

MTI Research Snaps presents:

Examining the effects of a bike and e-bike lending program on commuting behavior: the Google case study

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About Google

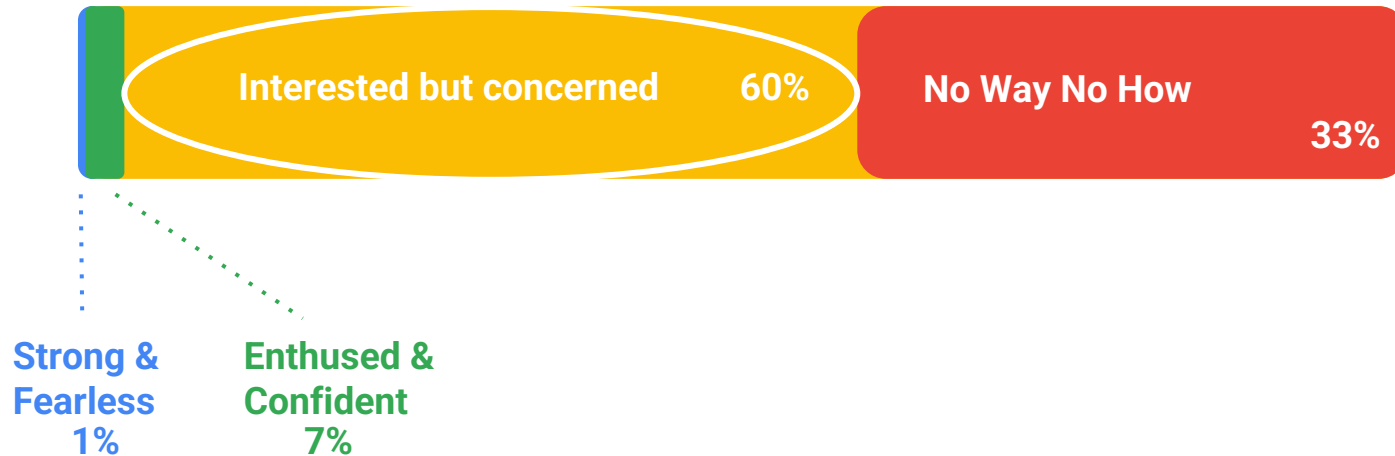
TDM Challenges

- **Free parking**
- Traffic and trip caps
- Rapid campus expansion
- Parking is available, but not always adjacent
- Valet services are costly
- Free EV charging - incentive to SOV
- Cultural resistance to paid parking in most locations



Focus on Bicycling

Four Types of Cyclists



Interested, but Concerned:

- 3.3% Lacking skills
- 11.6% Don't have a bike
- 47.2% Perceived effort or difficulty

Building a Bike Program

Building Habits



Make it easy



Make it attractive



Breaking Bicycling Barriers

- **Traffic Safety**
- **Distance**
- **Ownership costs and time**
- **Knowledge**



Dill, 2009; Fowler, Berrigan, & Pollack, 2017; Heinen, van Wee, & Maat, 2010; Xing, Handy, & Mokhtarian, 2010; Handy, Xing, & Buehler, 2010; Ramezani, Hasanzadeh, Rinne, Kajosaari, & Kyttä, 2021

The Role of E-bikes

- **Greater Bicycling Rates**

Fyhri & Beate Sundfør, 2020; Fyhri & Fearnley, 2015; Fyhri, Sundfør, & Weber, 2016

- **Greater Car Substitution**

Lamy, 2001; MacArthur, Harpool, Schepke, & Cheery, 2018; Fyhri & Beate Sundfør, 2020; Fyhri & Fearnley, 2015; Fyhri, Sundfør, & Weber, 2016

- **Commuting a Common Purpose for Change**

Fitch, 2019; Haubold, 2016

- **Awareness is Growing**

Handy & Fitch, 2020

- **Health Benefits Still Occur**

Sundfør & Fyhri, 2017

The Potential for Bike Lending

- **Increase Awareness and Consideration**
- **Reduce Distance Barrier (E-bikes)**
- **Reduce Ownership Costs and Time**

The Timeline

- **Phases of Study**

- Before (person specific period up to 1 year prior to program)
- During (person specific period during the program)
- After (person specific period after the program, unlimited duration)

PROGRAM CHANGES OVER THE YEARS



The Evaluation

- Change in Bicycling to Work (days & distance)
- Change in SOV driving to Work (days & distance)

Program Phase	Unique Months	Unique Persons	Unique Person-Commute Days
before	66	1,707	73,910
during	55	2,663	224,415
after	43	1,033	120,140

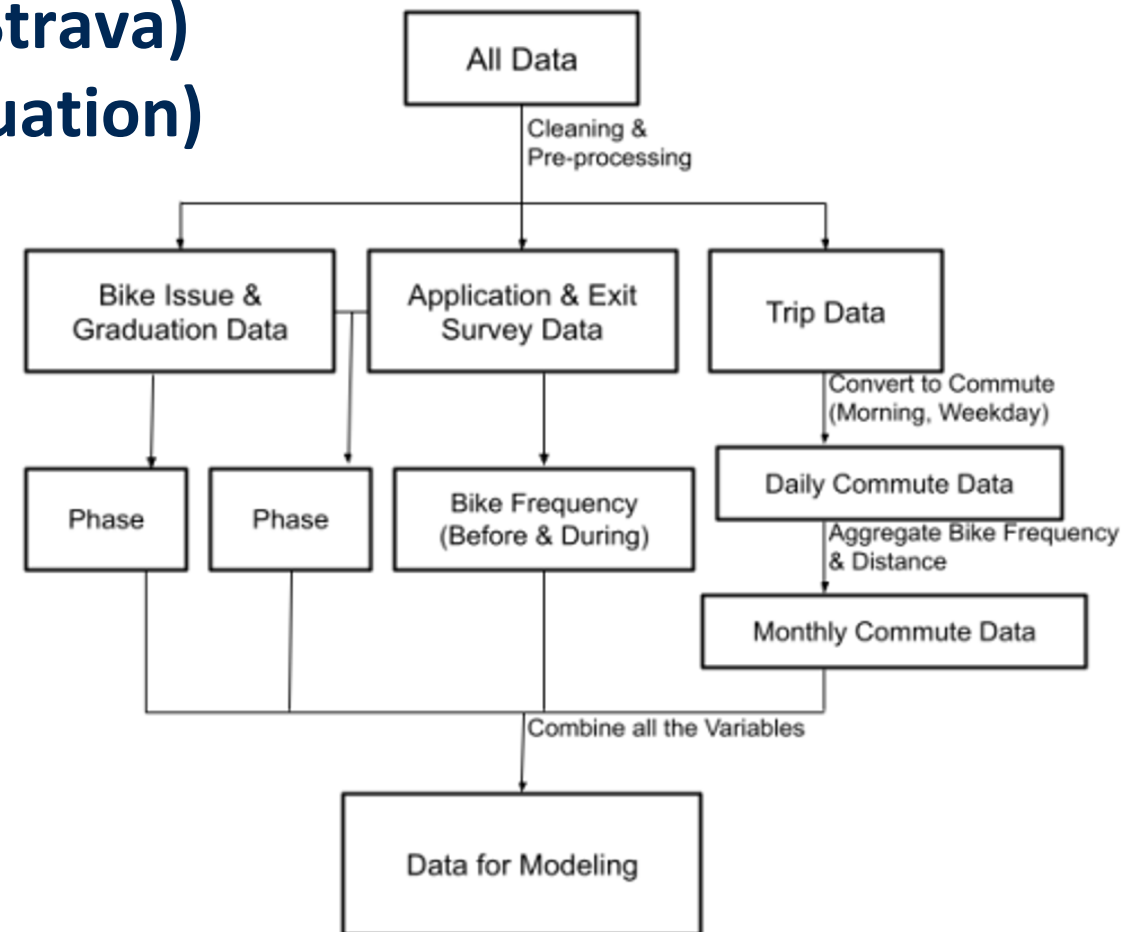
Data Preparations

Data

- Survey Data (application and exit)
- Trip Reporting (Self-report web-form, Strava)
- Operations tracking (Bike issuing, graduation)

Pre-Processing

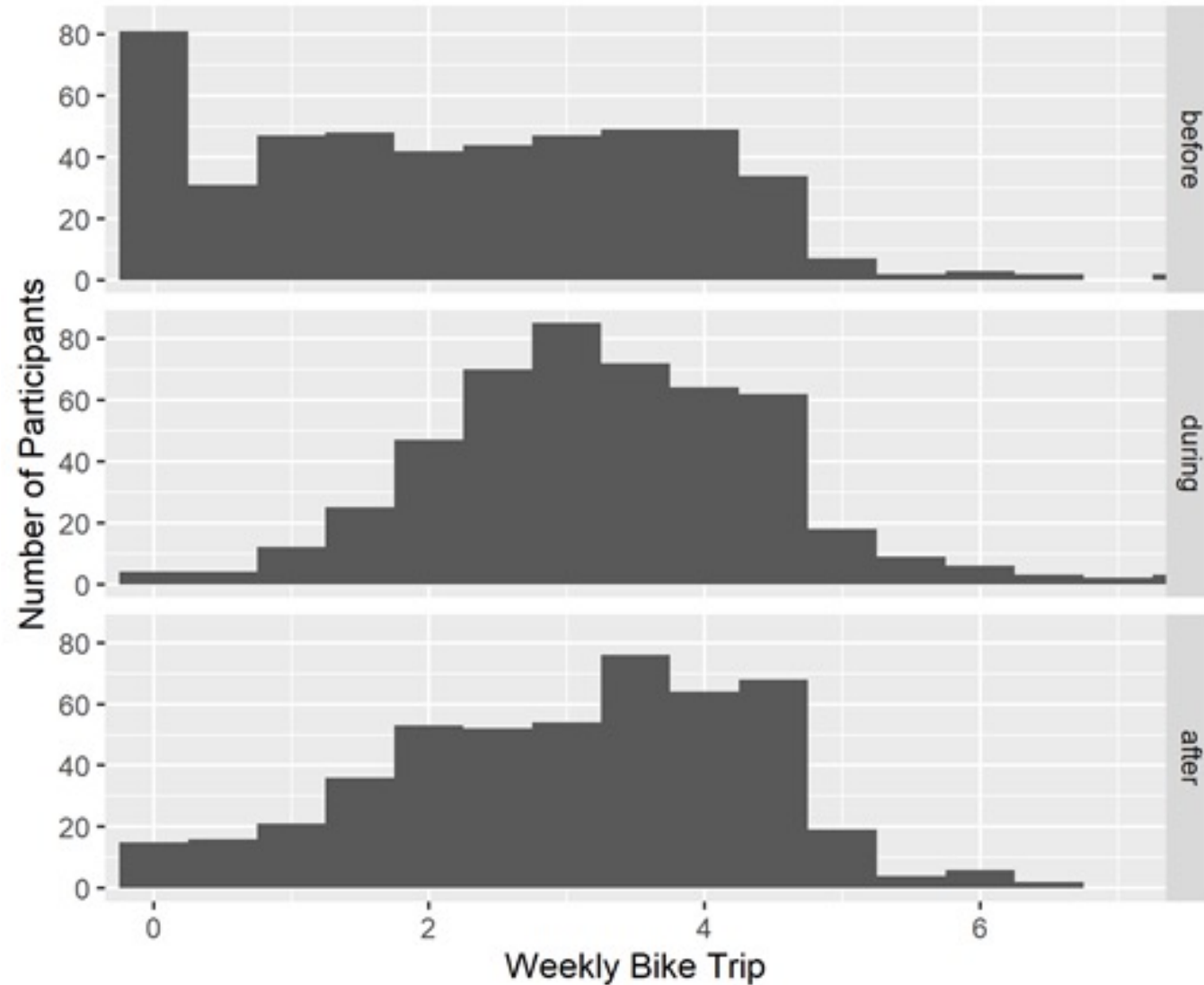
- Clean and Synthesize Survey Data
- Convert Trips to Commute Mornings
- Aggregate to Monthly Counts



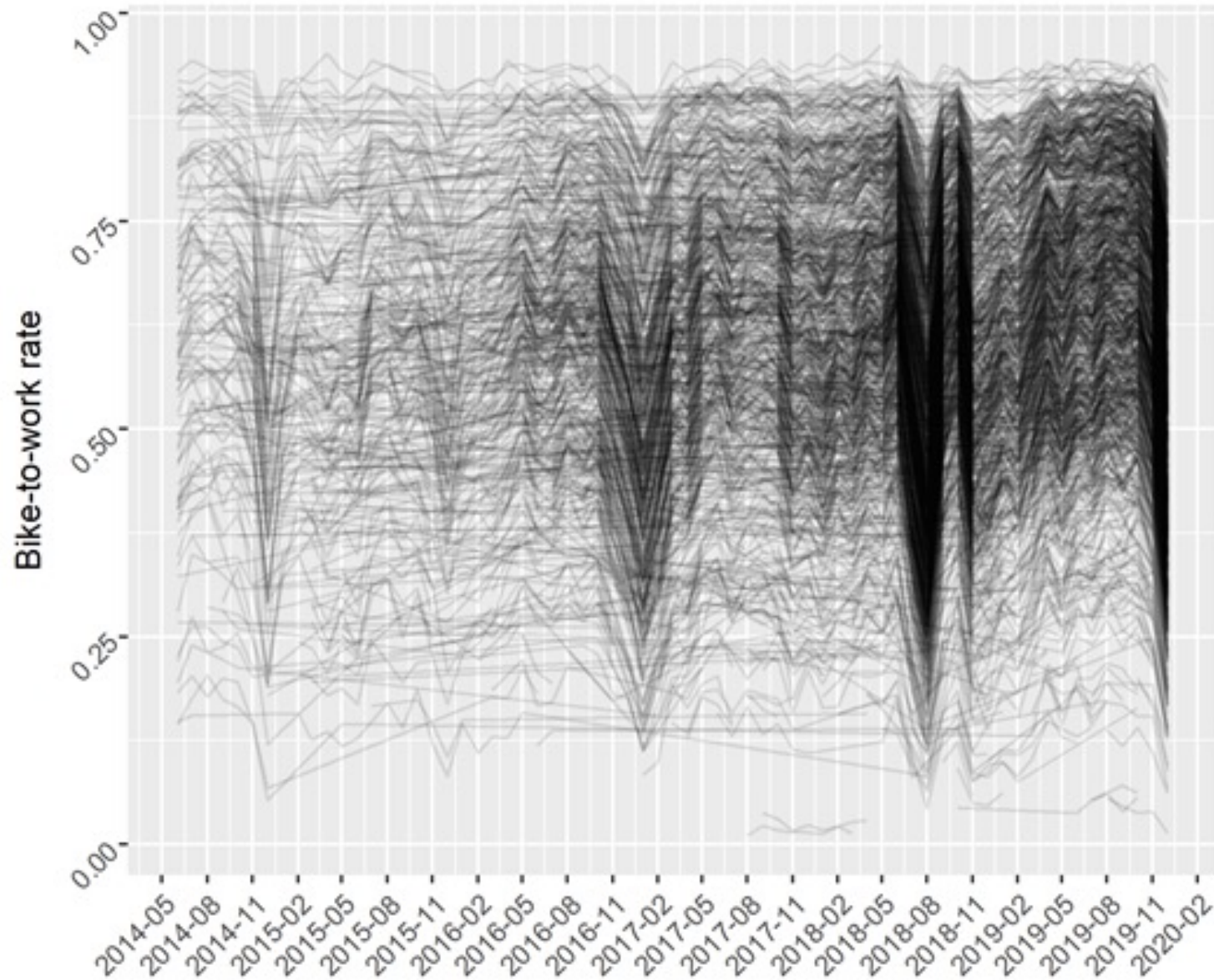
Analysis

- **Multilevel (by person and month) Zero-Inflated Aggregated Binomial Regression**
- **Estimated the likelihood each participant bike (or SOV) commutes on commute days (ignoring holidays, work-from-home, PTO)**

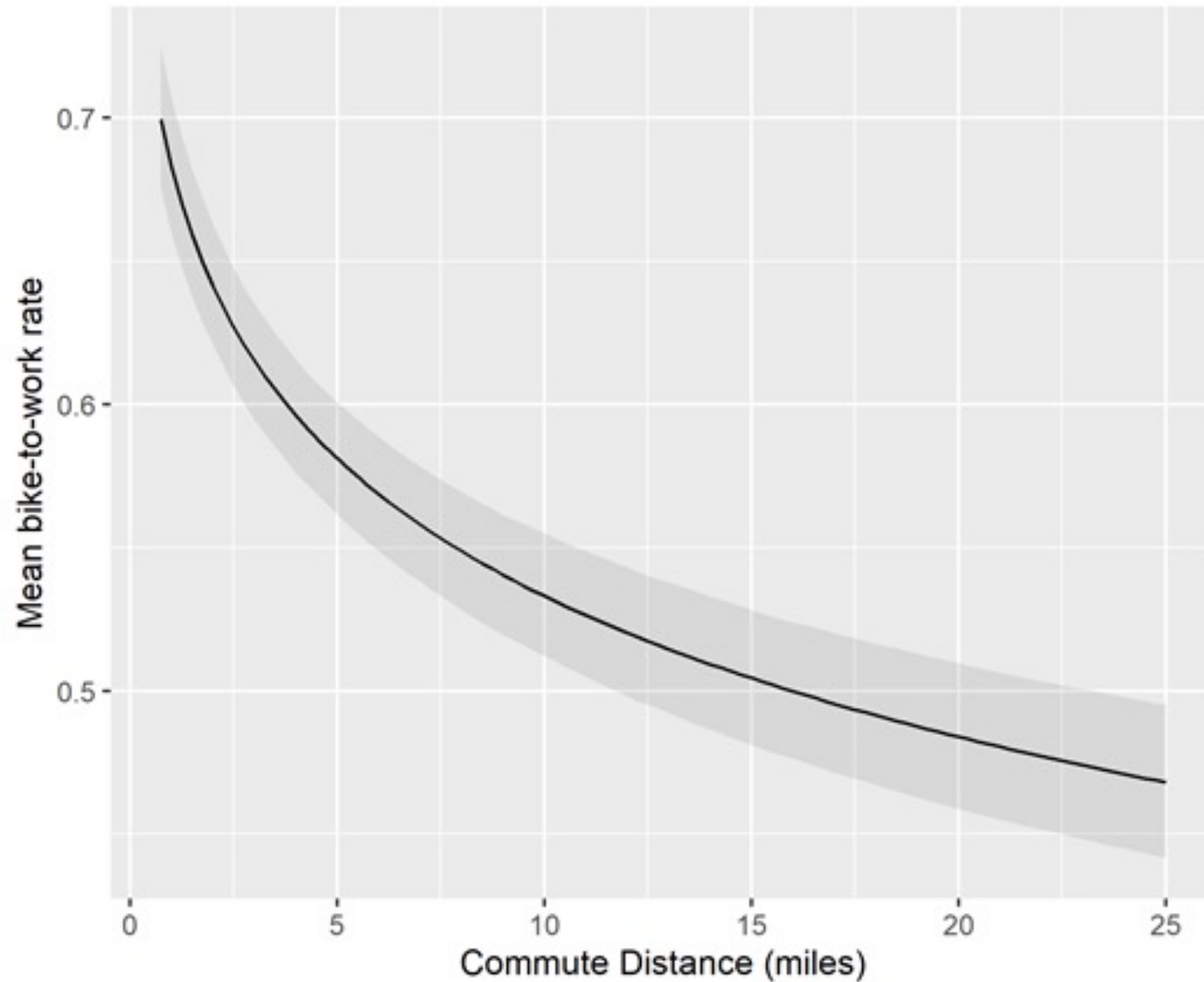
Results: Bike Commuting (trip-reporting)



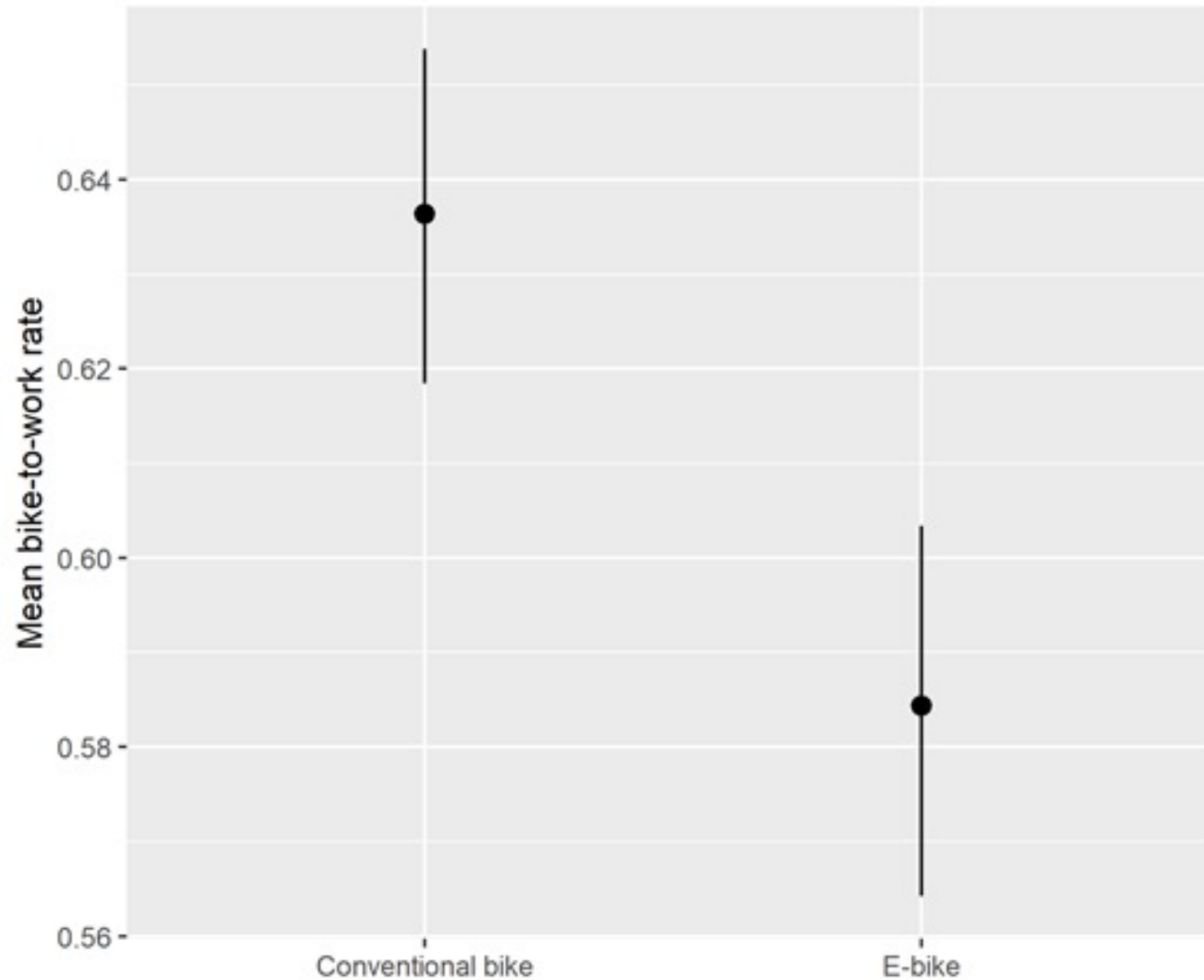
Results: Predicted Bike Commuting by Month



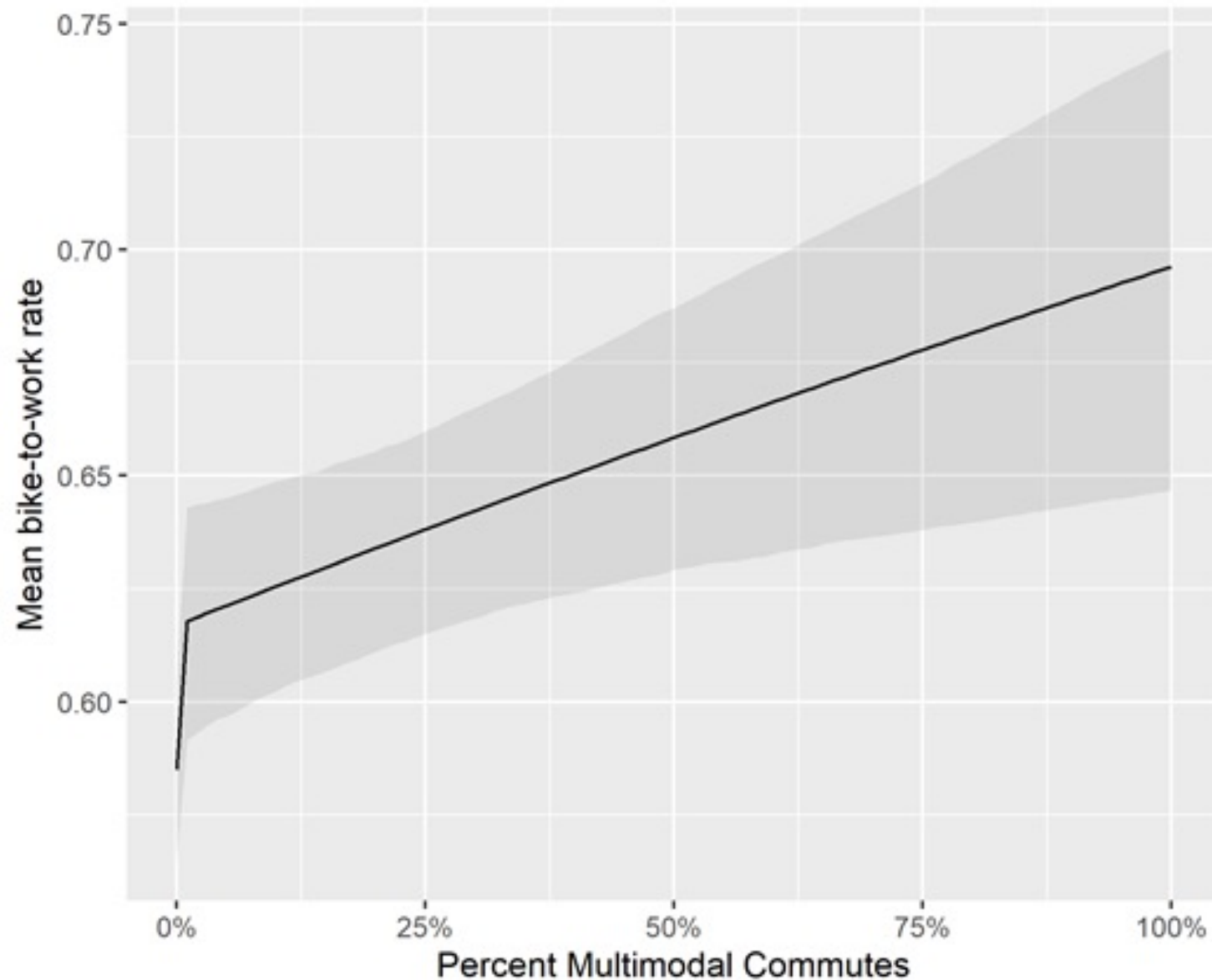
Results: Predicted Bike Commuting by Distance



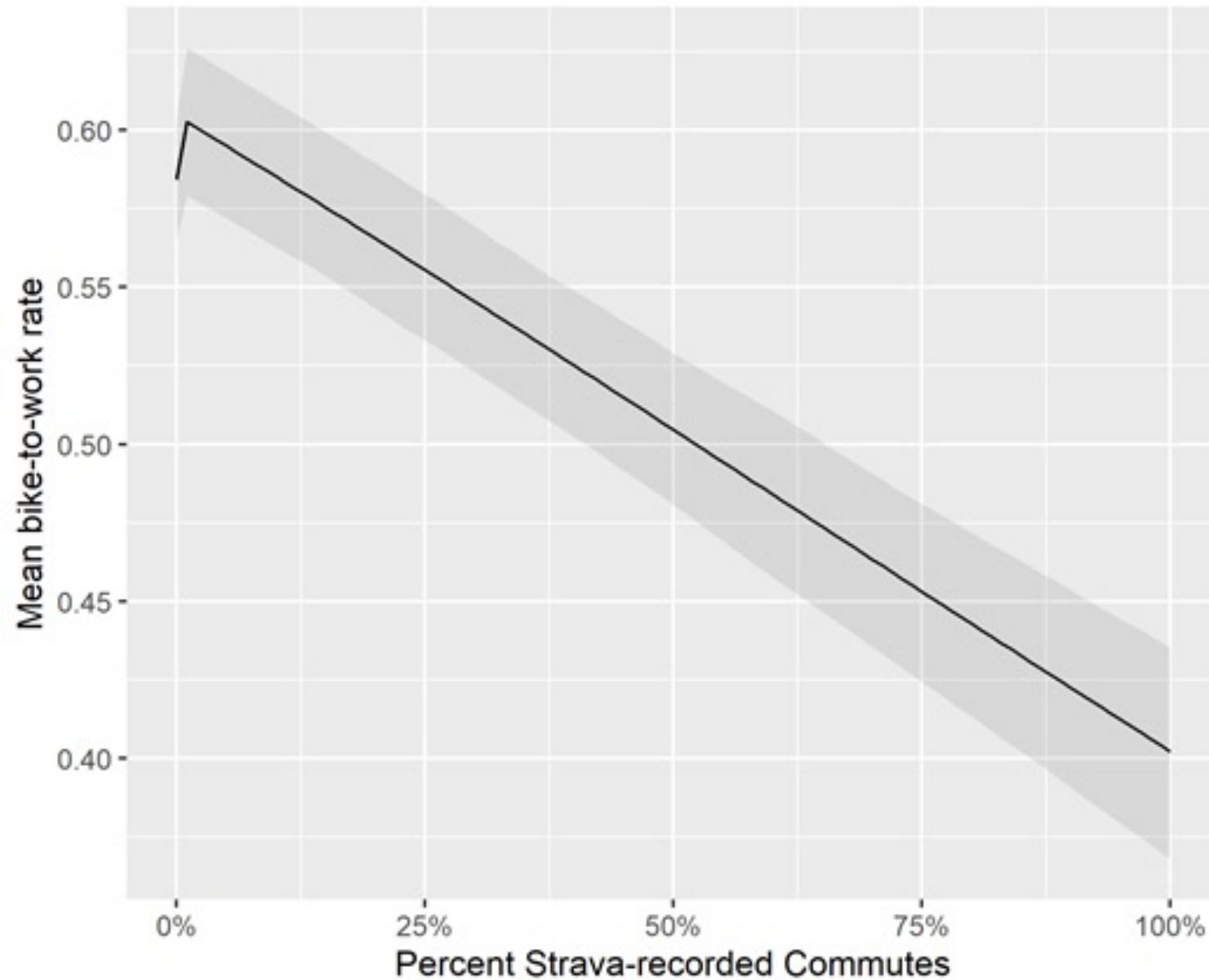
Results: Predicted Bike Commuting by Bike Type



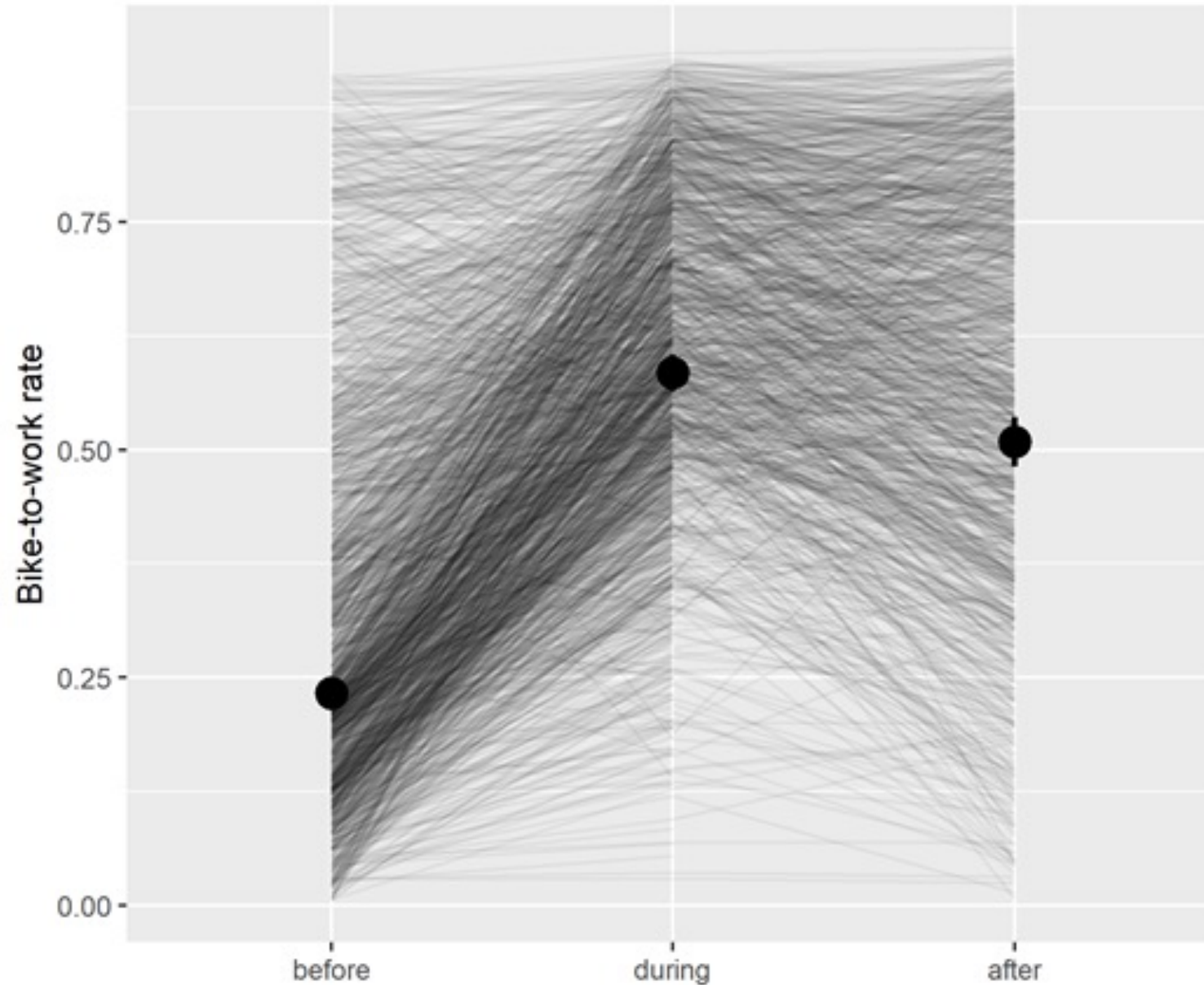
Results: Predicted Bike Commuting by Multimodal Commuting



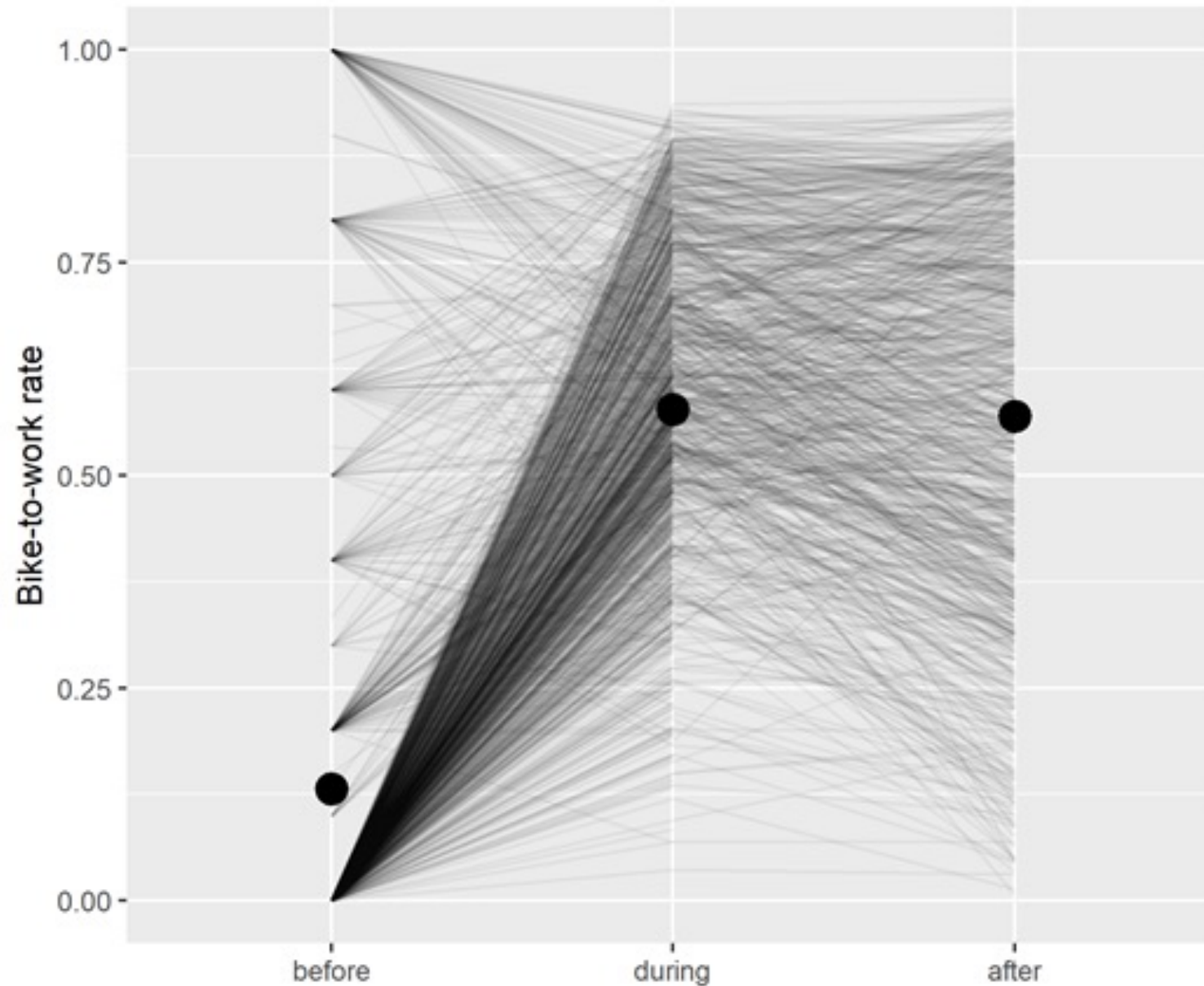
Results: Predicted Bike Commuting by Strava Use



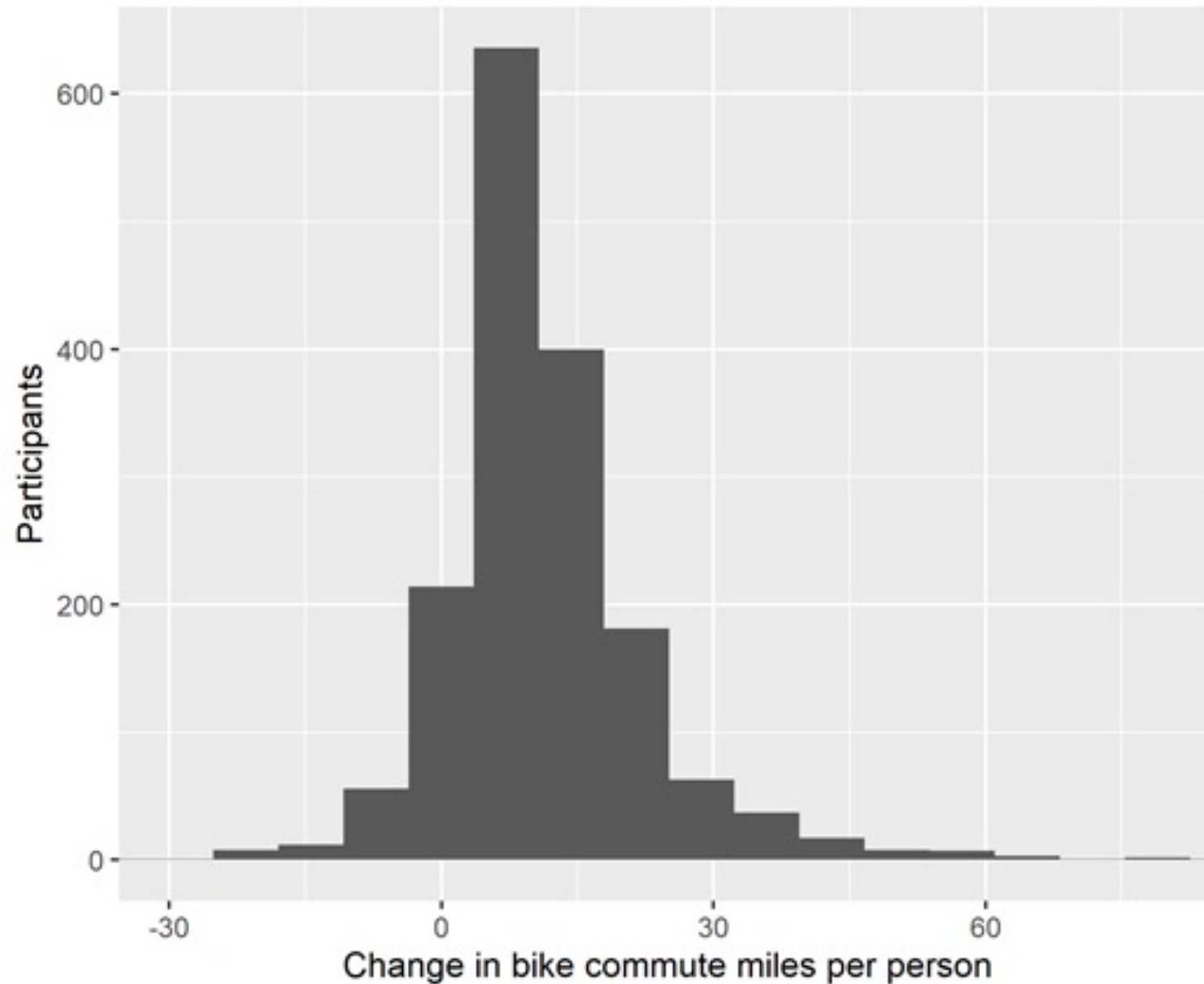
Results: Predicted Bike Commuting by Phase



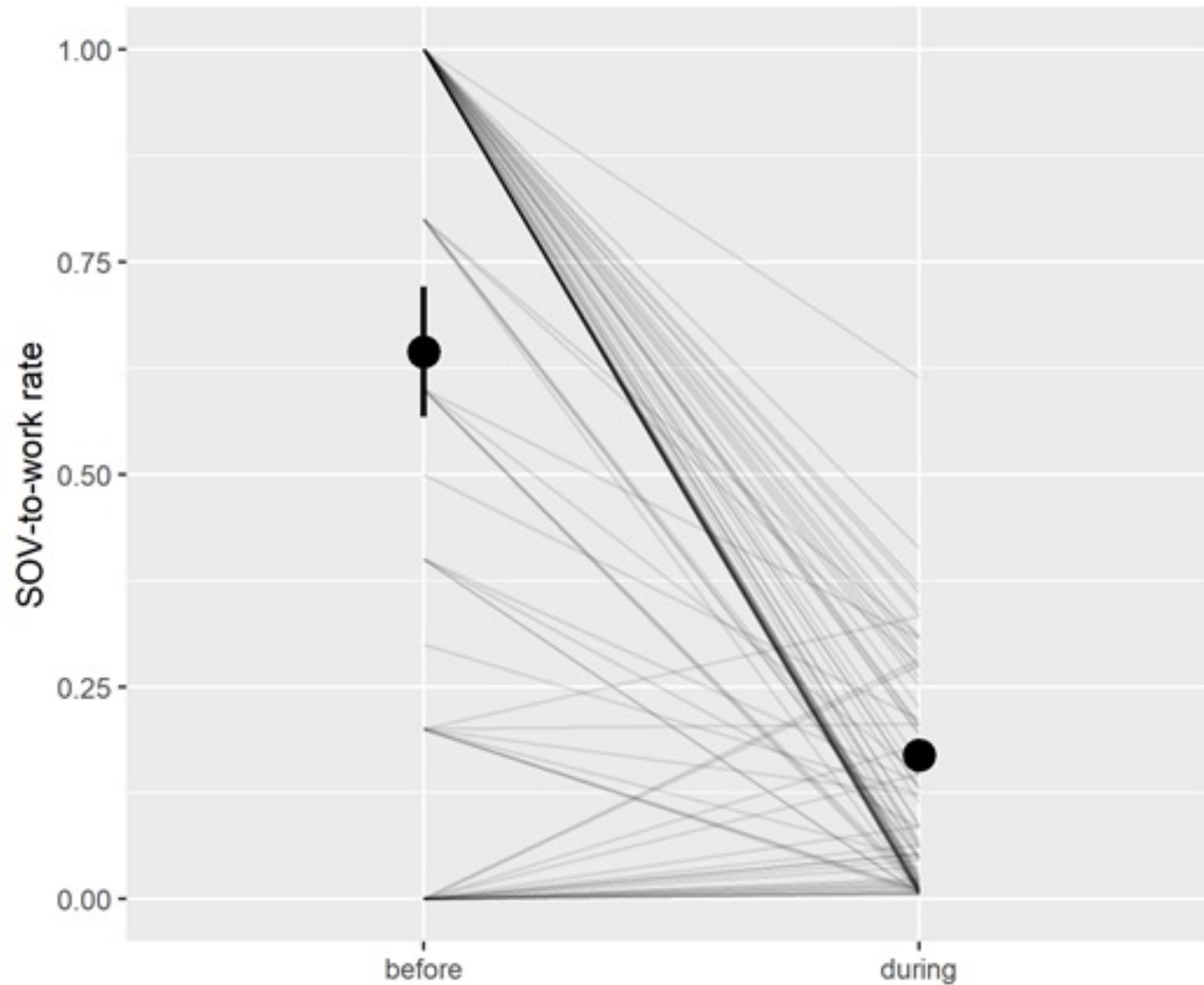
Results: Predicted Bike Commuting by Phase



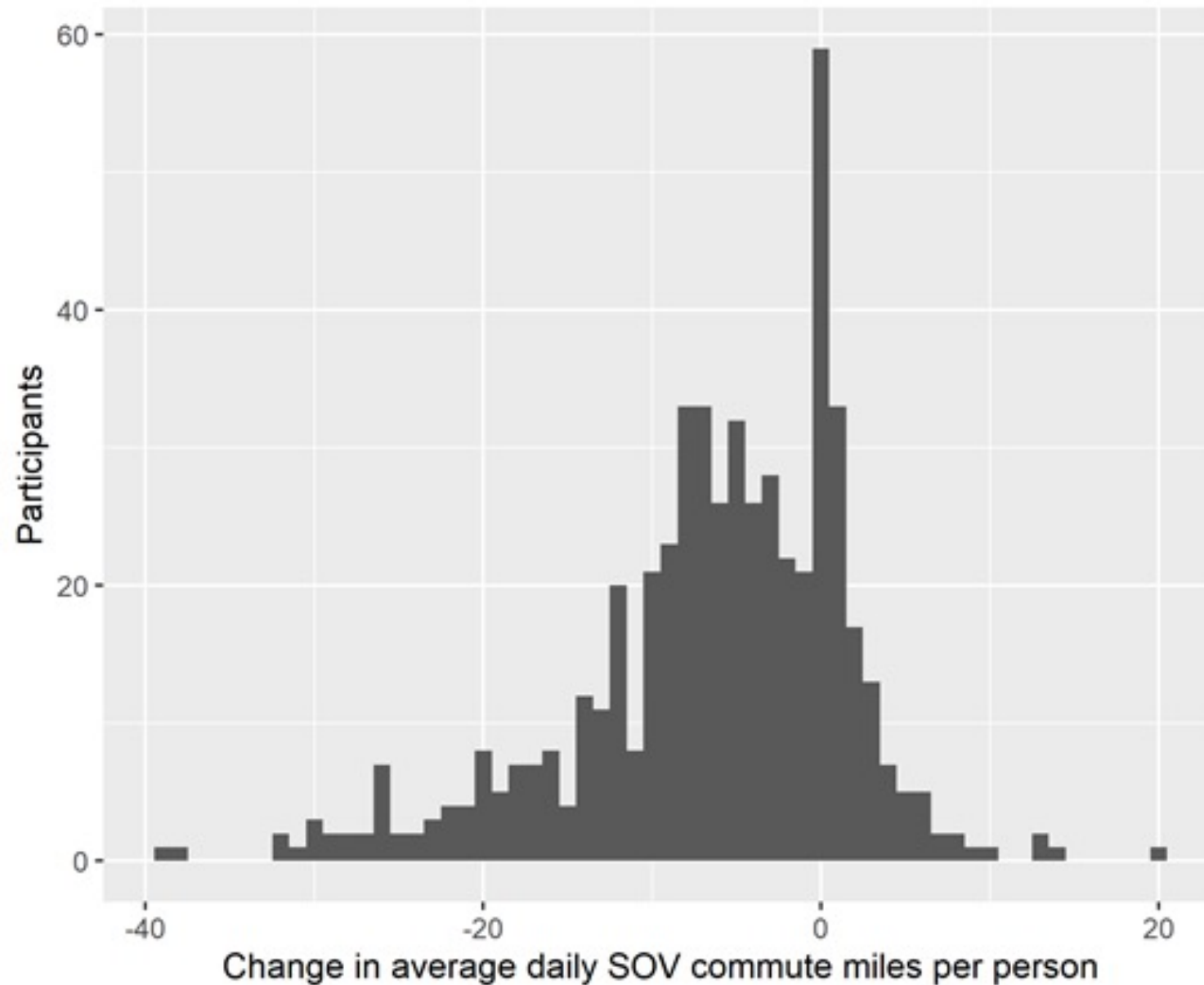
Results: Predicted Change in Bike Commute Miles



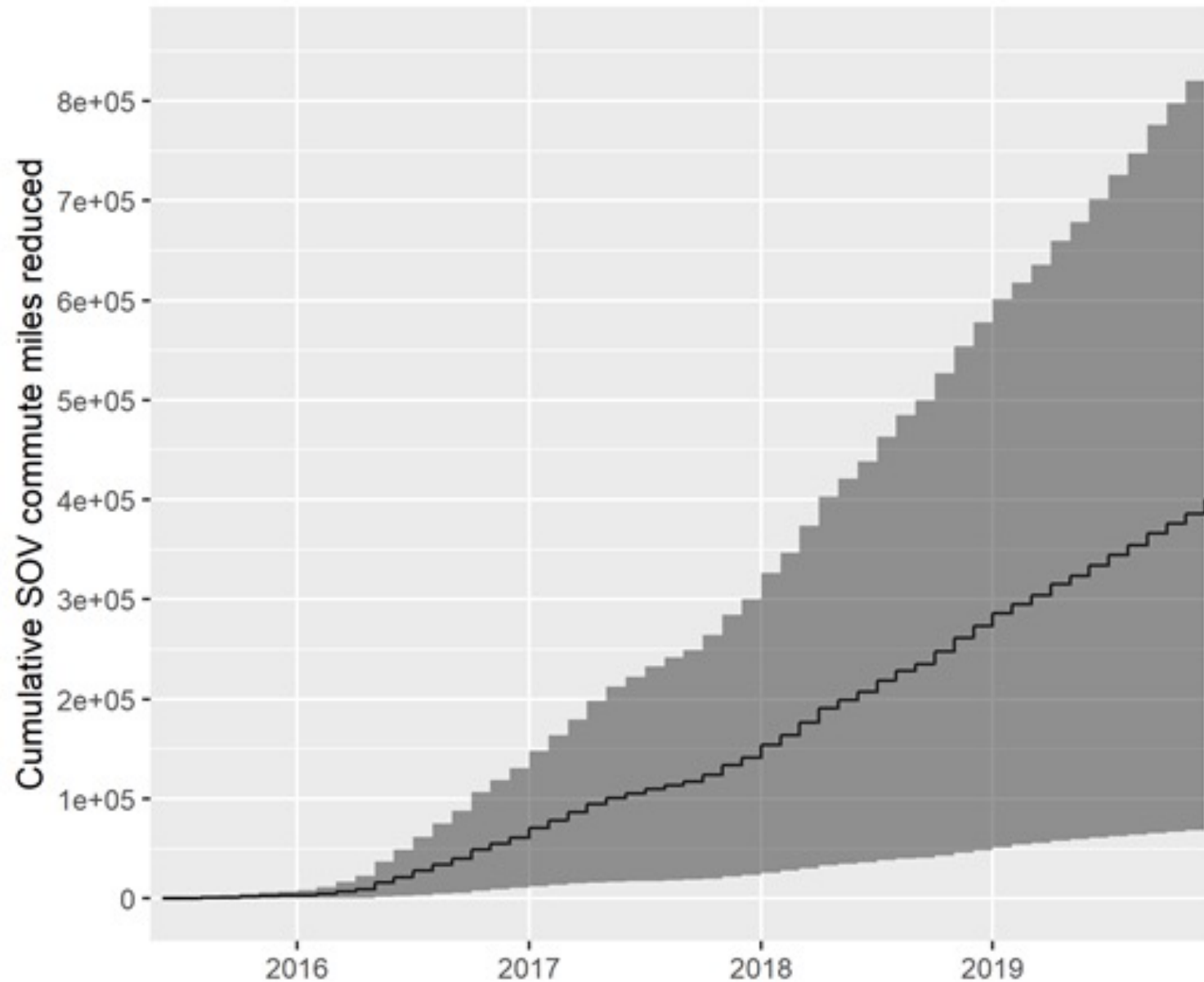
Results: Predicted SOV Commute by Phase (33% of participants)



Results: Predicted Change in SOV Commute Miles



Results: Predicted Program Level SOV Commute Miles Reduced



Results Summary



Increases of
1.7 - 2.3
*days per week spent
bike commuting*



Additional
8.4 - 10.5
*miles per week spent
bike commuting*

**All or nearly all bike increases are
associated with SOV decreases!**

Policy Recommendations (and Changes)

- *Consider permanent lending with no graduation*
 - Option A: graduate with subsidy to buy
 - Option B: continue with free bike
- *Consider alternative vehicle form factors and targeting multimodals*
 - See next slide on subscription program
- *Consider all distance commuters*
 - Commute distance no longer a selection criteria (all distances welcome)
- *Try to target non-bike commuters*
- *Other Changes:*
 - Subsidy increase from \$300 to \$500

Launch of Parallel Micro-Vehicle Subscription Program

- Introduction of new subscription model in parallel to bike lending
- Employee subscribes to external service provider and pay monthly fee to lease an e-scooter, sit-down e-scooter, or e-bike
- Google pays employees \$2.50 per one-way commute for subscribers to commute by their leased vehicle to help cover the subscription
- Allows Google to scale the program faster with fewer staff

Thank you for joining us for:

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