

**What about People in
Behavioral Modeling?
The Influence of Ryuichi
Kitamura on (my) Travel
Behavior Research**

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Introduction

NINTH EUROPEAN CONGRESS OF THE REGIONAL SCIENCE ASSOCIATION

Papers of the Regional Science Association 24, 1970

WHAT ABOUT PEOPLE IN REGIONAL SCIENCE?

by **Torsten Hägerstrand***

... the fate of the individual human being in an increasingly complicated environment or ... questions as to the quality of life.

Since this occasion is the first time that the presidential address is being delivered at a congress in Europe, it seems appropriate to explore the past to see whether there has been a difference in emphasis or tone between the European and the North American meetings. I think there has been a difference although I am not prepared to show statistical evidence. When looking over the proceedings of the sixties, one gets the impression that participants in this part of the world have preferred to remain closer to issues of application rather than to issues of pure theory. We in Europe seem to have been looking at Regional Science primarily as one of the possible instruments with which to guide policy and planning. I have chosen to proceed along this line by suggesting that regional scientists take a closer look at a problem which is coming more and more to the forefront in discussions among planners, politicians, and street demonstrators, namely, the fate of the individual human being in an increasingly complicated environment or, if one prefers, questions as to the quality of life. The problem is a practical one and, therefore, for the builder of theoretical models, a 'hard nut to crack.'

Introduction (cont'd)

- This insistent focus on human beings (not just models), and their quality of life, was very much a part of Ryuichi's philosophy, as well
- One way it was manifested was through a relentless search to make "behavioral models" more behavioral
- Early "demand" models were based on principles of physics, sometimes pure economics, but very little psychology or sociology
- Ryuichi constantly strove to improve our models to reflect behavior more realistically

Introduction (cont'd)

- Some of Ryuichi's contributions include:
 - Promoting the activity-based analysis approach
 - » Time allocation decisions
 - » Space-time prisms (Hägerstrand)
 - » Trip chaining behavior
 - » Microsimulation
 - Accounting for the dynamic aspects of behavior
 - » Habit disruption
 - » Route choice
 - » Departure time choice

Introduction (cont'd)

- More contributions:
 - Application areas:
 - » Car ownership
 - » Vehicle type choice (demand for alternative-fuel vehicles)
 - Methodological:
 - » Market segmentation
 - » Panel attrition
 - » Non-randomness in choice-based samples
- ... and many more!

Ryuichi's Influence on Three Key Areas of My Research

1. Impacts of information and communications technology (ICT) on travel behavior
2. Positive utility of travel
3. Impacts of residential location on travel behavior, accounting for self-selection

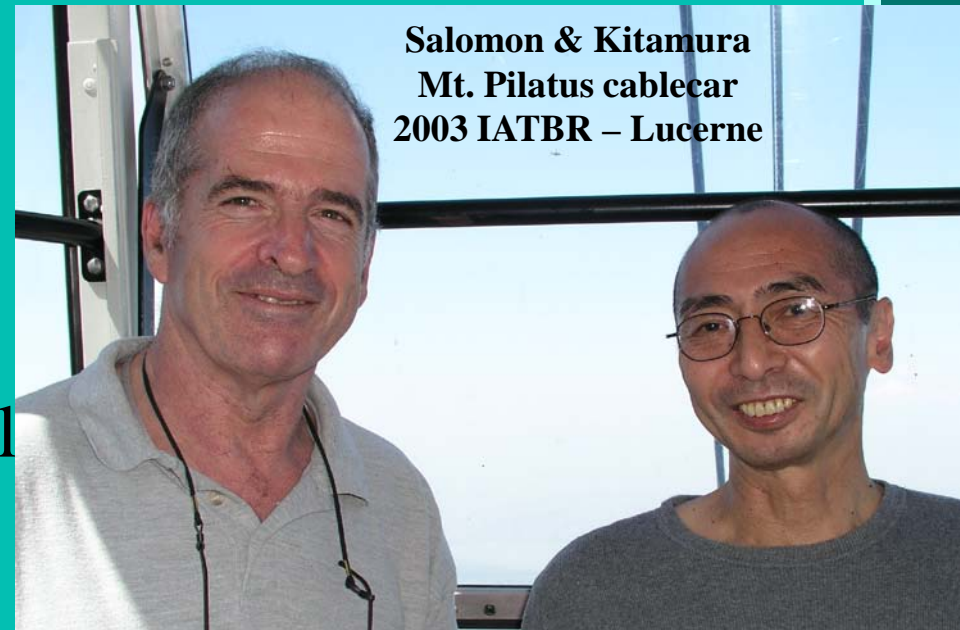
Ryuichi: A Valued Intellectual Mentor/Partner

■ When did I meet Ryuichi?

- He was always just there!
- TRB, 1988
- Governor's Conference on Telecommuting, Seattle, Washington, June 1989

■ In Feb. 1989 came the call that changed my life

■ I joined UC Davis in March 1990



1. Impacts of ICT on Travel

Telecommunications

Rapid advances are being made in telecommunications technology. New telecommunications capabilities now available offer the potential of replacing certain shopping and personal business trips. Through the use of home computers or television sets, consumers can shop electronically for an increasing variety of goods and services. Bank transactions can be made from home using the telephone. The potential travel impacts of the evolving telecommunications technology have been reviewed by Salomon (88).

These developments have made telecommuting a realistic alternative to commuting. Permitting workers to perform their tasks without leaving their homes, telecommuting will have an immediate and substantial impact on the travel behavior of workers and their family members. In addition, telecommuting will have a long-term effect on the spatial and organizational structures of many economic and social activities. New forms of employment are likely to emerge, allowing telecommuting workers to engage in part-time employment with multiple employers that may be scattered throughout the country; telecommuting lifts geographical constraints that have so long bound the location decision of both employers and workers, possibly leading to new urban forms.

The potential of telecommuting in relieving traffic congestion, reducing energy consumption, mitigating air pollution, and saving infrastructure construction and maintenance costs remains to be determined. Unfortunately, assessments of the impact of telecommunications technology on life-style, residential location, and travel demand tend to be educated guesses. One critical difficulty is the lack of data that can support the effort to determine

A Look Ahead: Year 2020 181

whether in-home activities may substitute for out-of-home activities, whether out-of-home activities will be suppressed, or whether new out-of-home activities will be induced as a result of new telecommunications technology.

Unfortunately, ... assessments of the impact ... tend to be educated guesses. One critical difficulty is the lack of data... to determine whether ... new out-of-home activities will be induced as a result

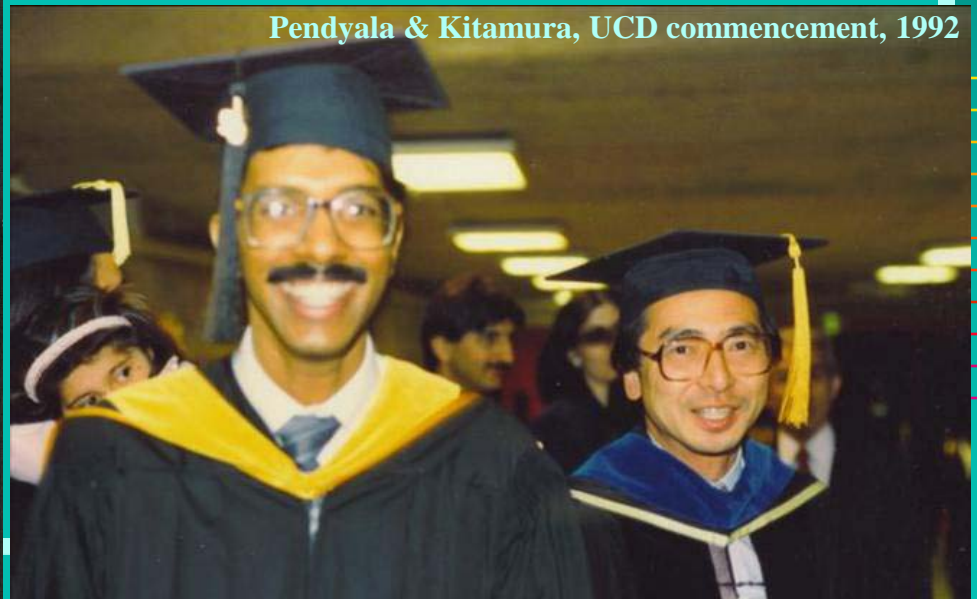
1. Impacts of ICT on Travel (cont'd)

- Ryuichi (with Ram Pendyala and Kostas Goulias) was the first to conduct rigorous analyses of the travel impacts of telecommuting (State of Calif. TCing Pilot Project)

Goulias & Kitamura, UCD commencement, 1991



Pendyala & Kitamura, UCD commencement, 1992



Pendyala, R.M., K. G. Goulias and R. Kitamura (1991) Impact of telecommuting on spatial and temporal patterns of household travel. *Transportation* 18(4), 383-409.

Telecommuters' activity spaces contract after TCing begins – even on regular commuting (“non-telecommuting”) days

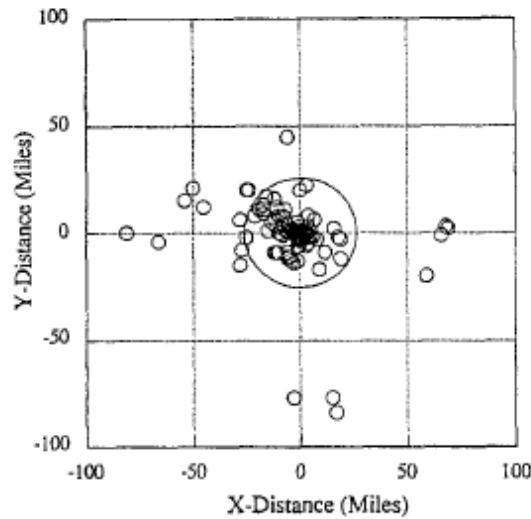
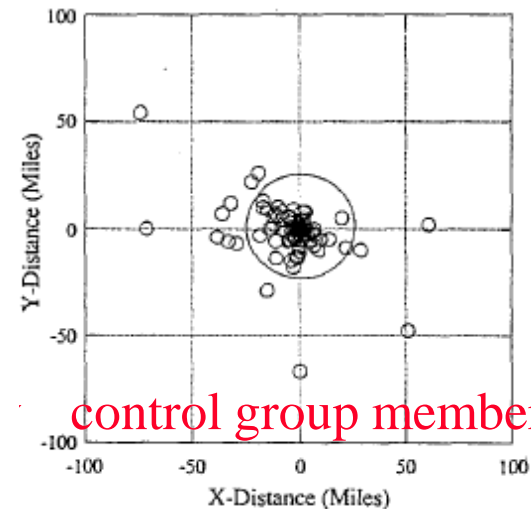


Fig. 2. Trip destination distribution around home for telecommuter employees: Wave-1 non-work trips.

TCer – before TCing

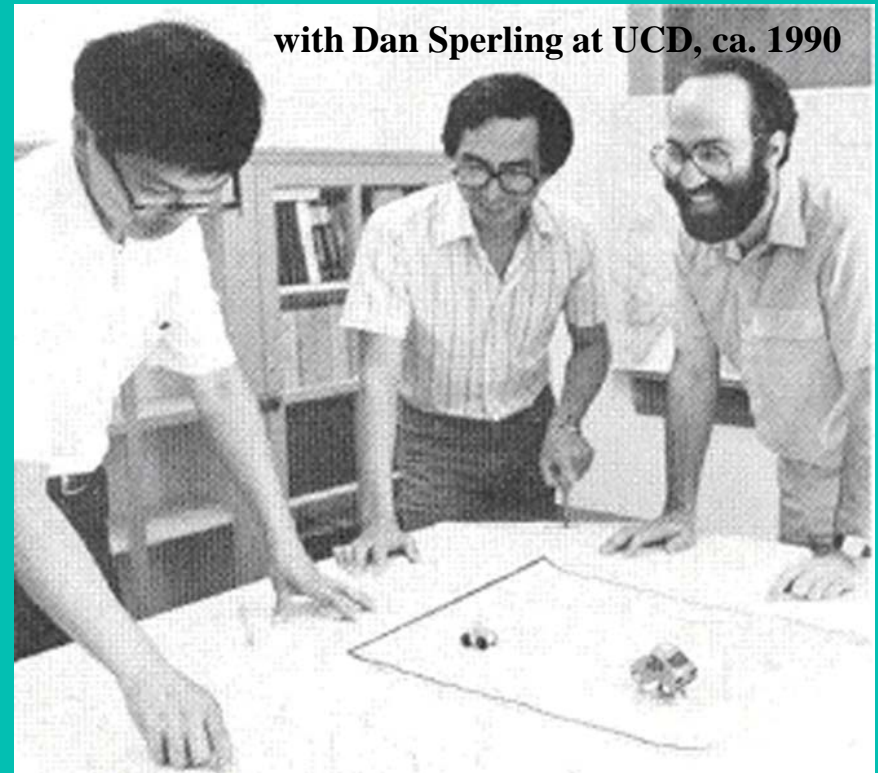


control group member

Fig. 5. Trip destination distribution around home for control group employees: Wave-1 non-work trips.

1. Impacts of ICT on Travel (cont'd)

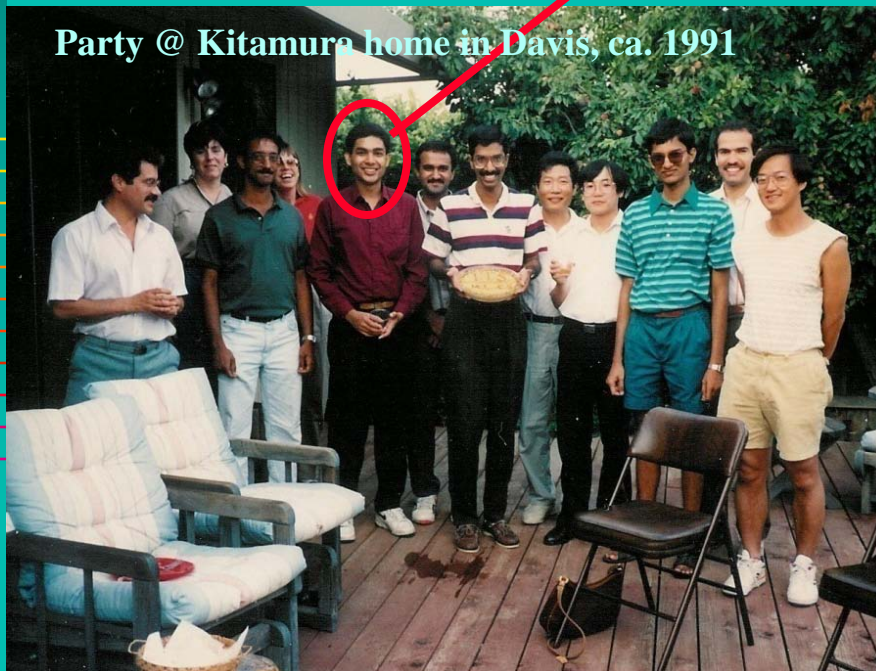
- Ryuichi (with Paul Jovanis) obtained UCTC funding to continue the analysis – and generously turned the project over to me when I arrived at UCD



1. Impacts of ICT on Travel (cont'd)

We continued separate work in the area, each influenced by the other

- Saxena, S. and P. L. Mokhtarian (1997) The impact of telecommuting on the activity spaces of participants and their households. *Geographical Analysis* 29(2) (April), 124-144.
- Senbil, M. and R. Kitamura (2003) The use of telecommunications devices and individual activities relationships. Presented at the Transportation Research Board Annual Meeting, Washington, DC, January.
- Senbil, M. and R. Kitamura (2003) Simultaneous relationships between telecommunications and activities. Presented at the 10th International Conference on Travel Behavior Research, Lucerne, Switzerland, August.



2. The Positive Utility of Travel

Life-Style and Travel Demand

RYUICHI KITAMURA

... the automobile [can be] an end in itself as well as a means.

TO DEAL WITH THE challenge to urban transportation, one must first recognize that congestion is not the problem but merely a symptom. The true problem is the life-style to which Americans aspire; the American dream is to live in a suburban single-family house on a half-acre lot with a three-car garage. If this is the root of the urban transportation problem, then obviously a fundamental solution to the issue of congestion cannot be reached without addressing the question of life-style. The concept of life-style is important to travel behavior because the automobile, the dominant mode of urban travel today, is basic to the American life-style. As Flink (1) notes, patterns of "courtship, residence, socialization of children, education, work habits, and use of leisure time were radically altered by the adoption of the automobile." The relation of the automobile to American culture has inspired many authors. For example, focusing on "the car's role in the larger dream/nightmare patterns dominating American life and thought," Dettelback (2) notes that "as the most favored—and problematic—offspring of that particularly American union of space, romance, and technology, the automobile occupies a central place in our fantasies as well as in our daily lives." If the American life-style is inspired by such fantasies, the automobile is an end in itself as well as a means.

2. The Positive Utility of Travel

related to fundamental human values and needs. In particular, Reichman challenges the wisdom that travel demand is a derived demand (5): "Is transportation only a means to an end, or does it really fulfill some ends in itself?"

The definition by Reichman offers important implications. First, according to Reichman, life-style is not merely a typology of observed behavior but a latent factor that motivates behavior. Life-style thus defined is termed "life-style as behavioral orientation" as opposed to "life-style as a behavioral typology." Second, if an individual's travel behavior is driven by his life-style aspirations, adaptation behavior cannot be studied without knowledge of the values that the individual holds. Driving a car to work may not necessarily imply that driving has been chosen by an objective cost-benefit calculation of alternative modes; it may be an indication that the commuter assigns values to the act of driving itself.

Reasons to Travel

- Curiosity, variety-, adventure-seeking
- Exposure to the environment
- Enjoyment of a route, not just a destination
- Pride in skillful control of movement
- Conquest
- Sensation of speed or even just movement
- Symbolic value (status, independence)
- Escape, buffer
- Physical/mental therapy
- Synergy

3. Residential Self-Selection

Residential location is extremely relevant to the discussion... But what is the relation between housing preferences and household travel behavior? Unfortunately, little is known that might answer this question...

household car ownership variable is desired that the car ownership variable be replaced by another variable more intrinsically related to travel behavior.

Other factors that are less frequently used in travel behavior analysis but are nonetheless relevant here include education, ethnicity, and residence location. Education is used by Salomon as one of the dimensions along which the life-style orientation is defined (9). Past studies have found certain associations between education and travel behavior (60). Allaman et al. (4) found education to be associated with the time spent working, eating away from

A very fundamental question is whether travel behavior is conditionally independent of life-style orientation, given residence location, car ownership, and other measurable factors.

caused by shifts in life cycle, or in economic status. little is known about the association between ethnicity and travel, possibly due to the multitude of ethnic and cultural backgrounds. In addition, the frequently

observed correlation between ethnic background and socioeconomic status makes the isolation of an ethnic effect a difficult task.

Residential location is extremely relevant to the discussion if suburban life-style is the cause of urban congestion problems. Relatively little attention has been paid in travel demand analysis to the factors that influence choice of residential location. The key issue that needs to be addressed is how households trade off among commuting distance (and time), housing price, and various amenities that vary greatly by location. Among the preferred housing attributes are "better" neighborhood quality, better schools, a new house in a well-established neighborhood, a housing unit all on one floor, and a large lot (77). Obviously these preferences are correlated with the life cycle and life-style of the household. But what is the relation between housing preferences and household travel behavior? Unfortunately, little is known that might answer this question.

The existing results indicate that trip generation is negatively correlated with population density, suggesting geographical variations in life-style within a metropolitan area (4, 78). The significant effect of home ownership found in several studies (51) may again be viewed as an indication of the association between population density and travel behavior. An analysis of daily travel patterns concludes that (36) "those residing in low-density areas are significantly more likely to undertake a multistop daily pattern."

Although some insights are already available, more detailed and extensive examination is desirable on the subject of life-style and residential location.

Analyses in this subject area have not advanced, possibly because of the conviction that there exist spatially invariant trip generation rates and that trip generation models are geographically transferable. Attempts to determine the effects of accessibility on trip generation have shown only minor results (79, 80). Thus, the conventional planning models implicitly assume that households of given characteristics will exhibit the same travel patterns no matter where they are located.

Still another problem is that many attributes of a metropolitan area, including transportation service levels and characteristics of household members and their preferences, are spatially correlated. Because of this, cases of ecological fallacy are the likely consequences of a marginal analysis of travel characteristics in which a limited number of contributing factors is controlled for. Because of these limitations, it is not possible to determine whether a particular travel pattern exhibited by a household is due to the household's life-style aspiration or to residence location and car ownership.

A very fundamental question is whether travel behavior is conditionally independent of life-style orientation, given residence location, car ownership, and other measurable factors. An answer to this question will determine the

Residential Self-Selection: Motivation

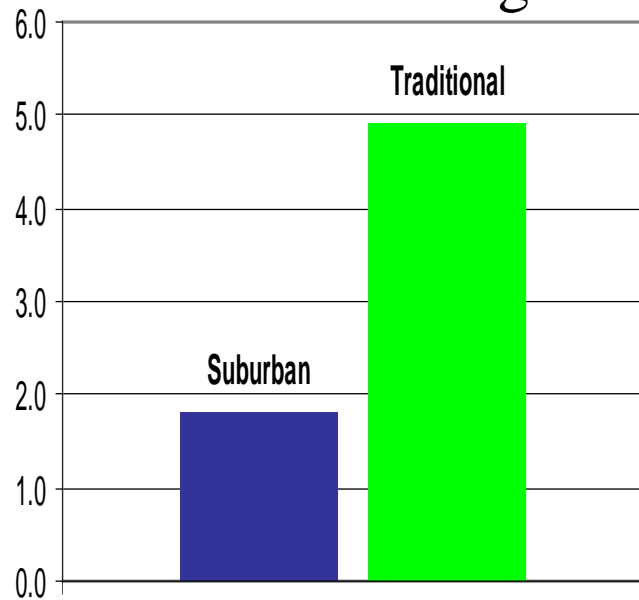
- Many studies have compared travel behavior (TB) of residents of “suburban” versus “urban” neighborhoods
- and found that **suburban dwellers walk less and drive more,**
- supporting the rationale for more compact urban forms

A Northern California Example



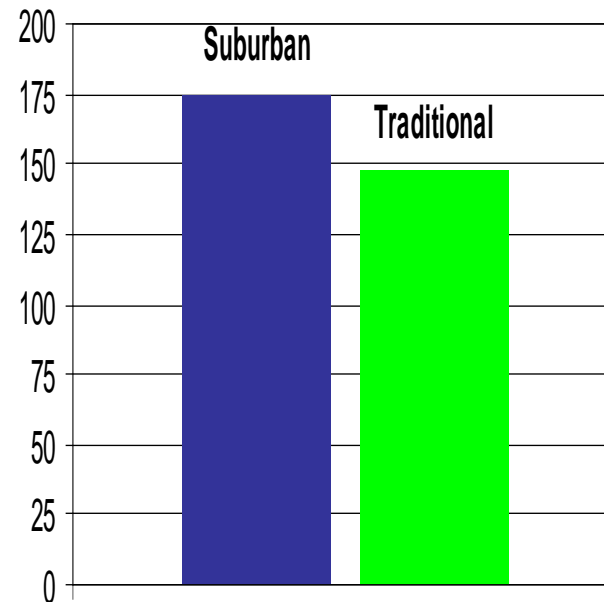
Walks to Store in Last 30 Days

2.7 x higher!

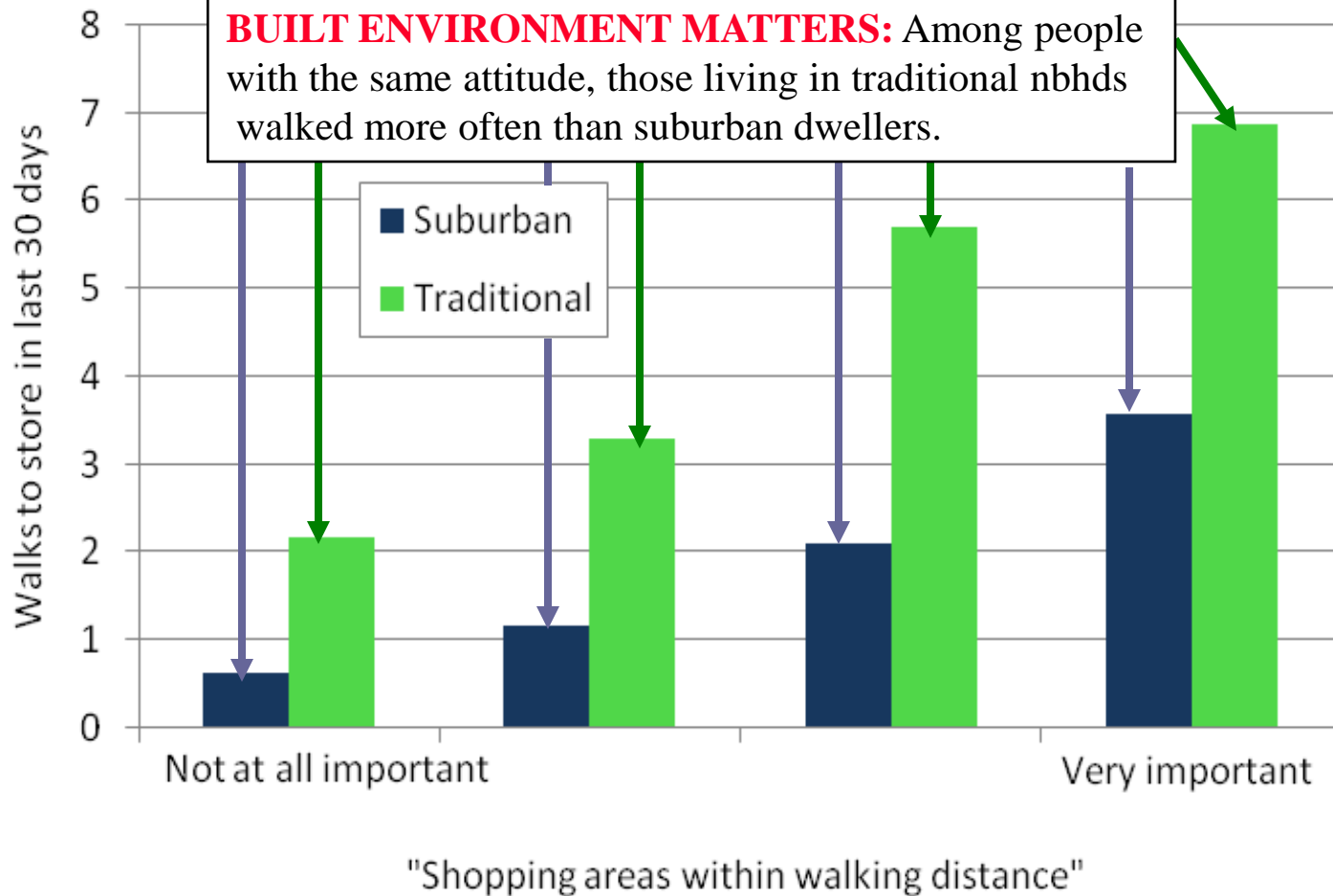


Veh-Mi. Driven per Week

15% lower!

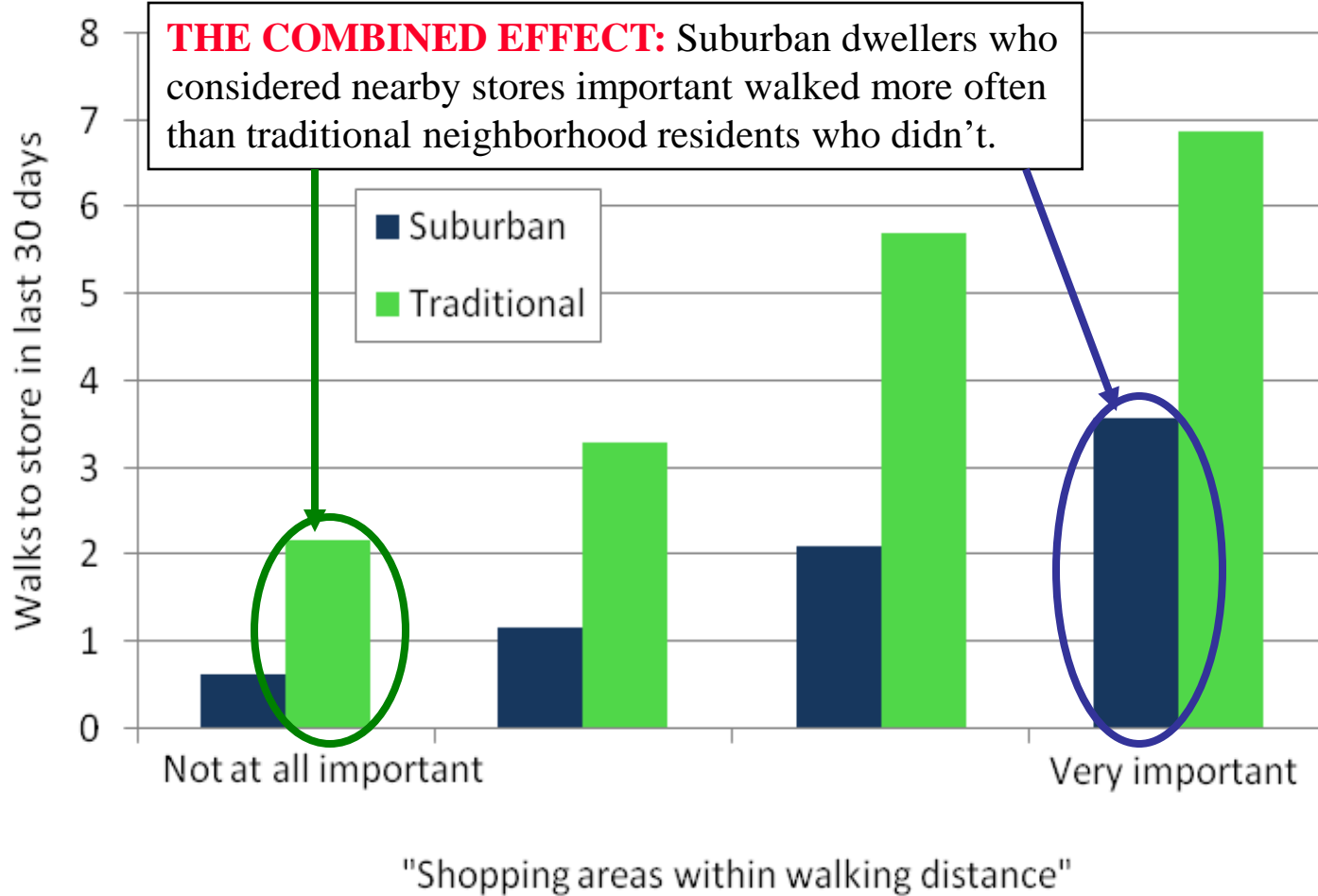


Great! What's the Problem?



ATTITUDE MATTERS: Among people living in the same type of nbhd, those who consider having nearby shops to be very important walked (~ 4x) more often than those who don't.





The RSS Problem (cont'd)

- So are the observed TB differences because of
 - a true independent influence of the built environment (BE)?

or because

- people who like walking (or, want to minimize driving) choose to live in neighborhoods supportive of that desire (AT)?

or

- some of both?

The RSS Problem (cont'd)

- If the effect of BE on TB is primarily due to attitudinal predispositions (AT), then policies promoting denser, more diverse land use patterns may not have the desired effect
- For example, if a “car-lover” lands in an urban neighborhood because of policy incentives (e.g. financial), s/he may still drive like the typical suburban dweller

The RSS Problem (cont'd)

- Costs of being wrong:
 - potentially diminished quality of life
 - » inability to satisfy preferences
 - » disadvantages of crowding (e.g. lack of privacy, lack of children's play space/green space, congestion, tensions, contagion)
 - opportunity costs – time, money, & political capital could have been spent on more useful policies
- Thus, to evaluate the effectiveness of (proposed) LU policies, it's important to know the relative roles of BE and AT in influencing TB

Our Collaboration

Importance of residential location & lifestyle
(Kitamura, 1988)

PKL(M) dissertation: importance of attitudes to explaining travel behavior

CARB project: impact of attitudes & lifestyle on relationship between built environment and travel behavior

Transportation 24: 125–158, 1997

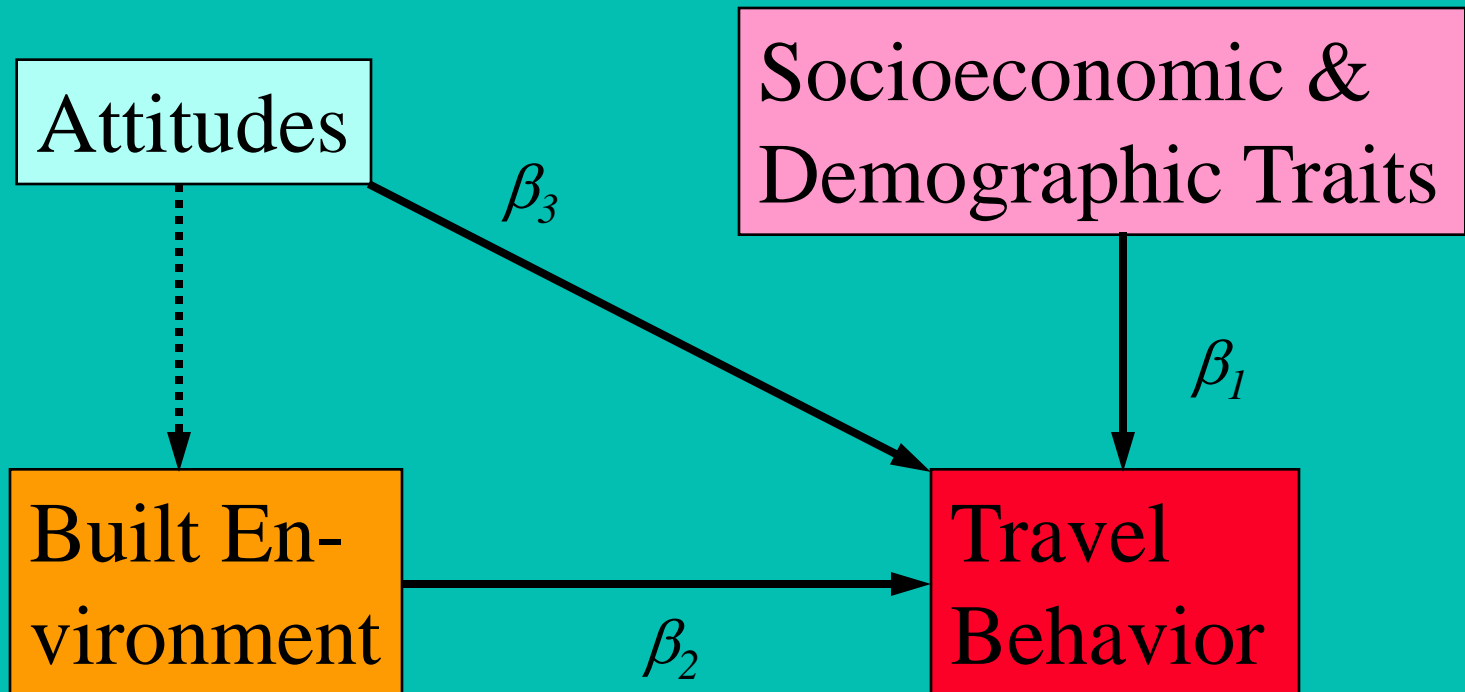
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A micro-analysis of land use and travel in five neighborhoods in the San Francisco Bay Area

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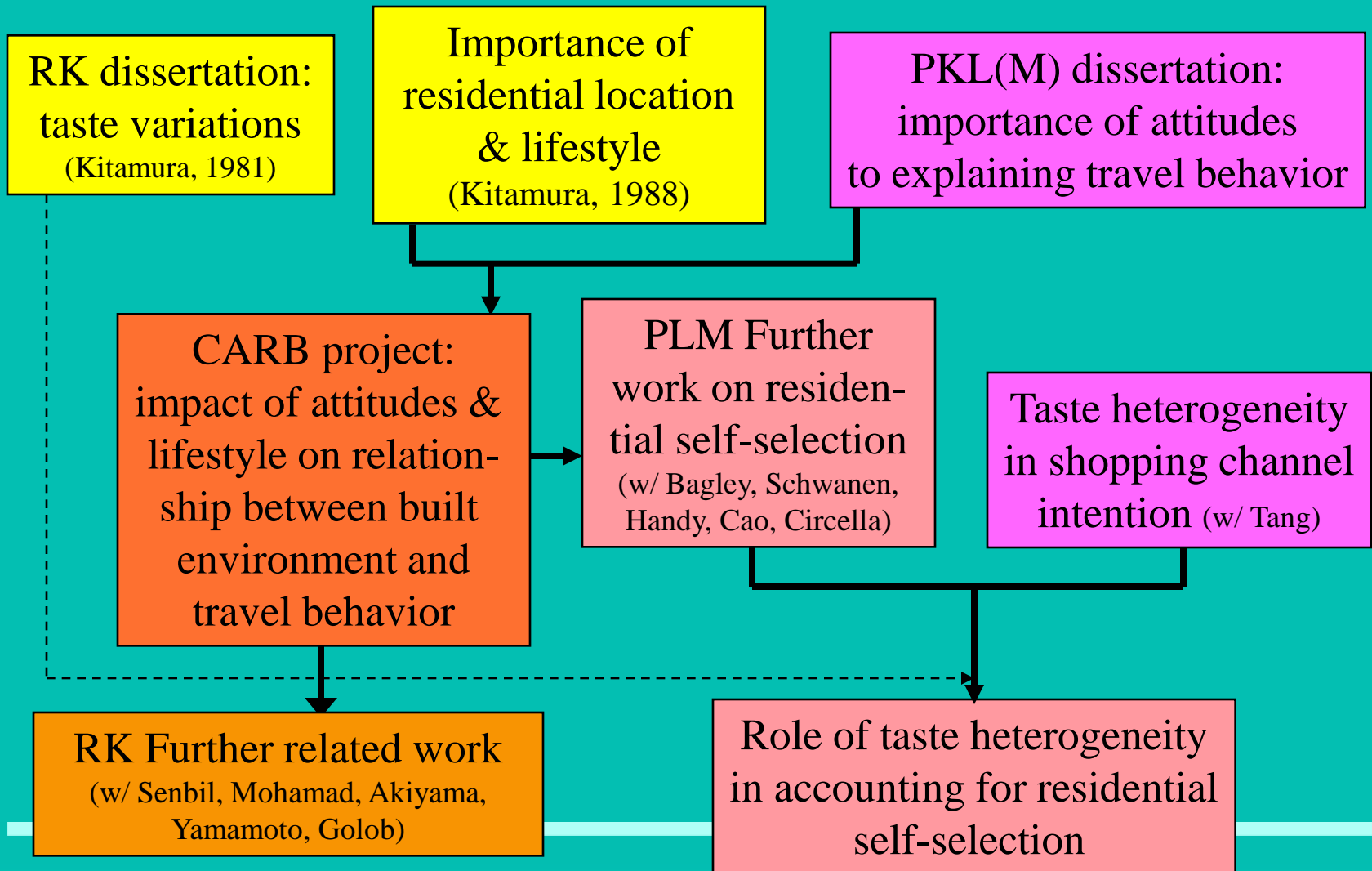
Built Environment as a Mediator of Attitudes



Key Findings of Kitamura et al. (1997)

- Attitudes had (substantially) more explanatory power than BE variables
- Magnitudes and significances of the BE variables declined with the insertion of attitudes
- But they remained significant, indicating that the BE has an influence of its own, even after accounting for attitudes

Ryuichi's Influence Continues...



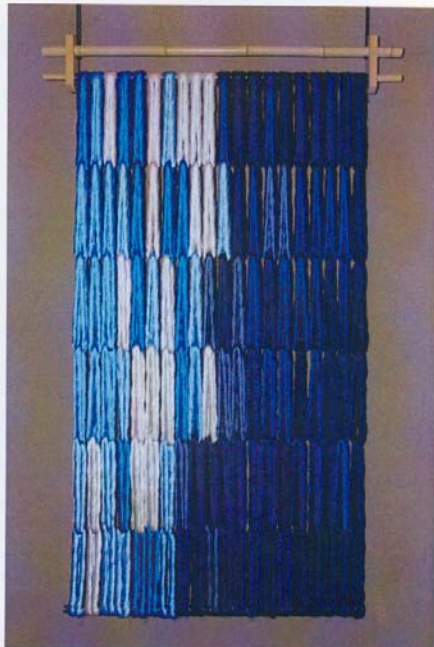
Conclusions

- An interesting metric of Ryuichi's influence on me
 - 34 (~1/3) of my papers cite him
 - Those 31% of my papers account for more than 50% of the citations of my work by others
 - In other words, the papers that were influenced by Ryuichi have been my own most influential papers

Weaving the Fabric of Knowledge, and of Humanity

Welcome to Nishijin

IATBR Reception
August 17, 2006



Dye work by Shozo Shimonishi



About Nishijin

The Nishijin area has drawn attention of social scientists because of its unique economy and social composition. Its high-density, mixed land-uses would be of great interest to urban planners. It is the center of traditional textile industry of Japan, producing fabrics for the Kimono and Obis (wide bands used to tie a kimono around the waist). The industry comprises hundreds of small production units scattered across the Nishijin area, some preparing the warp of yarn, some the woof, some dye, and some weave. Traditional Machiyas used to, and still do, house small factories; you can find Machiya houses which have several electric-powered looms or dye works in the back.

The Nishijin area is old, with many residents living in the neighborhoods for generations. It is a rare community with job-residence proximity, with many residents having workshops in their own homes, or commute short distances to work within Nishijin. It is a pedestrian-oriented neighborhood with the Senbon shopping street running through it, farmers from the northern parts of the city making daily calls at the neighborhoods to sell fresh produce, mothers taking their children to school on a bicycle, and independent bakeries, confectioneries, ethnic as well as Japanese restaurants in all price ranges dotting the area. Of course motorization has progressed and old Machiyas are being replaced with pre-fabricated houses in Nishijin as in any other parts of Japan, and the area's traditional lifestyles are being replaced with more contemporary ones. Yet, you can easily appreciate the traditional, pedestrian-oriented aspects of this neighborhood by walking through it.



Thank you,
Ryuichi —
you are always
in our hearts



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