Time Use Behavior Analysis: Theories and Applications
時間利用行動分析の理論と応用

Junyi ZHANG　張　峻屹

Akimasa FUJIWARA & Makoto CHIKARAISHI

HiTEL, Hiroshima University, Japan

HiTEL

Hiroshima University Transportation Engineering Laborotary

How Ryuichi has influenced/helped me?

- **1993年から交通行動分析をスタート**

- **Special Issue: Longitudinal Data Method, Transportation Research Part A, Volume 21, Issues 4-5, 1987.**

  - **G.J. Duncan, F.T. Juster, J.N. Morgan: The role of panel studies in research on economic behavior**
  - **David A. Hensher: Issues in the pre-analysis of panel data**
  - **Ryuichi Kitamura, Piet H. L. Bovy: Analysis of attrition biases and trip reporting errors for panel data**
  - **G. S. Maddala: Recent developments in the econometrics of panel data analysis**
  - **R. Dunn, S. Reader, N. Wrigley: A nonparametric approach to the incorporation of heterogeneity into repeated polytomous choice models of urban shopping behaviour**
  - **R.B. Davies, A.R. Pickles: A joint trip timing store-type choice model for grocery shopping, including inventory effects and nonparametric control for omitted variables**
  - **P. B. Goodwin, M. C. Dix, A. D. Layzell: The case for heterodoxy in longitudinal analysis**

- **北村隆一：時間利用データを用いた交通行動分析，交通工学，Vol.29，No.1，pp.11-13，1994.**

How Ryuichi has influenced/helped me?

- **Dr. Thesis博士学位論文：異質性を考慮した交通行動のダイナミックモデルDynamic Models of Travel Behaviour Considering the Heterogeneity 、広島大学大学院工学研究科、1996.03.**
  - ☐ 集計型ダイナミックモデル（異質性、系列相関、状態依存）
  - ☐ 非集計型ダイナミックモデル（異質性Mass Point、状態依存）
  - → 学会などでいろいろな貴重なコメントをいただいた。
- 交通計画におけるパネル調査の方法論およびパネルデータ解析手法に関する研究, 1996～1997年度文部省科学研究費補助金（基盤研究B(1), 京都大学・北村隆一, 研究分担者）. 2000.04~2001.03

How Ryuichi has influenced/helped me?

- **Consultant生活のとき、嫌な日々があった。**

  □ **Ryuichiのご紹介で、オランダへ**

- **2000.04~2001.03: Research Fellow, Eindhoven Univ. of Technology, NL**

  □ **Prof. Harry Timmermansに出会う**

    今日の研究プラットフォームの構築

- **IATBR2006 Local Organizing Committee**

- **土木計画学研究委員会など → 土木論文集の英文誌**

How Ryuichi has influenced/helped me?

- IWATS'2005 (International Workshop on Advanced Transportation Studies)

How Ryuichi has influenced/helped me?

- IWATS'2007

How Ryuichi has influenced/helped me?

- Japan-NL Joint Seminar: Household Activity-Travel Behavior Analysis for Urban Policy of Supporting Women's Participation in Labor Market: A Comparative Study between Japan and the Netherlands

JP- Principal researcher

Junyi Zhang

Member

Ryuichi Kitamura

NL- Principal researcher

- **Harry Timmermans**

Joint Seminar: Household Activity-Travel Behavior Analysis for Urban Policy of Supporting Women's Participation in Labor Market: A Comparative Study between Japan and the Netherlands

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> Junyi Zhang
(zjy@hiroshima-u.ac.jp)
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What's new

2008.8.1 --- Open the website.

Research Purpose

Japan is suffering from rapid progress of aging society with low birth rate and decline of total population. It is becoming more and more important to promote women's participation in labor market (henceafter, WPLM) by improving relevant social system. On the other hand, in the Netherlands, rate of elderly people just exceeds 10%, but it is estimated to increase to more than 20% after 20 years, and even though the required age of retirement is 65 years old, many people retire earlier than the required age. As a result, serious shortage of labor force in the future is worried about. Because of such situation, even though rate of the employed women in the Netherlands is relatively higher in the world, promoting WPLM is further required. Under such circumstance, this study focuses on the influence of WPLM on urban system and examines what kinds of measures are effective to promote WPLM. To that effect, this study first explores better urban system for Japan based on the experiences of the Netherlands, and then examines what's going on, what should be done for the next step in the Netherlands. Since the Netherlands is one of the leading countries in the world in promoting WPLM, I would like to hold the joint seminar with the research partner in the Netherlands, Prof. Timmermans, director of Urban Planning Group, Eindhoven University of Technology. Holding this joint seminar in the Netherlands could provide the researchers from Japan with a good opportunity to understand and experience the policies promoting WPLM.

How Ryuichi has influenced/helped me?

■ Wang, Z., Zhang, J., **Kitamura, R.** and Fujiwara, A. (2008): Modeling heterogeneous dynamics in departure time choice behavior during a social experiment of discounting the tolls of the Hanshin expressway, Proceedings of International Symposium on City Planning 2008, 443-452, Jeonju, Korea, August 21-23.

■ 第3回 米谷・佐佐木賞【研究部門】受賞
　飯田恭敬　　(当社団会長、京都大学名誉教授)・・・委員長
　北村隆一　　(当社団副会長、京都大学大学院教授)
　桑原雅夫　　(東京大学　生産技術研究所教授)
　藤原章正　　(広島大学　大学院教授)
　溝上章志　　(熊本大学　教授)
　浅井加寿彦 (当社団専務理事)

Outline

- **Ryuichi in time use study**

- **Individual time use modeling**

- **Household modeling**

- **Weekday-weekend interdependence**

- **Timing**

- **Variation and change**

- **Subjective wellbeing & time use**

Target

Type

Others

Duration

QOL

Timing

Travel

Feeling

Place
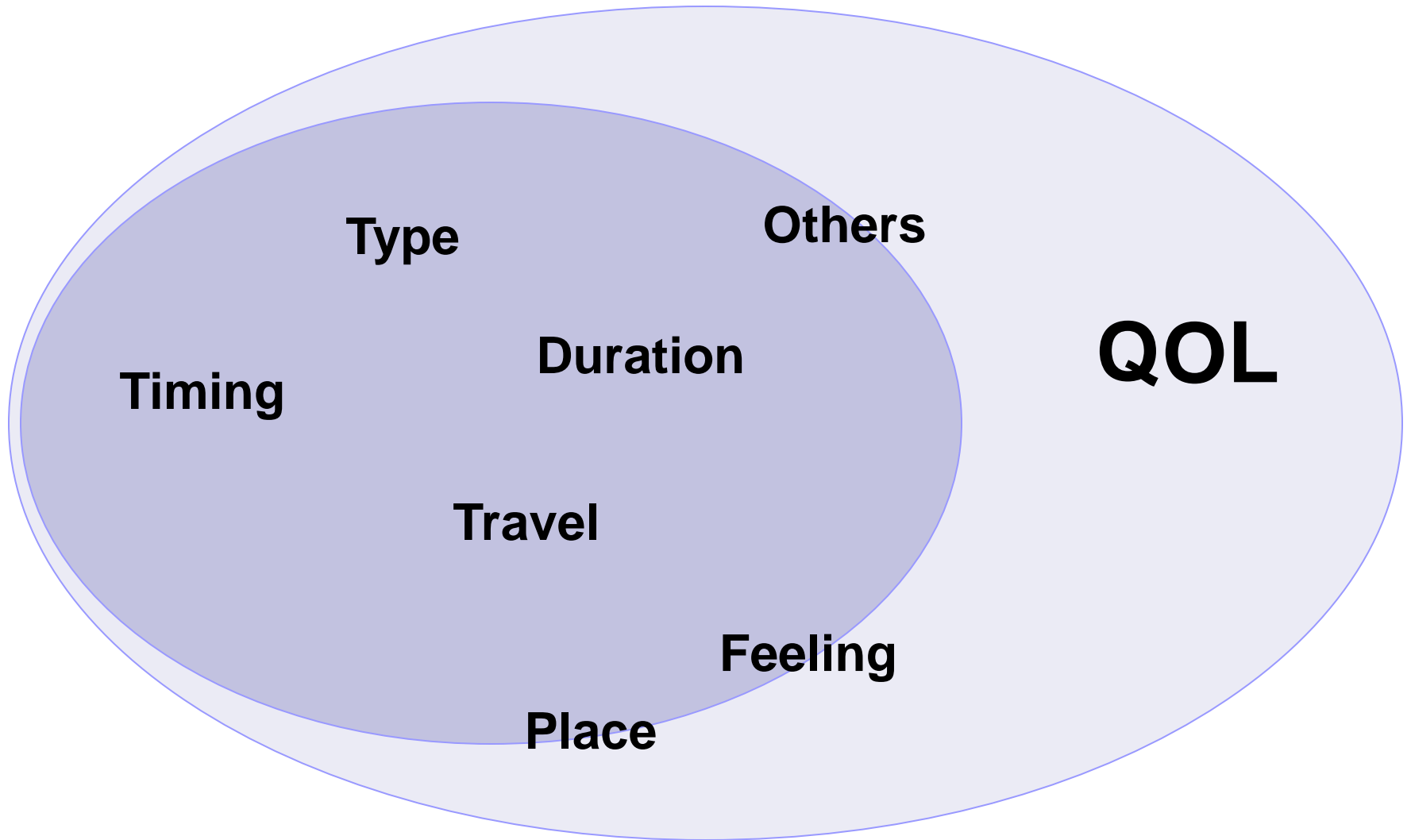
Existing literature

- Becker (1965), Tobin (1958), Heckman (1976)
- Kitamura (1984) model
  - □ A discrete-continuous time use model with the assumption of diminishing marginal utility
- Improvement of discrete-continuous time use model
  - □ Doubly-censored Tobit model (Yamamoto and Kitamura, 1999)
  - □ Multiple Discrete-Continuous model (Bhat, 2005 & 2008)
- Improvement of utility function
  - □ S-shaped function: diminishing & increasing marginal utility (Supernak, 1992; Timmermans et al., 2001)
  - □ CES type: Satiation effects that vary with activity type (Bhat, 2008)
- Multi-day modeling
  - □ Historical dependence (Kitamura, 1988)
  - □ Weekday-weekend (Bhat and Misra, 1999; Zhang et al., 2007)
- Intra-household interaction (multi-linear & iso-elastic utility)
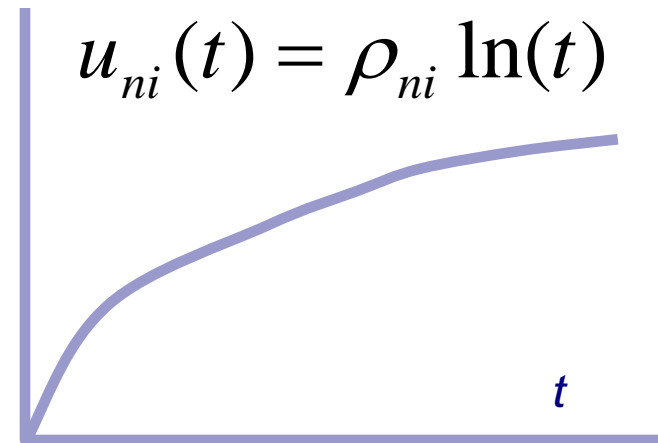 - □ Zhang et al., 2002, 2005, 2006, 2007)

Individual time use modeling

Continuous modeling

Maximize

$$U_n = \sum_i u_{ni}(t)$$

Subject to

$$\sum_i t_{ni} = T_n$$

$$u_{ni}(t) = \rho_{ni}\ln(t)$$

t

Time use function

$$t_{ni} = T_n \frac{\rho_{ni}}{\sum_i \rho_{ni}} = T_n \frac{\exp(v_{ni})}{\sum_i \exp(v_{ni})}$$

Individual time use modeling

Discrete-continuous modeling

$$u_{ni}(t)$$

$$u_{ni}(t) = \rho_{ni} \ln(t)$$

t

Discrete   Continuous

Probit   → Tobit modeling

Logit   → Lee modeling

Scobit   → Lee modeling

Individual time use modeling

$$P_t(y_t = 1) = 1 - \frac{1}{(1 + \exp(v_t))^\alpha}$$

Scobit Distribution function

$$F(\varepsilon_t) = \frac{1}{(1 + \exp(-\varepsilon_t))^\alpha}$$

- α (0.1)
- α (0.2)
- α (0.3)
- α (0.4)
- α (0.6)
- α (1.0)
- α (3.0)
- α (5.0)
- α (11.0)
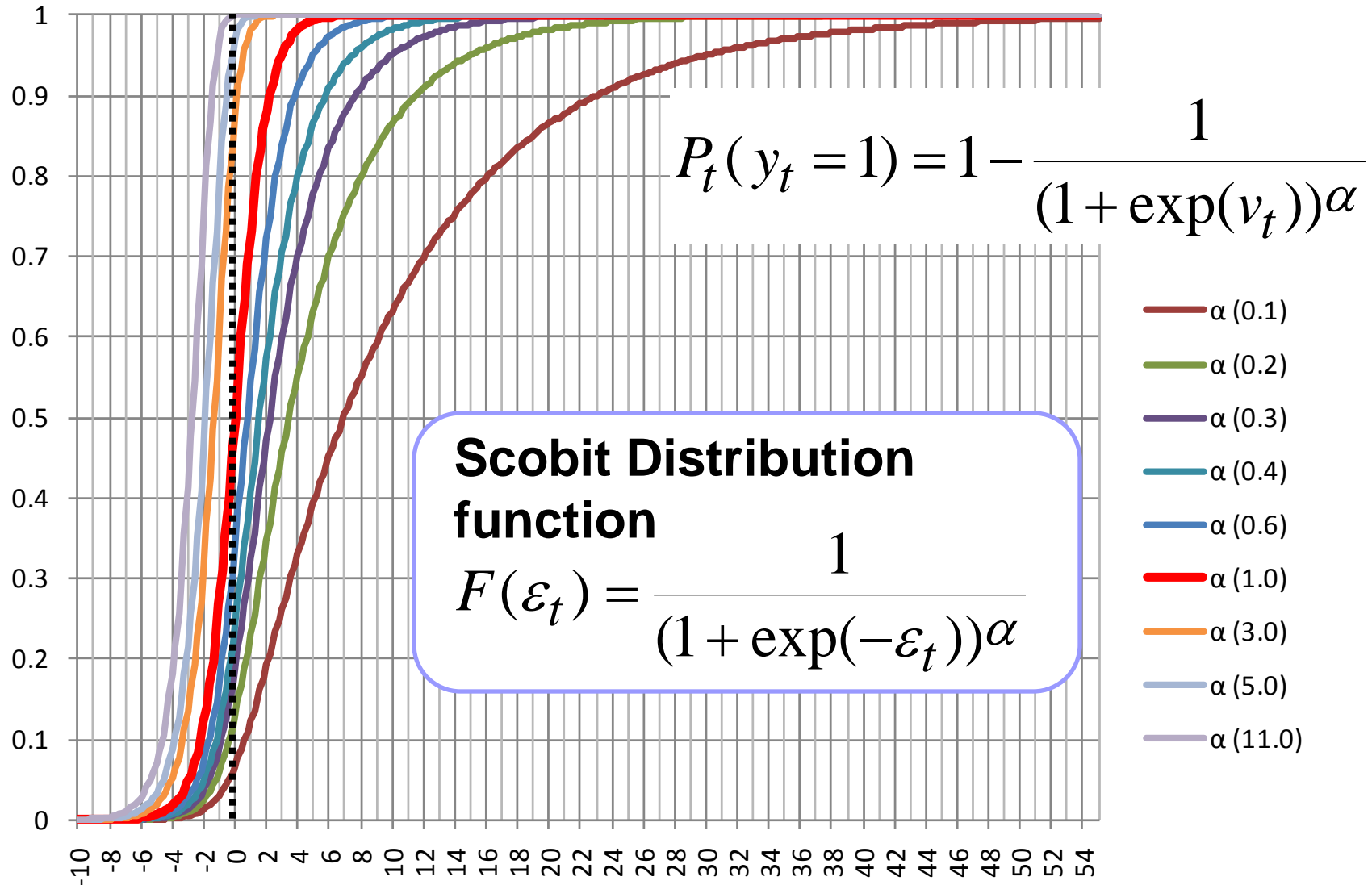
Individual time use modeling

Relative interest (Relative importance)

$$u_{ni} = \sum_i \boxed{r_{ni}} u_{ni}$$

Inter-activity interaction

$$u_{ni} = \sum_i r_{ni} u_{ni} + \left[\sum_i \sum_{j \neq i} \delta_{ni} r_{ni} r_{nj} u_{ni} u_{nj} \right]$$

Household time use modeling

Maximize

$$U_h = \sum_n w_{hn} u_{hn} + \sum_n \sum_{i' \neq n} \lambda_h \, w_n w_{n'} \, u_n u_{n'}$$

$$U_h = \frac{1}{1-\alpha} \sum_n w_n u_n^{1-\alpha}$$

Intra-household interaction

Subject to

$$\sum_i t_{ni} = T_n \, , \, i \in h$$

Household time use modeling

Nested structure

Non-shared activity

$$P(ns) = \frac{\sum_i \left(\psi_{iH} + \sum_j \psi_{iD_j} + \sum_k \psi_{iA_k} \right)}{\sum_i \left(\psi_{iH} + \sum_j \psi_{iD_j} + \sum_k \psi_{iA_k} + \sum_m \psi_{iS_m} \right)}$$

Shared activity

$$P(S_m) = \frac{\sum_i \left(\psi_{iS_m} \right)}{\sum_i \left(\psi_{iH} + \sum_j \psi_{iD_j} + \sum_k \psi_{iA_k} + \sum_m \psi_{iS_m} \right)}$$

In-home activity

$$P_i(H / ns) = \frac{\psi_{iH}}{\psi_{iH} + \sum_j \psi_{iD_j} + \sum_k \psi_{iA_k}}$$

Discretionary activity

$$P_i(D_j / ns) = \frac{\psi_{iD_j}}{\psi_{iH} + \sum_j \psi_{iD_j} + \sum_k \psi_{iA_k}}$$

Allocated activity

$$P_i(A_k / ns) = \frac{\psi_{iA_k}}{\psi_{iH} + \sum_j \psi_{iD_j} + \sum_k \psi_{iA_k}}$$

Estimation Method

SUR

Weekday-weekend interdependence

Maximize

$$HUF = \sum_i w_i u_i + \sum_i \sum_{i' \neq i} \lambda \, w_i w_{i'} \, u_i u_{i'}$$

$$u_i = \sum_j r_{ij} u_{ij} + \sum_j \sum_{j' \neq j} \delta_i \, r_{ij} r_{ij'} u_{ij} u_{ij'}$$

$$u_{ij} = f(\, t_{ij}^d , t_{ij}^e \,)$$

Subject to

$$\sum_j t_{ij}^m = T_i^m$$

HUF: **Household utility function**
i: **household member**
j: **activity**
u: **utility**
w: **weight (relative influence)**
r: **weight (relative importance)**
t: **activity time**
T: **total available time**

d **weekday** λ : **intra-household interaction**
e: **weekend** δ : **inter-activity interaction**

Weekday-weekend interdependence

- ## Utility functions of activities

1) Non-shopping activities

$$u_{ij} = \rho_{ij} (\, \alpha_{ij}^{d}\, ln\, t_{ij}^{d} + \alpha_{ij}^{e}\, ln\, t_{ij}^{e}\,)$$

$$\alpha_{ij}^{d} + \alpha_{ij}^{e} = 1,\, \alpha_{ij}^{d} \geq 0,\, \alpha_{ij}^{e} \geq 0$$

2) Shopping activities (r: shared shopping; k: non-shared shopping)

$$u_{ik} = \rho_{ik} (\, \alpha_{ik}^{d}\, ln\, t_{ik}^{d} + \alpha_{ir}^{d}\, ln\, t_{r}^{d} + \alpha_{ik}^{e}\, ln\, t_{ik}^{e} + \alpha_{ir}^{e}\, ln\, t_{r}^{e}\,)$$

$$\alpha_{ik}^{d} + \alpha_{ir}^{d} + \alpha_{ik}^{e} + \alpha_{ir}^{e} = 1,$$

$$\alpha_{ik}^{d} \geq 0,\, \alpha_{ir}^{d} \geq 0,\, \alpha_{ik}^{e} \geq 0,\, \alpha_{ir}^{e} \geq 0$$

Weekday-weekend interdependence

1) Time function for in-home activity (h)

$$t_{ih}^d = \frac{\Omega_{ih}^d}{\Omega_{ih}^d + \Omega_{ij}^d + \Omega_{ik}^d} \frac{\sum_i (\Omega_{ih}^d + \Omega_{ij}^d + \Omega_{ik}^d)}{\Omega_s^d + \Omega_{sk}^d + \sum_i (\Omega_{ih}^d + \Omega_{ij}^d + \Omega_{ik}^d)} T_i^d$$

$$t_{ih}^e = \frac{\Omega_{ih}^e}{\Omega_{ih}^e + \Omega_{ij}^e + \Omega_{ik}^e} \frac{\sum_i (\Omega_{ih}^e + \Omega_{ij}^e + \Omega_{ik}^e)}{\Omega_s^e + \Omega_{sk}^e + \sum_i (\Omega_{ih}^e + \Omega_{ij}^e + \Omega_{ik}^e)} T_i^e$$

2) Time function for out-of-home independent activity (j)

$$t_{ij}^d = \frac{\Omega_{ij}^d}{\Omega_{ih}^d + \Omega_{ij}^d + \Omega_{ik}^d} \frac{\sum_i (\Omega_{ih}^d + \Omega_{ij}^d + \Omega_{ik}^d)}{\Omega_s^d + \Omega_{sk}^d + \sum_i (\Omega_{ih}^d + \Omega_{ij}^d + \Omega_{ik}^d)} T_i^d$$

$$t_{ij}^e = \frac{\Omega_{ij}^e}{\Omega_{ih}^e + \Omega_{ij}^e + \Omega_{ik}^e} \frac{\sum_i (\Omega_{ih}^e + \Omega_{ij}^e + \Omega_{ik}^e)}{\Omega_s^e + \Omega_{sk}^e + \sum_i (\Omega_{ih}^e + \Omega_{ij}^e + \Omega_{ik}^e)} T_i^e$$

3) Time function for out-of-home shared non-shopping activity (s)

$$t_s^d = \frac{\Omega_s^d}{\Omega_s^d + \Omega_{sk}^d + \sum_i (\Omega_{ih}^d + \Omega_{ij}^d + \Omega_{ik}^d)} T_i^d$$

$$t_s^e = \frac{\Omega_s^e}{\Omega_s^e + \Omega_{sk}^e + \sum_i (\Omega_{ih}^e + \Omega_{ij}^e + \Omega_{ik}^e)} T_i^e$$

4) Time function for out-of-home shared shopping activity (r)

$$t_r^d = \frac{\Omega_r^d}{\Omega_s^d + \Omega_r^d + \sum_i (\Omega_{ih}^d + \Omega_{ij}^d + \Omega_{ik}^d)} T_i^d$$

$$t_r^e = \frac{\Omega_r^e}{\Omega_s^e + \Omega_r^e + \sum_i (\Omega_{ih}^e + \Omega_{ij}^e + \Omega_{ik}^e)} T_i^e$$

5) Time function for out-of-home shopping activity (k)

$$t_{ik}^d = \frac{\Omega_{ik}^d}{\Omega_{ih}^d + \Omega_{ij}^d + \Omega_{ik}^d} \frac{\sum_i (\Omega_{ih}^d + \Omega_{ij}^d + \Omega_{ik}^d)}{\Omega_s^d + \Omega_{sk}^d + \sum_i (\Omega_{ih}^d + \Omega_{ij}^d + \Omega_{ik}^d)} T_i^d$$

$$t_{ik}^e = \frac{\Omega_{ik}^e}{\Omega_{ih}^e + \Omega_{ij}^e + \Omega_{ik}^e} \frac{\sum_i (\Omega_{ih}^e + \Omega_{ij}^e + \Omega_{ik}^e)}{\Omega_s^e + \Omega_{sk}^e + \sum_i (\Omega_{ih}^e + \Omega_{ij}^e + \Omega_{ik}^e)} T_i^e$$

Estimation method

SUR

Timing modeling

$$Max: U_h = \sum_n \sum_i U_{hni} = \sum_n \sum_i \int_{\tau_{ni-1}}^{\tau_{ni}} u_{hni}(t)dt$$

time
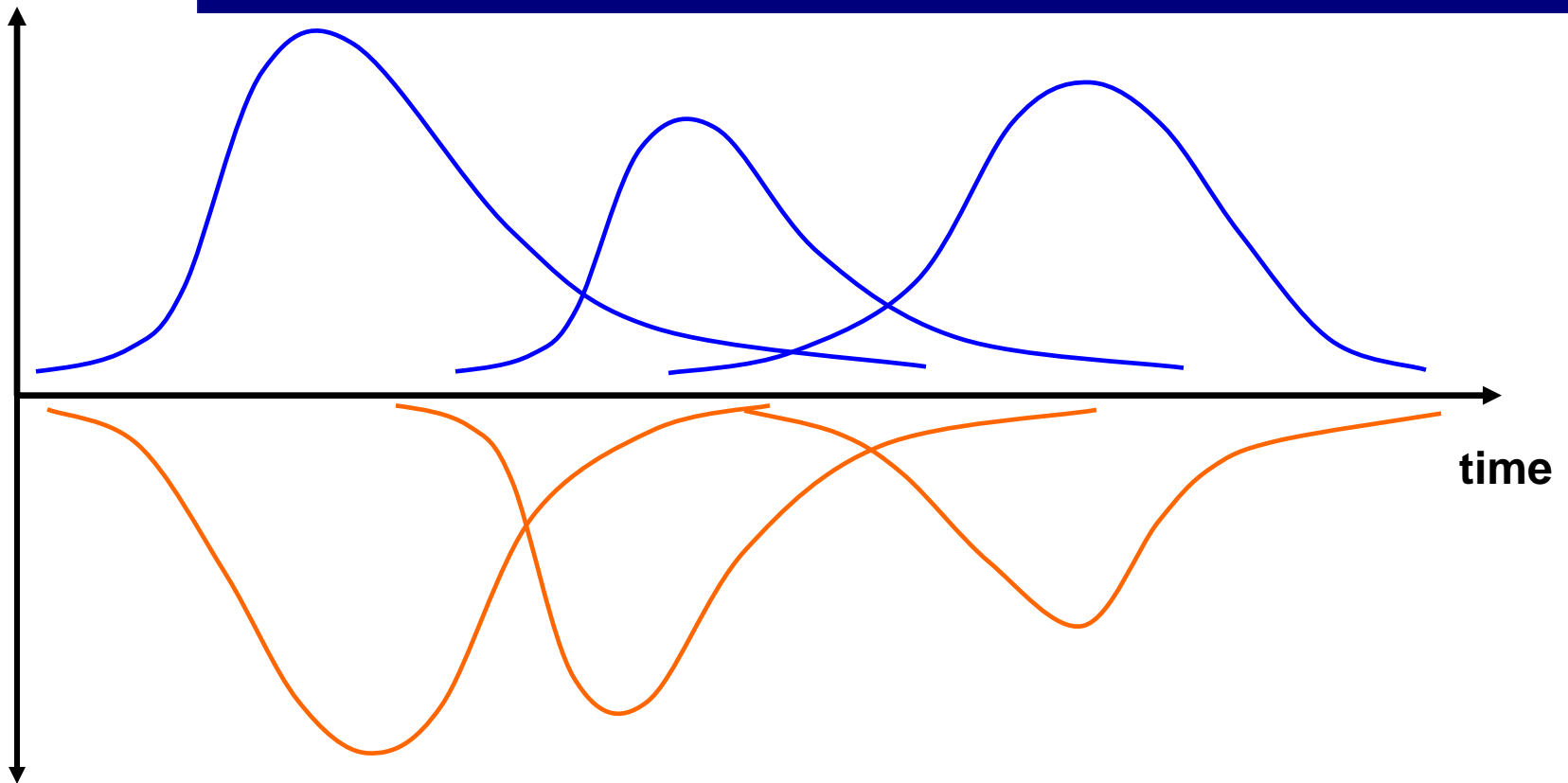
Variation & Change: Multilevel MDCEV model

$$\text{maximize} \quad U_{ihds} = \sum_{j=1}^{J} u_{ihds}^{j}\left(t_{ihds}^{j}\right)$$

$$\text{subject to} \quad \sum_{j=1}^{J} t_{ihds}^{j} = T, \; t_{ihds}^{j} \geq 0$$

$$u_{ihds}^{j}\left(t_{ihds}^{j}\right) = \psi_{ihds}^{j} \, ln\left(t_{ihds}^{j} + 1\right)$$

U_{ihds} : Total utility of individual i who live in prefecture s

u_{ihds}^{j} : Utility derived from activity j

t_{ihds}^{j} : Allocated time for activity j

T : Total amount of time (24H)

ψ_{ihds}^{j} : Baseline preference

Observed variation

Unobserved variations (random components)

normal   normal   normal   normal   normal   gumbel

$$\psi_{ihds}^{j} = exp\left(\beta^{j} x_{ihds}^{j} + \gamma_{ih}^{j} + \gamma_{h}^{j} + \gamma_{d}^{j} + \gamma_{s}^{j} + \eta_{ihds}^{j} + e_{ihds}^{j}\right)$$

Inter-household variation

Spatial variation

Inter-individual variation   **Temporal variation**   **Intra-individual variation**

Variation & Change: Multilevel MDCEV model

the figure means:

$$\frac{observed}{observed + unobserved}$$

within each variation type

Total variation

0% 20% 40% 60% 80% 100%

Total

Mandatory activities	79% / 100 / 95 / 12	**77.7%**
Private business	62 / 19 / 87 / 24 / 0.2	**18.1%**
Pick up/Drop off	38 / 76 / 44 / 5	**24.8%**
Daily shopping	46 / 100 / 11 / 1.1	**24.9%**
Non-daily shopping	55 / 33 / 96 / 18 / -2.5	**12.9%**
Leisure	66 / 35 / 94 / 50 / 2.9%	**25.0%**

■ Inter-individual variation ■ Inter-household variation
■ Temporal variation ■ Spatial variation
▨ Intra-individual variation
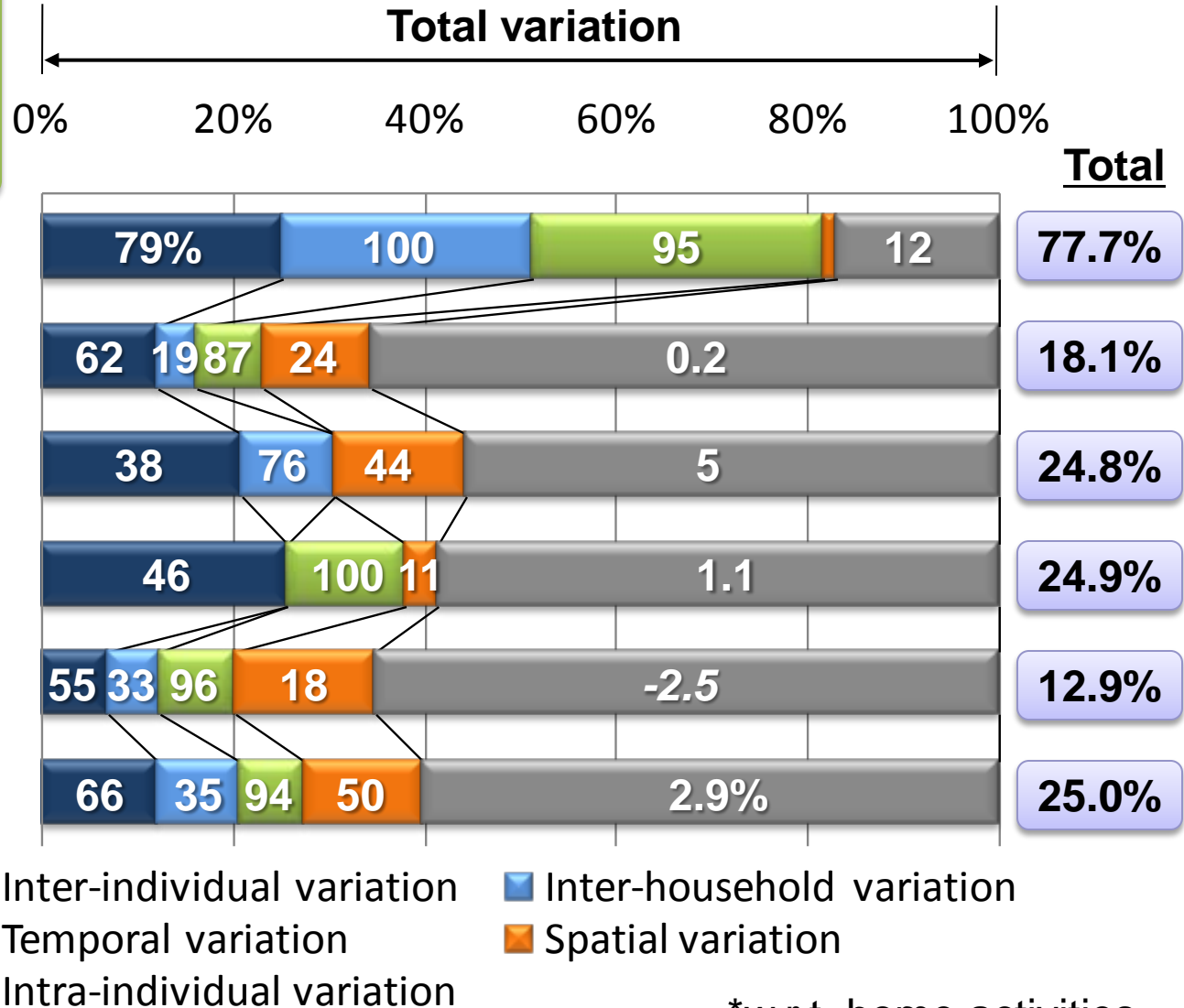
*w.r.t. home activities

Compulsory-committed · **Compulsory-contracted** · **Discretionary**
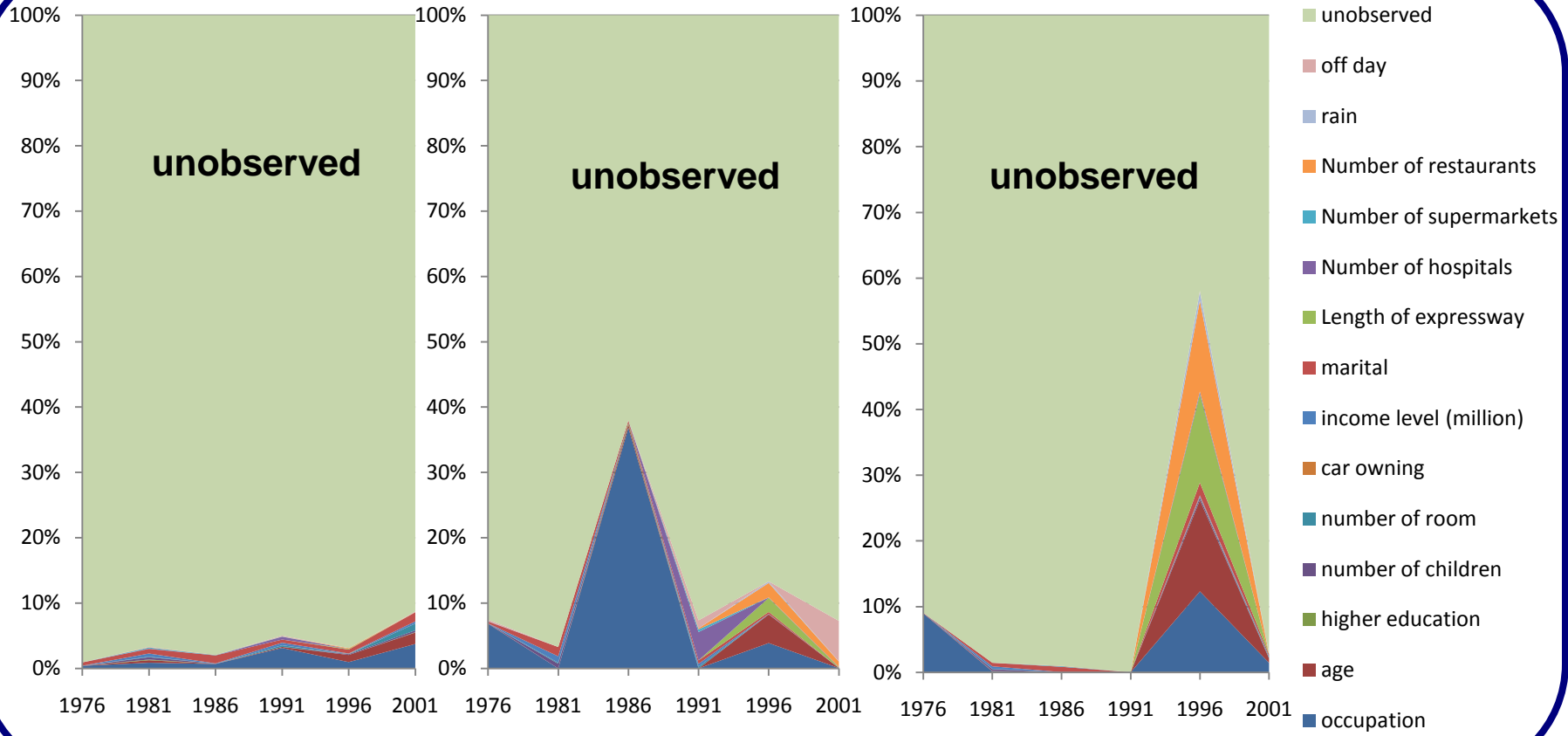
Activity participation part

Base activity: maintenance

Subjective wellbeing

D. Kahneman et al (2004)

Happy

Warm/friendly

Enjoying myself

Competent/capable

Impatient for it to end

Frustrated/annoyed

Depressed/blue

Hassled/pushed around

Angry/hostile

Worried/anxious

Criticized/put down

Tired

C.D. Ryff (1989)

Self-acceptance

High scorer: Possesses a positive attitude toward the self; acknowledges and accepts multiple aspects of self including good and bad qualities; feels positive about past life.
Low scorer: Feels dissatisfied with self; is disappointed with what has occurred in past life; is troubled about certain personal qualities; wishes to be different than what he or she is.

Positive relations with others

High scorer Has warm, satisfying, trusting relationships with others; is concerned about the welfare of others; capable of strong empathy, affection, and intimacy; understands give and take of human relationships.
Low scorer: Has few close, trusting relationships with others; finds it difficult to be warm, open, and concerned about others; is isolated and frustrated in interpersonal relationships; not willing to make compromises to sustain important ties with others.

Autonomy

High scorer: Is self-determining and independent; able to resist social pressures to think and act in certain ways; regulates behavior from within; evaluates self by personal standards.
Low scorer: Is concerned about the expectations and evaluations of others; relies on judgments of others to make important decisions; conforms to social pressures to think and act in certain ways.

Environmental mastery

High scorer Has a sense of mastery and competence in managing the environment; controls complex array of external activities; makes effective use of surrounding opportunities; able to choose or create contexts suitable to personal needs and values.
Low scorer: Has difficulty managing everyday affairs; feels unable to change or improve surrounding context; is unaware of surrounding opportunities; lacks sense of control over external world.

Purpose in life

High scorer: Has goals in life and a sense of directedness; feels there is meaning to present and past life; holds beliefs that give life purpose; has aims and objectives for living.
Low scorer: Lacks a sense of meaning in life; has few goals or aims, lacks sense of direction; does not see purpose of past life; has no outlook or beliefs that give life meaning.

Personal growth

High scorer: Has a feeling of continued development; sees self as growing and expanding; is open to new experiences; has sense of realizing his or her potential; sees improvement in self and behavior over time; is changing in ways that reflect more self knowledge and effectiveness.
Low scorer: Has a sense of personal stagnation; lacks sense of improvement or expansion over time; feels bored and uninterested with life; feels unable to develop new attitudes or behaviors.

DRM: Day Reconstruction Method

A Survey Method for Characterizing Daily Life Experience: The Day Reconstruction Method
Daniel Kahneman, *et al.*
Science **306**, 1776 (2004);
DOI: 10.1126/science.1103572

A Survey Method for Characterizing Daily Life Experience: The Day Reconstruction Method

Daniel Kahneman,[1] Alan B. Krueger,[1,2] David A. Schkade,[3]* Norbert Schwarz,[4] Arthur A. Stone[5]

The Day Reconstruction Method (DRM) assesses how people spend their time and how they experience the various activities and settings of their lives, combining features of time-budget measurement and experience sampling. Participants systematically reconstruct their activities and experiences of the preceding day with procedures designed to reduce recall biases. The DRM's utility is shown by documenting close correspondences between the DRM reports of 909 employed women and established results from experience sampling. An analysis of the hedonic treadmill shows the DRM's potential for well-being research.
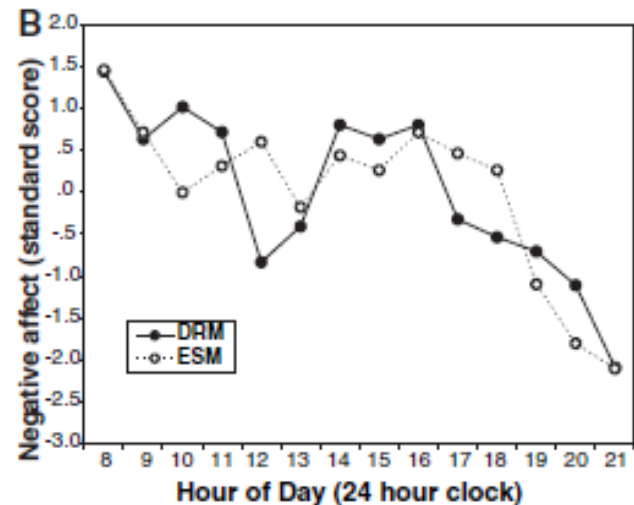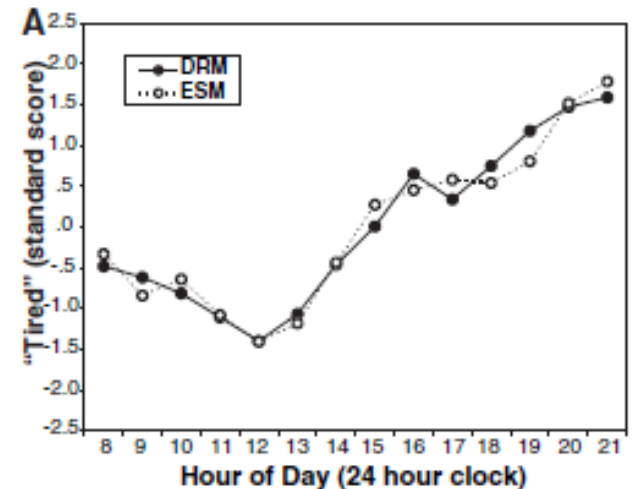

Fig. 1. Comparison of diurnal patterns of tiredness (**A**) and negative affect (**B**) for DRM and ESM studies. Points are standard scores computed across hourly averages within each sample.

DRM Questionnaire

Step 1

公共交通を利用したときの日記

（例）

問7．当日，あなたが公共交通機関を利用し，出発地から目的地までの時間をどのように過ごしたか，以下の簡単な日記をご記入ください．なおこの日記を返却していただく必要はありません．以下の質問に答える際にお使いください．*記入方法は左ページの記入例を参考にしてください．*

当日の 出発地からの出発時刻 ……… 7時 40分

目的地到着時刻 ……… 8時 55分

移動中に何があったか，または，何をしていたか？（待ち行動を含む）

←同一時間帯に，例えば，音楽を聴きながら読書をしたような場合，同じ活動欄にご記入ください．*（例参照）*

		開始時刻		終了時刻	どんな気持ちだったか？
(活動1)	徒歩で駅へ向かう	7:40	～	7:55	とても暑かった
(活動2)	電車を待つ	7:55	～	8:00	かなり人が多い
(活動3)	電車に乗って音楽を聴く	8:00	～	8:15	人が多くて座れなかったからしんどかった
(活動4)	駅についてバス停へ	8:15	～	8:20	バスが見えたので急ぐ
(活動5)	バスで音楽を聴きながら読書	8:20	～	8:35	座れたからラッキーだ
(活動6)	午後の会議の書類に目を通す	8:35	～	8:50	プレゼンが不安だ
(活動7)	徒歩で会社へ	8:50	～	8:55	今日も暑くなりそうだ・・・
(活動8)			～		
(活動9)					
(活動10)		:	～	:	

できるだけ詳細に分割して記述してください．

その時に感じたこと，周りがどんな状況だったかを思い出し，自由に記述してください．

時間に空きが出来ないように記入してください

2

Step 2

（活動1）～（活動10）について

日記を見て活動1～活動10（この番号は先程記入いただいた日記の左端の番号と対応しています）のそれぞれに対して以下の問8～問14についてお答えください．

※　このページの解答は全て右ページの解答用紙にご記入ください．
※　問8には時間を，問9～問14には最もあてはまる数字を記入してください．

問8．開始・終了時刻　　　開始時刻　：　　終了時刻　：

問9．その時，どの交通機関（待っている交通機関も含め）を利用しましたか？（解答は一つ）

1）JR・私鉄　　　2）バス　　　　　3）アストラムライン
4）路面電車（単車）　5）路面電車（連結車）　　6）徒歩　7）その他

問10．その時，あなたは何をしましたか？　（※同時に行っていた活動があれば複数回答可）

1）読書　　　　　　　　　2）周辺の風景を見ていた　　3）音楽鑑賞
4）広告を見ていた　　　　5）携帯でメール　　　　　　6）話していた
7）携帯でウェブ等の閲覧　8）ぼ～っとしていた
9）睡眠をとっていた　　　10）業務的なことをしていた　11）その他

問11．その時，あなたはどこにいましたか？（解答は一つ）

1）駅・バス停に向かう途中　2）駅構内，停留所内（駐輪場等含む）　3）車両内
4）交通機関乗り換えの途中　5）駅から目的地に向かう途中　　　　　6）その他

問12．その時，あなたは誰と一緒にいましたか？（解答は一つ）

1）一人　　　　　　　2）配偶者　　　　　　3）子供
4）その他の身内の方　5）友人　　　　　　　6）上司
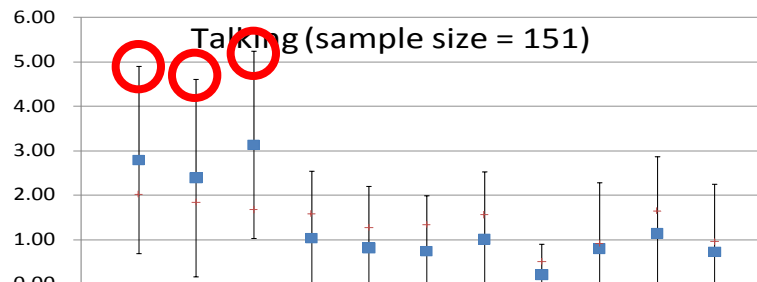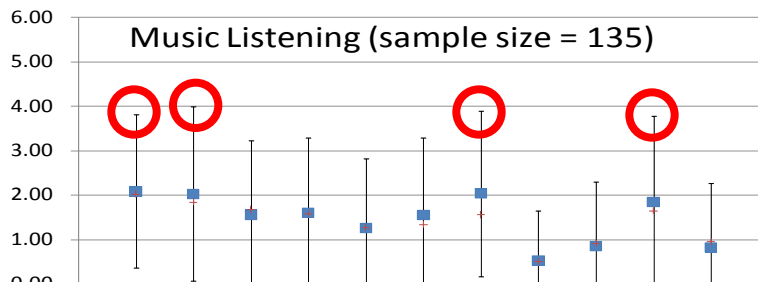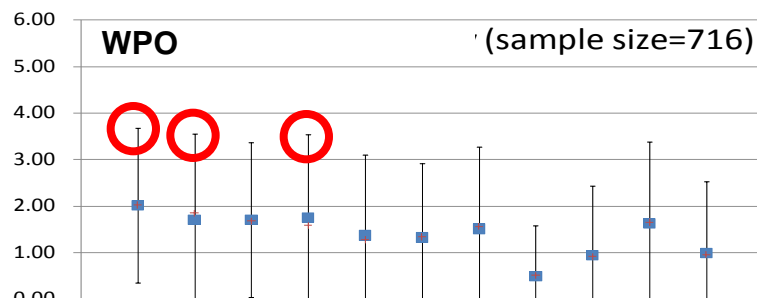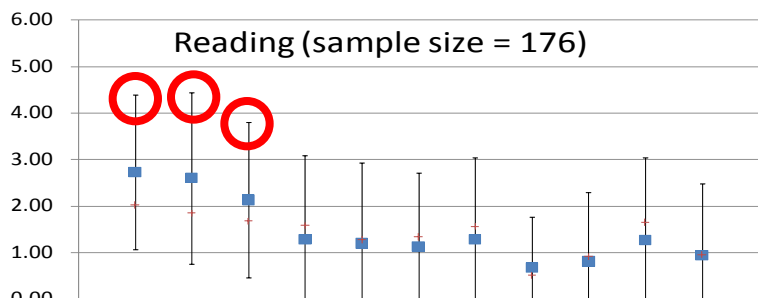7）同僚　　　　　　　8）得意先の方　　　　9）その他

問13．その時，あなたはどのような状態でしたか？（解答は一つ）

1）立席　（楽な状態）　　　　2）立席　（窮屈な状態）
3）着席　（5人掛け以上の席）　4）着席　（ボックス席・2人席）　　5）移動中

問14．当該時間内をどの様な気持ちで過ごしましたか．
以下に示した11種類の気持ちについて，どの程度当てはまるかをご答えください．

	全く当てはまらない					完全に当てはまる	
幸せ	0	1	2	3	4	5	6
耐える	0	1	2	3	4	5	6
イライラ	0	1	2	3	4	5	6
温かい	0	1	2	3	4	5	6
元気がない	0	1	2	3	4	5	6
面倒だ	0	1	2	3	4	5	6
楽しい	0	1	2	3	4	5	6
怒る	0	1	2	3	4	5	6
不安	0	1	2	3	4	5	6
疲れた	0	1	2	3	4	5	6
プレッシャー	0	1	2	3	4	5	6

4

Reading (sample size = 176)

WPO (sample size=716)

Music Listening (sample size = 135)

Talking (sample size = 151)

Mobile Surfing (sample size = 99)

Doing Nothing (sample size = 405)

Sleeping (sample size = 124)

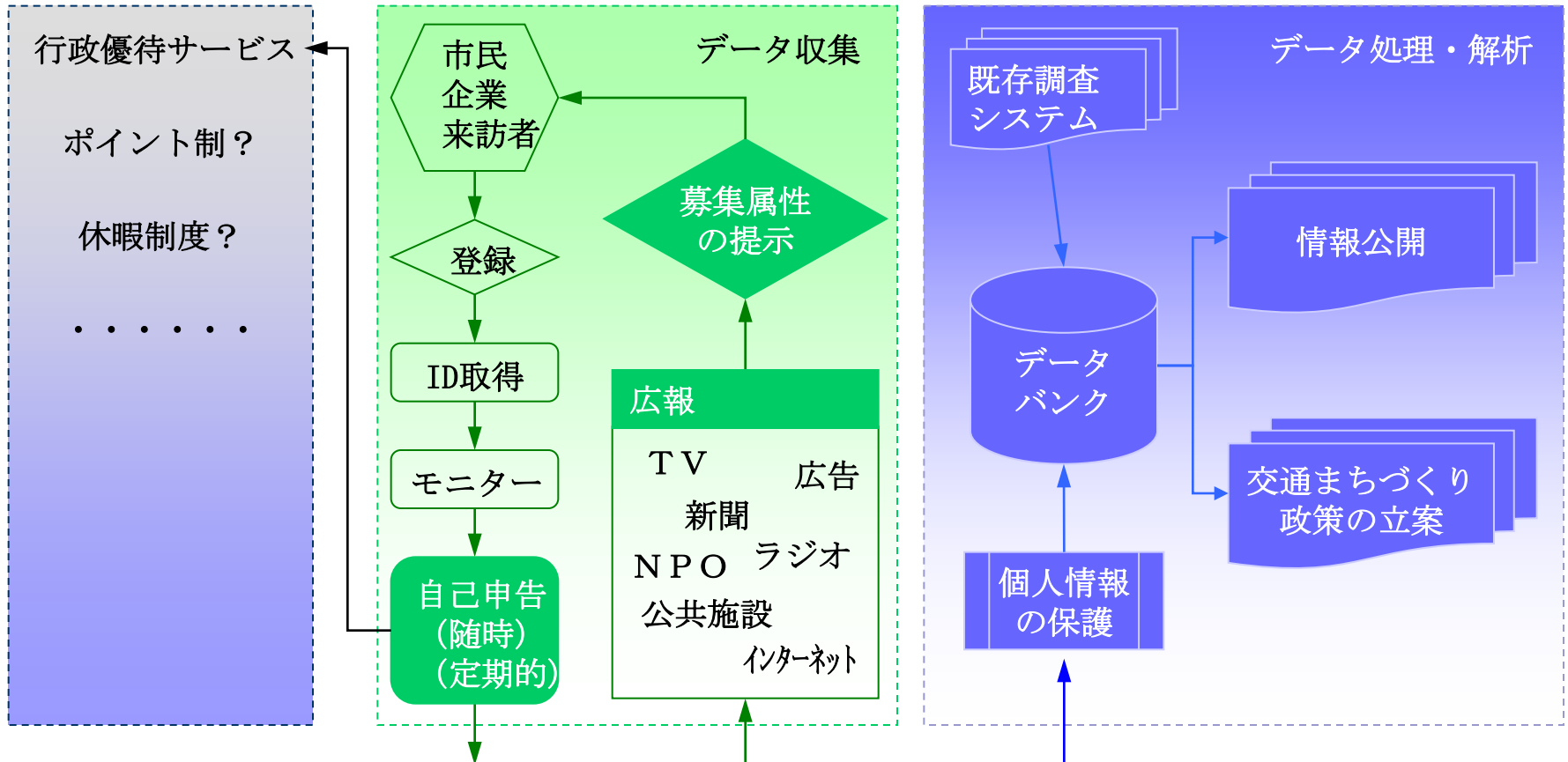Business (sample size = 46)
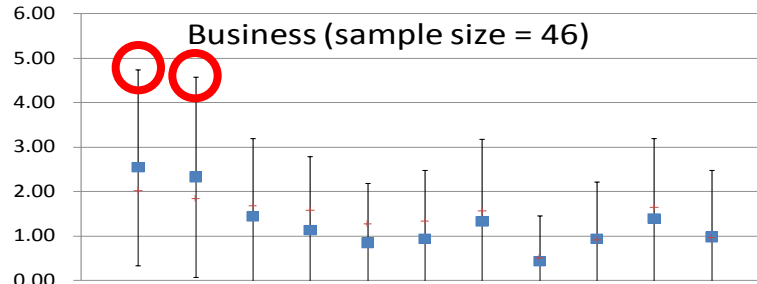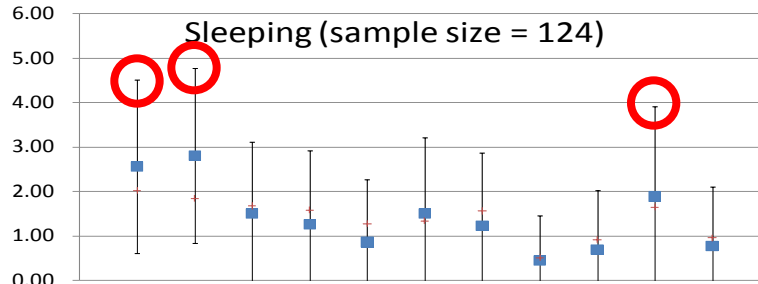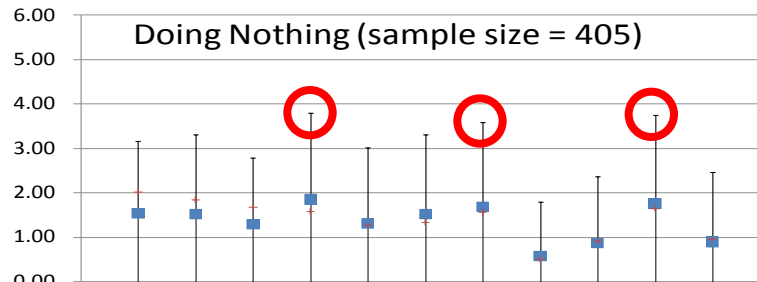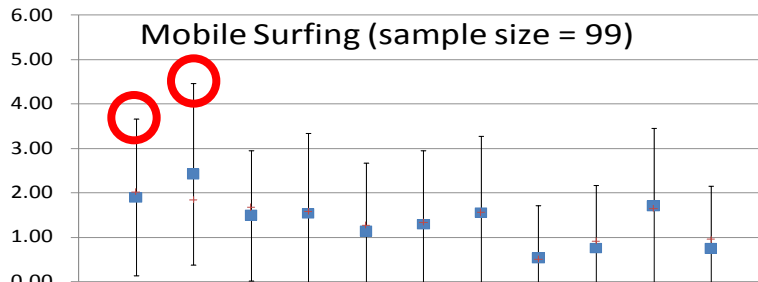
| Happy | Warm | Enjoyable | Patient | Frustrated | Depressed | Hassled | Angry | Worried | Tired | Stressful |

Data

- **Survey on Time Use and Leisure Activities**

  - ☐ Ministry of Internal Affairs and Communications, Japan

  - ☐ 1976, 1981, 1986, 1991, 1996, 2001, 2006

- **Activity dairy survey in a depopulated area in Japan**

  - ☐ HiTEL, 2002

- **Albatross data**

  - ☐ TU/e, NL

- **DRM Survey, Tokyo/Hiroshima, by HiTEL**

- **German MobiDrive**

- **German Mobility Panel Survey**

自主参加型調査手法の開発

行政優待サービス

ポイント制？

休暇制度？

・・・・・・

データ収集

市民
企業
来訪者

↓

登録

↓

ID取得

↓

モニター

↓

自己申告
（随時）
（定期的）

募集属性
の提示

↑

広報
ＴＶ　　　　広告
　新聞
ＮＰＯ　ラジオ
公共施設
　　　インターネット

データ処理・解析

既存調査
システム

データ
バンク

個人情報
の保護

情報公開

交通まちづくり
政策の立案

自己申告システム（自主参加型調査）

| 実施主体 | 民間会社
（サービス特典）
地方自治体
（行政サービス
特典） | 実施媒体 | 紙媒体
インターネット
　　　　ファックス
E-MAIL
　　携帯電話 | サンプリング | 申告 | 民間会社　専門家
地方自治体 |

Next step

？

交通行動学　から
Travel Behavior Theory

市民生活行動学　へ
Citizen Life Behavior Theory

基盤研究（A）（一般）、研究代表者　張　峻屹（H21～25年度）
市民生活行動学の構築による部門横断型まちづくりのための
政策意思決定方法論の開発