Modeling simultaneous choices in transportation

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Mode choice

A multifactorial choice:

- socio-economic characteristics : age, gender, number of cars...
- spatial characteristics: density, diversity, access to infrastructures and services, public transportation level of service, parking...
- \bullet trip characteristics : purpose, distance, time, cost...
- psychological characteristics : habits, way of life, perceptions...

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- → spatial and trip characteristics : related to residential location
- → cost : related to the possession of a transit pass

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- And concerning number of cars and possession of a transit pass?

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Example

A person who does not like to drive will choose more easily to live close to his work or a station to have the possibility to choose alternative modes to the car.

Research question

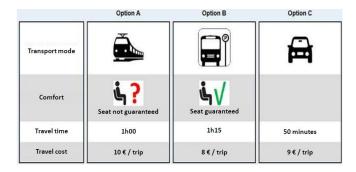
How to model simultaneously choices, which involve qualitative discret and count variables? And taking into account the influence of both observed and unobserved (latent) variables?

Why is it important?

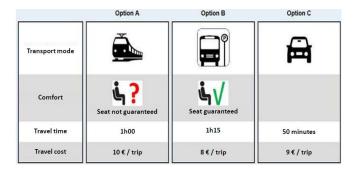
• A joint model ...

Principle

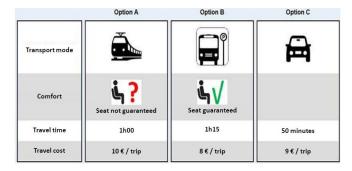
- Objective:
 - reflect the (causal?) relationship between the variables
 - capture the "bundling" of choices
- Intuition
 - \bullet model the choice dimensions together in a joint equations modeling framework
 - account for correlated unobserved psychological variables as well as possible structural effects



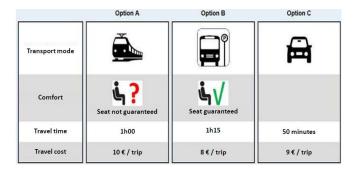
• Qualitative analysis (focus groups, interview)



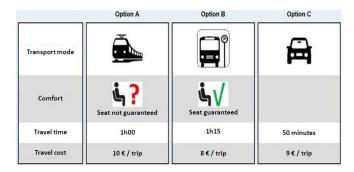
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- Efficient bayesien design

Psychometrics : technique of psychological measurement

Pour chacune des affirmations suivantes, merci d'indiquer dans quelle mesure vous êtes d'accord ou non.							A set of directions on how to respond to the items
	Pas du tout d'accord	Pas d'accord	Neutre	Plutôt d'accord	Complètement d'accord	Non réponse	
L'équilibre de la nature est fragile	0	0	•	0	0	0	
Chacun doit être libre d'utiliser sa voiture quand il veut et où il veut	0	0	•	0	0	0	A set of response alternatives
Nous avons besoin de construire plus de parkings en centre-ville	0	0	•	0	0	0	
Le prix de l'essence devrait être augmenté pour réduire les bouchons et la pollution	0	0	•	0	0	0	
Les pouvoirs publics ont le droit de réduire l'utilisation de la voiture pour préserver l'environnement et la qualité de vie	0	0	•	0	0	0	
Nous allons au-devant d'une catastrophe écologique majeure	0	0	•	0	0	0	
La soi-disant « crise écologique » et ses conséquences pour l'Homme sont très exagérées	0	0	•	0	0	0	
Nous avons besoin de plus de transports en commun même si cela implique d'augmenter les impôts	0	0	•	0	0	0	
A list of items designed							
to elicit particular kinds							
of responses							

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- Perceptions and feelings towards public transport ($\alpha=0.86$)
 - Perceived behavioral control
 - Perceived use of time
 - Feelings

${\bf Example: Feelings\ in\ public\ transport}$

ve r (1) to often (5) [?]				
Item	Definition			
Feel1	I feel a sense of freedom.			
Feel2	It puts me in a good mood.			
Feel3	I feel comfortable and at ease.			
Feel4	I feel I could meet people and get into conversation with them.			
Feel5	I feel I'm doing something, I feel useful.			
Feel6	I find the people, noise and smells disagreeable.			
Feel7	I feel stressed.			
Feel8	I feel harassed.			
	Feel1 Feel2 Feel3 Feel4 Feel5 Feel6 Feel7			