Life, Family, and Peers on Transport

Owen Waygood
PhD Candidate
Kyoto University

Kitamura as a “sensei”

Welcome to the family

What *are* you doing?

Get it together

Now that’s interesting

Fridays with Kitamura

- Social and environmental concerns
- People’s opinions and attitudes
- Stages of life
- The built environment

Where People Live

- Built Environment: Fukui, K.
  - Population
  - Commercial
  - Employment
  - Household
  - Individuals
  - Automobile ownership

People Getting Around

- Activity engagement: Susilo
- Cohorts: Maeda
- Lifecycle: Sun
- Children: Waygood

The Short-term Variability and the Long-term Changes of Individual Spatial Behavior in Urban Areas

2002/2005 Student: Yusak Octavius Susilo (UWE, Bristol, UK)

- Aims: Exploring the variability and the changes of the way individual compose their activity-travel engagements and their spatial movement in short & long term periods
- Methods:
  - Introduce model frameworks of how individual compose their travel and their activity space
  - Estimate with simultaneous equation models over time (from day-to-day basis and long term period)
  - Explore the impacts of individual heterogeneity, internal and external causes and trends of changes
- Data used: Osaka Metropolitan Area person-trip dataset and Mobidrive six-week travel diary

Results

1. The individual activity space variability is highly influenced by individual's out-of-home commitments, their work and home locations as well as their unique preferences.
2. Unobserved heterogeneity and difference commitments across individuals are found as a major component that accounts for the variability of their centroid locations on weekdays.
3. The urban residents have expanded their travel and activities engagement as well as their action space over the 20–year period.

   In last 20 year period, transit users have superior action space than other mode users
4. The structural relationships underlying their activity-travel patterns were not stable over time. Auto commuters, transit commuters and non-commuters are exhibit different tendencies of change, highly influenced by their commute mode characteristics.
5. The stability test has revealed that only the under-specified model is transferable over periods.

Cohorts: Maeda

- People are influenced by the era that they grow up in.
- This will affect their attitudes and beliefs.
- Those will affect their transportation mode use.

Lifecycle Stages: Sun

- At different stages of one's life, there are different values and restrictions.
- If the population of an area remains the same,
  - Is just cohort differences between built environments?
- No
  - Separating out households into lifecycle stages.
  - Built environment explains more of the difference.

Children

- More vulnerable to built environment deficiencies for non-motorized travel.
- Compact development and children
  - Opinions on modes
  - Characterize travel
  - Role of built environment and people on:
    - Independent travel
    - Exercise

Children Results

- Personal: Opinions don’t matter, but differ by density.
- Societal: Overrides built environment
- Built environment:
  - Affects distances -> important for non-motorized
  - Affects interaction
- People
  - Knowing your neighbors
  - Traveling with other youth
- Exercise
  - Independent travel important

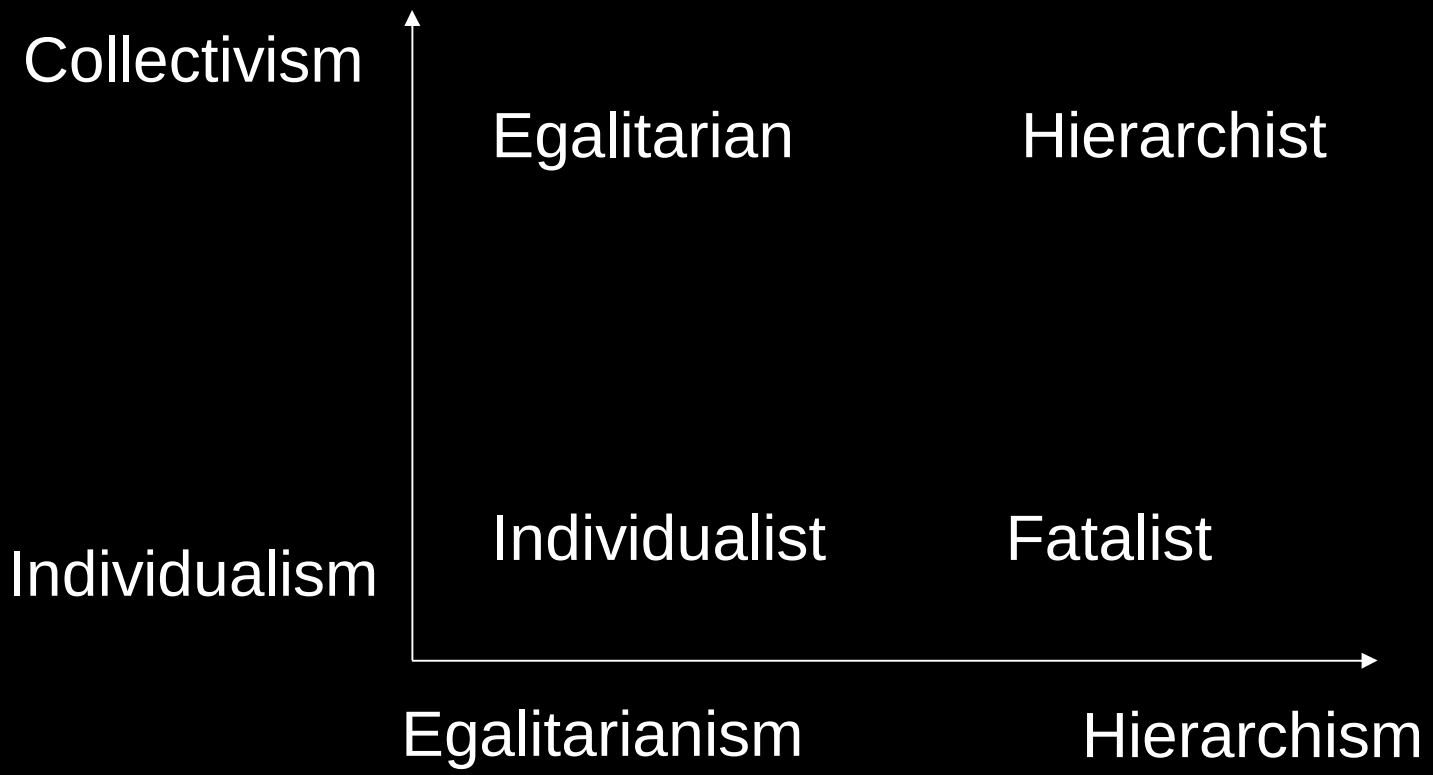
Thank you

Any Questions?

World View: Sakamoto

- *individualists*, *egalitarians*, *hierarchists* and *fatalists*.
- strongly associated with attitudes toward:
  - public policies, residential location preferences, health and environmental consciousness.
- Marketing: identify individuals to whom various mobility management measures would be effective.
- Factors exhibit strong correlations with age or sex, basic demographic variables.

Dake's Worldview Categories



Distinguishing the Built Environments

- Population
  - Population density
  - Diurnal population change
  - Population concentration

Distinguishing the Built Environments

- Commercial
  - Office density
  - Retail shop density
  - Supermarket density
  - Service density

Distinguishing the Built Environments

- Employment
  - Employment rate change
  - Employment rate
  - Commuter percentage

Distinguishing the Built Environments

- Household
  - Single person household percentage
  - Average household size

Distinguishing the Built Environments

- Individuals
  - Youth and Elderly percentages
  - Average age

Distinguishing the Built Environments

- Automobile ownership

Five Built Environments

Highly Commercial

Mixed Commercial

Mixed Residential

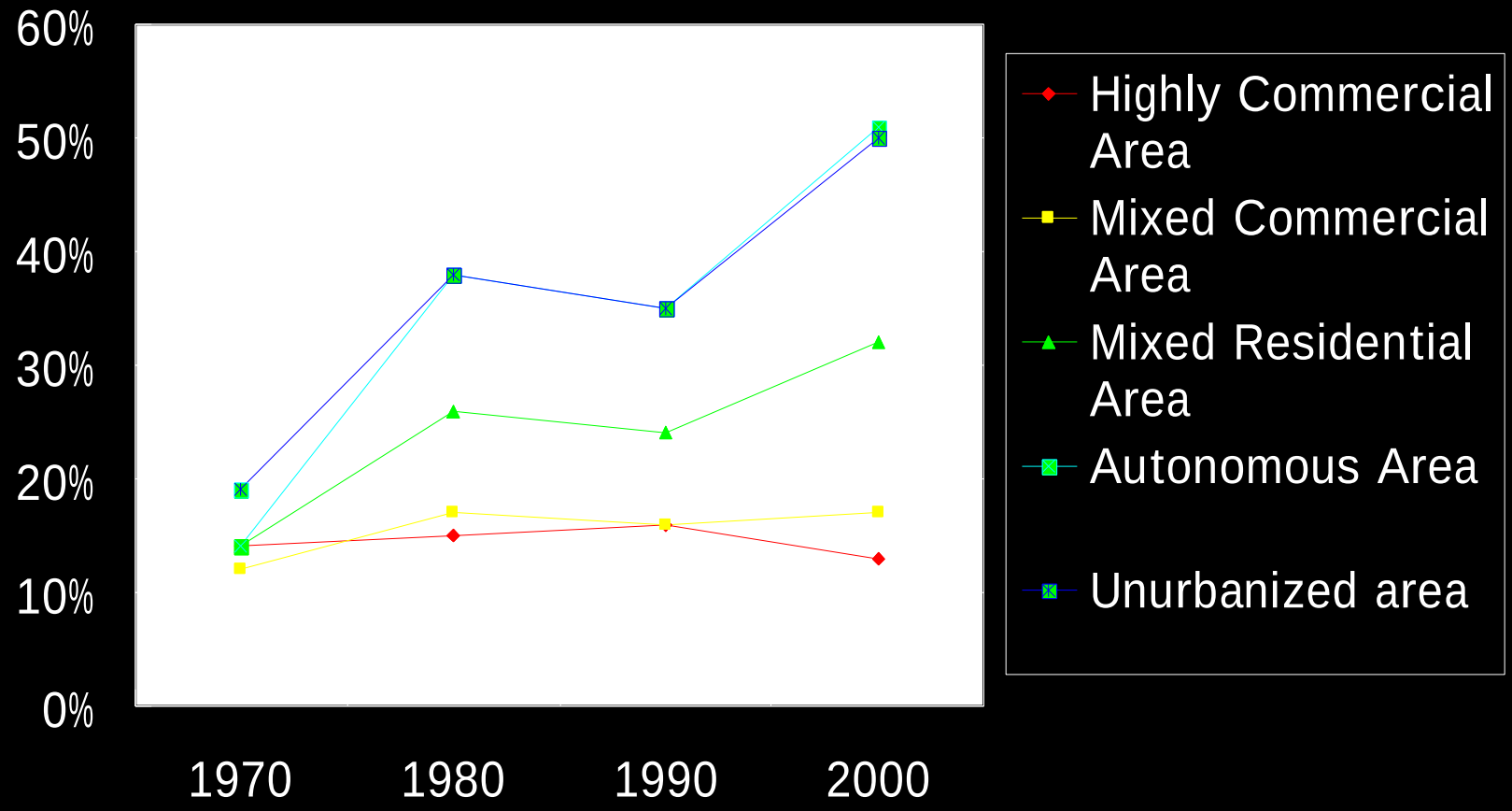
Autonomous

Unurbanized

Household Lifecycle Stages

- Younger single
- Younger childless couple
- Pre-school nuclear
- Young school nuclear
- Older school nuclear
- All adults
- Older childless couple
- Older single
- Single parent
- Others

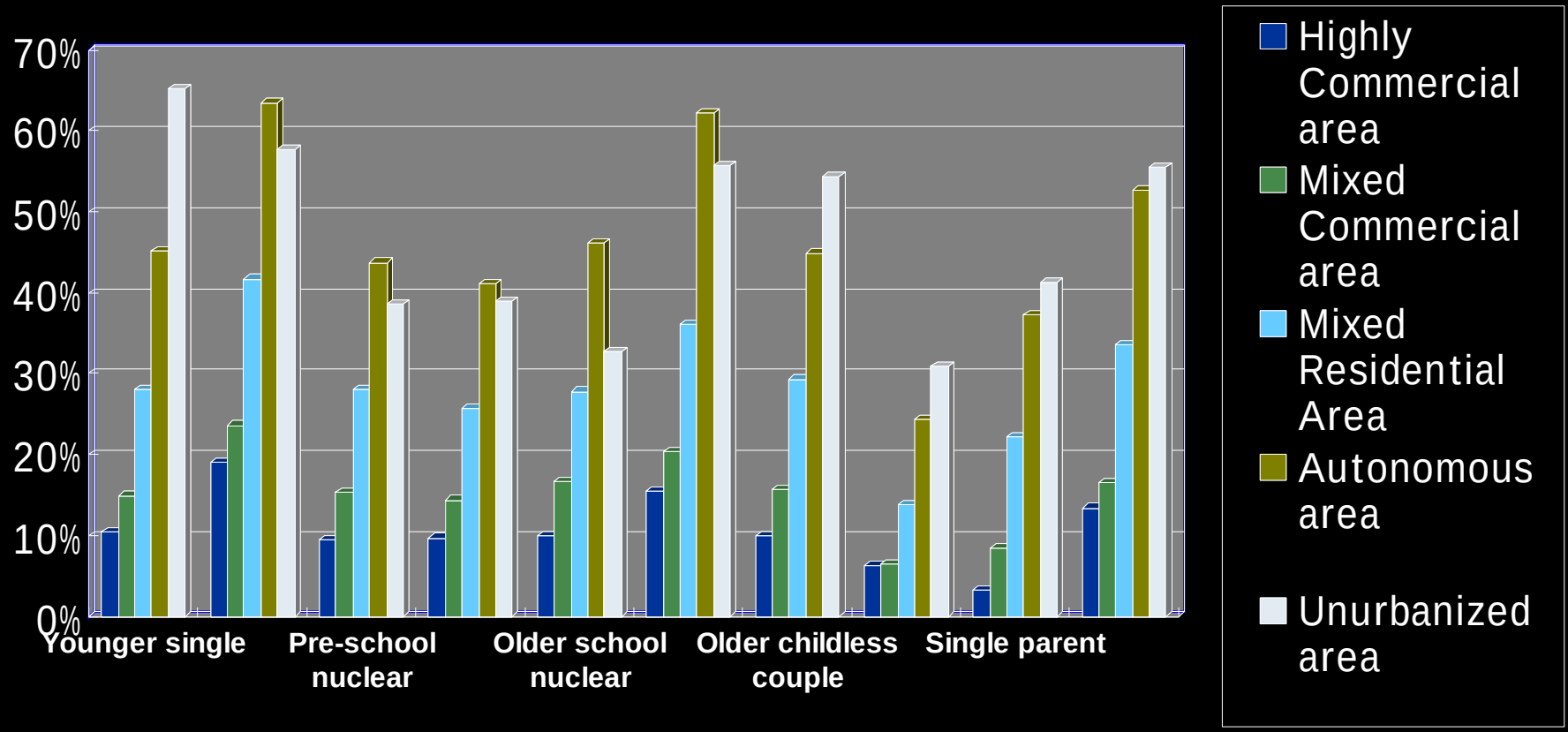
Household Automobile-Use by Built Environment Type over Four Decades



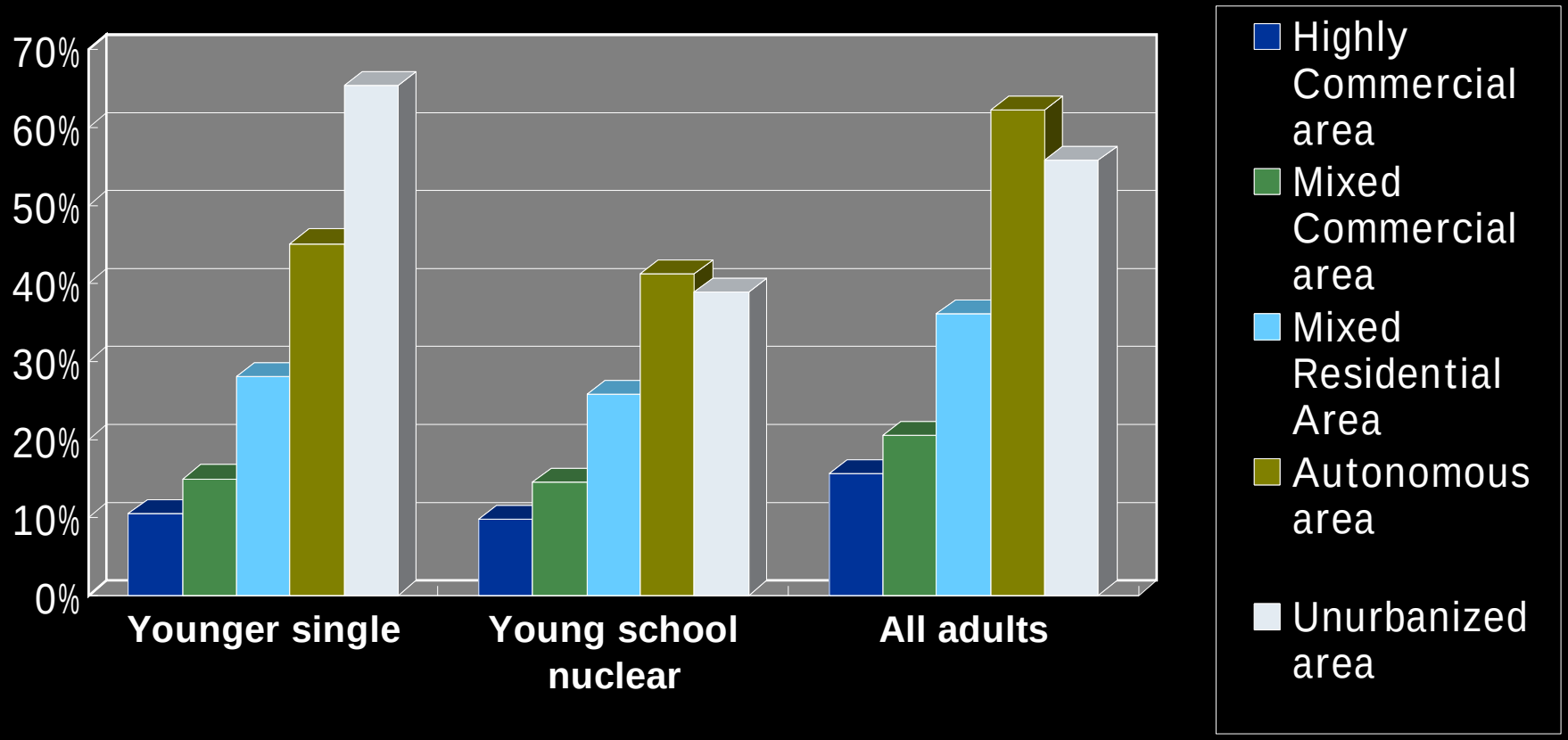
Summary of Trend

- Higher density areas saw less growth in automobile's share of trips.
- Is it because young families move out and only the older people who grew-up walking remain?

Household Automobile-Use by Lifecycle across the Built Environments (2000)



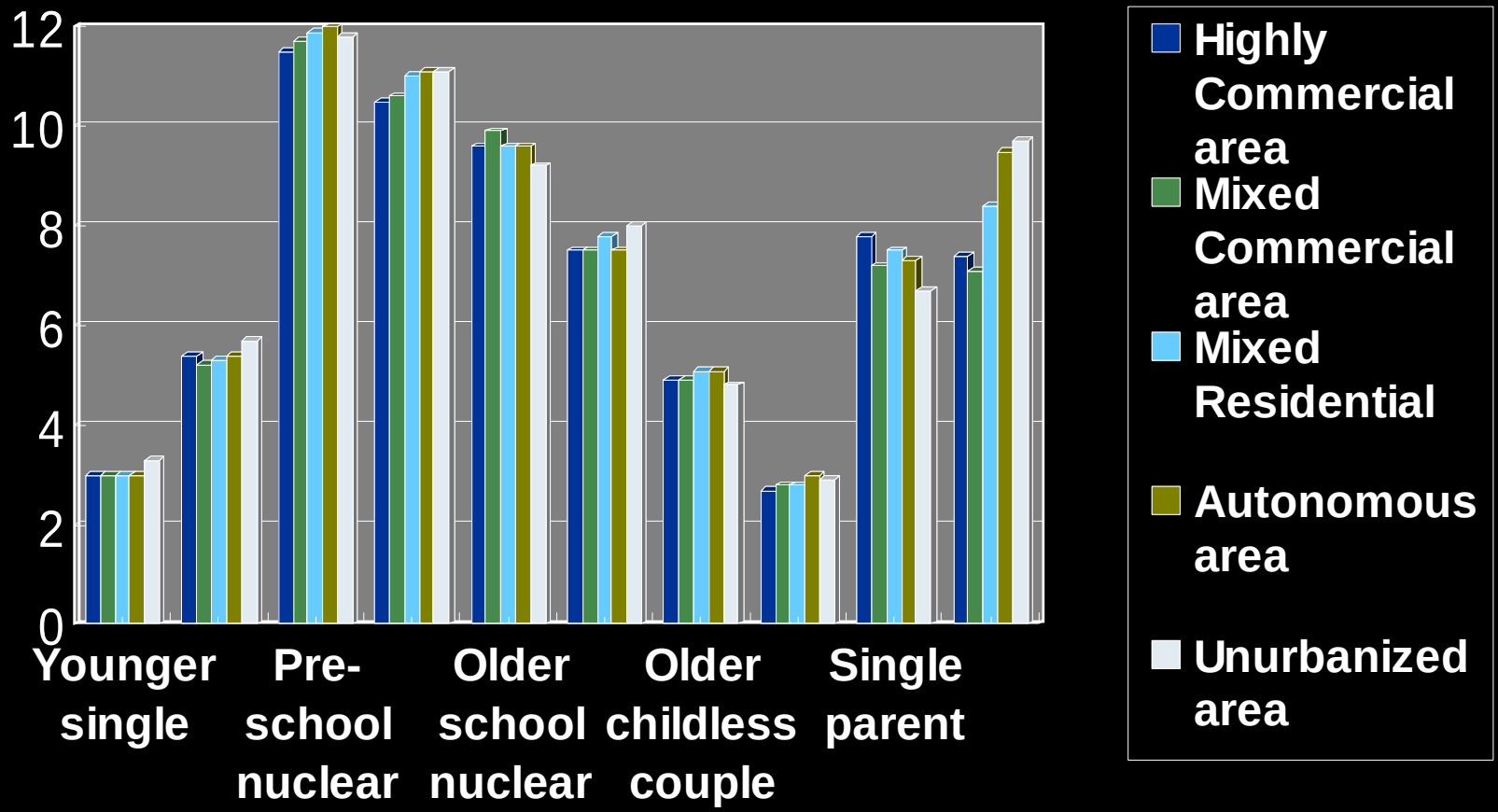
Household Automobile-Use by Lifecycle across the Built Environments (2000)



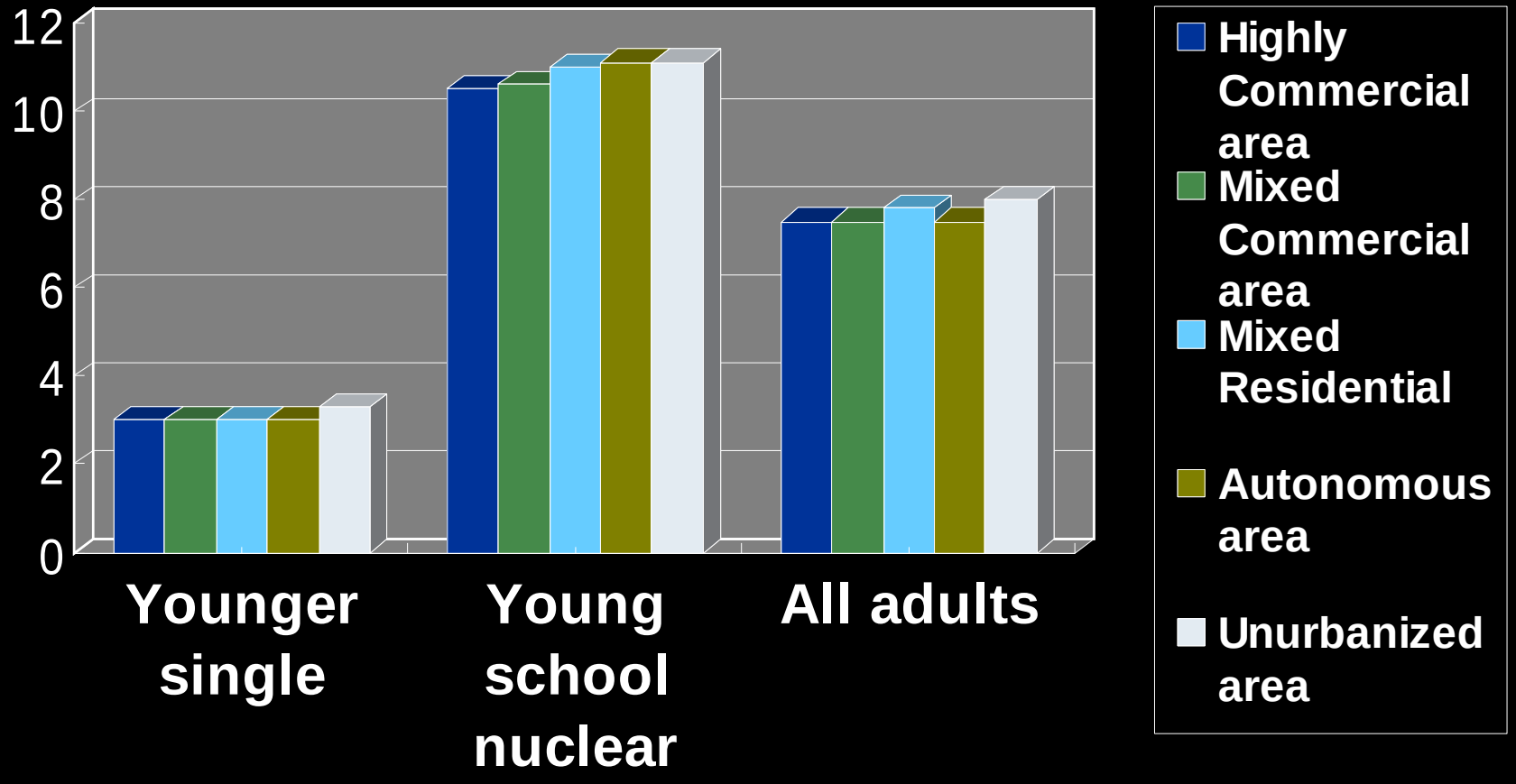
ANOVA Results

	Sum of Squares	F
Corrected Model	1510.8	290.6*
Intercept	794.6	7490.2*
Built Environment (BE)	577.5	1360.8*
Lifecycle stage (LCS)	58.0	60.7*
LCS x BE	45.9	12.0*
Error	11685.5	
Corrected Total	13196.3	

Household Trip Number by Lifecycle across the Built Environments (2000)



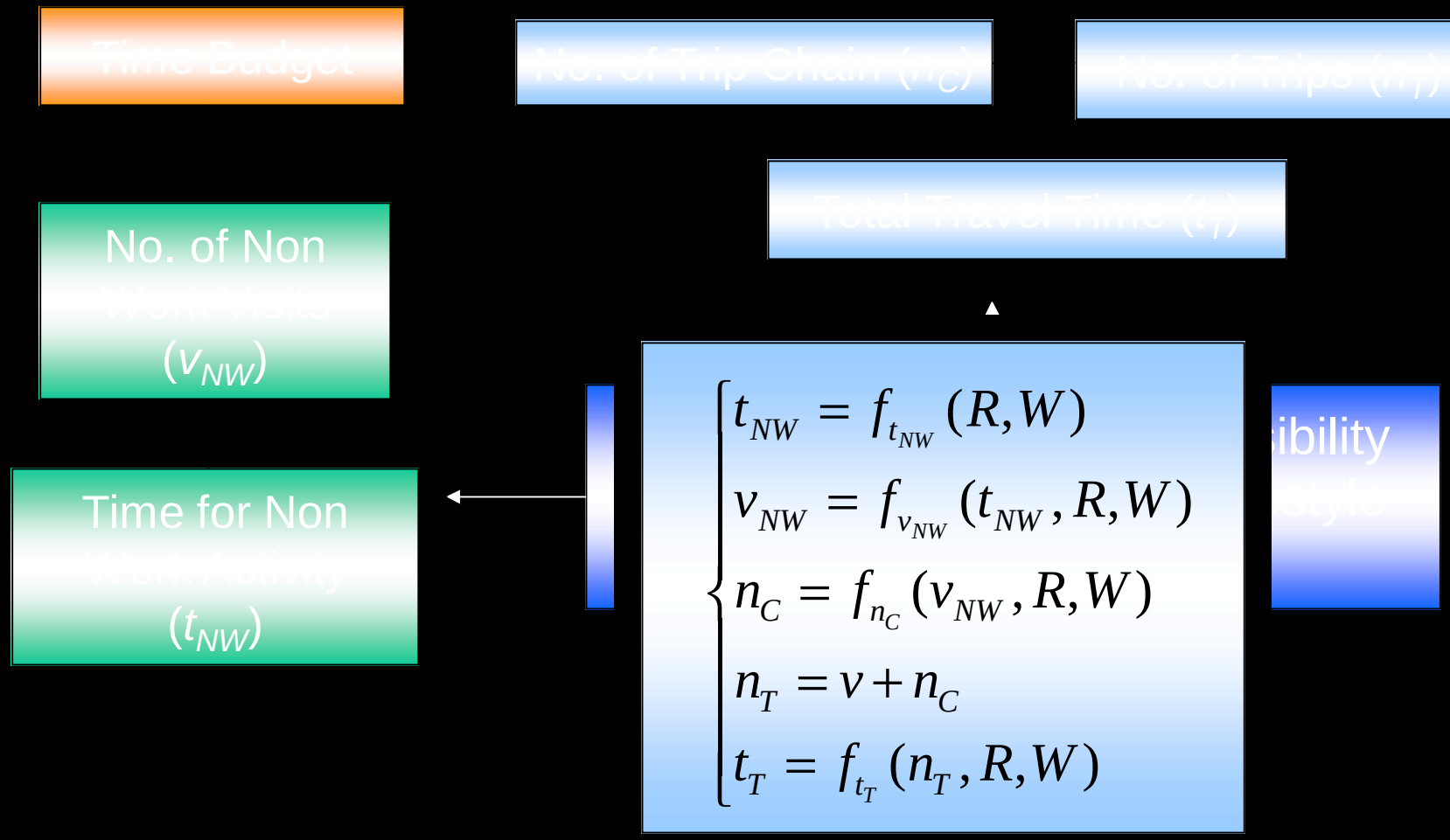
Household Trip Number by Lifecycle across the Built Environments (2000)



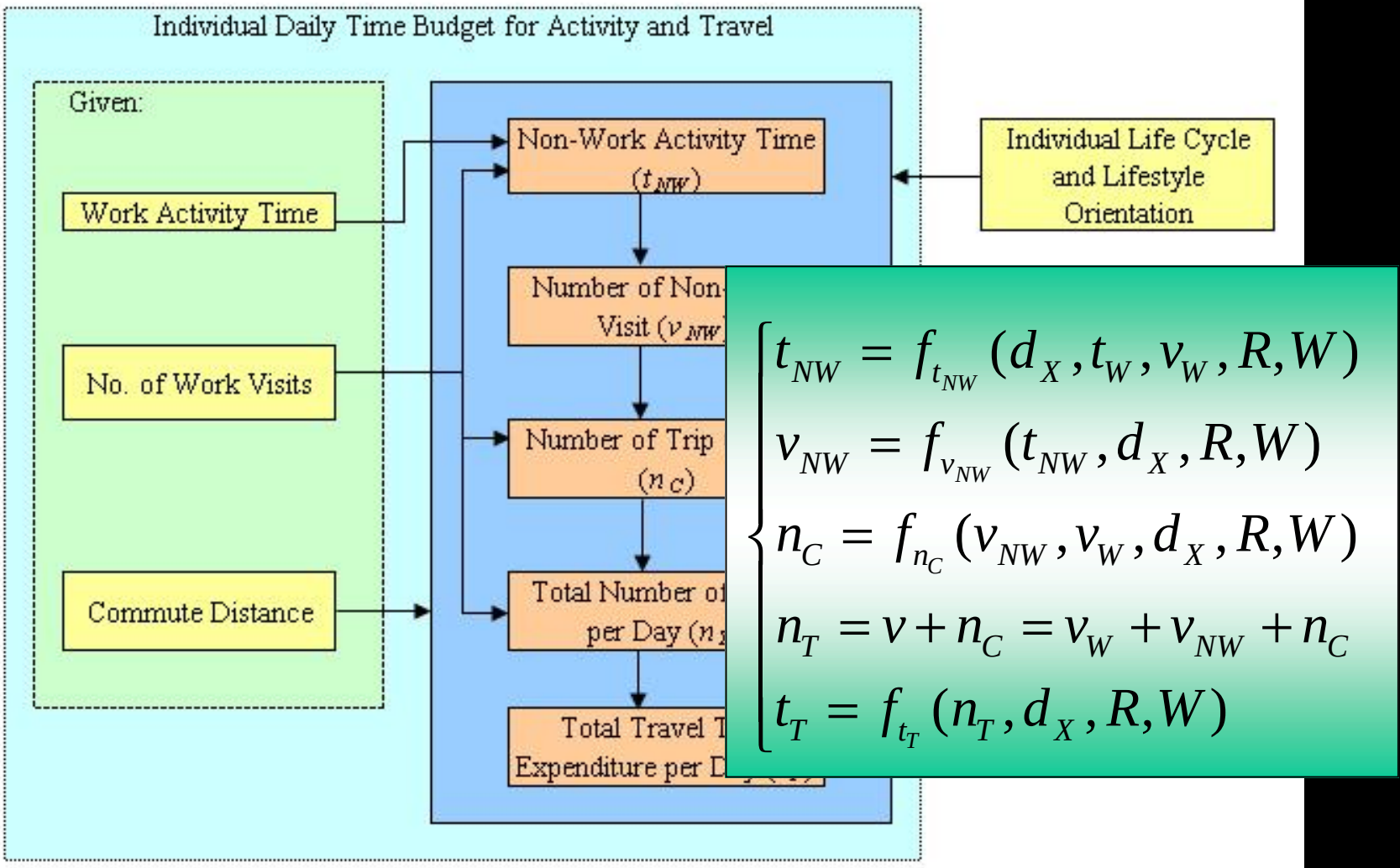
Conclusions

- The built environment explains more of the changes seen than household lifecycle stage.
  - Greatest increases in low density areas.
  - Similar reduced car use is seen within the same built environment, not household lifecycle stage.
  - Similar trip generation is seen within household lifecycle stage, not the built environment.
- For a area-wide TOD-like built environment, higher density areas have restricted car use.

Model Systems for Non-Commuters

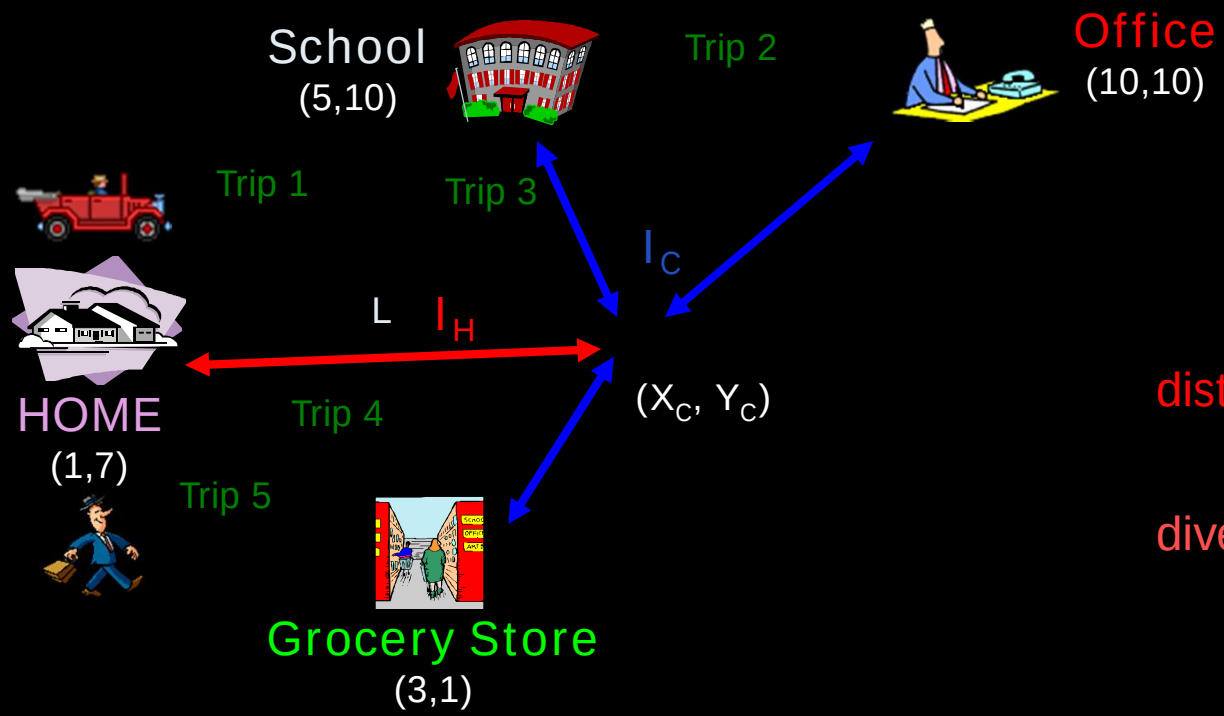


Model Systems for Commuters



$$
\begin{cases}
t_{NW} = f_{t_{NW}}(d_X, t_W, v_W, R, W) \\
v_{NW} = f_{v_{NW}}(t_{NW}, d_X, R, W) \\
n_C = f_{n_C}(v_{NW}, v_W, d_X, R, W) \\
n_T = v + n_C = v_W + v_{NW} + n_C \\
t_T = f_{t_T}(n_T, d_X, R, W)
\end{cases}
$$

The Concept of the Second Moment



distance

diversification

Related publications

- Susilo, Y.O. and Kitamura, R. (2008) Structural changes in commuters' daily travel: The case of auto and transit commuters in the Osaka metropolitan area of Japan, 1980 through 2000. *Transportation Research A*, Vol. 42, pp. 95 - 115.
- Kitamura, R. and Susilo, Y.O. (2006) Does a Grande Latte Really Stir Up Gridlock? Stops in Commute Journeys and Incremental Travel. *Transportation Research Record,* No. 1985, pp. 198 – 206.
- Kitamura, R., Yamamoto, T., Susilo, Y.O. and Axhausen, K.W. (2006) How routine is a routine? An analysis of the day-to-day variability in prism vertex location. *Transportation Research A*, Vol. 40, pp. 259 – 279.
- Susilo, Y.O. and Kitamura, R. (2005) On an analysis of the day-to-day variability in the individual's action space: an exploration of the six-week *Mobidrive* travel diary data. *Transportation Research Record,* No. 1902, pp. 124 – 133.
- Kitamura, R. and Susilo, Y.O. (2005) Is travel demand insatiable?: A study of changes in structural relationships underlying travel, *Transportmetrica*, Vol. 1 No. 1, pp. 23 – 45.
- *And still one at drafting stage (has been on-hold for sometime), hopefully will be presented and published at the forthcoming TRB annual meeting.*

Ryuichi is a teacher who never despise anybody, no matter how weak and inexperience the student is (like me). Despite of his tight schedules, he always have time to tailored his approach based on each students' ability and personality.

I really miss him as a teacher, a father and a very good friend …

On my farewell dinner at Ryuichi's house