

TEMPORAL ORDERING OF DAILY ACTIVITIES

BEFORE AND DURING COVID-19

Joanna R. Pepin
University at Buffalo

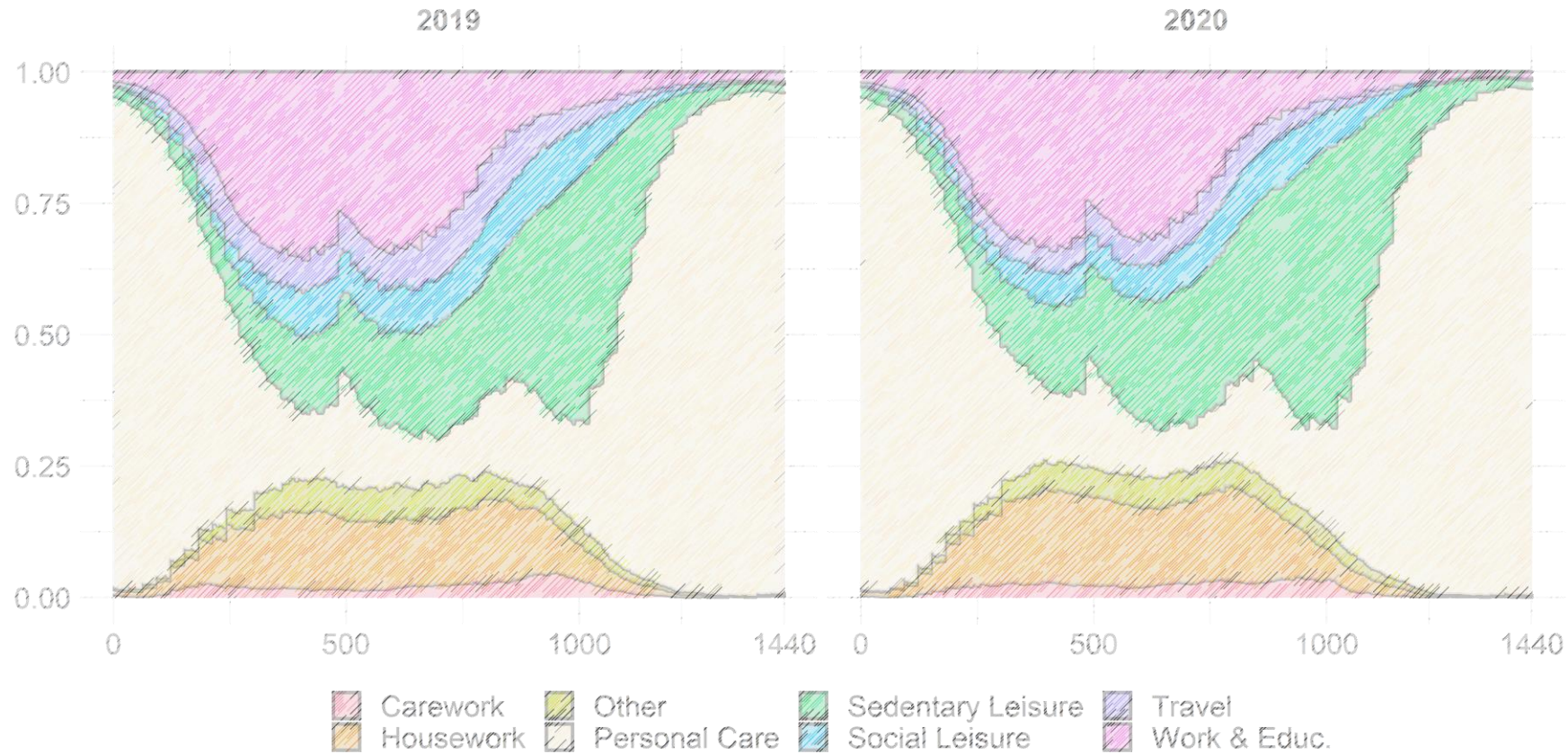
🐦 @CoffeeBaseball

Liana C. Sayer
University of Maryland

@LCHSayer

Sarah Flood
University of Minnesota

@SarahMFlood





Angelica Malin
@jellymalin

Is Covid-19 sponsored by banana bread?

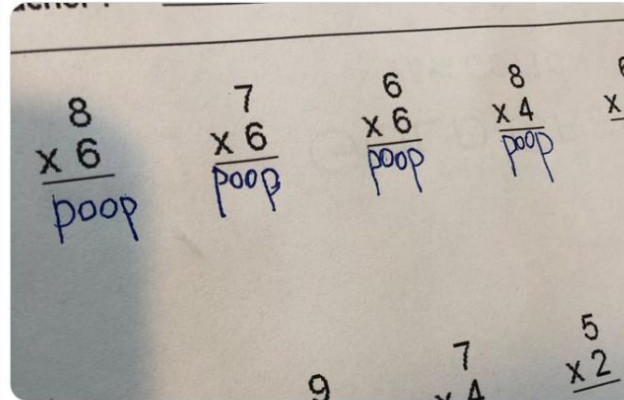
4:18 PM · Mar 29, 2020 · Twitter for iPhone

319 Retweets 43 Quote Tweets 2,347 Likes



Jason Kander
@JasonKander

Homeschooling is hard. I walked away for one minute.
[#TrueStory](#)



4:31 PM · Mar 19, 2020 · Twitter for iPhone



Skai
@skaijackson

I can't believe people are going out to the club... WE
ARE IN A WHOLE PANARAMA!

8:06 PM · Mar 8, 2021 · Twitter for iPhone

379 Retweets 31 Quote Tweets 5,355 Likes



The Salty Mamas
@saltymamas

Me in 2019: If I could just have like a week with nothing
to do and nowhere to go I could finally get this house
clean and organized.

Me now: Nope, that wasn't the problem....

7:46 PM · Mar 24, 2020 · Twitter for Android

435 Retweets 34 Quote Tweets 1,936 Likes

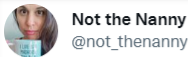


Stephen Colbert
@StephenAtHome

The longer this goes on, the harder it's going to be to
return to a society where pants are required.

10:10 PM · Mar 27, 2020 · Twitter for iPhone

17.1K Retweets 1,411 Quote Tweets 156.3K Likes



Not the Nanny
@not_thenanny

I just wanted five minutes to drink my coffee so I sent
my kid in the other room to look for a toy that's in my
pocket.

Follow me for more parenting hacks.

10:42 AM · May 20, 2020 · Twitter for iPhone

321 Retweets 39 Quote Tweets 1,802 Likes



benji
@sevenbenjisins

Joe Exotic will go down as the man who singlehandedly
helped us get through COVID-19 [#TigerKing](#)

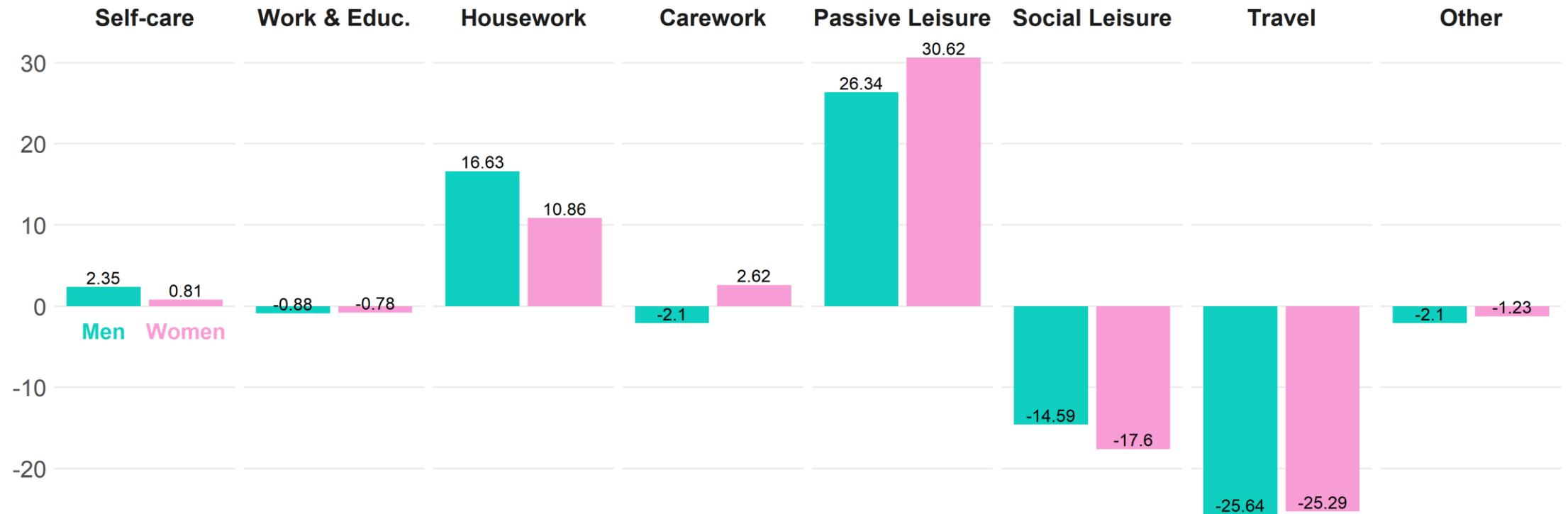



3:44 AM · Mar 25, 2020 · Twitter for iPhone

161 Retweets 9 Quote Tweets 970 Likes

Men's and Women's Change in Minutes per Day in _____

between 2019 and 2020



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How did **patterns** of activities **change** over the course of a day during the COVID-19 pandemic?

Data



American Time Use Surveys
2019 and 2020 surveys
N = 12,801

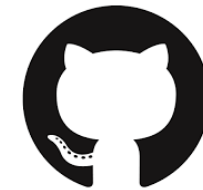
<https://www.atusdata.org/atus/>

Sample



https://htmlpreview.github.io/?https://github.com/jrpepin/ATUS_Sequences/blob/master/docs/sequences_table01.html

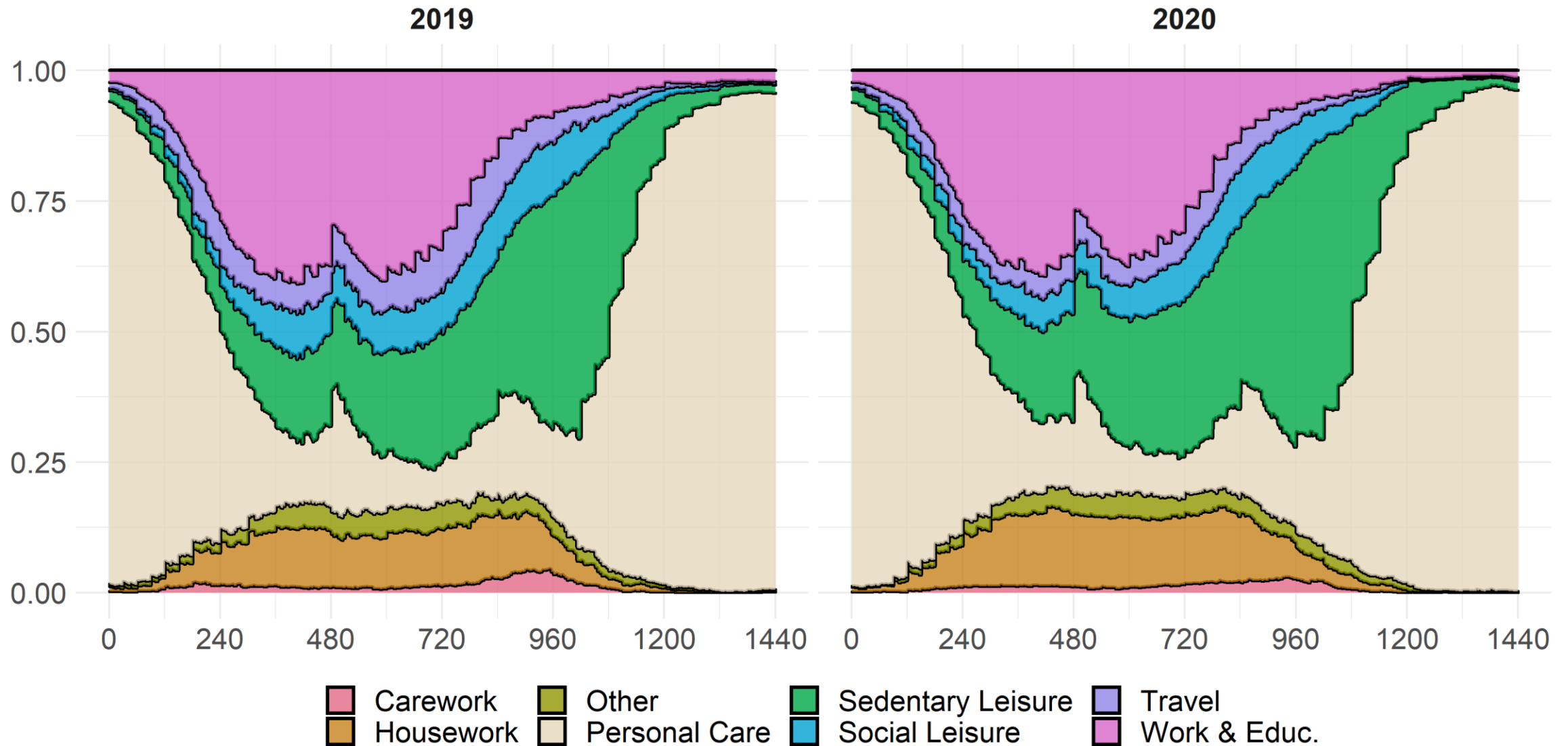
Analysis



1. **Illustrate timing** and sequencing of activities
2. **Construct typologies** of daily time use

https://github.com/jrpepin/ATUS_Sequences

Proportion of Men in Each Activity by Minute

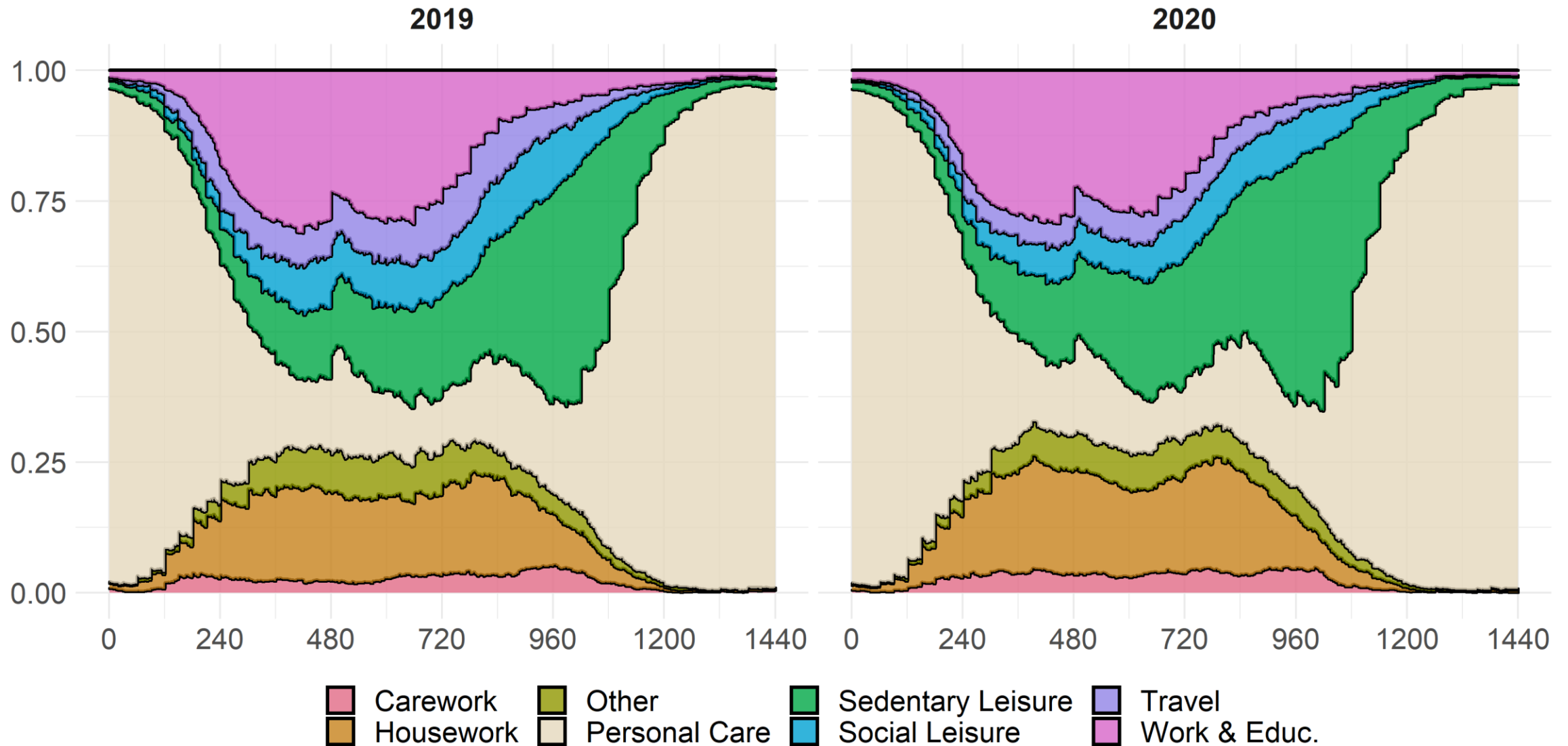


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Proportion of Women in Each Activity by Minute



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@LCHSayer

@SarahMFlood

Cluster Analysis

Choose a ...

Measure of Dissimilarity

1. Dynamic Hamming Distance (**DHD**)
2. Optimal Matching of Sequence transitions (**OMS**)

Clustering Algorithm

1. Hierarchical Clustering Method (**HCM**)
2. Partitioning Around Medoids (**PAM**)

4 measures of fit quality:

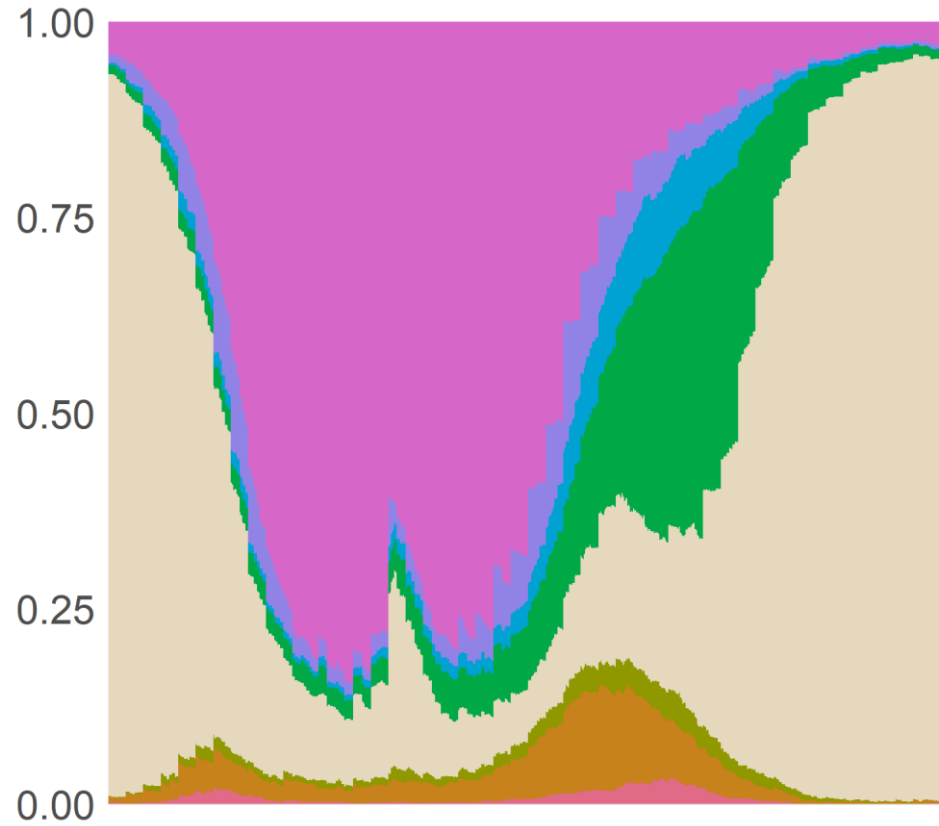
1. Hubert's C (HC) (*min value*)
2. Average Silhouette Width – weighted (ASWw)
3. Point Biserial Correlation (PBC)
4. Hubert's Gamma (HG)

Cluster Analysis



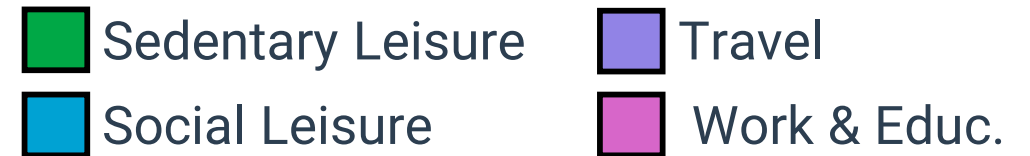
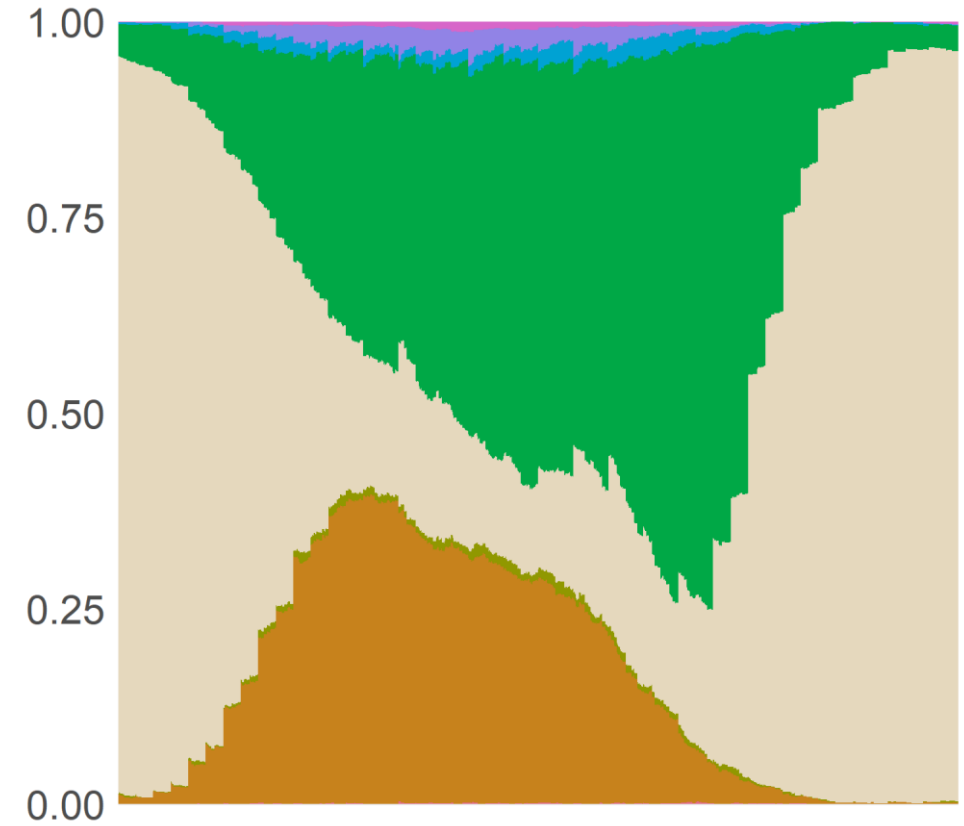
Cluster 1: Paidworkers

N = 3435



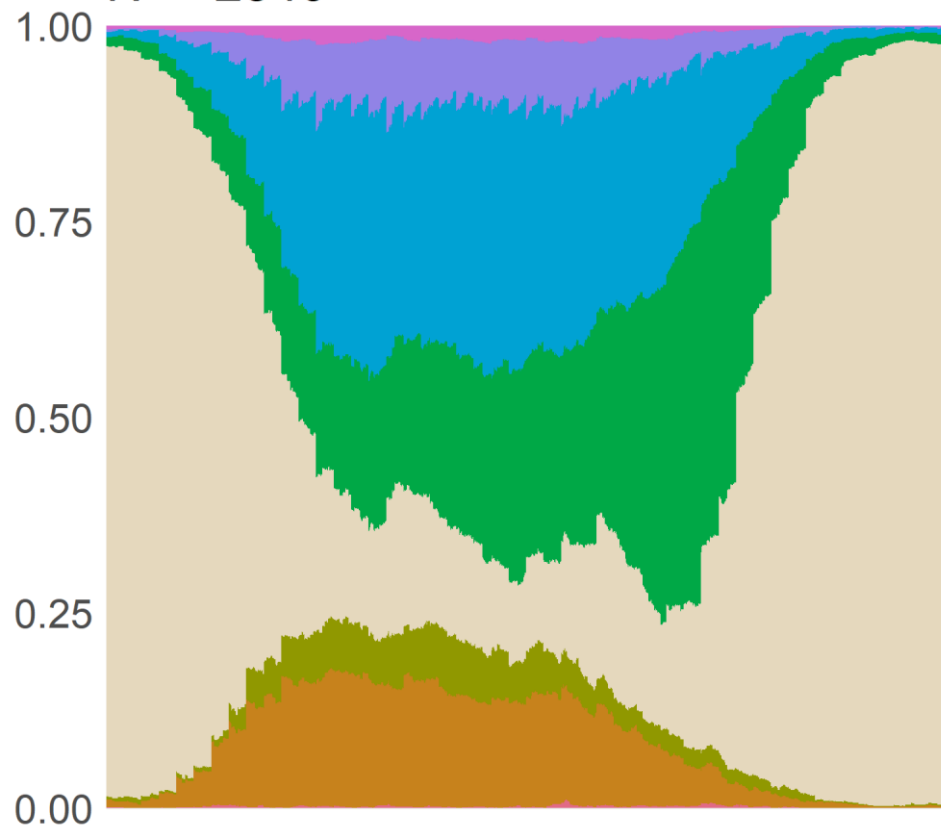
Cluster 2: Houseworkers

N = 2848



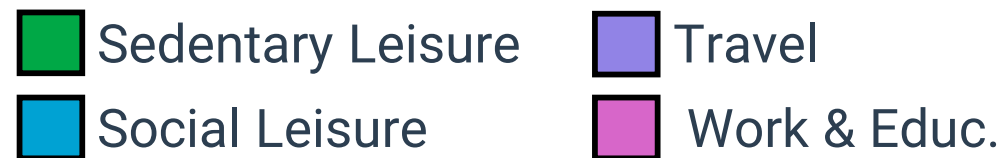
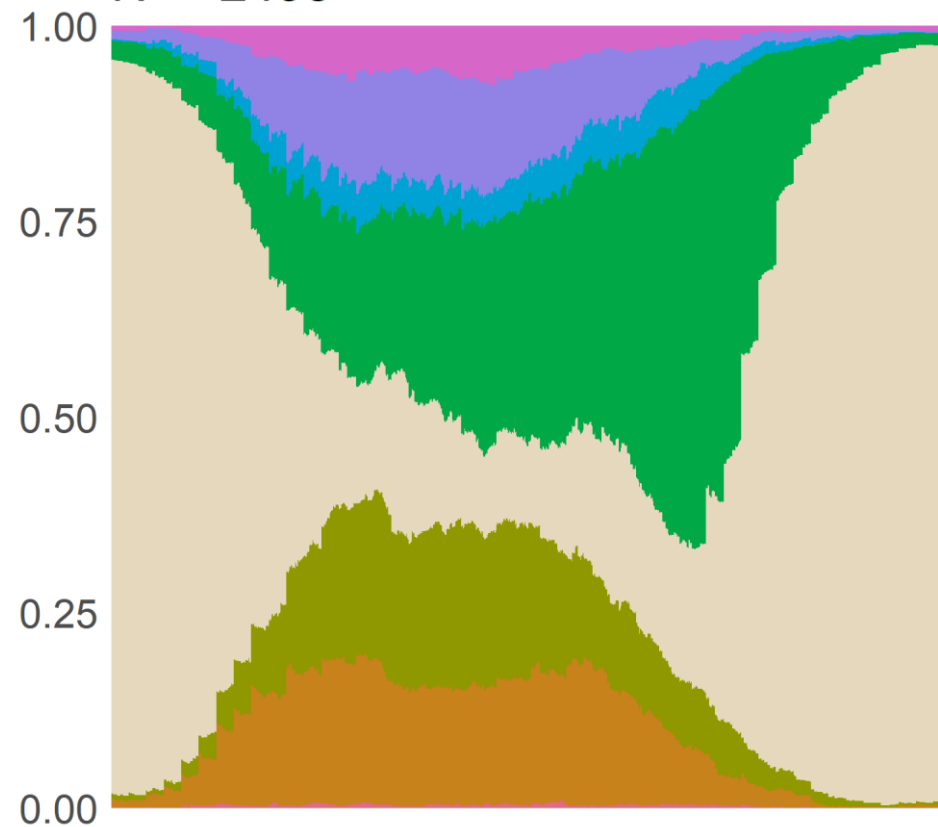
Cluster 3: Players

N = 2540



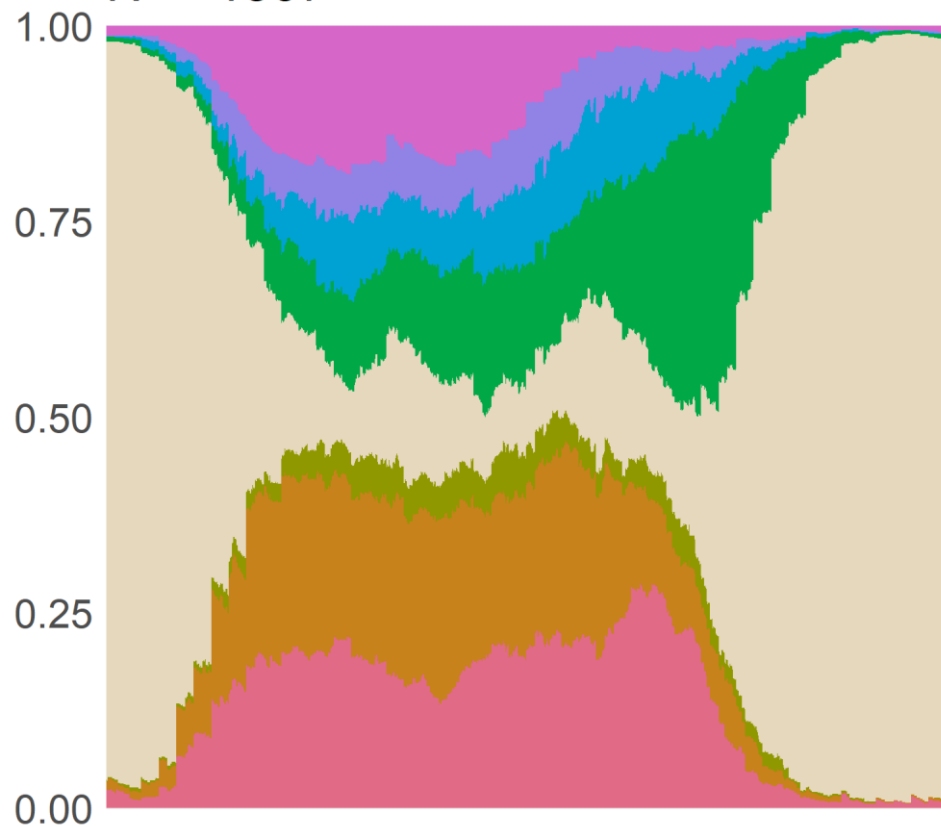
Cluster 4: Errands

N = 2495



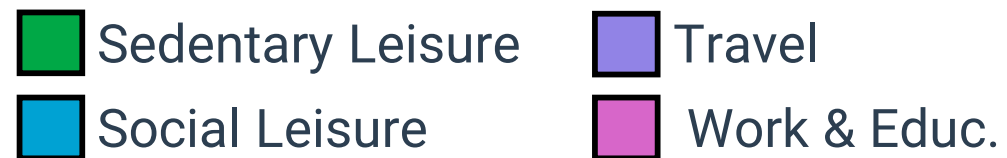
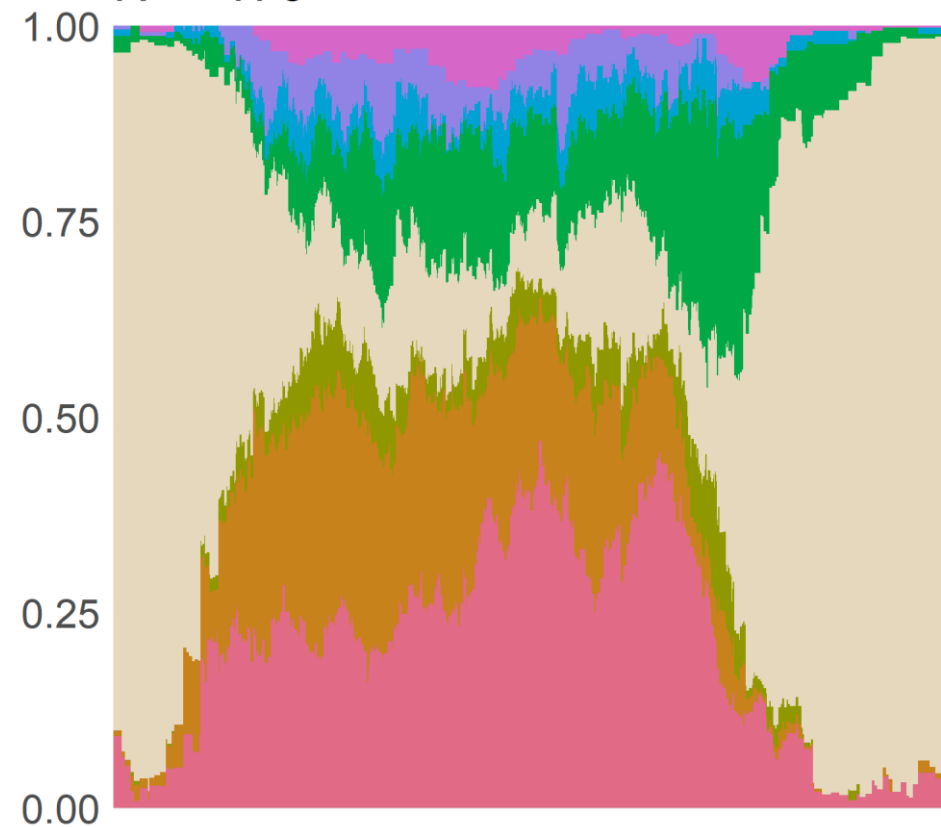
Cluster 5: Work & CareTakers

N = 1307



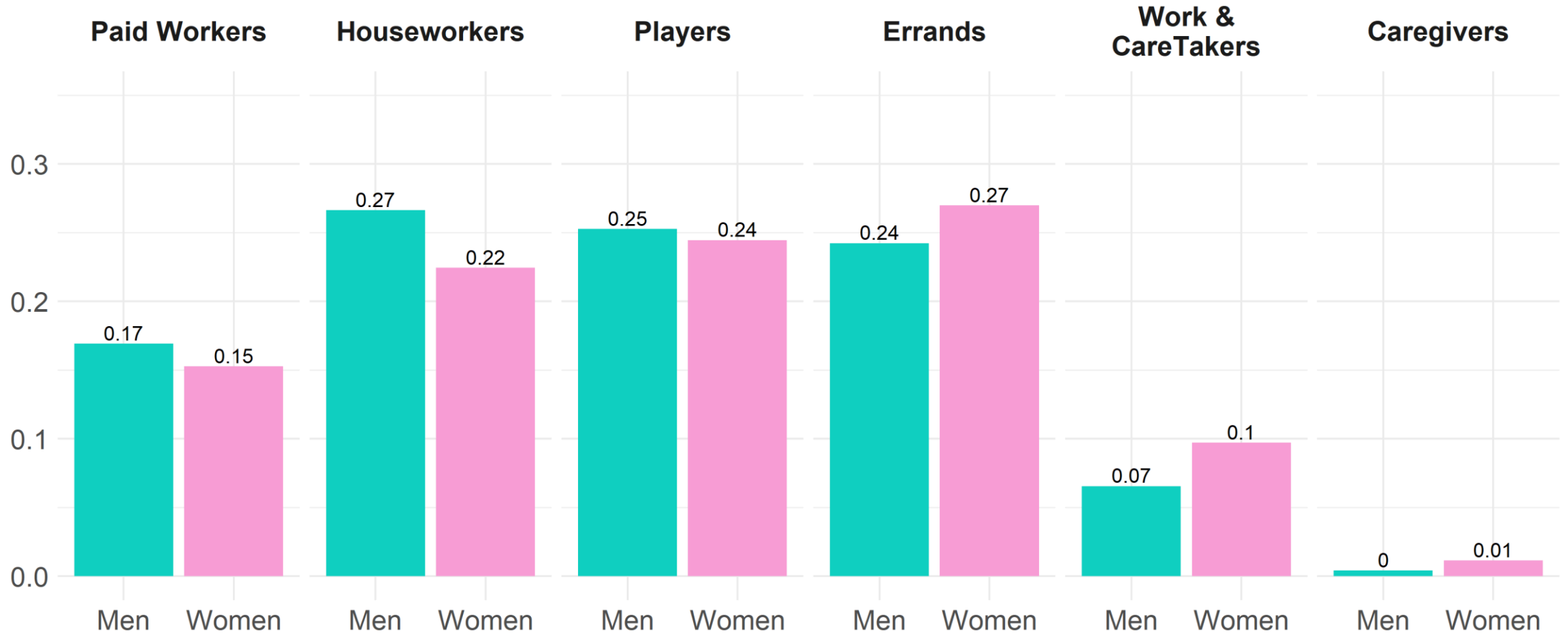
Cluster 6: Caregivers

N = 176



Predicted proportion of cluster membership

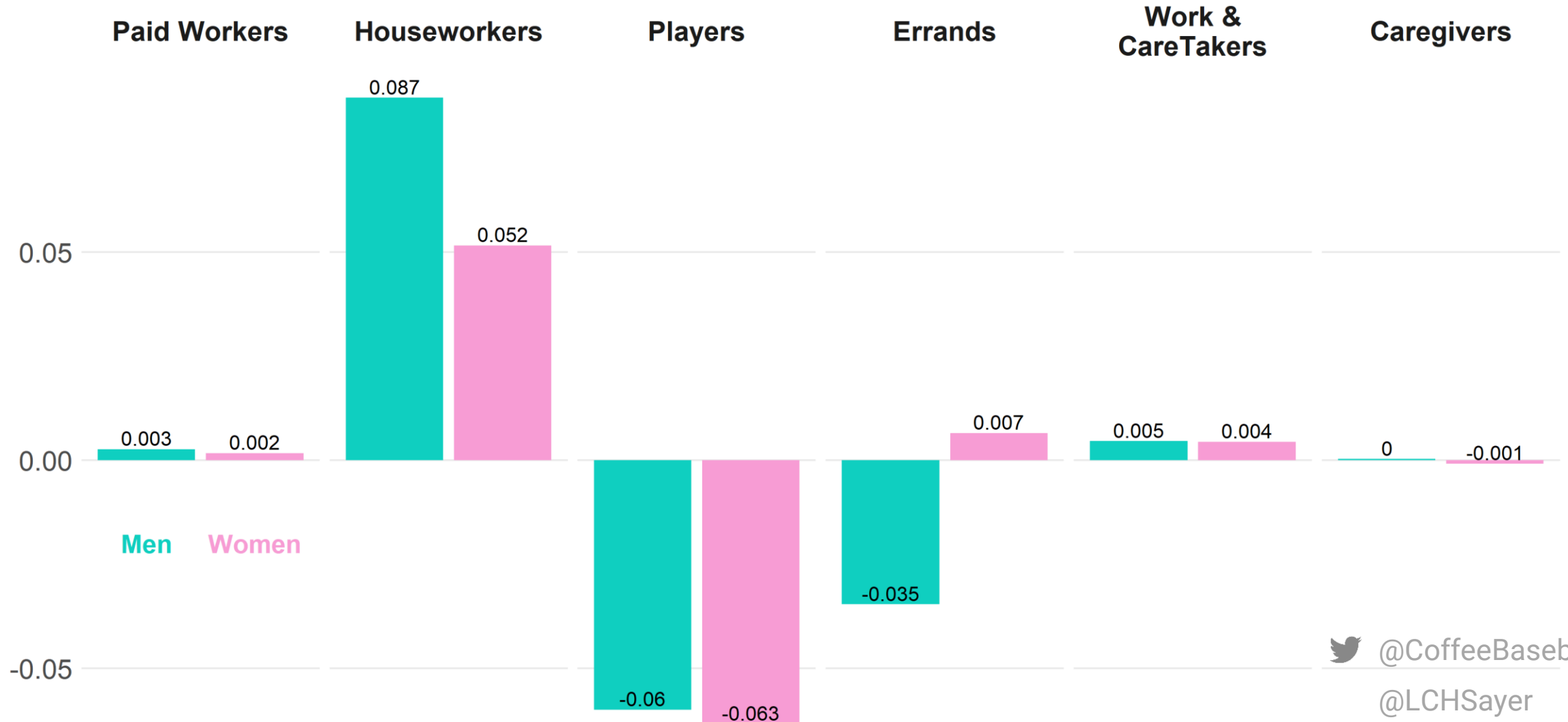
among *men* and *women*




Source: American Time Use Surveys

Due to COVID-19 pandemic, data range: May through December in 2019 and 2020
Models control for education, race-ethnicity, marital status, extra adults,
number of household kids, kids under 2, age, weekend diary day

Change in men's and women's probability of cluster membership *between 2019 and 2020*



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@LCHSayer
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Summary

Most people engage in **sedentary leisure in the evenings...**
...regardless of their daytime activities.

Proportion of people who filled their day with **multiple types of leisure declined...**
...which was replaced by time spent in housework and sedentary leisure.

APPENDIX SLIDES

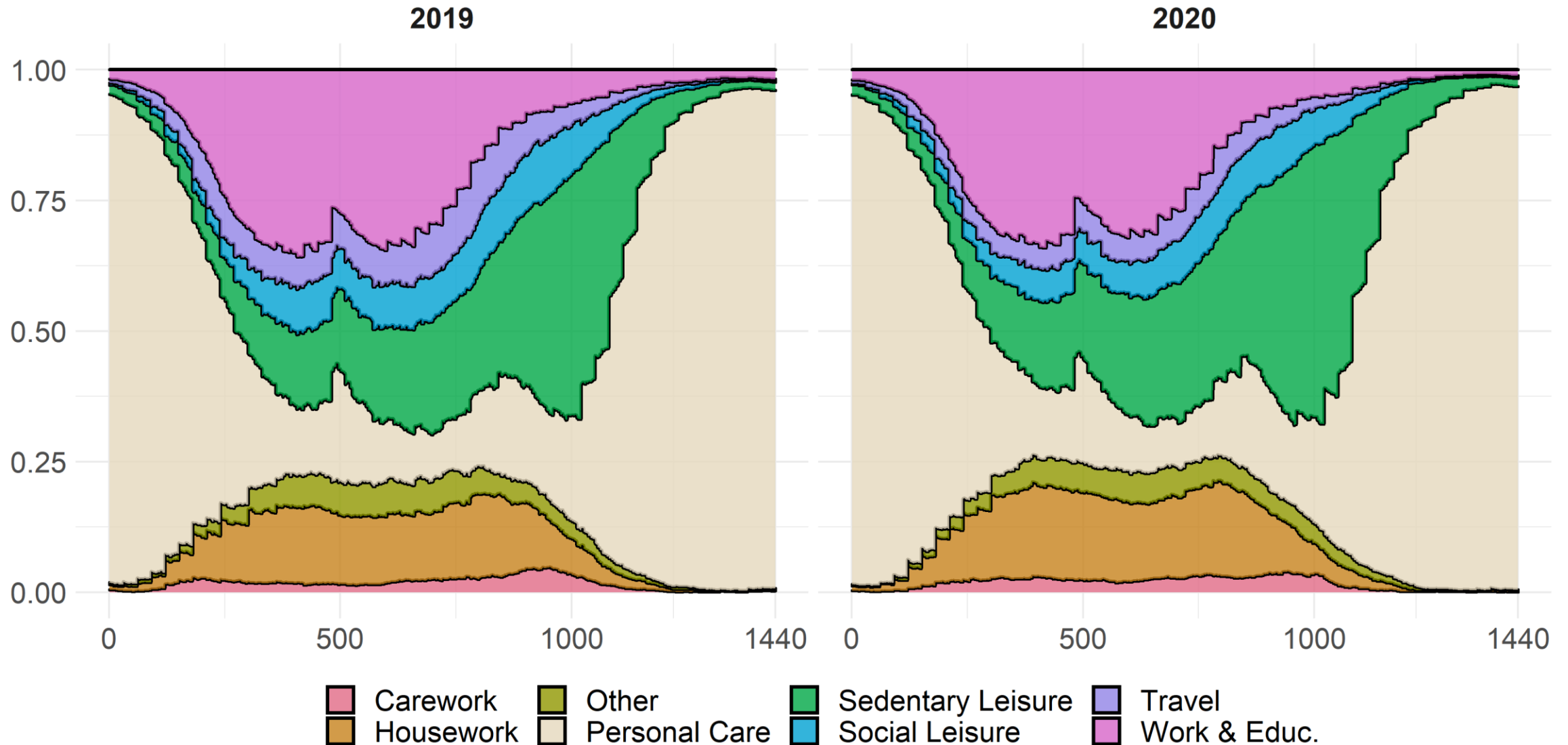
Next Steps

Adjust length of state and restrict sequence to daytime hours

Construct activity categories using the “with whom” data

Sensitivity tests of clustering algorithm

Proportion of Individuals in Each Activity by Minute

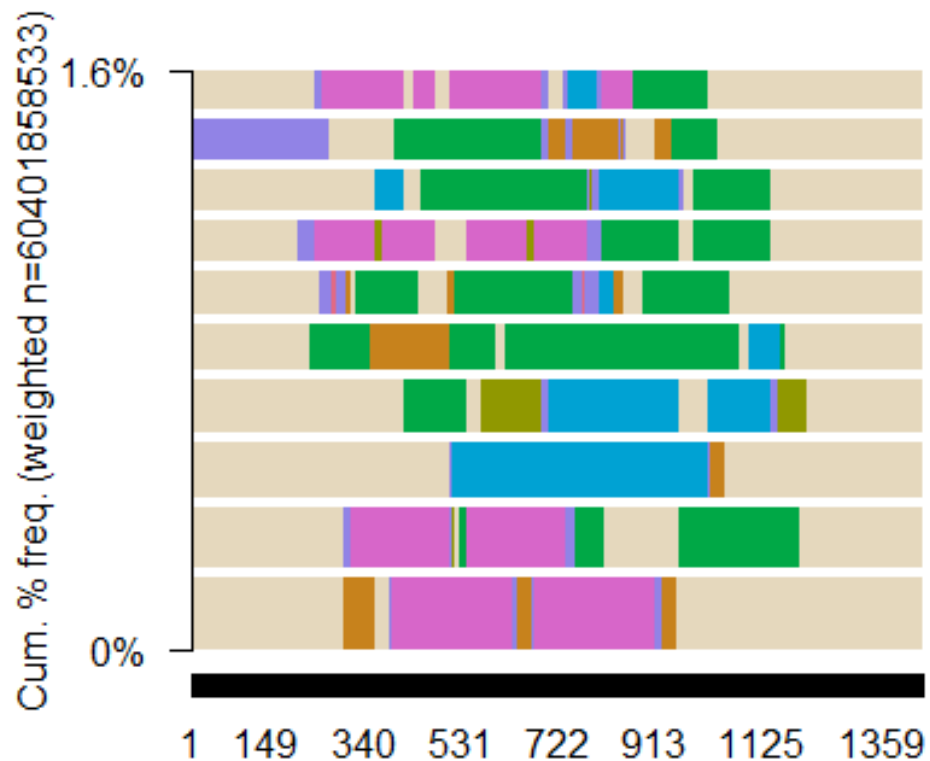


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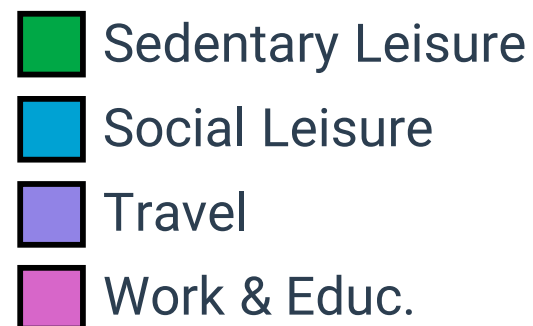
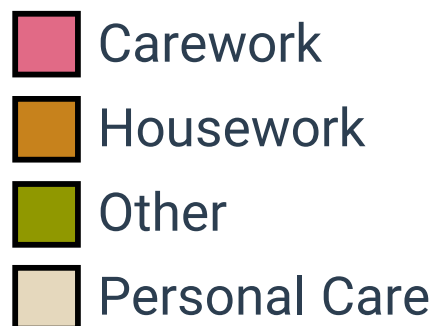
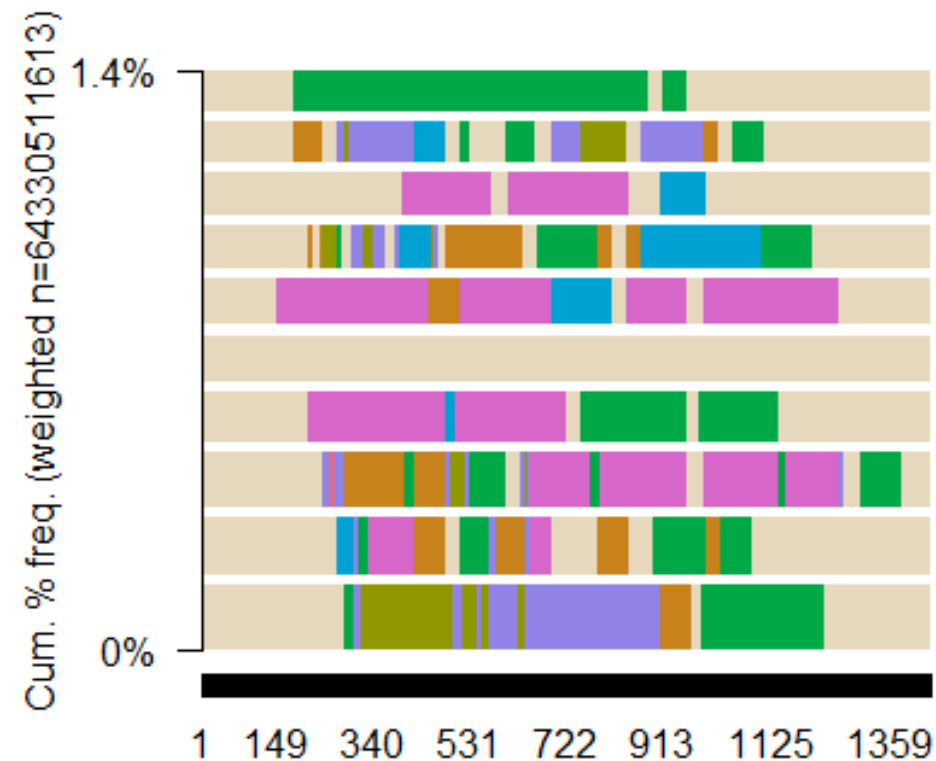
@LCHSayer

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Sequence frequency plot - Man

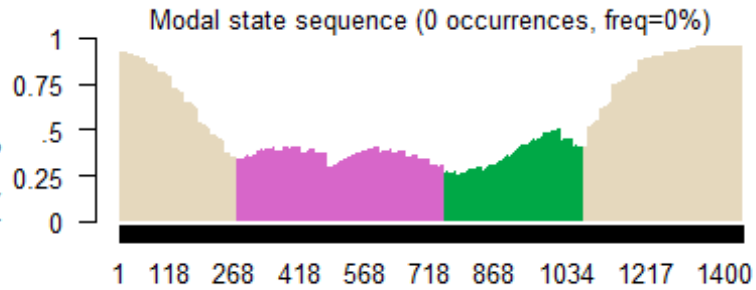


Sequence frequency plot - Woman



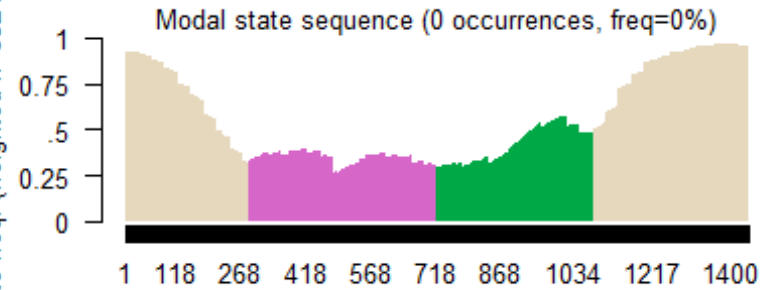
State freq. (weighted n=30157945120)

2019.Man



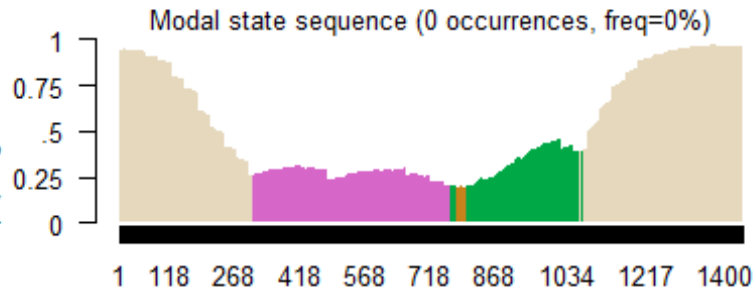
State freq. (weighted n=30243913413)

2020.Man



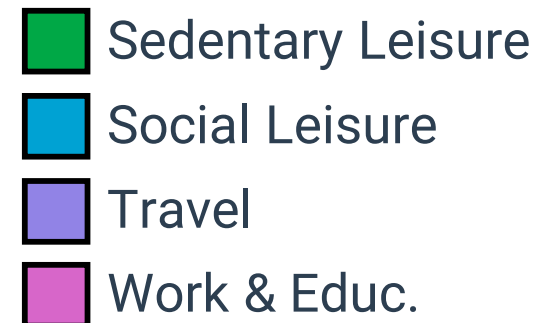
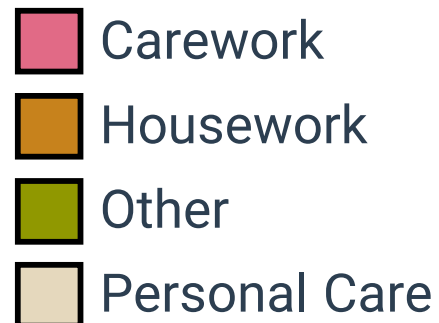
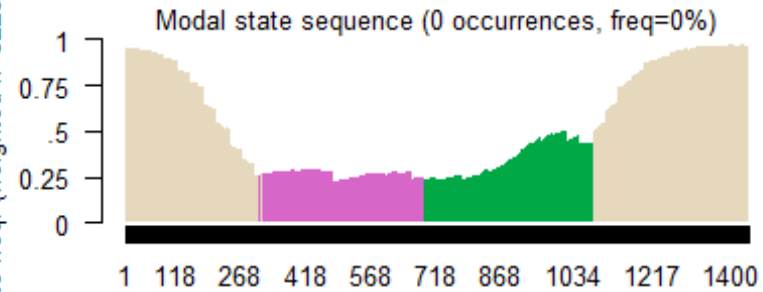
State freq. (weighted n=32078127265)

2019.Woman



State freq. (weighted n=32252384348)

2020.Woman



Legend

- Carework
- Housework
- Other
- Personal Care
- Sedentary Leisure
- Social Leisure
- Travel
- Work & Educ.

Carework	Sedentary Leisure
Housework	Social Leisure
Other	Travel
Personal Care	Work & Educ.

Carework	Sedentary Leisure
Housework	Social Leisure
Other	Travel
Personal Care	Work & Educ.

Carework	Other	Sedentary Leisure	Travel
Housework	Personal Care	Social Leisure	Work & Educ.