T3D

TIME USE, TRAVEL, AND TELEWORK DASHBOARD

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Southeast Florida Model Users Group | September 2024 Meeting

Arizona State University

TOMNET Transportation Center
Teaching Old Models New Tricks

TBD TRAVEL BEHAVIOR AND DEMAND NATIONAL CENTER

THE UNIVERSITY OF TEXAS AT AUSTIN

Need for Better Data for Planning and Forecasting

Equity Implications of Severe Disruptions

More disruptions than ever, including pandemics, extreme weather events, technological disruptions

Reimagining Transit in the New Normal of Telework

Relying solely on commute travel for transit is no longer feasible for regaining ridership in the new normal.

Importance of Detailed "Trend" Data

Historical patterns are no longer reliable due to:

Rapid changes in societal behaviors

Changing demographics & diverse lifestyle preferences

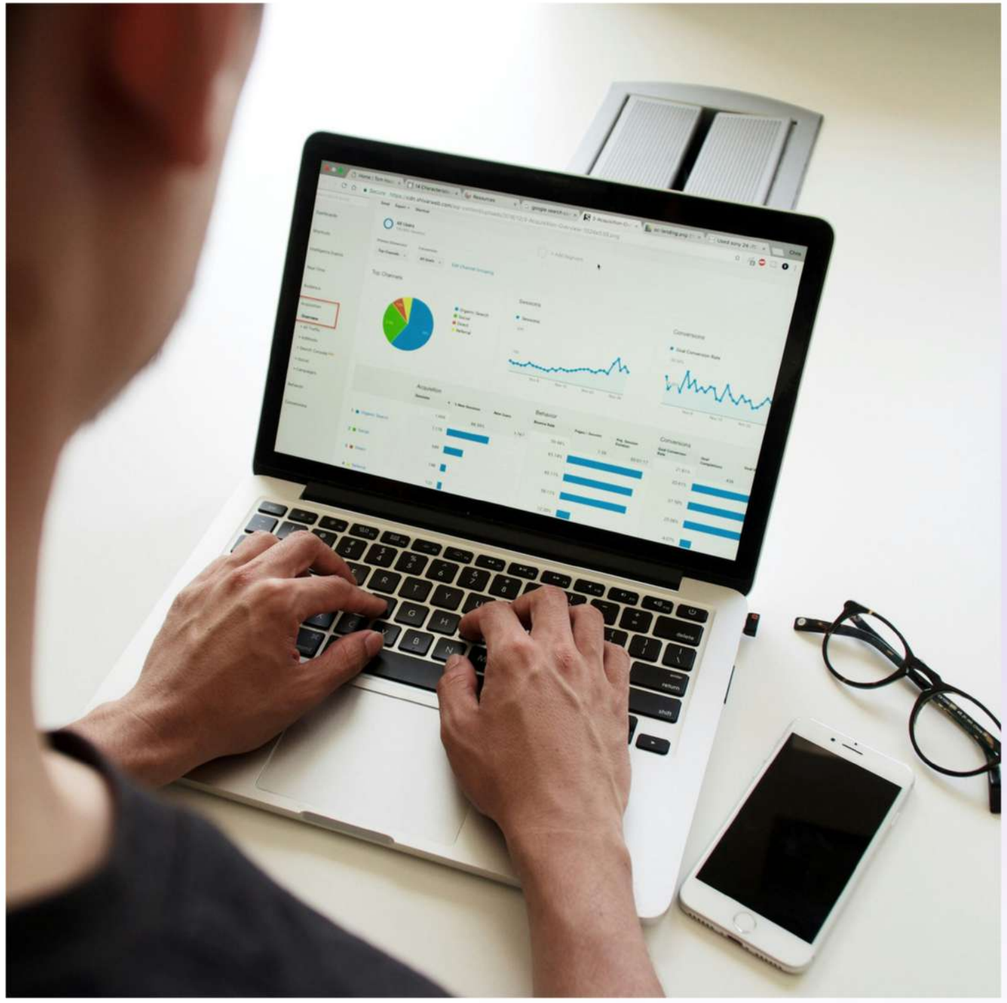
Harness potential of national survey data sets

American Time Use Survey provides a wealth of insights into the daily lives of Americans

WHY TOMNET/TBD DASHBOARDS?

Instant Access to Customizable "Trend" Data

- Aimed at putting detailed trend data, at the fingertips of planners and decision-makers.
- To make data-driven decisions with the most up-to-date information.



T3D

Time Use, Travel, and Telework Dashboard

Team

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Teaching Old Models New Tricks

TBD | NATIONAL CENTER FOR UNDERSTANDING FUTURE TRAVEL BEHAVIOR AND DEMAND

ASU Ira A. Fulton Schools of Engineering
Arizona State University

Motivation

American Time Use Survey (ATUS)
provides a wealth of insights into the daily lives of Americans

Navigating ATUS is challenging
for a broad spectrum of users

Even for experts
exhaustive and repetitive data analysis for each new inquiry is a significant burden.

The goal is to democratize ATUS
to make it more accessible and interpretable for everyone.

ATUS

AMERICAN TIME USE SURVEY

AMERICAN TIME USE SURVEY

Nationally representative estimates of how people spend their time

- Sponsored by the Bureau of Labor Statistics
- Conducted by the U.S. Census Bureau every year since 2003

Randomly selected individuals (15+) interviewed for their time use diary information for previous day (4 am to 4 am)

- Time, location, and purpose of activities pursued and who they were with during each activity
- Demographic information is also available for each respondent

AMERICAN TIME USE SURVEY

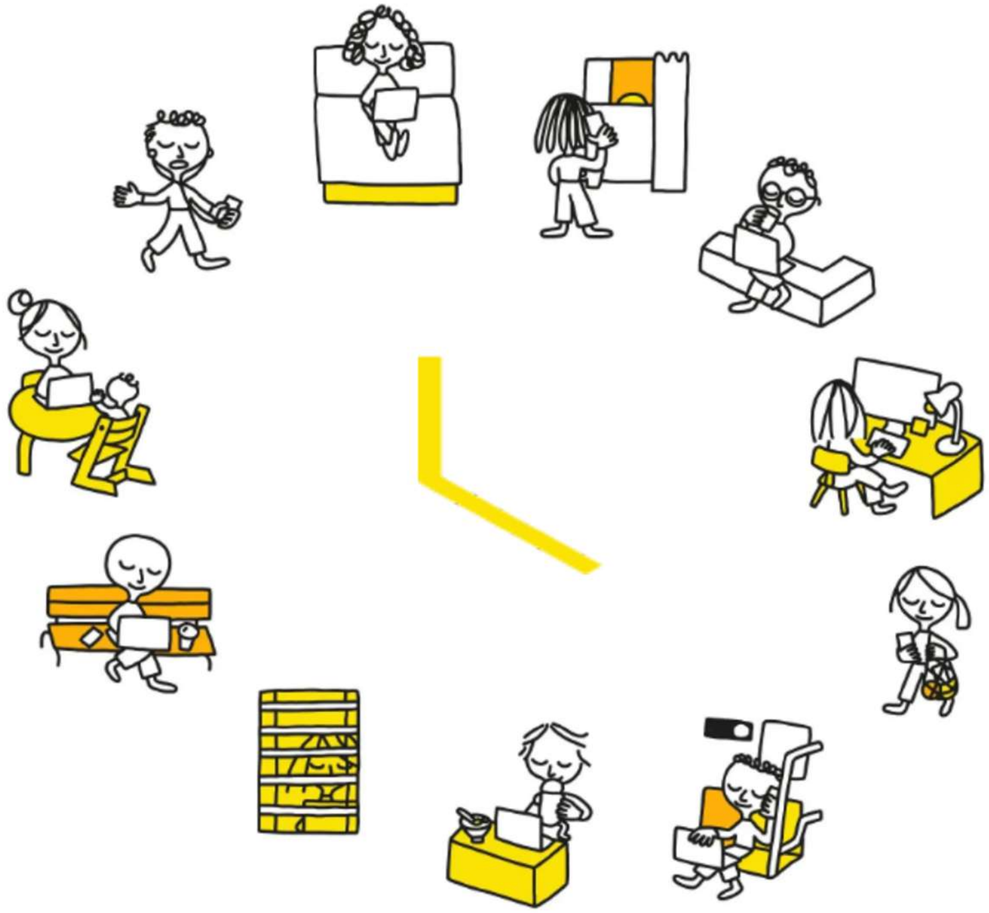


Illustration by Oscar Bolton Green

- Detailed activity and time use data
- Individuals report all of their activities over the course of a day, including travel episodes
- ~10,000 respondents per year

ACTIVITY CLASSIFICATION AND DEFINITION

Activity Types

- Tier-1
- Tier-2
- Tier-3

Tier-1 Activity Types (A Total of 18)

- Personal care (sleeping)
- Household activities
- Caring for and helping household members
- Caring for and helping non-household members
- Work and work-related activities
- Education
- Consumer purchases
- Professional/personal care services
- Household services
- Government services and civic obligations
- Eating and drinking
- Socializing, relaxing,
- Sports, exercise, and recreation
- Religious and spiritual activities
- Volunteer activities
- Telephone calls
- Traveling
- Other

426

ACTIVITY TYPES

Tier-1 X Tier 2 X Tier 3

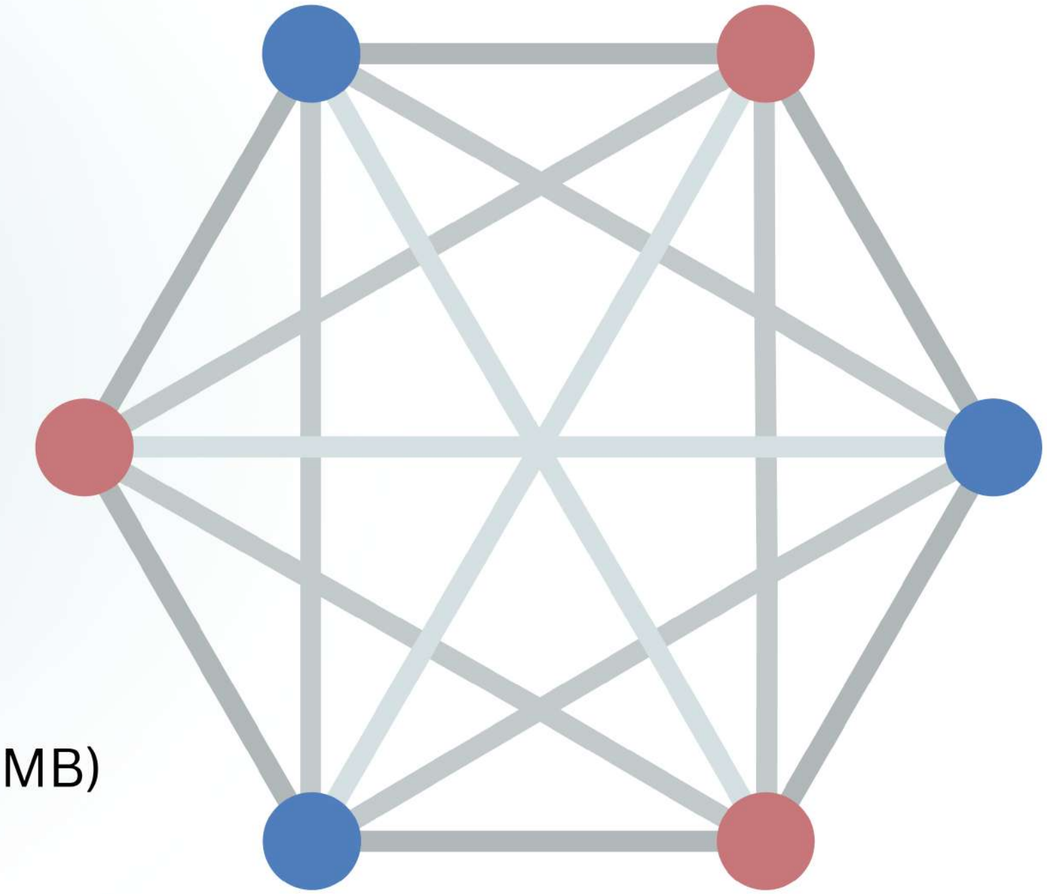
- Personal Care: 11 activity types
- Work: 20 activity types
- Education: 18 activity types
- Travel: 53 trip purposes

01 Personal Care Activities	
0101 Sleeping	• 010101 Sleeping • 010102 Sleeplessness • 010199 Sleeping, n.e.c.*
0102 Grooming	• 010201 Washing, dressing, and grooming oneself • 010299 Grooming, n.e.c.*
0103 Health-related self care	• 010301 Health-related self care • 010399 Self care, n.e.c.*
0104 Personal Activities	• 010401 Personal/Private activities • 010499 Personal activities, n.e.c.*
0105 Personal Care Emergencies	• 010501 Personal emergencies • 010599 Personal care emergencies, n.e.c.*

*n.e.c. stands for "not elsewhere classified".

Richness comes with increased complexity…

1. Respondent file (zip) (17.0 MB)
2. Roster file (zip) (3.2 MB)
3. Activity file (zip) (80.2 MB)
4. Activity summary file (zip) (15.6 MB)
5. Who file (zip) (19.9 MB)
6. CPS file (zip) (106.5 MB)
7. Eldercare Roster file (zip) (0.2 MB)
8. Replicate weights file (zip) (276.5 MB)
9. Pandemic Replicate weights file (zip) (56.1 MB)
10. Case history file (zip) (5.0 MB)



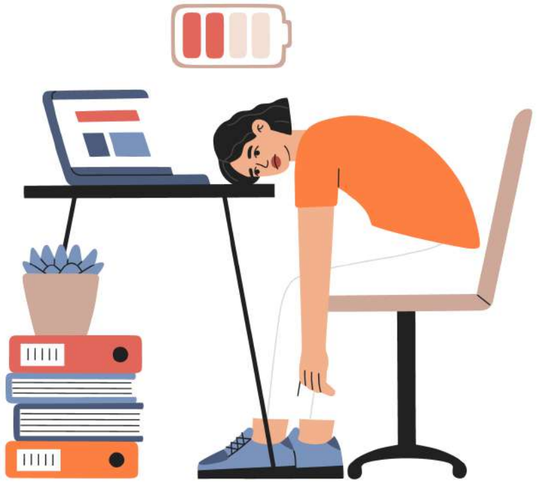
NAVIGATING THE COMPLEX ATUS DATA SERIES

Got advanced coding skills?

You can’t analyze!

No

Yes



Time-consuming!

OUR GOALS

1 - Identify topics of interest to the community

2 - Determine what to visualize in each topical area and necessary **analysis types**

3 - Design a simplistic and user-friendly platform

4 - Preprocess and **optimize** data visualization operations on the back end

5 - Keep **open source**, make it **easy to maintain**, and **seek** continuous **feedback** for improvement

T3D

Time Use, Travel, and Telework Dashboard

-- by TOMNET and TBD University Transportation Centers

WATCH DEMO

Dive Into the American Time Use Survey Data to Uncover Trends and Patterns

Time Use

Explore how and where people spend their time during the day.

Travel

Get insights into people's travel patterns by mode and purpose.

Telework

Examine the latest and historical teleworking trends.

THREE DIFFERENT ANALYSIS TYPES

Within-year

Between-year

Cross-segment

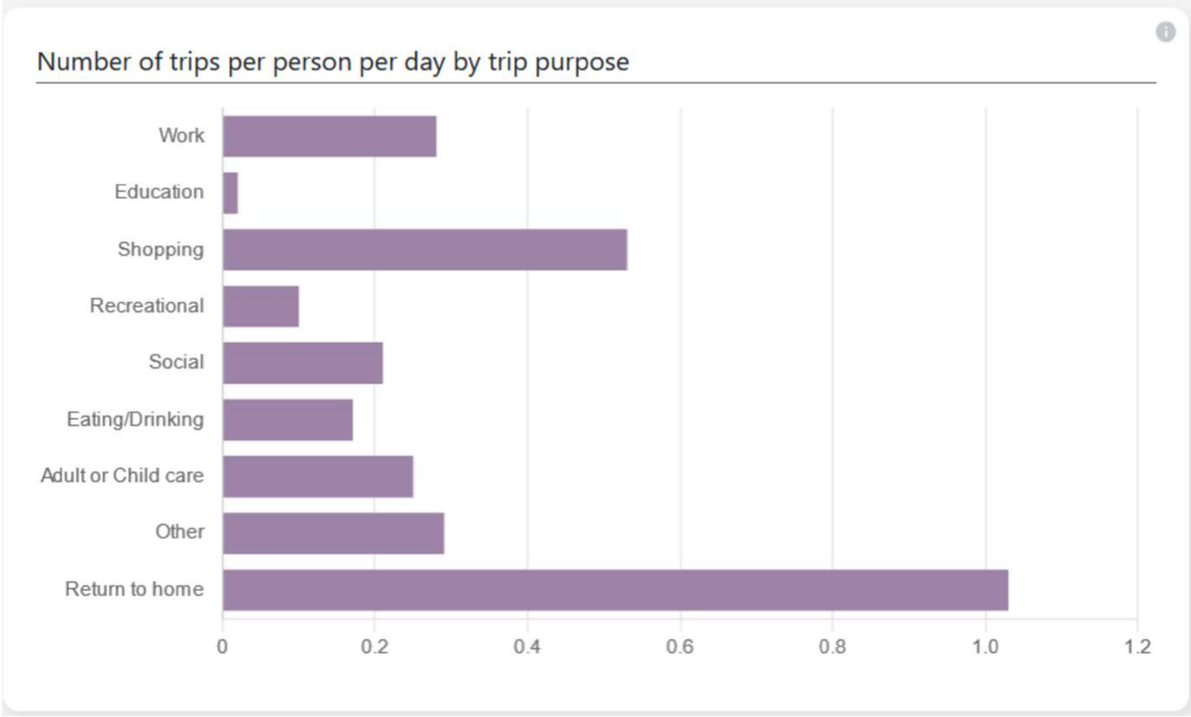
Time Use, Travel, and Telework Dashboard

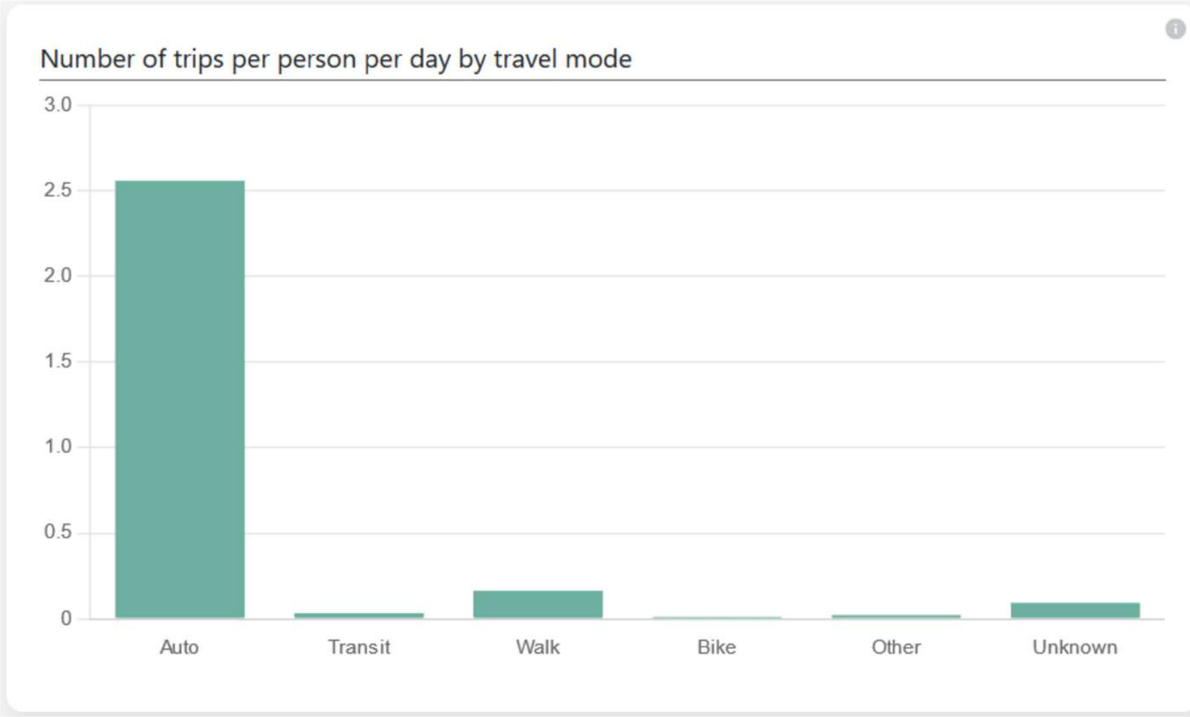
Travel

Select segment: All | Select attribute | Select attribute | Select attribute | Apply | Reset

Within Year Analysis

Day: All | Year: 2023





similarly for daily travel durations…

Time Use, Travel, and Telework Dashboard

Travel

Select segment: All | Select attribute | Select attribute | Select attribute | Apply | Reset

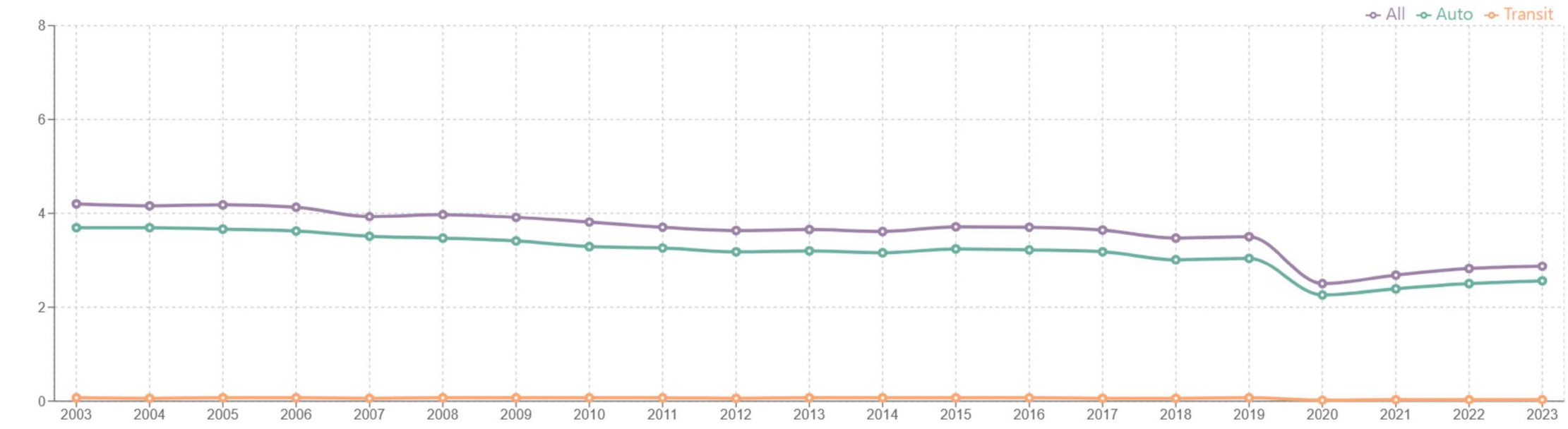
Between Year Analysis

Start year: 2003 | End year: 2023 | Day: All

By trip purpose | By travel mode

Trip purpose: All

Average number of trips per person



Time Use, Travel, and Telework Dashboard

Cross Segment Analysis

Start year: 2003 | End year: 2023 | Day: All | Trip purpose: All | Metric: Number of trips

By trip purpose | By travel mode

All

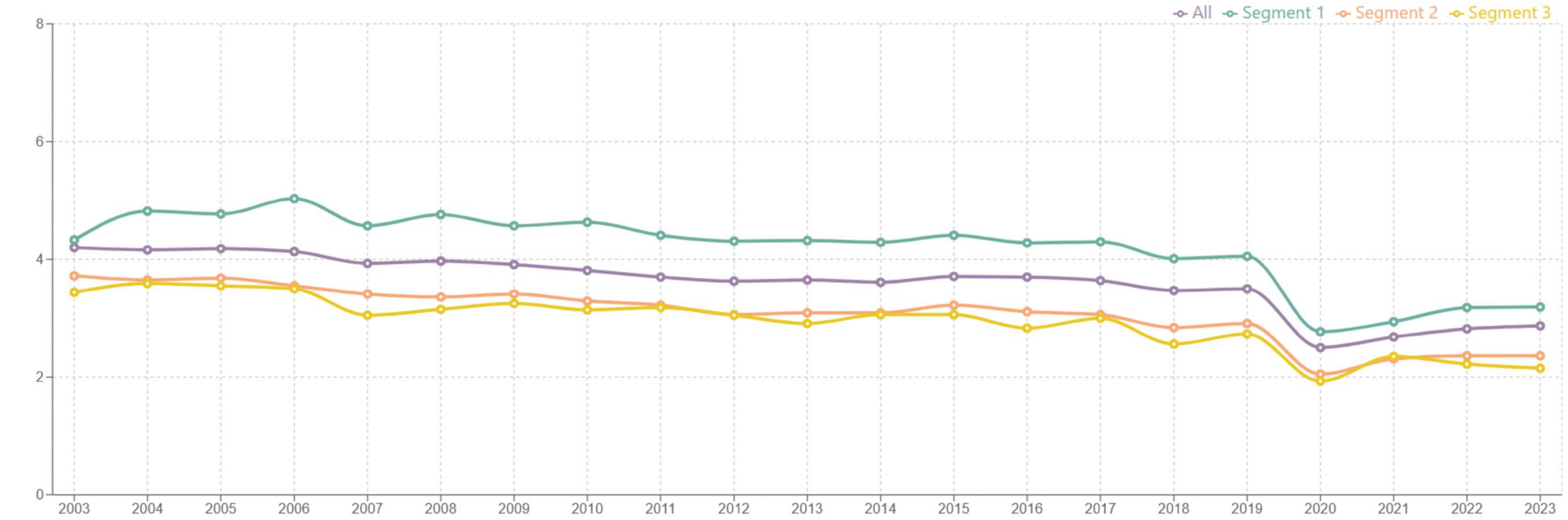
Segment 1
>$100K

Segment 2
<$35K

Segment 3
<$35K | Black

Travel

Average number of trips per person



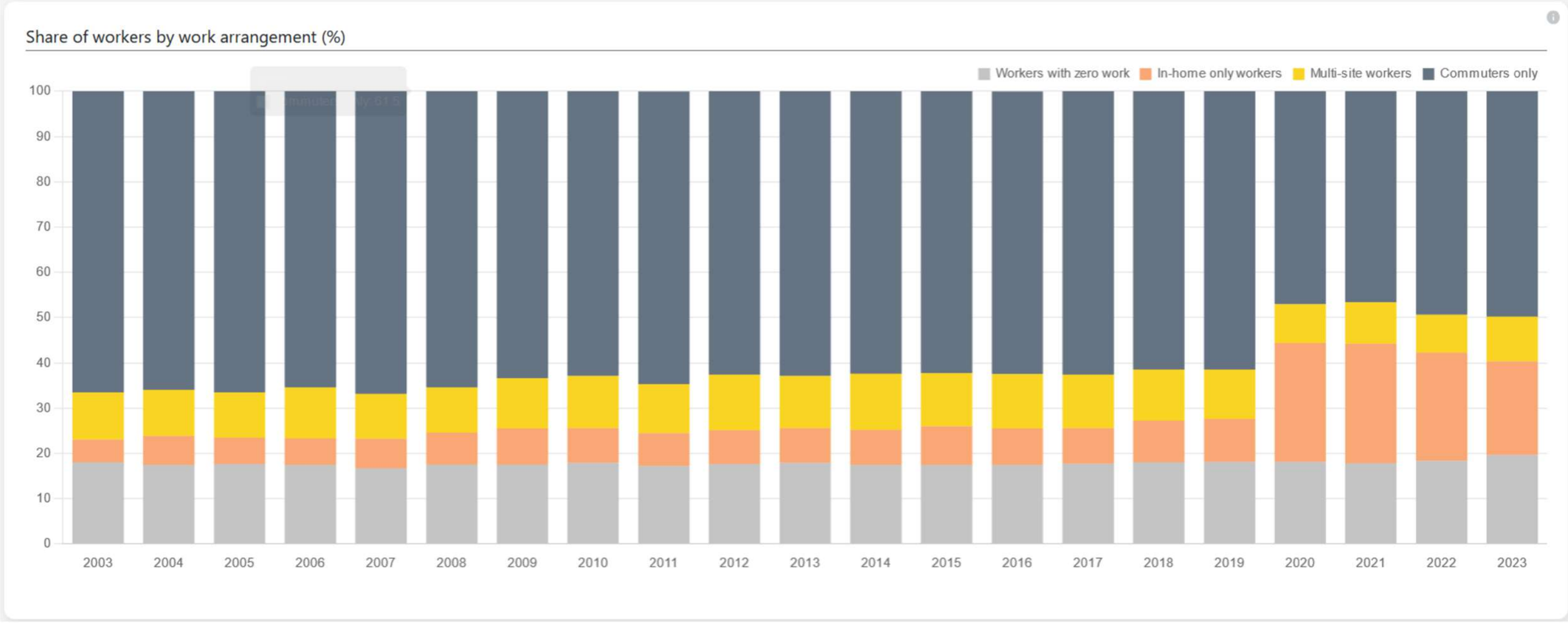
Time Use, Travel, and Telework Dashboard

Telecommute

Select segment: All | Select attribute | Select attribute | Select attribute | Apply | Reset | Include December:

Between Year Analysis

Start year: 2003 | End year: 2023 | Day: Weekday | Employment: All



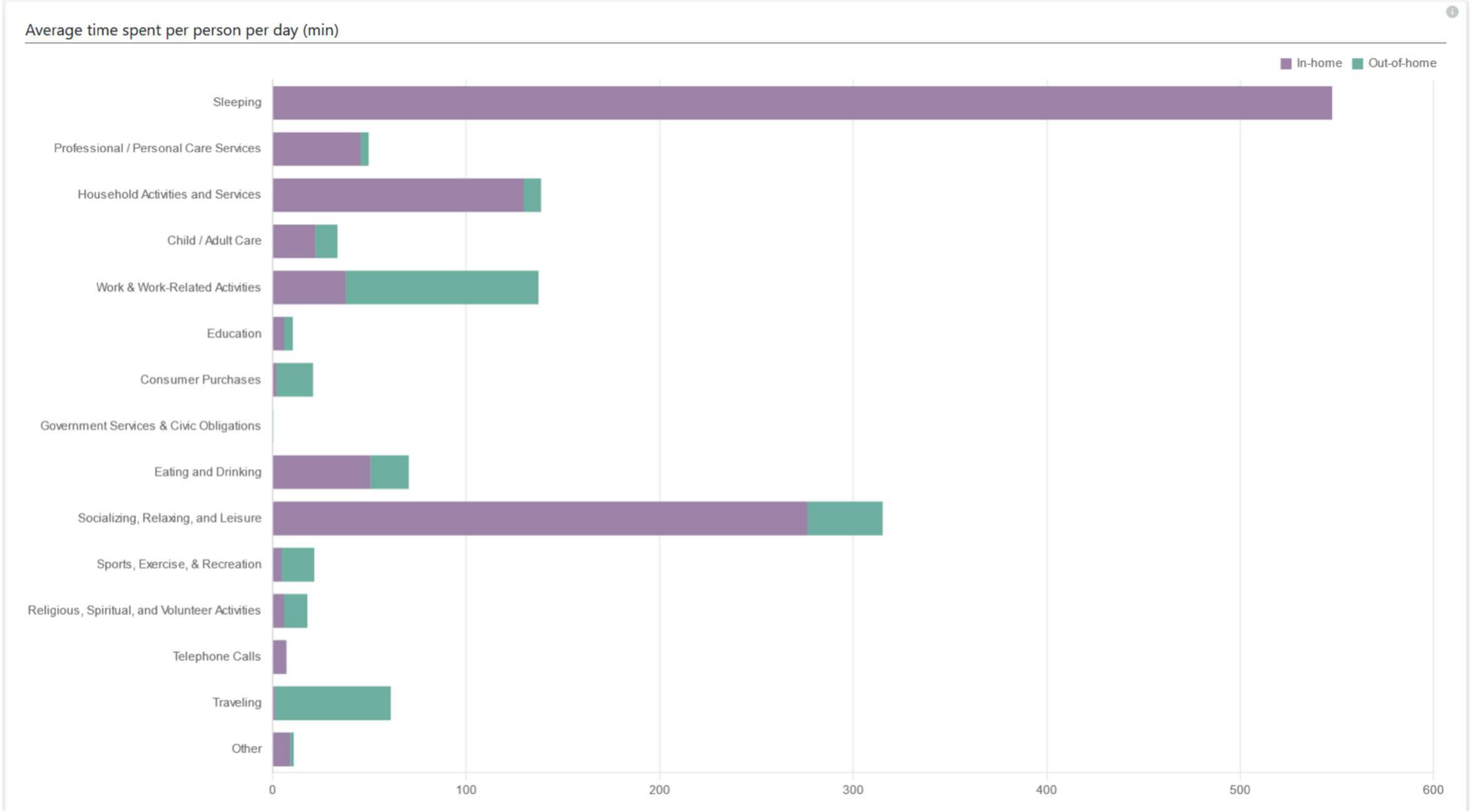
Time Use, Travel, and Telework Dashboard

Time use

Select segment: All | Select attribute | Select attribute | Select attribute | Apply | Reset | Include December:

Within Year Analysis

Day: All | Year: 2023



Some Use Cases

1. Checking consistency of statistics in other data sources

- Check for consistency of variables in other data sources
  - National Household Travel Survey
  - In-house data collection efforts

2. Test Research Questions and Hypotheses

- Use T3D to explore relationships between your model's dependent variables and demographic variables

3. Creating Statistics for Reports and Proposals

- Agencies, academics, NGOs, and communities can quickly generate statistics on nationwide or regional trends in time use, travel, and telework for their reports and proposals

Additional concepts

Zero-trip making

- indicative of **social exclusion** and disengagement from society
- potentially contributing to **lower wellbeing**

Zero-trip makers at the highest level since 2001 (NHTS Data Series)

Additional concepts

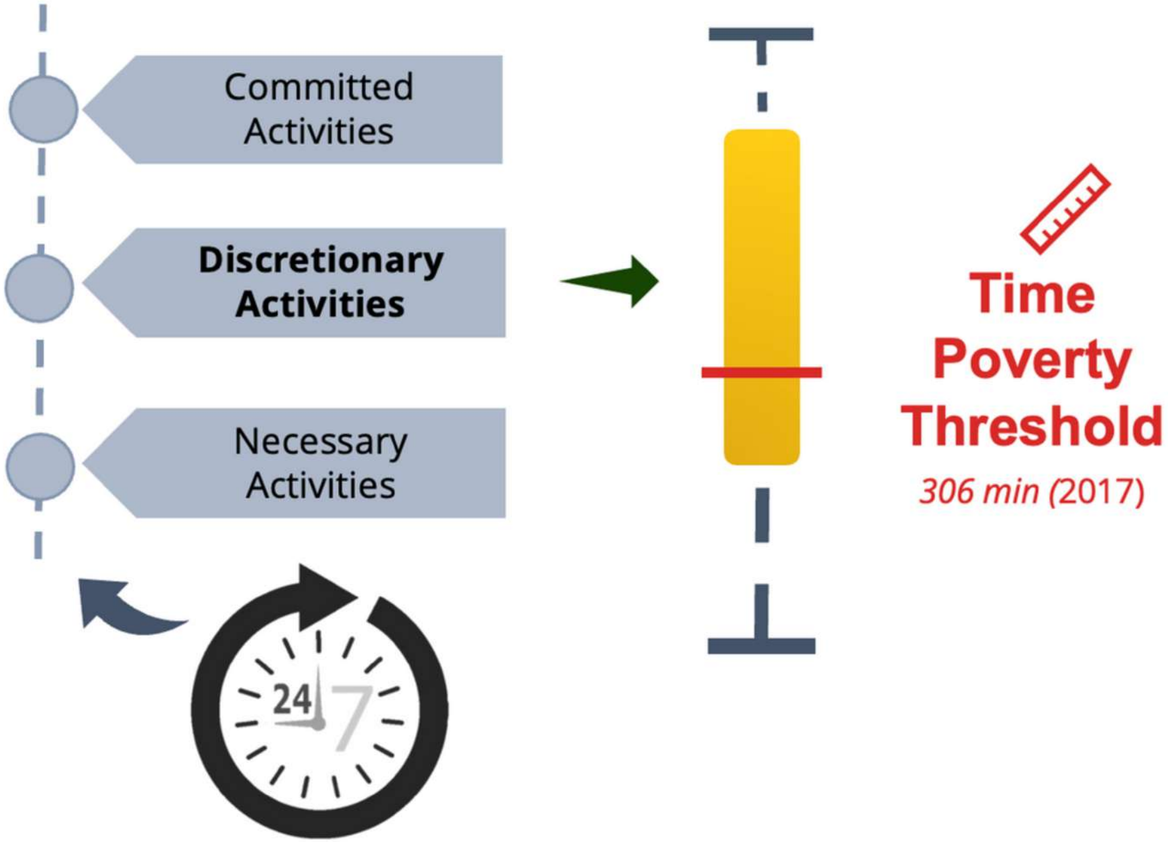
Time poverty

- Defined as the **lack of available time** for pursuing **discretionary** activities
- Often equated with **lower wellbeing** in the sociological domains

Time Poverty

- Time poverty, like income poverty, is linked to wellbeing.
- A threshold value of **available time for discretionary activities** is used to determine if a person is **time poor**.
- Discretionary time is **1440 minutes minus all committed and necessary activity time**.
- **60% of the median discretionary time** is adopted as threshold in this study.

Computation Method



Kalenkoski, C. M., & Hamrick, K. S. (2013). How does time poverty affect behavior? A look at eating and physical activity. Applied Economic Perspectives and Policy, 35(1), 89-105.

Worker Groups

Non-workers

- Unemployed or not participating in the labor force

Workers with Zero Work

- Respondents who reported no work activity in their time use diary

In-home Only Workers

- Working exclusively from home, with no reported out-of-home work

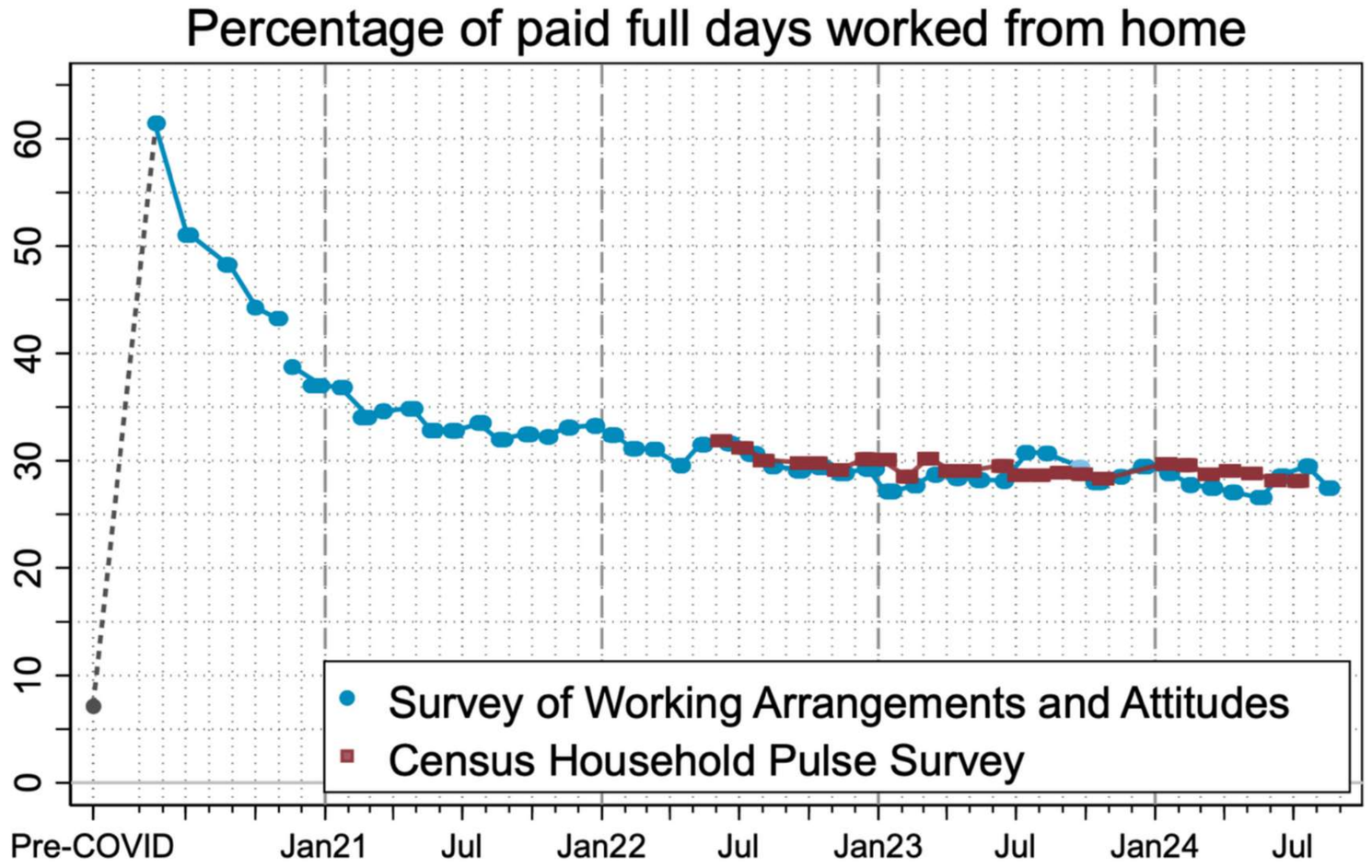
Commuters Only

- Engaging in at least some out-of-home work activity in their time use diary, without any in-home work activity.

Multi-site Workers

- Those who reported both out-of-home and in-home work activity in their time use diary

About 28% of Paid Days in the US in August 2024 Were Work-From-Home Days



*We estimate the pre-COVID rate using the 2019 American Time Use Survey
*The break in the series in November 2020 reflects a change in the survey question.
*The SWAA Sept. 2023 estimate averages August and October due to data quality issues in September.

Source: Responses to the questions:

- **Currently (this week)** *what is your work status? (SWAA)*
- *For each day* **last week**, *did you* **work a full day (6 or more hours)**, *and if so* **where?** (SWAA)
- *In the last 7 days, have you…teleworked or worked from home? (HHP)*

Notes: For each wave, we compute the percent of paid full days worked from home in the SWAA and Household Pulse Survey (HHP) and plot it on the vertical axis. The horizontal-axis location shows when the survey was in the field. The pre-COVID figure is from the 2017-2018 American Time Use Survey. SWAA: Before November 2020, we asked the first question above. Since November 2021, we have asked the second question. From November 2020 to October 2021, we back-cast responses to the current question using a regression model based on current-question responses and another question (not shown). We re-weight the sample of US residents aged 20 to 64 earning $10,000 or more in a prior year to match CPS shares by age-sex-education-earnings cells. HHP: We focus on individuals aged 20 to 64 with household incomes above $25,000 per year. We assign 30% of days WFH if the respondent did so for "for 1-2 days;" 70% if they did so "for 3-4 days;" 100% if "5 or more days;" and 0 for "No."

N = 198,742 (SWAA) N = 866,373 (HHP)

Sample Sizes

Does it allow analysis of regional trends?

Year	N	Year	N
2003	20,058	**2014**	11,238
2004	13,561	**2015**	10,557
2005	12,680	**2016**	10,157
2006	12,553	**2017**	9,880
2007	11,844	**2018**	9,276
2008	12,301	**2019**	9,130
2009	12,646	**2020**	8,513
2010	12,768	**2021**	8,746
2011	12,027	**2022**	7,855
2012	12,023	**2023**	8,241
2013	10,993		

Data Download Availability

Browse Our Recent

Products

Time Use, Travel, and Telework Dashboard (T3D)

Github | Dashboard

TOMNET Wellbeing Platform

Github | Dashboard

PopGen Population Synthesizer

Github

For more information, visit our GitHub

https://tomnetutc.github.io

LET'S DEMO!

https://tomnetutc.github.io/t3d/

What is next?

TBD Flagship Project

Travel Behavior Data (TBD) Hub

- TBD Hub brings various data sets (NHTS, ATUS, ACS, CE, etc.) into a single unified platform
- Serving as a one-stop shop for data-driven insights on travel behavior and demand

Thank you

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