Towards a Holistic Understanding of Quality of Life: An Analysis of Activity Travel Patterns on Non-Mid-week Days

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STRIDE | Southeastern Transportation Research, Innovation, Development and Education Center
Agenda

- Objectives
- Motivation
- ATUS/NHTS surveys
- Activity Types
- Participation Rates
- Duration
- Time of Day Rates
- Work in progress
Objectives

- Activity travel patterns (non mid-week days)
- Modeling discretionary & maintenance
- Participation rates, duration, & time of day
- Two different surveys
Motivation

- Previous emphasis on mid-week (Tuesday-Thursday)
  - Shoulder (Monday, Friday)
  - Weekend (Saturday, Sunday)

- Market differences across days of week

- Data on Time Use and Travel Surveys
Surveys

American Time-Use
- 2003 (earliest) & 2009 (equivalent)
- National sample
- Time-use survey

National Household Travel
- 2001 & 2009
- National Sample
- Trip-based diary

Participants
- Randomly-selected member from household
- Ages 15 or older
- No gaps on survey day
Activities

- Activity
  - 24 hours from 4:00AM to 3:59AM (next day)
  - Derived from main trip purpose
  - Continuous, out-of-home, non-travel

- Activity types of interest
  - Maintenance-Household
  - Maintenance-Personal
  - Discretionary-Social
  - Discretionary-Meals
  - Discretionary-Exercise
Participation Rates & Duration
Results from NHTS 2009
Average daily duration

- In general, Social activity has the highest duration while Exercise and Other activities have the lowest.

- Shoulder and Mid-weekdays look similar in pattern, Weekends somewhat different.

- On weekends:
  - Social activity significantly higher
  - Personal maintenance lower
Participation rates

- HH maintenance has the highest rate, Exercise and Other show the lowest.

- Similar behaviors on shoulder and mid-weekdays, differences observed on weekends.

- Weekends reflect remarkably higher percentage of social and lower percentage of personal maintenance.

- No significant difference for other discretionary activities among the three categories.
Participation rate based on duration categories

- Five categories defined for each activity

- Similar trends observed for all activities
  
  *Individuals either do not participate in a discretionary activity or spend at least one hour for that.*

- Social activity on weekends show remarkably higher values (40% spend more than one hour in social activity on weekends)
Influence of socio-economic variables

Percentage of participants in social activities by occupation and day:

- Sales or service: Shoulder > Weekend > Midweekday
- Clerical or administrative: Shoulder > Weekend > Midweekday
- Manufacturing: Shoulder > Weekend > Midweekday
- Professional: Shoulder > Weekend > Midweekday

Percentage of participants in personal maintenance by income and day:

- Less than $5,000: Shoulder > Weekend > Midweekday
- $5,000 - $9,999: Shoulder > Weekend > Midweekday
- $10,000 - $14,999: Shoulder > Weekend > Midweekday
- $15,000 - $19,999: Shoulder > Weekend > Midweekday
- $20,000 - $24,999: Shoulder > Weekend > Midweekday
- $25,000 - $29,999: Shoulder > Weekend > Midweekday
- $30,000 - $34,999: Shoulder > Weekend > Midweekday
- $35,000 - $39,999: Shoulder > Weekend > Midweekday
- $40,000 - $44,999: Shoulder > Weekend > Midweekday
- $45,000 - $49,999: Shoulder > Weekend > Midweekday
- $50,000 - $54,999: Shoulder > Weekend > Midweekday
- $55,000 - $59,999: Shoulder > Weekend > Midweekday
- $60,000 - $64,999: Shoulder > Weekend > Midweekday
- $65,000 - $69,999: Shoulder > Weekend > Midweekday
- $70,000 - $74,999: Shoulder > Weekend > Midweekday
- $75,000 - $79,999: Shoulder > Weekend > Midweekday
- $80,000 - $99,999: Shoulder > Weekend > Midweekday
- $100,000 and above: Shoulder > Weekend > Midweekday

Percentage of participants in exercise vs. education by race and day:

- White: Shoulder > Weekend > Midweekday
- African American: Shoulder > Weekend > Midweekday
- Asian only: Shoulder > Weekend > Midweekday
- American/Indian, other: Shoulder > Weekend > Midweekday
- Multiracial: Shoulder > Weekend > Midweekday
- Hispanic/Mexican: Shoulder > Weekend > Midweekday

Percentage of participants in social activities by education and day:

- Less than high school graduate: Shoulder > Weekend > Midweekday
- High school graduate, include GED: Shoulder > Weekend > Midweekday
- Vocational, technical training: Shoulder > Weekend > Midweekday
- Some college, but no degree: Shoulder > Weekend > Midweekday
- Associate's degree: Shoulder > Weekend > Midweekday
ANOVA (Analysis of Variance)

- Several Socio-economic and demographic attributes considered
- Categories are defined based on these variables
- ANOVA applied on duration data for each activity among variable categories

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Variable analysis results

- **Gender**: Females show higher rates for HH, personal main. & social activities. Males show higher rates of meal & exercise.

- **Driving License, Vehicle ownership**: Both have a positive effect on participation rates.

- **Income**: In terms of percentage of participants, a slightly positive association observed. In activity duration, lots of fluctuations observed.

- **Education**: Positive correlation both for participation rates and duration, with some fluctuations in duration.

- **Life cycle, Occupation, Race**: Several comments can be made based on the diagrams.
  - On shoulder days, Multi-racials show highest rates of meal & social
  - “Managerial, technical” group show the highest participation rate in most cases.
Time of Day
Activity Start and End
Day of Week

Start of first activity: Midweek

2009 ATUS First Household-Maintenance Activity

Time of Day

Hourly Start of Activities

- Tuesday
- Wednesday
- Thursday
Day of Week

Start of first activity: Midweek

2009 ATUS First Household-Maintenance Activity

Time of Day

- Tuesday
- Wednesday
- Thursday
Day of Week

Start of first activity: Weekend

2009 ATUS First Household-Maintenance Activity
Day of Week

Start of first activity: Shoulders

2009 ATUS First Household-Maintenance Activity

Time of Day

Hourly Start of Activities

- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
End Times

2009 ATUS End of Last Household-Maintenance Activity

2009 ATUS End of Last Personal-Maintenance Activity

Monday  Tuesday  Wednesday  Thursday  Friday  Saturday  Sunday
Survey Years

2001 NHTS First Discretionary-Social Activity

2009 NHTS First Discretionary-Social Activity
Next Steps

- Statistical analysis using time-of-day hazard function
- Explore household roles and key sociodemographics
- Continue statistical models on activity participation (already started regression analysis for activity duration)
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Thank you!