
Exploration of Travel Well-Being in Static and Dynamic Contexts

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June 10, 2008



Acknowledgments

- Joint project between MIT ITS lab, Prof. Moshe Ben-Akiva, and EPFL TRANSP-OR lab, Prof. Michel Bierlaire
- LASUR: Prof. Vincent Kaufmann and Regina Witter
- Administrative assistance: Marianne Ruegg (EPFL), Tina Xue (MIT)
- Interviews: Vincent Chardonens (UNIL), Isaline Moullet (EPFL), Gaël Vietti-Violi (UNIL)
- Translations: Stéphanie Thomé, Gil Viry (EPFL)
- Parking offices: Muriel Cloux (UNIL), Philippe Vollichard (EPFL)

Acknowledgments (cont.)

- Geneva airport: Philippe Quaglia, Denis Teuscher
- Onex municipality: Angela Santini, François Turk
- Pre-test participants: Ashish Bhaskar (EPFL), Anne Curchod (EPFL), Prof. André-Gilles Dumont (EPFL), Dr. Simon Kuenzi (EPFL), Laurent Monney (EPFL), Kevin Tierney (Cambridge Systematics), Prof. Panos Tzieropoulos (EPFL), Dr. Roland von Kaenel (CFS Engineering)
- All participants
- Financial support: EPFL TRANSP-OR lab, UTC (New England), TL, and TPG

Motivation

- Subjective well-being (SWB):
 - People's own evaluation and feelings about the quality of their life and its domains
 - Has been measured and studied by psychologists and economists

- Example - World Values Survey

Taking all things together, would you say you are:

- 1 Very happy
- 2 Rather happy
- 3 Not very happy
- 4 Not at all happy

Motivation

State-of-the-Practice in Transportation

- In transportation:
 - Models are mostly based on travel time and cost
 - Project evaluation is heavily focused on assessment of travel time savings and ignores non-users
 - But well-being is broader than generalized cost!
 - Generalized cost
 - Flexibility
 - Comfort
 - Stress/anxiety, etc.

Why Study Travel Well-Being?

Importance of Travel Well-Being

- Psychological benefits of travel
- Spillover effects to work and home
- Health and driving capabilities consequences of commuting stress
- Design of responsive driving systems



Headlights turn red if driver is angry, to warn others and prevent road rage



Research Overview

- Objectives:
 - Develop and test a travel well-being measurement method
 - Model the relationship between travel well-being and behavior
- Stages:
 - 1: Cross-sectional data
 - 2: Panel data
 - 3: Overall modeling framework

Outline

1. Cross-sectional analysis of travel happiness
2. Dynamic analysis
3. Conclusion

Stage 1: Cross-Sectional Data

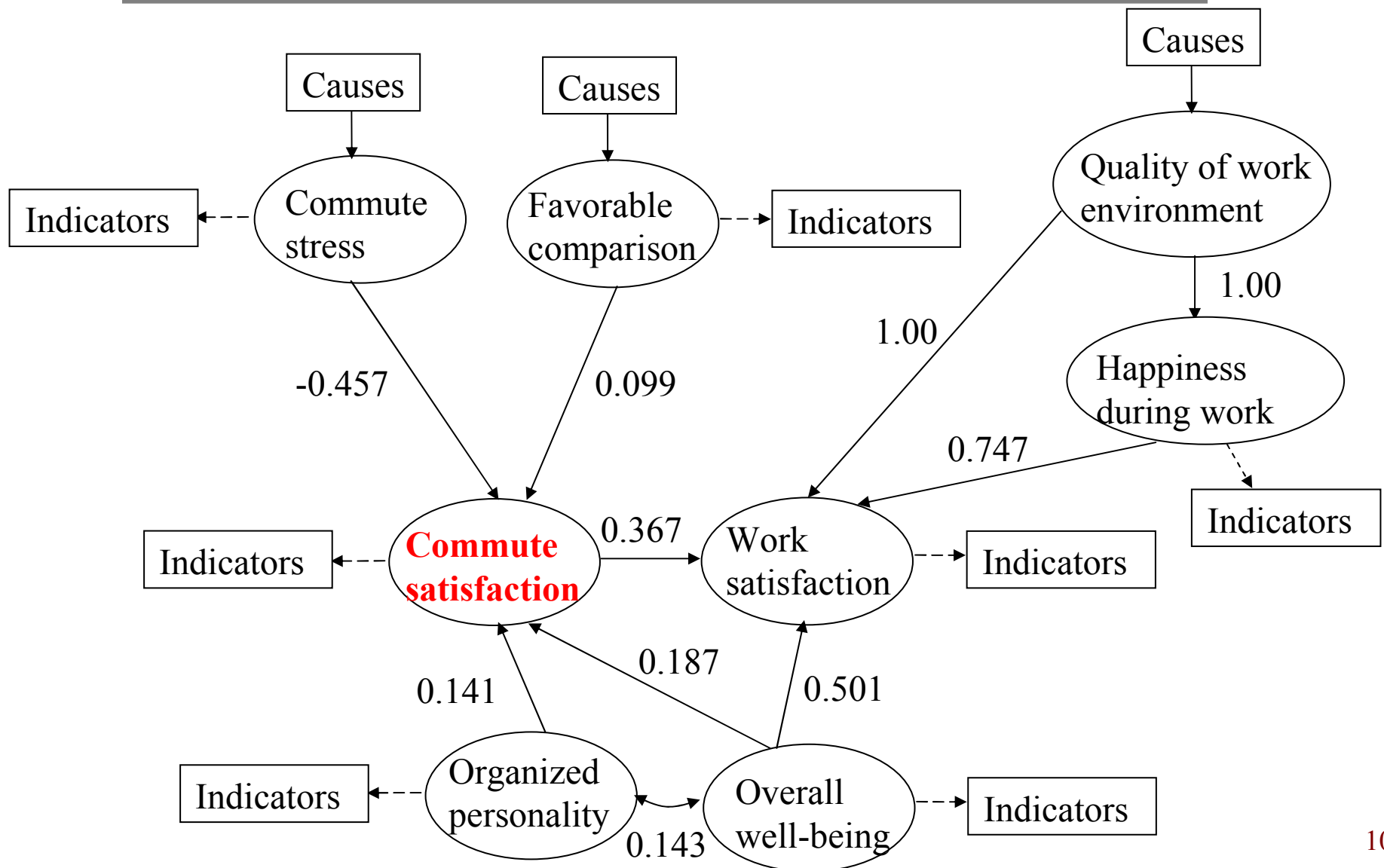
- Web-based travel and activity well-being survey of a convenience sample of commuters

Taking all things together, how satisfied would you say you are with your commute from home to work?

Very dissatisfied Dissatisfied Neither satisfied nor dissatisfied Satisfied Very satisfied

- Analyses:
 - Modeling commute satisfaction
 - Modeling the propensity to participate in activities

Commute Well-Being Model

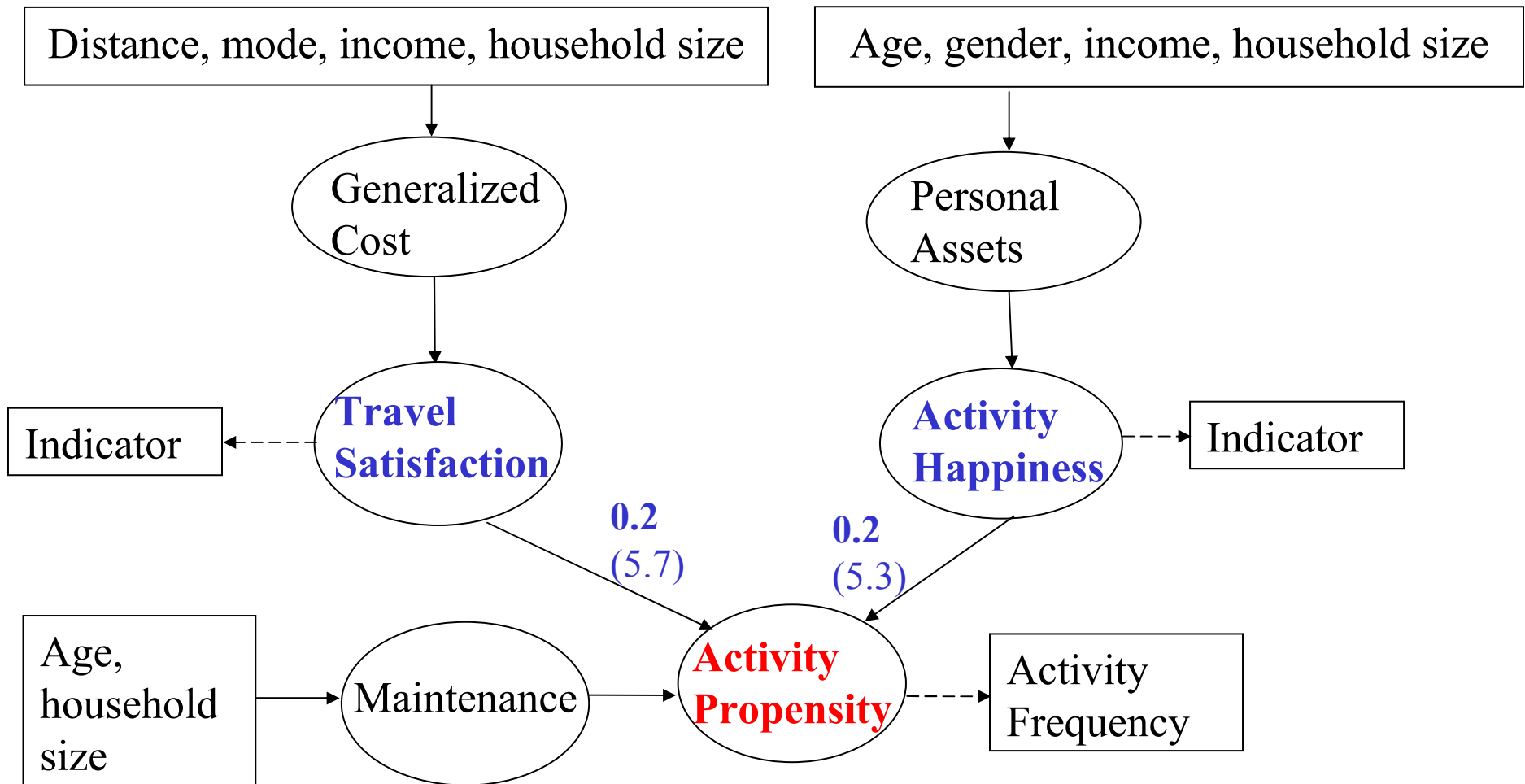


Happiness by Activity Type

Activity	% Happy
1. Social/recreational	95
2. Eating out	88
3. At home	79
4. Organizational/volunteer/religious	70
5. Work	56
6. Shopping	39
7. Personal business	26

Shopping Activity Propensity Model

Greater happiness \Rightarrow higher propensity of activity participation



Conclusion of Stage 1

- Established evidence for the existence of relationships among happiness, behavior, and various factors
- But...
 - Travel is a repetitive/routine activity
 - People don't fully evaluate their travel well-being unless they need to update their travel decisions due to personal or environmental changes

2. Stage 2: Panel Data

- **Objective:** develop a more accurate measure of travel happiness that accounts for the routine nature of travel
- **Key idea:** Induce a temporary behavioral **change** that forces people to re-evaluate their travel happiness as they make their travel decisions

Travel Behavior Modification Experiment

- “Force” commuters with strong car habits to switch temporarily to public transportation (PT) and observe the “free” choice afterwards
 - Idea proposed to me by Prof. Drazen Prelec (MIT)
- Two experiments:
 - “Ménages Pilotes” -- Onex: as part of other environmental-friendly actions, households have tried to reduce car use from February-April 2008
 - 3-week experiment conducted in May and June 2008 at Geneva airport, EPFL, and UNIL
 - Focus of the next slides

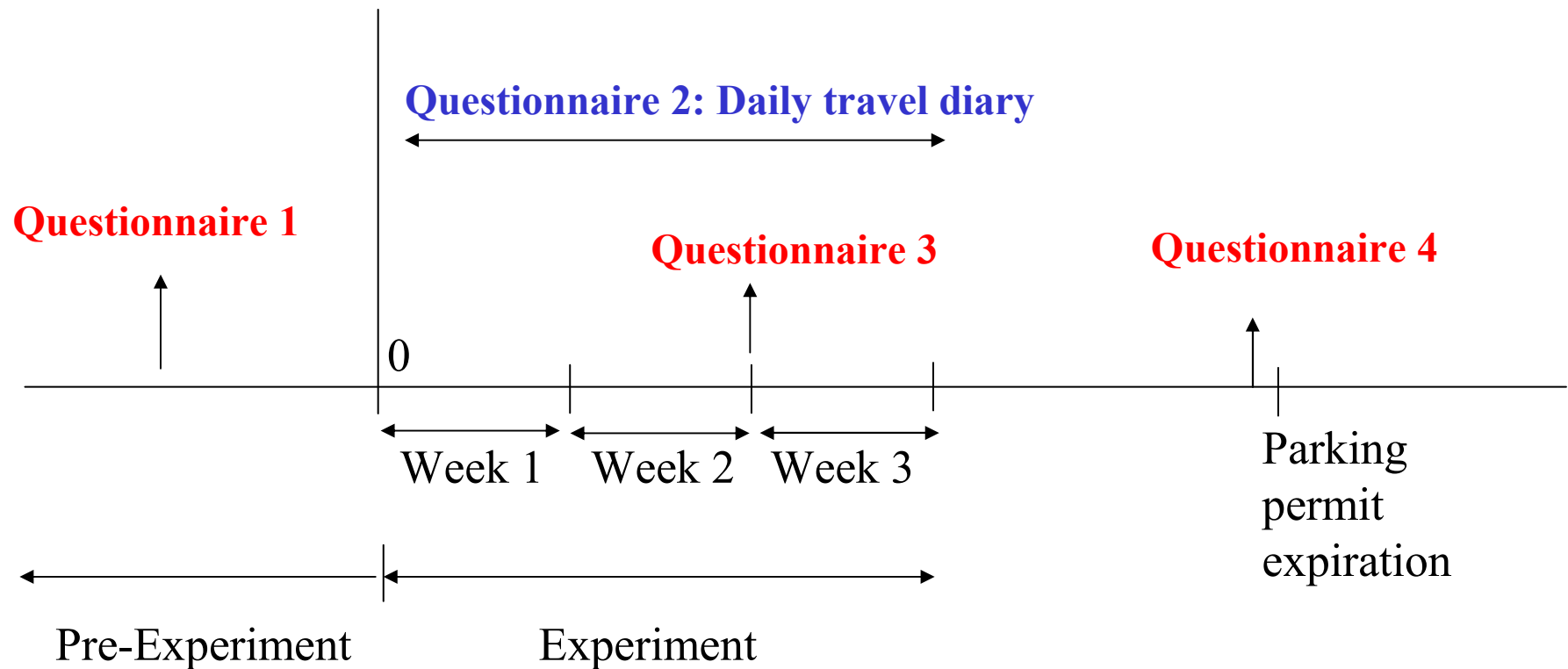
Mechanism

- Week 1: “free” mode choice
- Week 2: “forced” use of PT for 3 days
- Week 3: “free” mode choice
- Incentive: free PT passes during Weeks 2 and 3
- At the end of Week 2, participants have the option to “sell” their parking permits to us

Recruitment

- We send emails describing the study to employees of Geneva airport, UNIL, and EPFL
- Participants are self-selected with the following criteria:
 - Strong car habit for commuting
 - Have PT available to place of residence
 - Live and work at the same place since February
- We conduct phone interviews, identify PT routes, and prepare PT passes

Data Collected by Timeline



Questionnaires 1, 3, and 4

- Happiness:
 - Taking all things together, how satisfied are you with your commute by car between your residence and Geneva airport?
- Perceptions:
 - “I can count on the car (PT) to get me to Geneva airport on time”
 - “Using the car (PT) does not cost much”
 - “The car (PT) is comfortable”
- Attitudes:
 - “I wouldn’t mind having to make a transfer using public transport”
- Questions about the actual PT experience

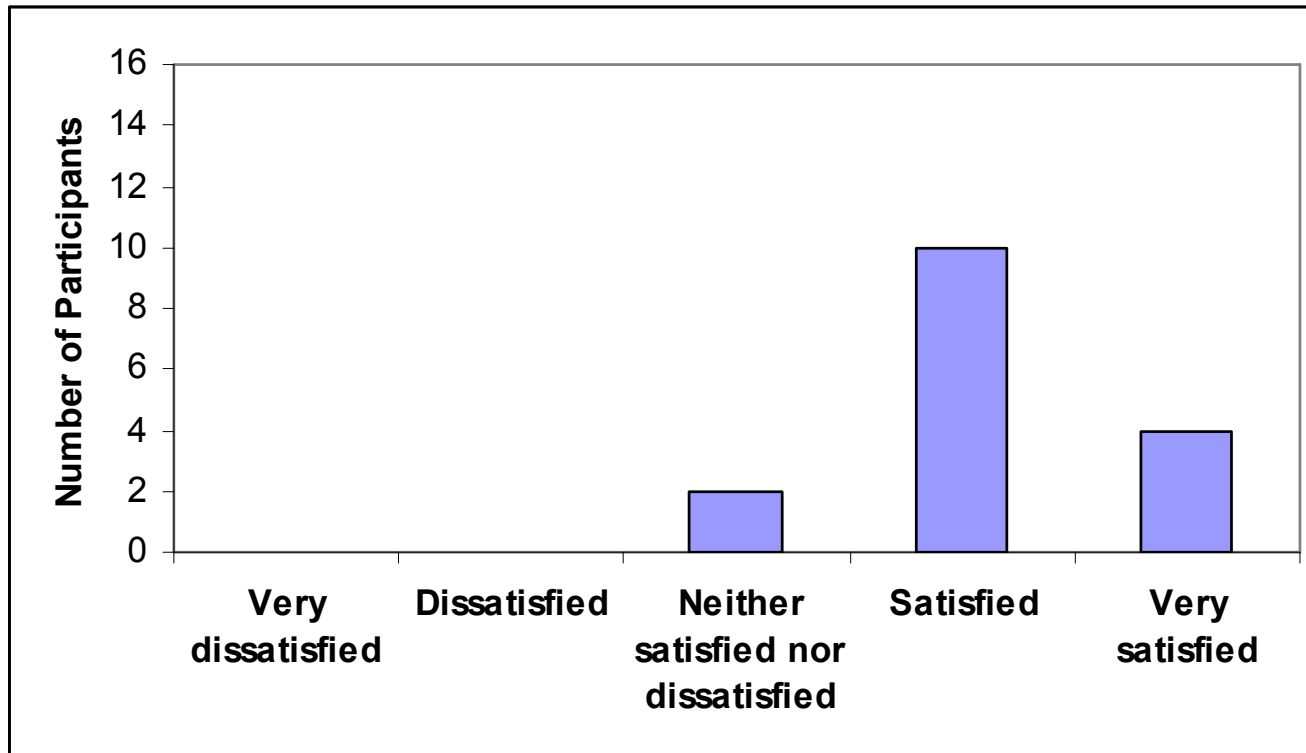
Analysis

- Objectives:
 - Measurement of travel happiness
 - Modeling of travel happiness and behavior
- In next slides:
 - Descriptive analysis:
 - Happiness before and after the treatment (PT use)
 - Perceptions/attitudes before and after the treatment
 - Happiness and mode choice
 - A framework for modeling happiness and behavior

Analysis: Pre-Treatment

Commute Satisfaction by Car

- Taking all things together, how satisfied are you with your commute by car between your residence and Geneva airport?



Analysis: Pre-Treatment

Reasons for Not Using PT: Qualitative Comments

« L'arrêt de la gare de Bassins se trouve à 3 km du village, il faut traverser la forêt, aucune lumière pour y arriver! Pas de parking possible à la gare de Bassins, une vrai catastrophe! En outre, la desserte des bus est correcte uniquement aux heures scolaires, sinon c'est galère! Les bus sont bondés, on ne peut même pas s'asseoir! En résumé et malheureusement, la liberté passe par la voiture! »

Analysis: Pre-Treatment

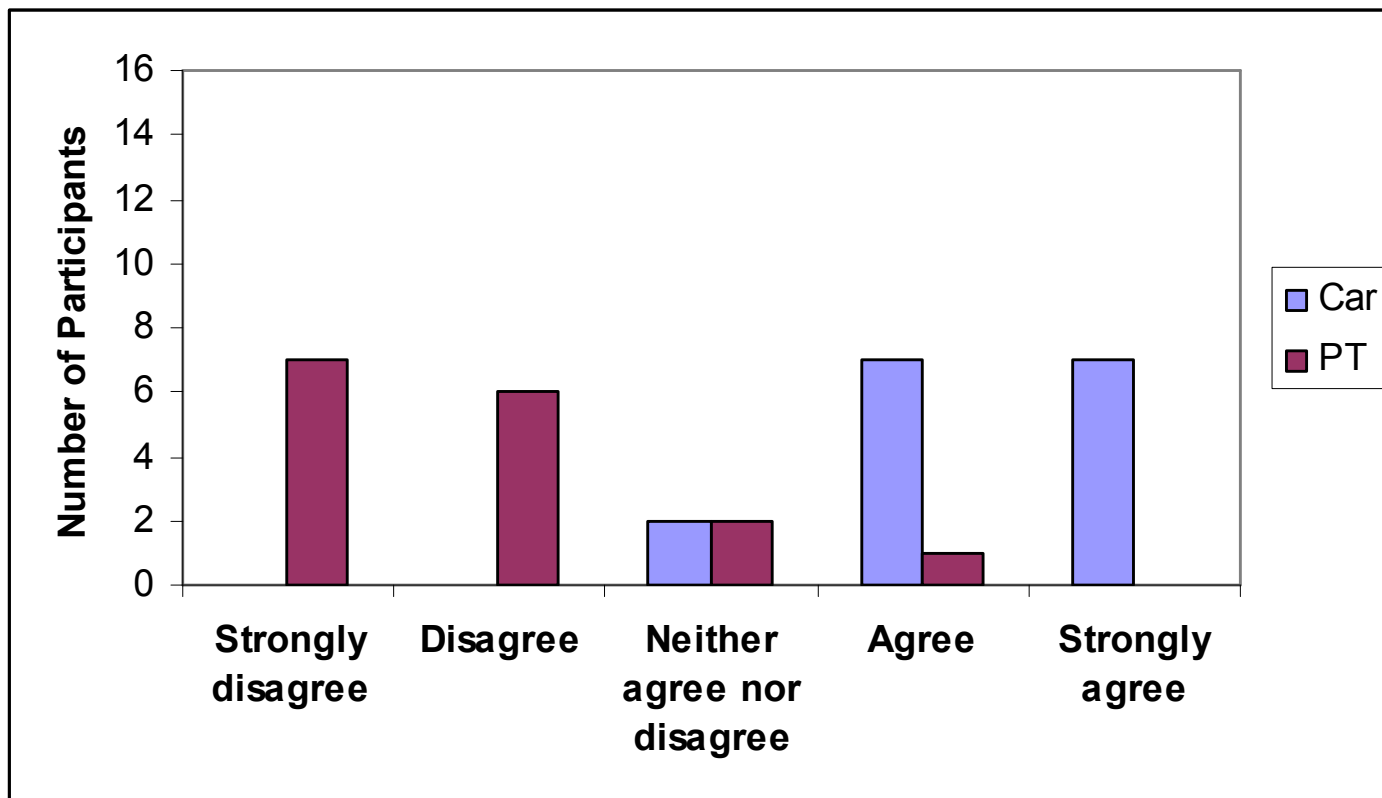
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- Travel time (6)
- Hours of operation (5)
- Flexibility (4)
- Comfort (2)
- Frequency of PT (2)
- Bad connections (2)
- Crowding (2)
- Access (2)
- Park-and-ride (2)
- Transfers (1)
- Cost (1)

Analysis: Pre-Treatment Perceptions about Travel Time

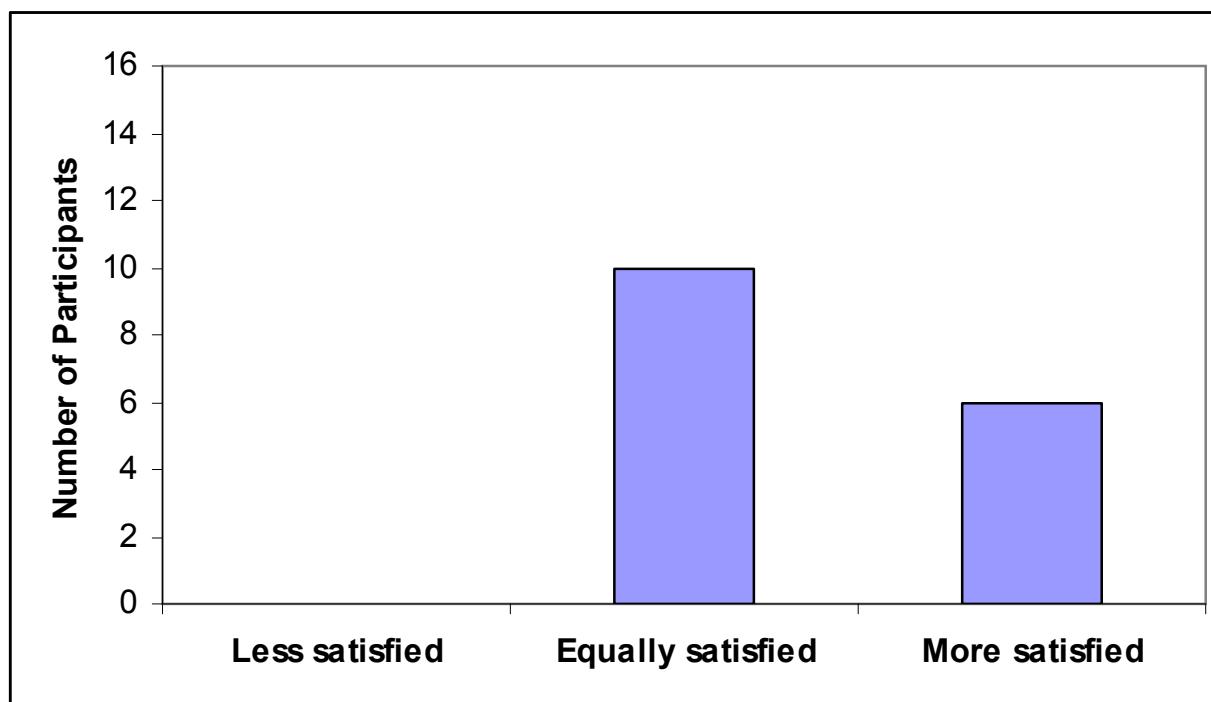
- “The car (public transport) gets me to Geneva airport quickly”



Analysis: Post-Treatment

Change in Commute Satisfaction by Car

- Taking all things together, how satisfied are you with your commute by car between your residence and Geneva airport? (Very dissatisfied -- Very satisfied)

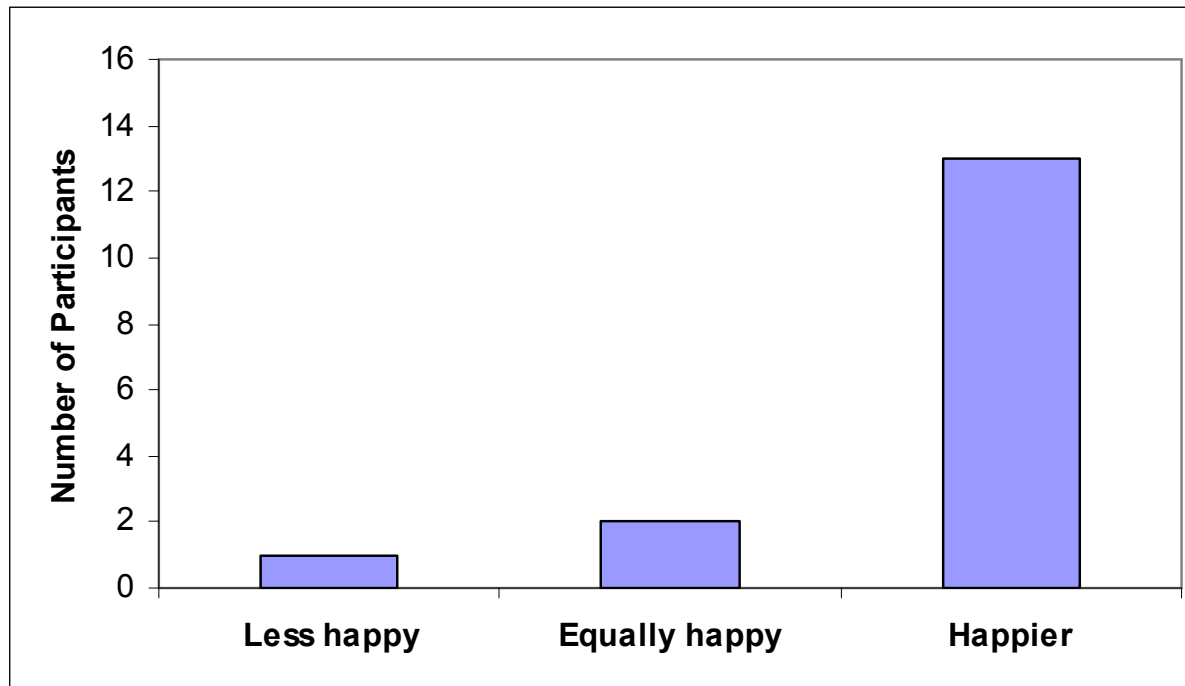


People felt the same or more satisfied with their commute by car after trying public transport

Analysis: Post-Treatment

Change in Happiness about Decision to Commute by Car

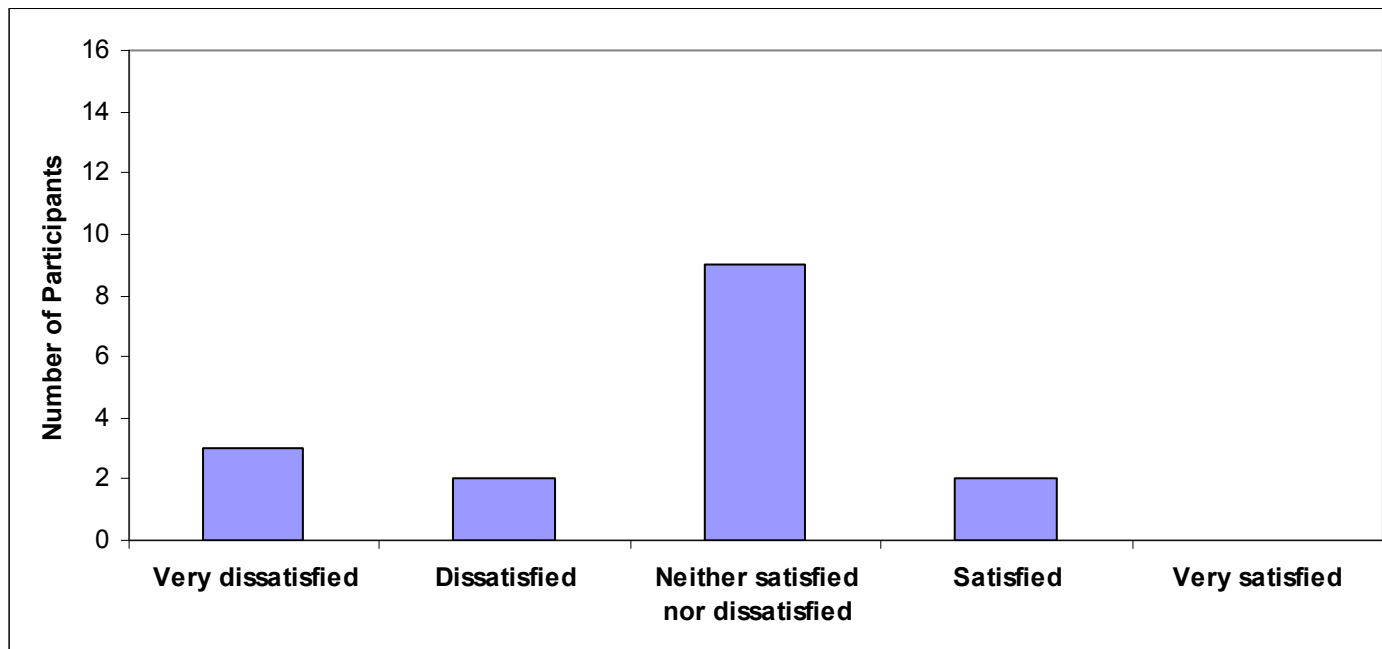
- After your experience during this study, how do you feel about your decision to use the car for commuting to work? (Less happy -- Happier)



People generally felt happier about their decision to commute by car after trying public transport

Analysis: Post-Treatment Commute Satisfaction by PT

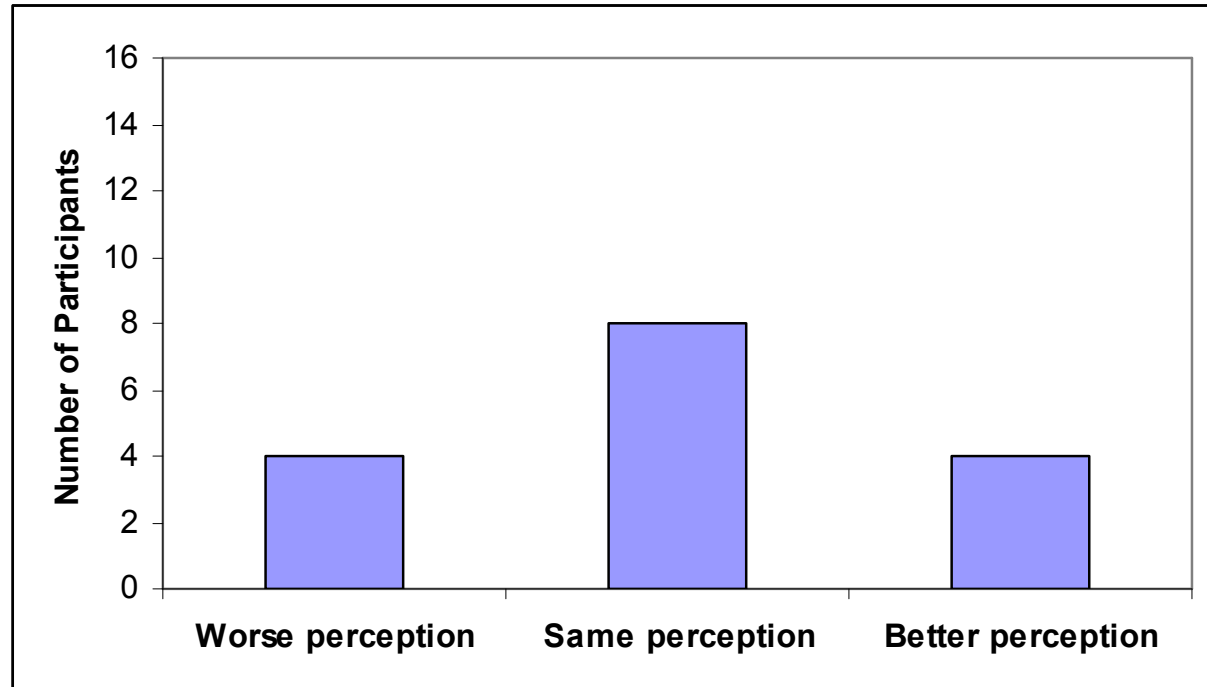
- Taking all things together, how satisfied were you with your commute by public transport between your residence and Geneva airport during this study? (Very dissatisfied -- Very satisfied)



Some participants were dissatisfied, but most were neither satisfied nor dissatisfied

Analysis: Post-Treatment Change in Perceptions: Travel Time

- “Public transport gets me to Geneva airport quickly”



- Several participants corrected their perceptions about travel time by public transport
- When asked about how the experience compared to expectations, most participants said they had a worse than expected travel time

Analysis: Post-Treatment Mode Choice and Intentions in Week 3

- In Week 3 (free choice), 9 out of 15 participants commuted by PT at least once but only 5 had an intention to use PT in the future
- How is satisfaction with PT correlated to behavior?

	Didn't use PT in Week 3	Used PT in Week 3	Improbable to use PT in future	Probable to use PT in future
Avg (satisfaction)	2.5	2.8	2.4	3.0
Pr(dissatisfied)	0.33	0.22	0.38	0.20

Framework for Modeling Travel Happiness

- Structural Model:

$$(1): H_{car} = f(X_{car}) + \underbrace{g(X_{car}, X_{PT})}_{\text{Comparison to PT}}$$

$$(2): H_{PT} = f(X_{PT}) + \underbrace{g(X_{car}, X_{PT})}_{\text{Comparison to car}} + \underbrace{h(X_{PT}, \tilde{X}_{PT})}_{\text{Disconfirmation}}$$

- Measurement Model:
 - Indicators of happiness

Modeling Happiness and Choice

- Test two possibilities:
 - Happiness as a predictor of choice

$$(3) : U_{car} = f(H_{car})$$

$$(4) : U_{PT} = f(H_{PT})$$

(With actual choice as indicator of utility)

- Happiness as utility
 - In this case, the happiness data provide additional indicators of utility

3. Conclusion

- Preliminary results show that happiness measure collected after experience of PT differs from that collected before
 - Need to show which measure is a better predictor of behavior
- Policy implications for public transport agencies
- Next steps
 - Conduct similar experiments at MIT and BU
 - Propose a transportation planning framework incorporating well-being