Relational Event Framework For Behavioral Time Use Data

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Relational Event Framework For Behavioral Time Use Data

- Outline
  - Motivation
  - American Time Use Survey Data
  - Example Results
  - Next Steps

Relational Event Framework For Behavioral Time Use Data

- Motivation
  - Ego-Centric REM

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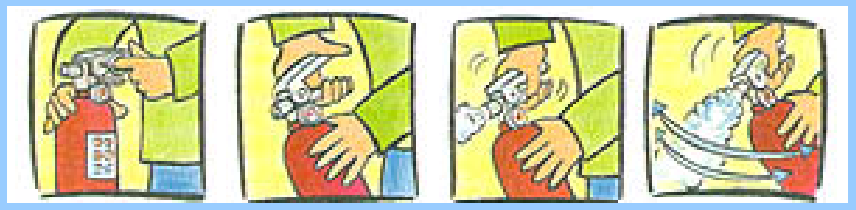
Independent Informant Accounts of Event History

Relational Event Framework For Behavioral Time Use Data

- Motivation
  - Ego-Centric REM

Independent Informant Accounts of Event History

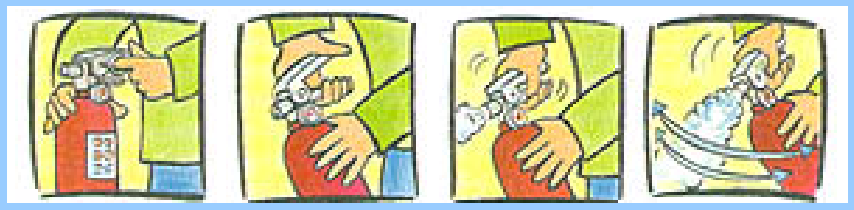


A firefighter detailing his/her response to a fire

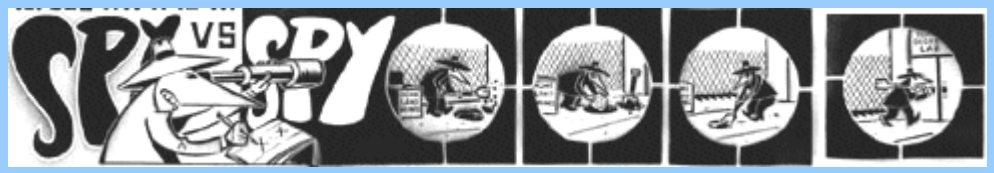
Relational Event Framework For Behavioral Time Use Data

- Motivation
  - Ego-Centric REM

Independent Informant Accounts of Event History



A firefighter detailing his/her response to a fire



A field agent reporting on a target's activities

Relational Event Framework For Behavioral Time Use Data

- Motivation
  - Model Ego-Centric Accounts When Event Timing is Known

Timing of Events in an Event History

At 0600 received call, 0605 departed station, arrived on scene at 0639, fire was extinguished by 0800, departed scene at 0830, and arrived home at 0900.

Subject entered bank at 10:00 where lost visual contact for 30 minutes. Left bank and walked east for 10 minutes. At 10:40, subject purchased beverage at food cart then departed in a black SUV, southbound.

Relational Event Framework For Behavioral Time Use Data

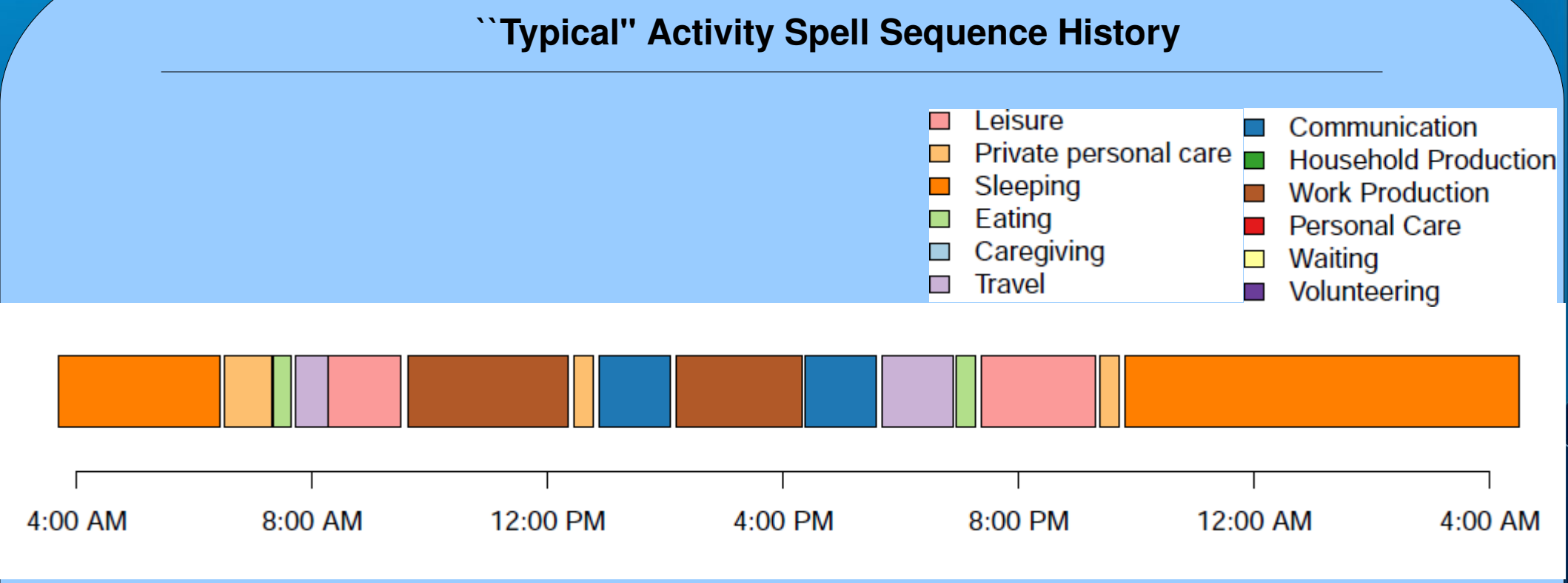
- Motivation
  - Ego-Centric REM
  - Model Ego-Centric Accounts When Event Timing is Known
  - Learn about timing of social action
    - Average duration of particular types of activities
    - Predict how long to wait for the next probable event
    - Covariate influences / differences on timing of SA

Relational Event Framework For Behavioral Time Use Data

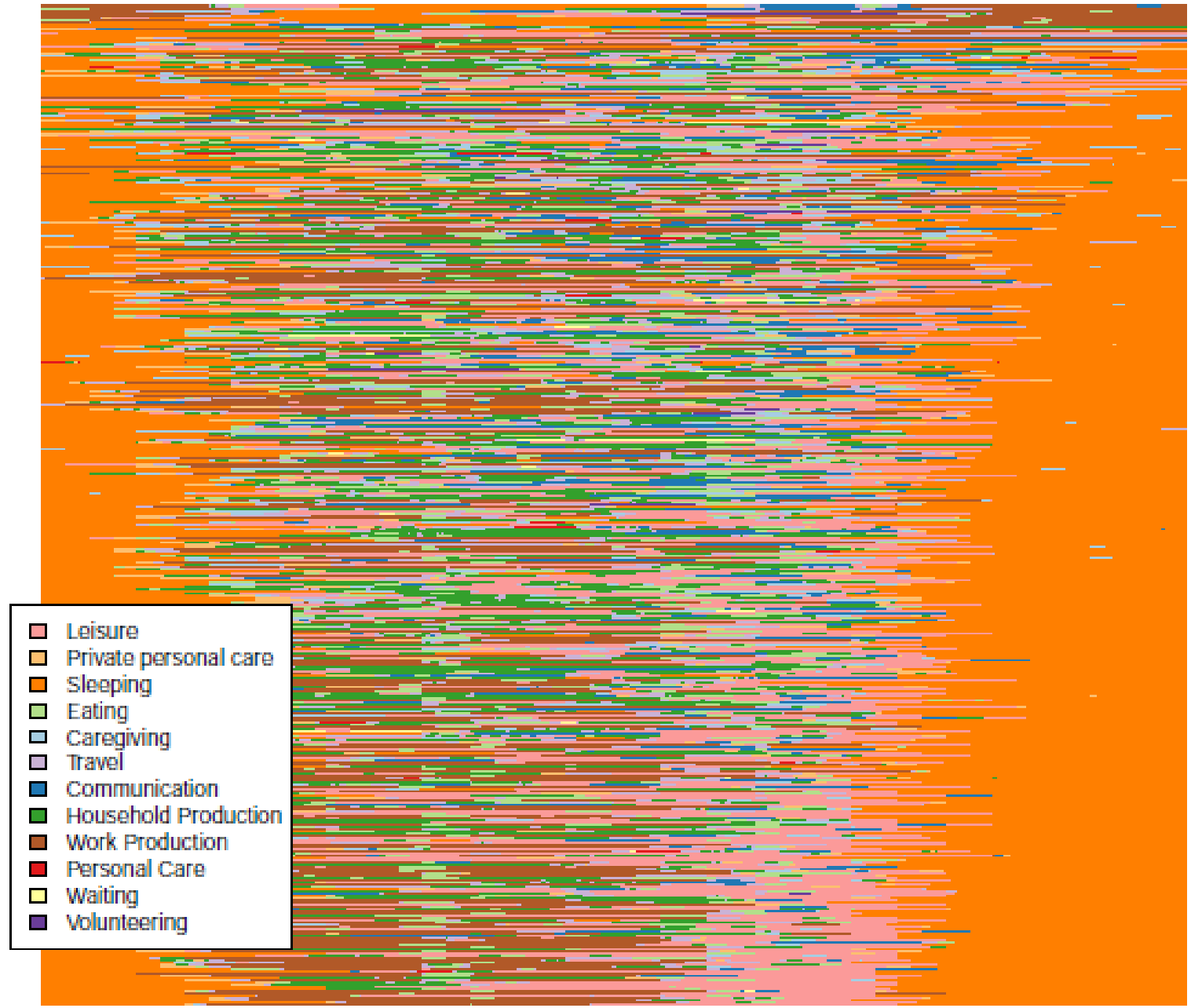
- American Time Use Data
  - Product of the Bureau of Labor Statistics
  - Collected information on activities done across a randomly selected day
    - Activity Type, Time & Duration, Location, Presence of Others
  - Conducted in conjunction with Current Population Survey
    - Many demographic/economic/social covariates
  - N = 82,745, M >1.5 Million

Relational Event Framework For Behavioral Time Use Data

- American Time Use Data

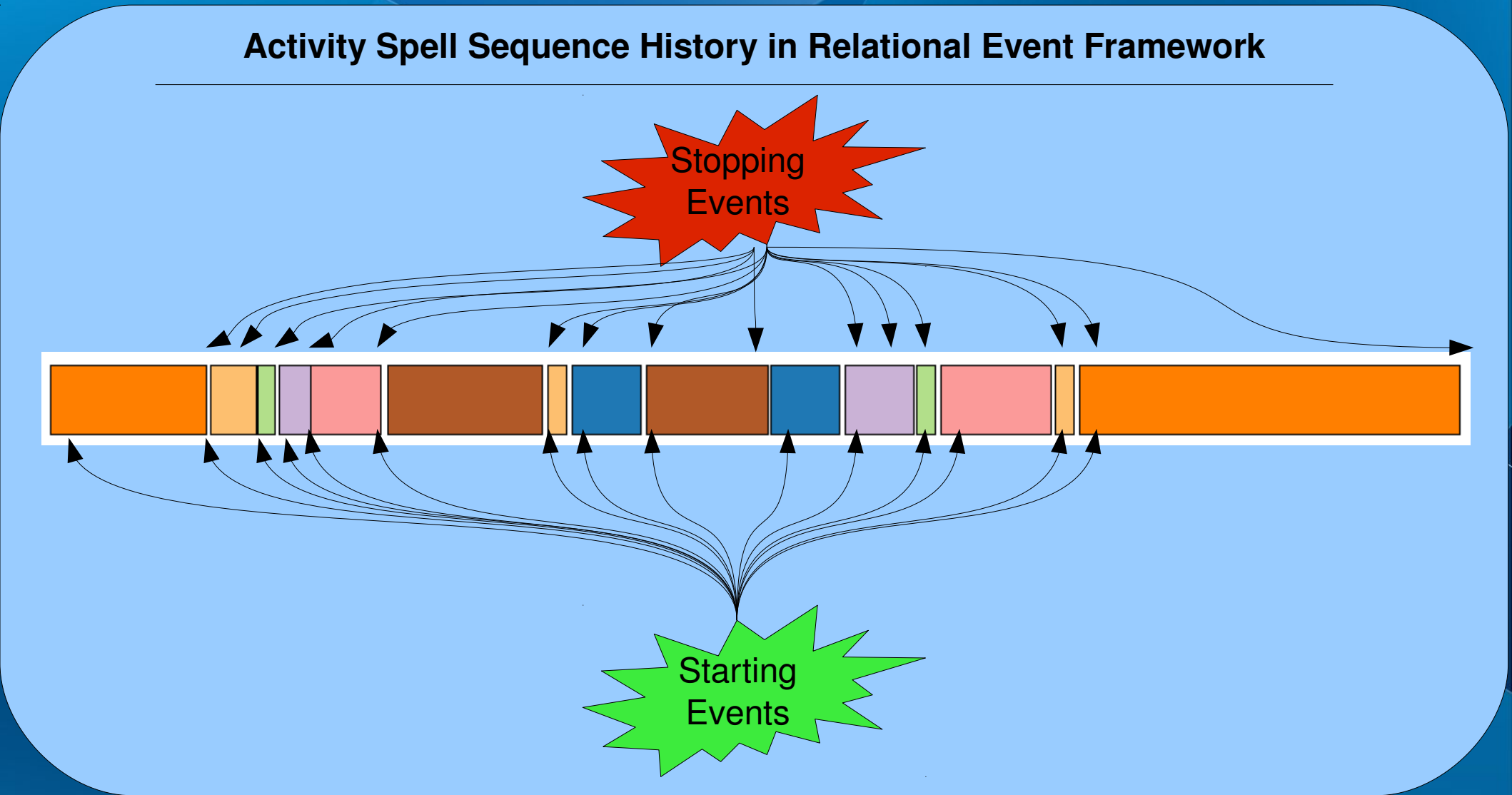


1000 Diurnal Activity Sequences



Relational Event Framework For Behavioral Time Use Data

- American Time Use Data



Relational Event Framework For Behavioral Time Use Data

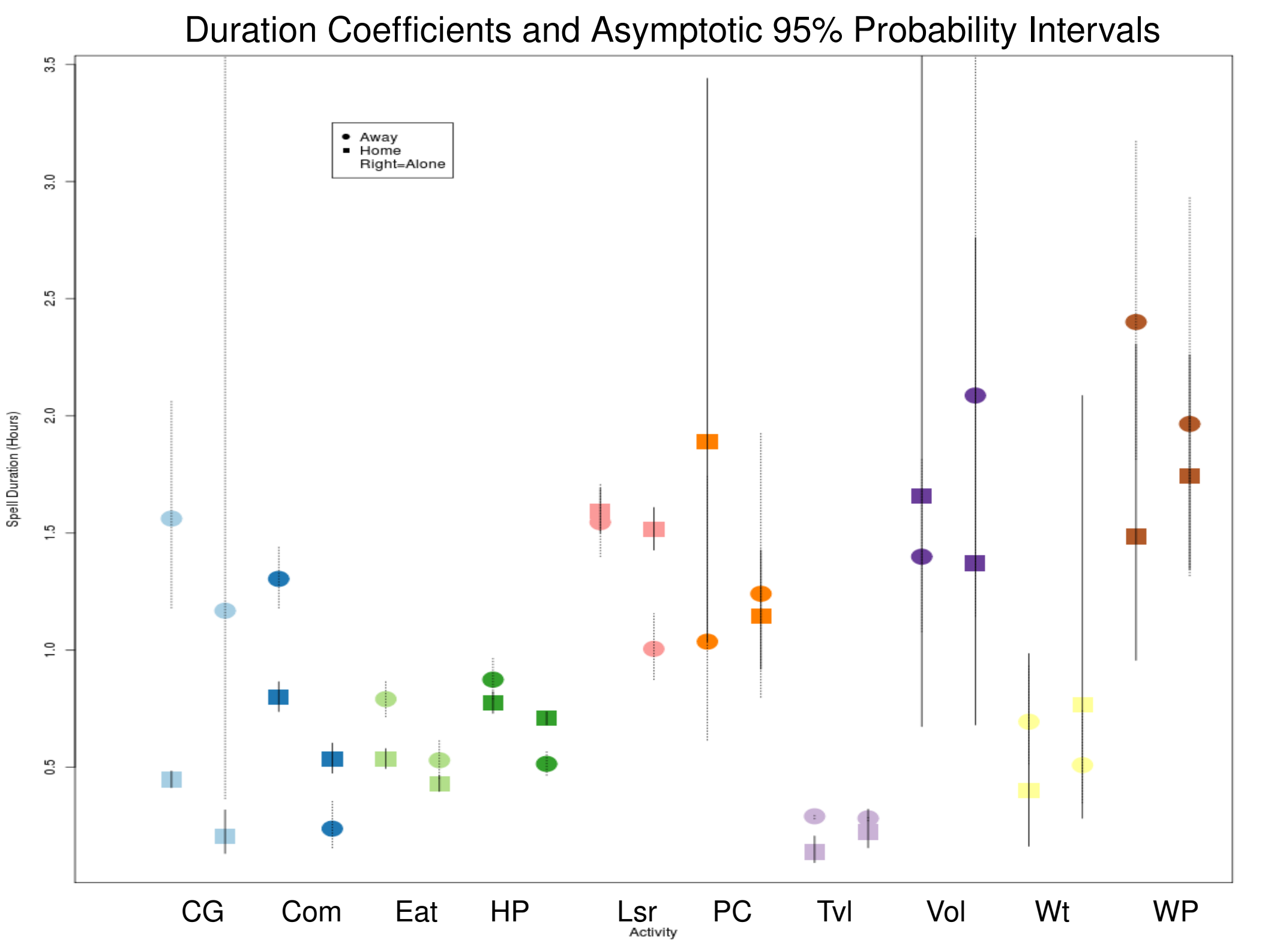
- American Time Use Data
  - Activity Spell Sequence History in Relational Event Framework
    - Each activity spell in the sequence consists of:
      - Starting Event at Time T
      - Stopping Event at Time T+d

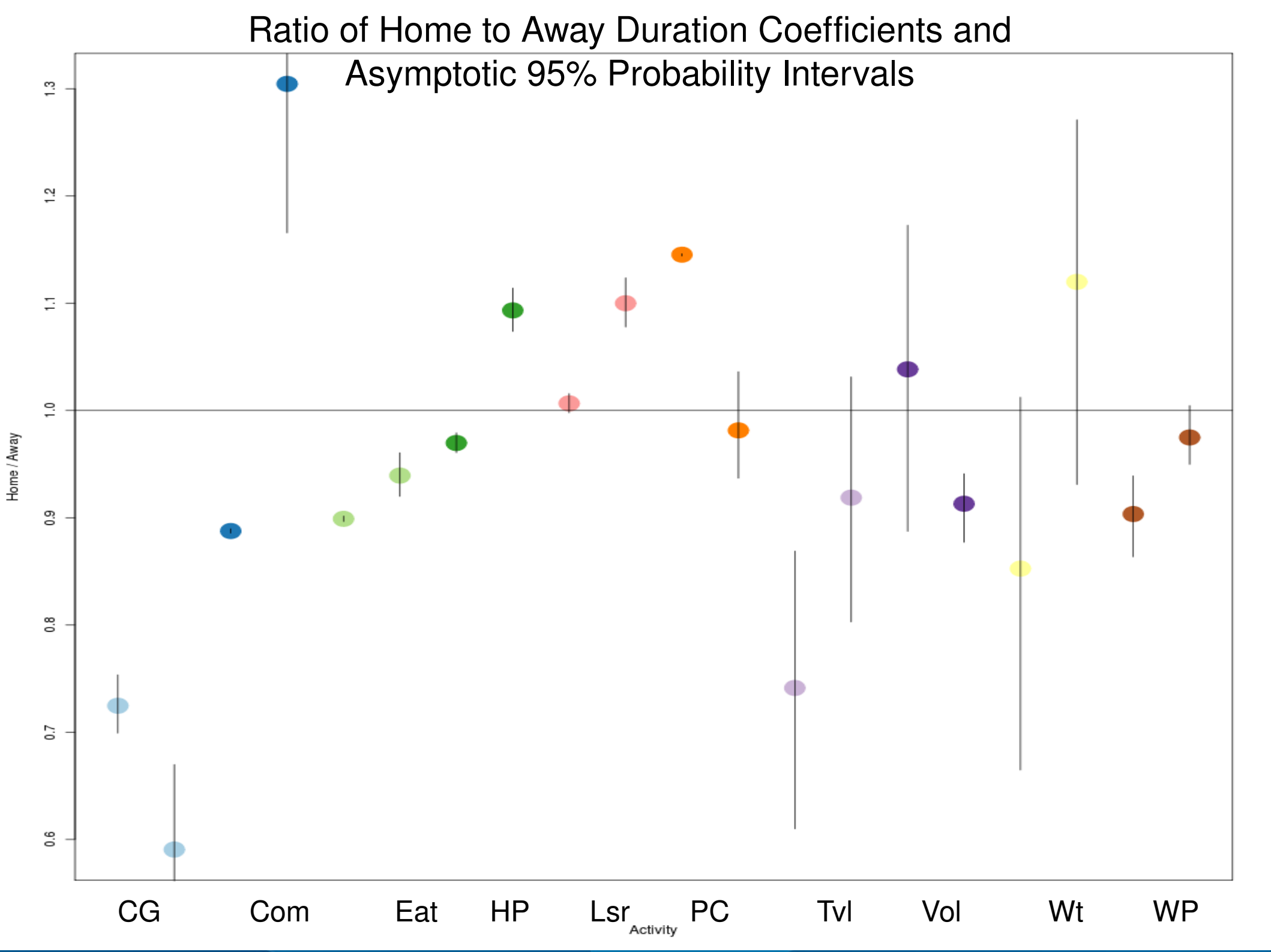
Relational Event Framework For Behavioral Time Use Data

- American Time Use Data
  - ActivitySpell Sequence History in Relational Event Framework
    - Each activity spell in the sequence consists of:
      - Starting Event at Time T
      - Stopping Event at Time T+d
    - Can model the expected waiting time (duration) from the activity onset to its termination as Continuous Ego-Centric REM

Relational Event Framework For Behavioral Time Use Data

- American Time Use Data
  - Empirical Results
    - Comparison Between Waiting Times for Activity Spells Done:
      - At Home and Others Present
      - At Home and Alone
      - Away from Home and Others Present
      - Away from Home and Alone
    - Fit using rem.ego() in Carter Butts's ``relevent'' R package


Duration Coefficients and Asymptotic 95% Probability Intervals
Away
Home
Right=Alone
Spell Duration (Hours)
0.5
1.0
1.5
2.0
2.5
3.0
3.5
CG
Com
Eat
HP
Lsr
PC
Tvl
Vol
Wt
WP
Activity


Ratio of Home to Away Duration Coefficients and
Asymptotic 95% Probability Intervals
Home / Away
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
CG
Com
Eat
HP
Lsr
PC
Tvl
Vol
Wt
WP
Activity

Relational Event Framework For Behavioral Time Use Data

- Empirical Results Conclusions
  - Most types of activity spells are short in duration (an hour or less)
  - Activity spells are shorter when at home than while not at home
    - But no clear pattern for an effect of being alone versus being with others
  - Communication spells are longer when home and alone (talking on the phone?)

Relational Event Framework For Behavioral Time Use Data

- Next Steps
  - Generalize waiting time parameterization to adjacent spell types
    - When Eating immediately follows Swimming, how long between starting eating and stopping swimming?
  - Even more complex waiting time patterns & predictions
    - Given completion of a particular spell, how much time passes before observing another particular (possibly the same) type of spell.
      - Given that Eating has stopped, what is the waiting time to start Swimming?

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Thank You