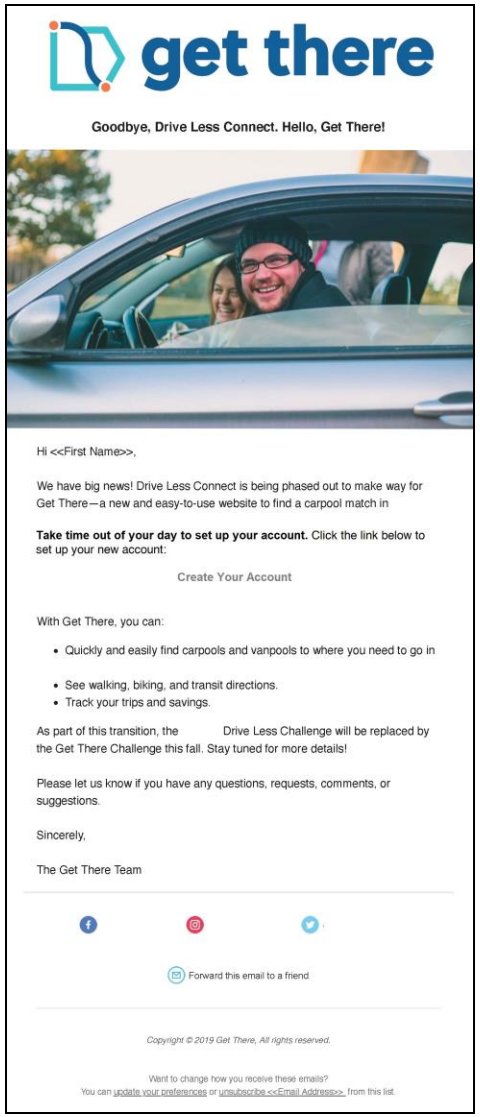
Treatments

More Effort

"Take time out of your day to set up your account."

"Create your Account"

In this condition, participants had to create an account from scratch.



get there

Goodbye, Drive Less Connect. Hello, Get There!

Hi <<First Name>>,

We have big news! Drive Less Connect is being phased out to make way for Get There—a new and easy-to-use website to find a carpool match in

Take time out of your day to set up your account. Click the link below to set up your new account:

Create Your Account

With Get There, you can:

- Quickly and easily find carpools and vanpools to where you need to go in
- See walking, biking, and transit directions.
- Track your trips and savings.

As part of this transition, the Drive Less Challenge will be replaced by the Get There Challenge this fall. Stay tuned for more details!

Please let us know if you have any questions, requests, comments, or suggestions.

Sincerely,

The Get There Team

Forward this email to a friend

Copyright © 2019 Get There, All rights reserved.

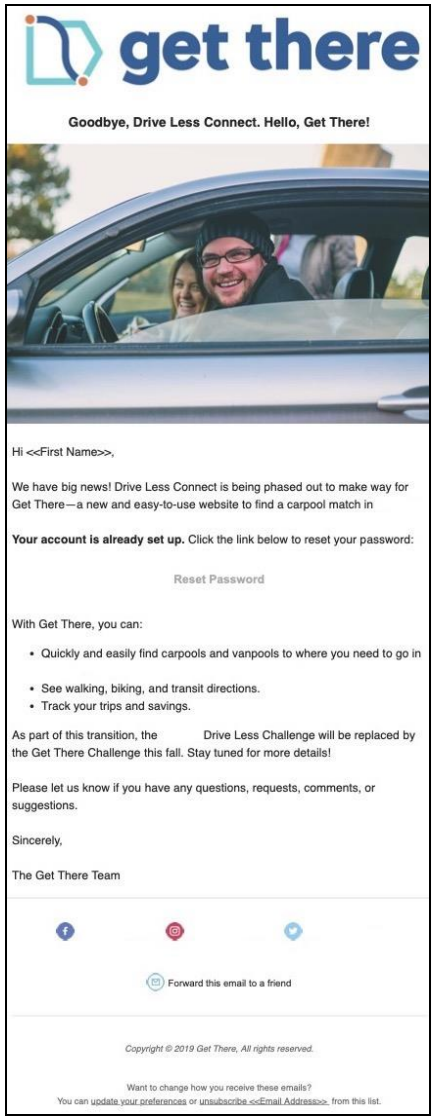
Want to change how you receive these emails?
You can update your preferences or unsubscribe <<Email Address>> from this list.

Less Effort

"Your account is already set up."

"Reset Password"

In this condition, participants completed one step to access their accounts: reset their password. (Their information was carried over from the old platform.)



get there

Goodbye, Drive Less Connect. Hello, Get There!

Hi <<First Name>>,

We have big news! Drive Less Connect is being phased out to make way for Get There—a new and easy-to-use website to find a carpool match in

Your account is already set up. Click the link below to reset your password:

Reset Password

With Get There, you can:

- Quickly and easily find carpools and vanpools to where you need to go in
- See walking, biking, and transit directions.
- Track your trips and savings.

As part of this transition, the Drive Less Challenge will be replaced by the Get There Challenge this fall. Stay tuned for more details!

Please let us know if you have any questions, requests, comments, or suggestions.

Sincerely,

The Get There Team

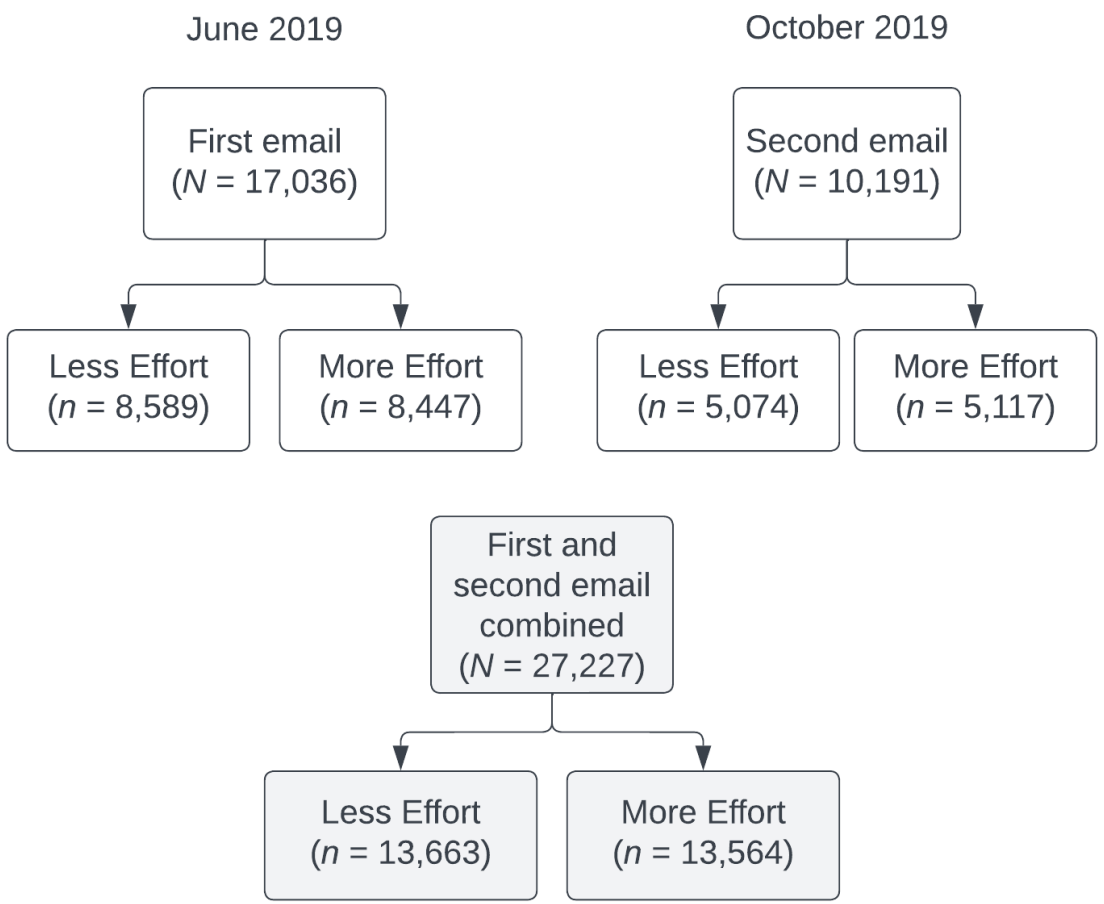
Forward this email to a friend

Copyright © 2019 Get There, All rights reserved.

Want to change how you receive these emails?
You can update your preferences or unsubscribe <<Email Address>> from this list.

Only difference between the two treatments: Level of effort required

Study timeline



Results

Descriptive statistics

- ITT sample: *N* = 27,227 participants
- Conditional on sign-up: *n* = 1,205 or 4.4% of ITT sample

	Count	*Mean (ITT)*	*Mean (Signed Up)*	*Min.*	*Max.*
Trips	9,417	.346	7.81	0	158
Miles	80,581	2.96	66.9	0	3,695
Days on Platform	89,461	3.3	74.2	0	124
Observations		27,227	1,205		

Click here for balance table →

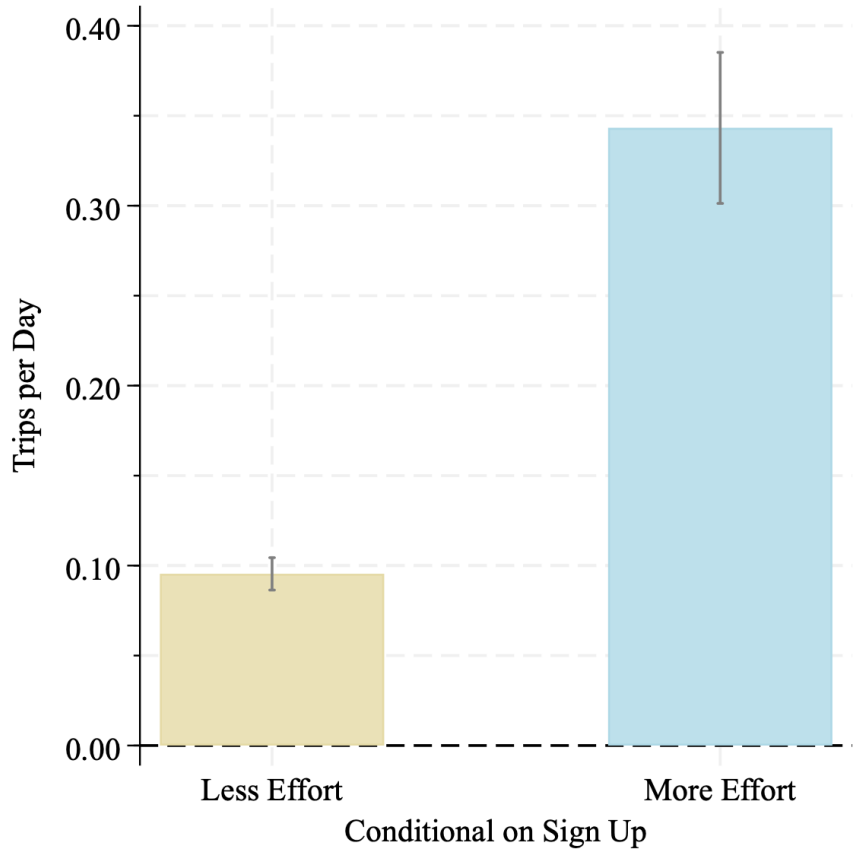
Main Results Table

		Conditional on Sign Up		ITT	
	(1) Sign Ups	(2) Trips per Day	(3) Miles per Day	(4) Trips per Day	(5) Miles per Day
Effort	-0.013***	0.248***	1.823***	0.008***	0.059***
	(0.002)	(0.043)	(0.307)	(0.002)	(0.013)
Constant	0.051***	0.095***	0.729***	0.005***	0.037***
	(0.002)	(0.009)	(0.093)	(0.000)	(0.005)
Observations	27,227	1,205	1,205	27,227	27,227

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Each column presents the results of a bivariate OLS model with an indicator for being in the *More Effort* group as the independent variable. Column 1 estimates the effect on an indicator for having signed up to the carpool platform. Columns 2 and 3 estimate the treatment effects on the number of trips taken per day on the platform and the miles driven per day, conditional on having signed up. Columns 4 and 5 estimate the treatment effect on trips per day and miles per day on the entire sample.

- *More Effort* treatment group is 1.3 percentage points less likely to sign up, off of a baseline of a 5.1% ($p < 0.01$)
  - → a 25% decrease in sign-up rate
- What about follow-through usage?

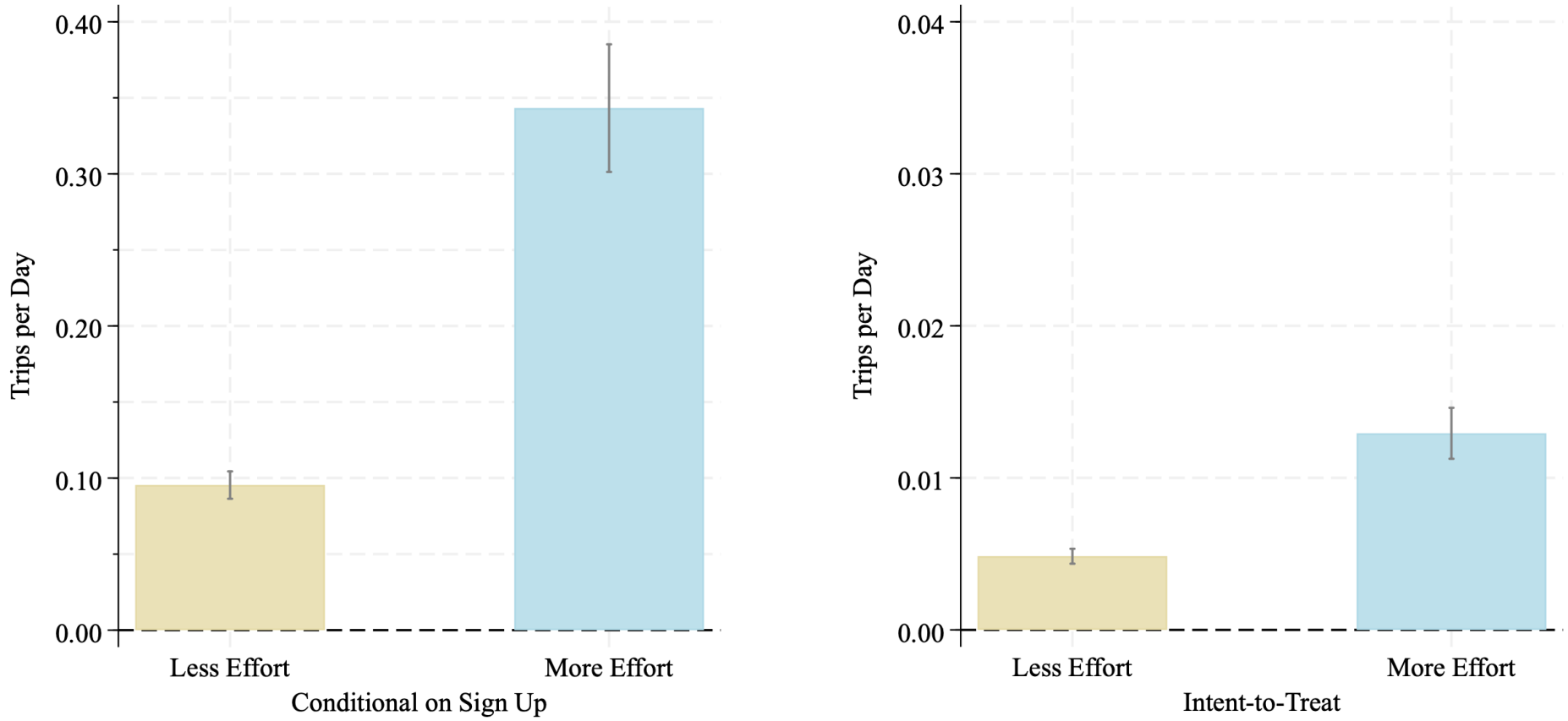
Effects of effort on follow-through usage



- Conditional on sign-up (*n* = 1,205):
  - *Less Effort* group: ~0.1 trips and 0.7 miles per day
  - *More Effort* group: 0.25 more trips per day and 1.8 more miles per day ($p < 0.01$).
- But is this a buy-in effect or a selection effect?
  - What is the effect of being assigned to the *More Effort group?*

Note: This graph show the average number of trips per day taken by treatment group, for participants who ever signed up to the carpool platform. The lines represent standard error bars.

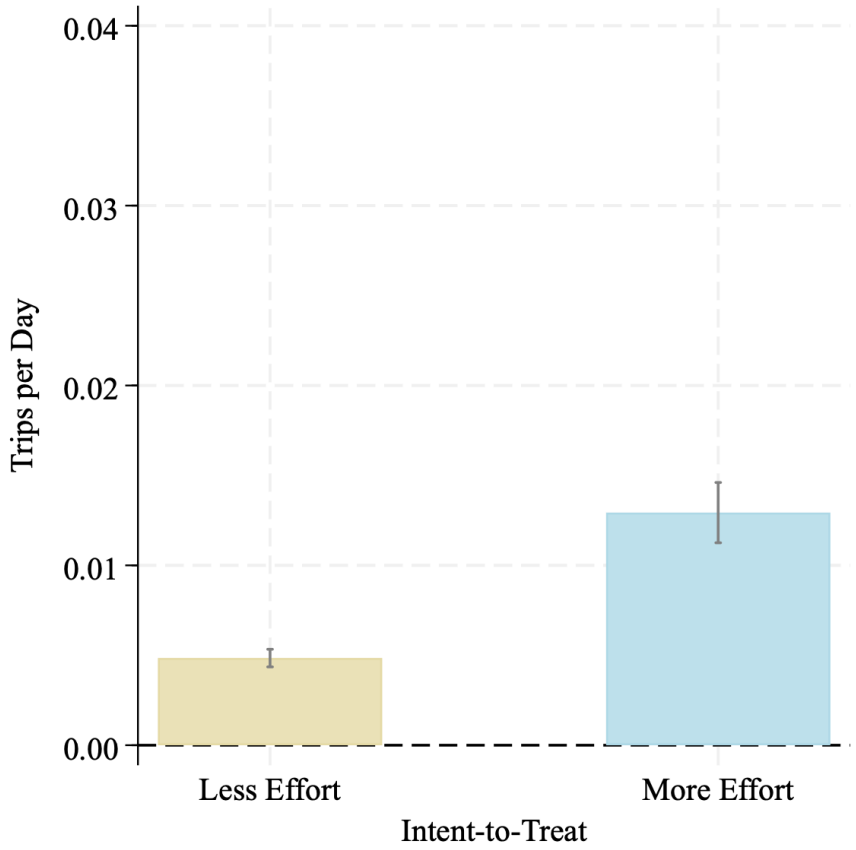
Effects of effort on follow-through usage



Note: This graph show the average number of trips per day taken by treatment group, for participants who ever signed up to the carpool platform, while the graph on the right shows this outcome for the entire sample. The lines represent standard error bars.

Effects of effort on follow-through usage

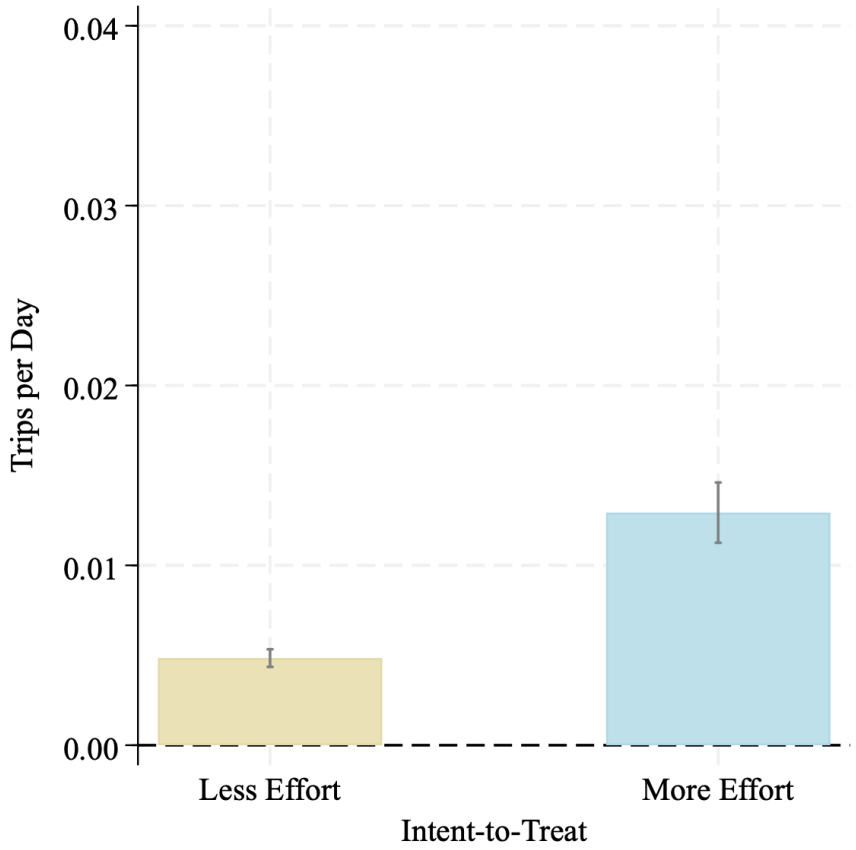
- ITT estimate as evidence of a buy-in effect:
  - *Always Takers* in both groups
  - *Complacents* only in *Less Effort* group, taking zero or positive numbers of trips
- ITT sample (*N = 27,227*):
  - *Less Effort* group: ~0.005 trips and 0.037 miles per day
  - *More Effort* group: 0.008 more trips per day and 0.059 more miles per day ($p < 0.01$).



Note: This graph show the average number of trips per day taken by treatment group for the entire sample. The lines represent standard error bars.

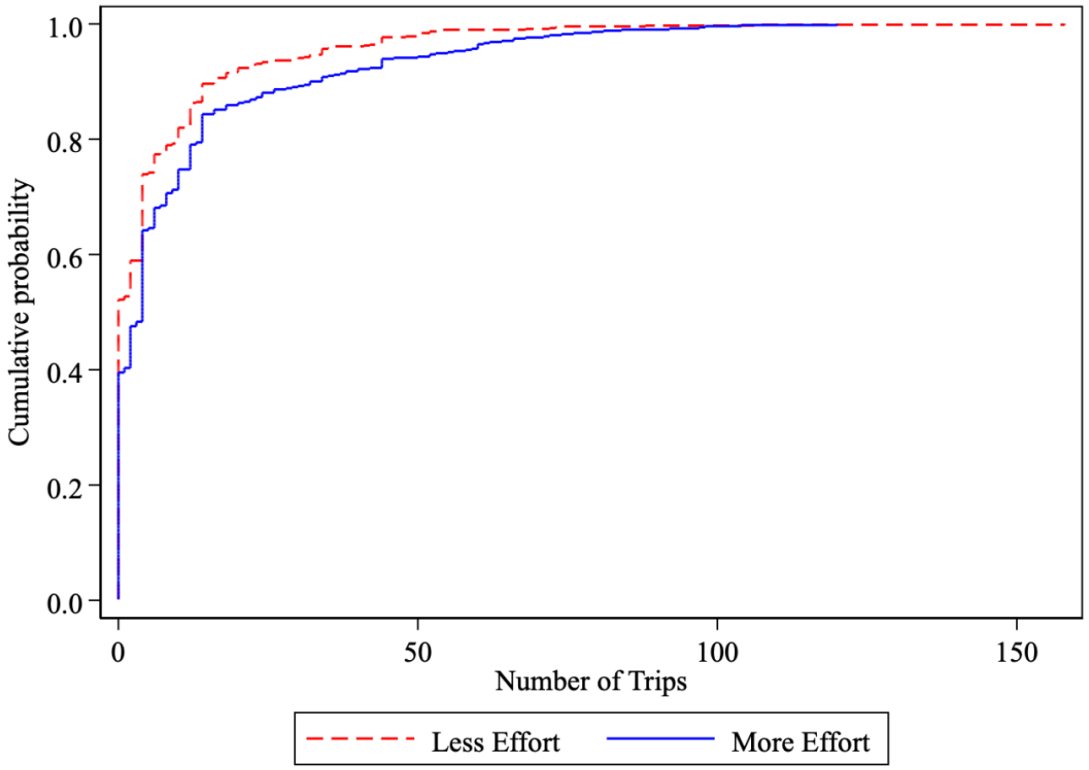
Effects of effort on follow-through usage

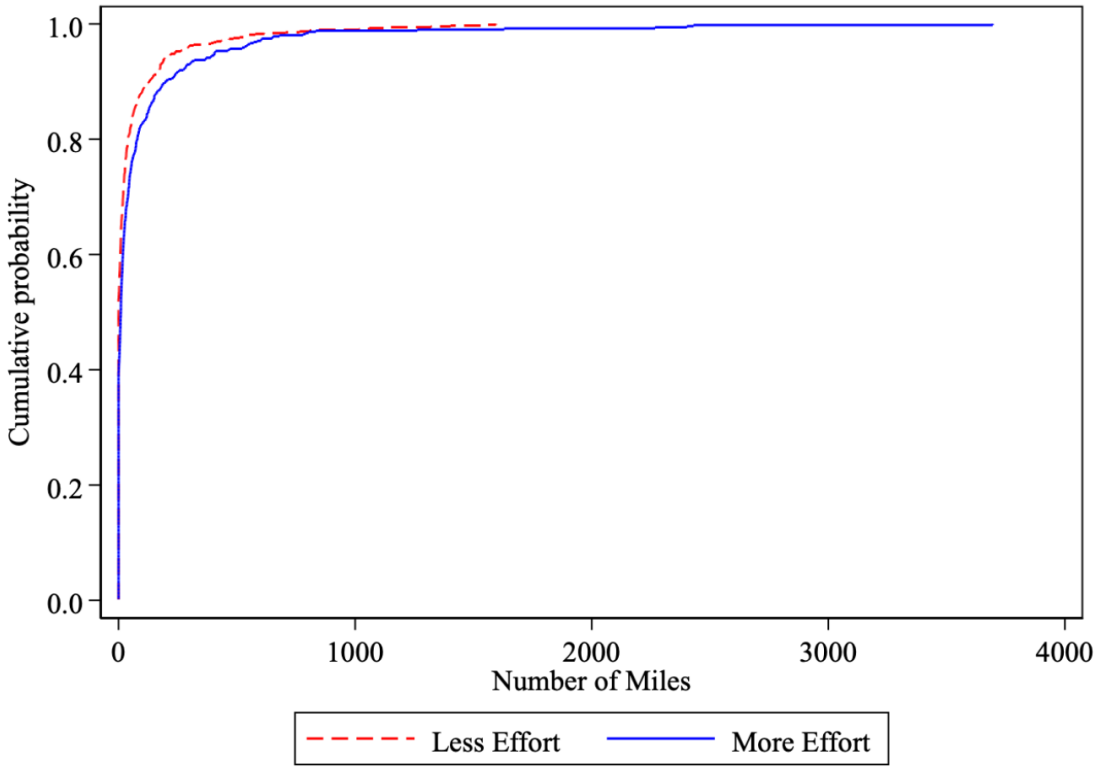
- In other words:
  - Out of 9,147 total trips:
    - *More Effort* group took 5,106
    - *Less Effort* group took 4,311



Note: This graph show the average number of trips per day taken by treatment group for the entire sample. The lines represent standard error bars.

Cumulative Distribution Functions





Note: These figures plot the CDFs of number of trips and number of miles for participants who signed up to the carpool platform. Formal Kolmogorov-Smirnov tests of the equality of treatment and control distributions reject the null for each ($p < 0.01$).

Other Robustness Checks

- Main results with controls for gender, race, zip code, and October email →
  - Also robust to looking at June and October samples separately
  - Also robust to looking at the subset of people who sign up quickly, those who sign up late, or controlling for days since sign-up
- Winsorized results →
- 8-month follow-up →

Summary

- **Fewer sign-ups:** 511 signed up from the *More Effort* group; 694 signed up from the *Less Effort* group
- Conditional on sign up, ***More Effort group*** **took 2.6 times more trips per day.** But is this only because they are more motivated?
- No! ITT analysis using the full sample shows that the ***More Effort*** **group took 1.6 times more trips per day**
  - Out of 9,147 total trips:
    - *More Effort* group took 5,106
    - *Less Effort* group took 4,311
    - More trips despite fewer sign-ups → evidence of a buy-in effect
- Small effects persist at 8-month follow-up

Conclusion

- Behavioral intervention designed to ***add friction*** to promote long-term behavior change
- Adding friction to a sign-up process may be beneficial in contexts that involve follow-through
- Positive environmental benefits: treatment saved 3.04 metric tons in CO_2 emissions
- Future research:
  - Examine in what contexts this effect exists
  - Examine the psychological mechanisms underlying this effect

Thank you!

Holly Dykstra
holly.dykstra@uni-konstanz.de

Appendix

Balance Table

Variable	(1) 0 Mean/(SE)	(2) 1 Mean/(SE)	(1)-(2) Pairwise t-test Mean difference
October	0.371	0.377	-0.006
	(0.004)	(0.004)	
Female	0.563	0.556	0.007
	(0.004)	(0.004)	
Race and Ethnicity			
American Indian	0.000	0.000	0.000
	(0.000)	(0.000)	
Asian	0.042	0.039	0.004
	(0.002)	(0.002)	
Black	0.013	0.013	0.001
	(0.001)	(0.001)	
Hispanic	0.054	0.049	0.004
	(0.002)	(0.002)	
Two or More Races	0.000	0.000	0.000
	(0.000)	(0.000)	
White	0.765	0.778	-0.014***
	(0.004)	(0.004)	
Number of observations	13663	13564	27227

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. This table shows the mean and standard error of each of the pre-sign-up variables. These include whether the study participant received the email in June or October, as well as their gender, race, and ethnicity. The last column shows the p-values of a pairwise t-test of the mean difference.

Click here to return →

Main results with controls

	Conditional on Sign Up			ITT	
	(1) Sign Ups	(2) Trips per Day	(3) Miles per Day	(4) Trips per Day	(5) Miles per Day
Effort	-0.015***	0.251***	2.013***	0.007***	0.058***
	(0.003)	(0.054)	(0.365)	(0.002)	(0.014)
October Email	-0.021***	0.203***	1.331***	0.002	0.009
	(0.003)	(0.078)	(0.481)	(0.002)	(0.016)
Same Zip Code		-0.032	-1.254***		
		(0.043)	(0.291)		
Female	-0.000	0.057	0.470*	0.002	0.020
	(0.003)	(0.037)	(0.277)	(0.002)	(0.013)
Race and Ethnicity					
American Indian	-0.042***			-0.009***	-0.066***
	(0.005)			(0.002)	(0.013)
Asian	-0.005	0.019	-0.088	-0.000	-0.010
	(0.007)	(0.089)	(0.656)	(0.004)	(0.028)
Black	-0.009	0.641	3.271	0.019	0.092
	(0.010)	(0.675)	(3.711)	(0.026)	(0.146)
Hispanic	-0.016***	-0.106***	-0.544	-0.005***	-0.032*
	(0.005)	(0.040)	(0.519)	(0.001)	(0.017)
Two or More Races	-0.060***			-0.005***	-0.042***
	(0.003)			(0.001)	(0.008)
Constant	0.061***	0.010	0.294	0.003	0.023*
	(0.003)	(0.040)	(0.264)	(0.002)	(0.013)
Observations	23,115	1,002	1,002	23,115	23,115

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Each column presents the results of a multivariate OLS regression model with independent variables for treatment group, whether they received the treatment email in June or October, an indicator variable for having the same home and work zip codes, as well as indicator variables for gender, race, and ethnicity. The base group for race and ethnicity is white. Columns 2 and 3 estimate the treatment effects on the number of trips taken per day on carpool platform and the miles driven per day, conditional on having signed up. Columns 4 and 5 estimate the treatment effect on trips per day and miles per day on the full sample.

Click here to return →

Winsorized results

	99th		95th		90th	
	(1)	(2)	(3)	(4)	(5)	(6)
	Trips per Day	Miles per Day	Trips per Day	Miles per Day	Trips per Day	Miles per Day
Effort	0.007***	0.059***	0.006***	0.049***	0.006***	0.037***
	(0.001)	(0.012)	(0.001)	(0.007)	(0.001)	(0.004)
Constant	0.005***	0.034***	0.004***	0.023***	0.003***	0.016***
	(0.000)	(0.004)	(0.000)	(0.002)	(0.000)	(0.001)
Observations	27227	27227	27227	27227	27227	27227

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Each column presents the results of a bivariate regression model with an indicator for being in the *More Effort* group as the independent variable. The outcome variables are trips per day and miles per day. Each outcome variable was winsorized at the 99th, 95th, and 90th percentiles.

Click here to return →

8-month follow-up

	Conditional on Sign Up			ITT	
	(1) Sign Ups	(2) Trips per Day	(3) Miles per Day	(4) Trips per Day	(5) Miles per Day
Effort	-0.0125***	0.0634***	0.4702***	0.0015***	0.0098
	(0.0025)	(0.0108)	(0.1459)	(0.0006)	(0.0070)
Constant	0.0524***	0.0852***	0.7180***	0.0045***	0.0376***
	(0.0019)	(0.0055)	(0.0910)	(0.0003)	(0.0050)
Observations	27,227	1,257	1,257	27,227	27,227

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Each column presents the results of a bivariate OLS model with an indicator for being in the *More Effort* group as the independent variable, with all outcome variables calculated through February 29, 2020. Column 1 estimates the effect on an indicator for ever having signed up to the carpool platform. Columns 2 and 3 estimate the treatment effects on the number of trips taken per day on the platform and the miles driven per day, conditional on having signed up. Columns 4 and 5 estimate the treatment effect on trips per day and miles per day for the entire sample.

Click here to return →