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Mobility trajectories: a key notion for conceptualizing and shaping changes in the way people travel

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In the CITERES laboratory, we're conducting a collective survey on daily mobility. In this program, we're trying to better understand mobility behaviors over the course of people's lives, and how the relationship to a given mode evolves. The goal of this work is to identify the plurality of factors that structure the evolution of mobility behaviors, in particular the predominant role of learning new modes, experimenting but also moments of reflexivity that change mobility behaviors.

What is a mobility trajectory?

The concept of a mobility trajectory views these changes as a continuum and not as a succession of disruptive changes. It looks at all the characteristics of mobility considered as part of an evolutionary system, with the aim of uncovering its

underlying principles and structures in order to identify patterns.

We hypothesize that some modal changes, such as a decreased use of individual cars, don't mean that cars are being completely abandoned, but show hybridization or a back-and-forth between modes that extends over time.

The hypothesis in our analyses is that behavioral evolutions take the form of a series of experiments which therefore lead people through different phases. And to understand these behavioral changes, we drew upon social psychology theories, in particular the trans-theoretical model developed by Prochaska and Di Clemente.

They argue that people go through phases of contemplation, during which they are no longer satisfied with their current habits and start considering a possible change, phases of determination, during which they prepare to take action by, for example, looking up train schedules or carpooling possibilities, and then phases of action, which are the implementation of the new practice. Sometimes, this process can lead to a maintenance phase, in which a new routine is considered to have been adopted.

Our second hypothesis is that behavioral evolutions stem partly from factors that are specific to each individual - social, family, professional characteristics - but also to external events, opportunities and disturbances. So here, we subvert the classic hypothesis by which changes come only from the individual by adding external factors.

We chose to illustrate this concept of mobility trajectory with a graph.

On the horizontal axis, we can track an individual's life: it's the chronological thread.

On the vertical axis, we show on the one hand how the chosen mode of travel is experienced, and on the other, the measures, values, representations of each mode incorporated in childhood and adolescence, as well as the opportunities and disturbances that can destabilize routines. Finally we illustrate the evolution of the individual's family, residential and professional context.
From this grid, we can reveal a first layer of information.

This first layer of information consists of all the elements expressed by the individual during the interview about his/her mobility or that of his/her partner.

On top of this first layer we add a second layer of information that we call the interpretive thread, which connects all the elements that structure the individual's mobility trajectory.

This interpretive thread has the advantage of being able to represent the evolution of the different psychological phases through which the individual passes during the processes of change.

Three examples of graphic representations

The graphic representation of Ms. André's trajectory is a good example of how even the most regular car drivers can experiment with other modes of travel and not necessarily be resistant to modal change.

Mrs. André

Mrs. André is 39, she lives in the outer suburbs of Tours and every day she drives half an hour to get to work in a neighborhood of Tours that is otherwise only accessible by bus. Throughout her trajectory, Ms. André reports feeling a strong emotional attachment to her car. It is present at every stage of her trajectory, since her childhood in a rural area. However, this emotional attachment to her car doesn't tell the full story about Ms. André's mobility practices throughout her life. Indeed, her residential and professional trajectory, which took her to large cities such as Paris and London, led her to use other modes of transport on a daily basis, especially the train. Even though she is now settled in the suburbs of Tours and relies on her car, Ms. André is nevertheless open to other modes of travel. For instance, through one of her colleagues, Ms. André knows how long it would take her to get to work by train.
Ms. André also experimented with carpooling for a few months with a co-worker but eventually stopped because her colleague was repeatedly late.

Mrs. Da Silva

Unlike Ms. André, Ms. Da Silva, who also drives her car on a daily basis to get to work, preferred it when she used to go by train, as during those trips she had many social relationships and also the time to enjoy reading.

First of all, the case of Ms. Da Silva shows the hybridization between different modes of travel. Indeed, a few months ago, she took the tram/train? and then a scooter to work, but still used her car a few days a month, especially when she had to go shopping after work or pick up her children.

The second interesting aspect of Ms. Da Silva's mobility trajectory is the influence of four groups of factors. Indeed, the evolution of her practices can be explained both by residential changes and a personal inclination to favor walking and public transport that she acquired during her childhood in an mid-sized city in Brazil. Thirdly, her trajectory also shows the influence of how people experience travel times, explaining why she largely prefers the train to her individual car. Finally, her trajectory is strongly influenced by external opportunities or disturbances such as her bicycle being stolen, her car breaking down and not having enough money to repair it, or more recently her husband's work hours changing which forced her, against her wishes, to stop using the train and start taking her car again.

Ms. Pia

We're going to end with a third example. At some point in her life, Ms. Pia had to change jobs and go to work in the center of Tours.

Until then she had commuted by car but she quickly realized that it was no longer possible because she was going to have too many parking problems. So she thought, I'll take the job but I'll go by train. At first this was a travel mode she didn't master at all. But little by little, she developed a whole new set of skills regarding schedules and how the train works, she learned to manage disturbances, delays, strikes, for example by organizing informal carpooling with other train colleagues. Eventually, she reported great satisfaction with this new mode of travel. All this new knowledge came to the fore on the day when her daily commute was disturbed. That day, she had a training session far from the train station and had to decide how to get there. Knowing she had the ability to travel by other means than by car allowed her to say to herself "Maybe I can find an alternative solution" and so she quickly realized that she could go by train and then by tram.

Here we can see how the fact that she developed these new skills and acquired this new knowledge, allowed her to find an alternative to the car, which she otherwise would have automatically relied on.

The second element that is extremely interesting in this trajectory is that we see how all these skills that Ms. Pia developed also had an indirect impact on her husband, as though these new skills were disseminated through discussions with him. Previously the couple would occasionally go to Tours at the weekend [LB1] [LB2] , always taking the car, but now Mr. Pia was the one who one day suggested to his wife that they go

there by train.

In the end, Mr. Pia who had never tried taking the train himself and therefore didn't master it as a means of transport was the one who encouraged his wife to change their habits.

What are the contributions to research and mobility policies?

By using mobility trajectories, we can depart from the normative approach to changes in mobility behaviors, which purports that we should move towards predefined sustainable modes of travel. Indeed, we see that in the ordinary experience of individuals, in this bottom-up process of transformation and innovation, we have a plurality of answers that are always located and evolving within people's biographical contexts. As a result, we can produce an analysis that is much denser, less dogmatic, that foreshadows less what tomorrow's sustainable mobility can be, but that remains as close as possible to people's experience and bottom-up experimentation.

At the scientific level, it helps us first to understand the processes of modal change and to uncover the complexity of these processes that include back-and-forth alternations, experiments, hybridizations of different modes.

The second interest at the scientific level is probably to facilitate the researcher's analysis by comparing the dynamics of the different trajectories in order to reveal different factors explaining how these trajectories evolve.

Finally, the third scientific advantage of this concept and its graphic translation is to allow innovative methodologies. Indeed, we can go back to the interviewees to show them the graphic we produced from their narrative, which can ultimately enrich these trajectories and thus our understanding of the processes of modal change.

From an operational standpoint, we believe that this tool or this concept of mobility trajectory can be of interest for thinking about mobility policies. All this work on individual practices has allowed us to better understand the impact of socialization and disturbances on modal choices. All these new skills can be leveraged in the development of mobility policies. For example, when a community has to decide about the pricing of a public transport service. Or when a community thinks about the level of comfort it will offer in its public transport or when it considers what educational or training measures to implement. That is one side. The other side is that mobility trajectories as a tool can be adapted in the implementation of

individualized marketing measures. Individualized marketing is a tool that is implemented to accompany changes in mobility practices towards more sustainable practices, or at least practices that are less dependent on individual car use. I think what is interesting and perhaps innovative in our approach is the vision we have of the behavioral change. We are no longer viewing change as a disruptive process, where one practice gives way to another and completely ends the previous one. Here we show that there is a continuum, with experiences that follow each other and are subject to hybridization. So I think this approach is pretty interesting.

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How do we come to change travel modes during our lifetime? What explains why we keep some mobility practices while we abandon others? Marie Huyghe, Nicolas Oppenchaim and Laurent Cailly develop the concept of mobility trajectory to better understand the way in which people go back and forth between different modes according to their residential, professional and family trajectories, but also with regards to their experience of mobility, to various disruptions, to skills that they integrate over the course of their experiences, and also to the different phases of reflexivity that play a part in behavioral changes. To account for the interactions between these different elements, they imagined a graphic representation that highlights the way in which an individual's mobility trajectory is constructed.

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