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Does the city's pulse beat at the same rate for men and women? Gender time-geography

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Abstract

Since the mid-70s, Household Travel Surveys (HTS) in France have been a major source of knowledge of the mobility of inhabitants within a territory. Since 2010, an "Urban Pulse" tool, developed by CETE de Lyon, has offered new perspectives for the use of travel survey data. Like the work based on gender time-geography, the tool enables an accurate understanding of the daily schedules of each individual within a territory, and focuses not only on trips, but also on what happens between two trips: who is where? For what type of activity? Thus, this paper focuses on gender-based spatio-temporal analyses of daily mobility in urban areas of the Rhône-Alpes region. What are the patterns / specificities in the spatial and temporal location of men and women in the cities of Lyon, Grenoble and Saint-Etienne? The "Urban Pulse" tool offers a new perspective on the diversity of urban areas, in the true sense of the term. Finally, these analyses highlight public policy issues that are raised when gender-based mobility is taken into account.

Keywords: mobility; gender time-geography; Household Travel Surveys (HTS); schedule

Résumé

Depuis le milieu des années 70 en France, les Enquêtes Ménages Déplacements (EMD) constituent une source importante de connaissance des pratiques de mobilités des habitants d'un territoire. En 2010, l'outil « pulsations urbaines » développé au CETE de Lyon, offre des perspectives nouvelles d'exploitations des données des EMD. A l'image des travaux issus de la time-geography, l'outil offre la possibilité d'appréhender finement les emplois du temps de chaque individu d'un territoire et de ne pas s'intéresser qu'aux seuls déplacements, mais aussi à ce qui se passe entre deux déplacements : Qui est où ? Pour faire quelle activité ? Ainsi, cette contribution porte sur l'analyse spatio-temporelle de la mobilité quotidienne par genre dans le cas des métropoles rhônes-alpines. Quelles sont les régularités/singularités dans la localisation spatiale et temporelle des femmes par rapport à celle des hommes dans les agglomérations de Lyon, Grenoble et Saint-Etienne ? L'outil "pulsation urbaine" propose ainsi, un nouveau regard sur la mixité, au sens propre, des territoires urbains. Au final, ces analyses mettent en évidence les enjeux de politiques publiques que pose la prise en compte des approches de mobilité par le genre.

Mots-clé: mobilité ; espace-temps des genres ; Enquête Ménage Déplacement (EMD) ; emploi du temps

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1. Observing the pace of life of urban men and women

Society evolves, leading to changes in the pace of life of each citizen. Travel behaviour is more or less shaped by factors such as population ageing, reduced work time, family composition, transport costs etc. Public policy-makers need to take into account the reality of the paces of life in order to make informed planning decisions within a territory. The “pulsations” that regulate the daily tempo of the urban frenzy, are, among other things, the reflection of the person’s occupational status (employee, student, retiree...), family situation (single or in a couple, with or without children...) but also gender.

Gender has proved to be a major factor explaining travel behaviour. The significant differences between men and women are particularly pronounced when it comes to commuting between home and work. Women’s commutes are generally shorter than men’s (Madden 1981, Hanson and Pratt, 1988; McLafferty and Preston, 1991; Lee & McDonald 2003) and closer to home (Carron, 2007). This is particularly true for suburban households, where women have strong local anchoring, which contrasts with longer commutes of men, who tend to work further from home (Cailly and Dodier 2007). The cross-analysis of consistencies/specificities in men’s and women’s behaviour helps to understand how the city moves.

Beyond the single issue of access to employment, we propose to go further into men’s and women’s pace of daily travel, by analysing their activities during the day. We have chosen to relate this analysis to “time-geography” research work. This approach, developed by the Swedish geographer Torsten Hägerstrand (1970), provides an analysis of the interactions between temporal and spatial constraints and experiences of individuals during their daily activities. This theory is based on a representation of the accessible space for an individual’s activities at a given time of day, the potential access to urban resources and facilities and the individual’s personal constraints, (Chardonnel, 2001). Other contributions (Bondi and Domosh, 1998; Scholten, Friberg, Sandén, 2012), show that time-geography provides a useful set of analytical tools which work successfully with the theory of social sciences, such as gender studies: “time-geography” shares the feminist interest in the quotidian paths traced by people, and again like feminism, links such paths, by thinking about constraints, to the larger structures of society” (Rose, 1993). It therefore seems pertinent to observe daily travel behaviour differences between men and women, using time-geography principles mentioned in recent work (Kwan, 2007 ; McQuoid, Dijst, 2012 ; Scholten, Friberg, Sanden, 2012).

This article therefore focuses on spatial-temporal analyses of daily travel in urban areas according to gender. What are the major temporal and spatial differences of men’s and women’s daily trips? The aim of this analysis is to identify common factors and differences in men’s and women’s daily programmes, and then to identify their spatial distribution throughout the city. The analysis is based on a travel-pulse modelling tool, which draws on data from household travel surveys. Since 2010, the Urban Pulse tool, which has been developed by CETE de Lyon, has helped provide a detailed understanding of the daily schedule of individuals in a given territory. It also enables us to go one step further and provides an analysis of what happens between two trips. In other words, the analysis allows us to know who is present in the city, where, at what time and for which activity. It is a spatial and temporal analysis, also known as “urban pulse”, which provides a visualization tool for observing the evolution of a population present in the city. This spatial and temporal analysis consists in identifying the schedule and the location of each interviewee, based on HTS (Household Travel Survey) data.

The raw material of the urban pulse tool is provided by the data from household travel surveys (HTS), carried out in French cities. The data from these surveys provides a picture of trips made by the interviewees on the day before the interview (all kinds of trips for all reasons). The survey therefore provides a reliable description of the travel behaviour of the inhabitants of a given area. Interviewees must accurately describe their travel behaviour, so as to provide representative information of daily mobility. With a sampling rate of 1 to 2%, we know the exact schedule and gender of the interviewees over 5 years old (declarative information). With over 150 HTS interviews, conducted in French cities since 1976, it is an important source of mobility information and highlights differences based on multiple criteria, such as gender.

The geographic areas concerned are the metropolitan areas of the Rhone-Alps region: the cities of Lyon, Grenoble and Saint-Etienne, which have recent HTS data². There are two main arguments to justify the choice

² Unless otherwise stated all data used in this article are : Source: the standard CERTU household travel survey of the Lyon metropolitan area conducted in 2006 in Greater Lyon (1 100 000 inhabitants) ;

- Source: the standard CERTU household travel survey of the greater Grenoble region conducted in 2010 (370 000 inhabitants) ;

of these urban areas: the first arises from the need to compare these neighbouring, but different cities: Lyon, capital of the Rhone-Alpes region, is a European metropolis; Grenoble is a dynamic regional centre, focused on research and innovation; while Saint-Etienne, which has a population equivalent to Grenoble, is marked by an industrial past and has more disadvantaged populations in comparison with the two other cities. The second reason consists in mitigating local specificities. By comparing the three cities' data, we can identify consistencies and local specificities. Given the contrasted nature of the cities' population, we can easily determine the importance of gender in daily travel behaviour analysis. Could it be used occasionally or systematically to understand the city's pace?

This analysis is carried out in three stages. First, it is important to present the main social demographic data of the analysed territories. This information should be put into perspective with the knowledge of men's and women's travel behaviour at the national level. Once that is done, we can apply the urban pulse tool to examine the similarities and differences in men's and women's schedules in three Rhone-Alpes urban areas. Finally, the analysis of daily activities is completed with a spatial dimension that provides a more detailed view of the daily processes of "feminization" or "masculinization" of the three urban areas, depending on the time of the day. Can we identify a city of men and a city of women? Finally, the "urban pulse" tool provides a new look into the diversity of urban territories. These analyses highlight public policy issues that could take gender into account in their approach to mobility.

2. Activity and mobility according to gender: situation in the Rhone-Alpes metropolitan area

2.1. Main occupation by gender: a lower rate of activity for women

The last household travel survey showed that there are generally few differences between Lyon, Grenoble and Saint-Etienne when it comes to occupation: about 40% of the population works (full-time or part-time), 25% is retired and 25% is made up of students, apprentices or school pupils. Only Saint-Etienne differs slightly from Lyon and Grenoble with a lower rate of workers and a stronger rate of retirees, unemployed and women remaining at home. In the three cities studied, the differences between men's and women's occupation rates are similar. The share of active men is higher than that of women, but the contrast is especially marked in terms of the type of employment: full-time workers are mostly men (in Lyon 44% for men, 30% for women), whilst part-time workers are mostly women (in Lyon 3% for men, 11% for women). In addition, those declaring that they stay at home are only women, reaching 12% in Saint-Etienne. The other main occupations are relatively balanced even though there are slightly more male students, apprentices, or school pupils and more women who are retired. These contrasts are homogeneous between Lyon, Grenoble and Saint-Etienne, which tends to prove that gender differences are little dependent on local contexts.

2.2. Daily travel behaviour: women are as mobile as men but less motorized

Mobility, described as the number of trips per day and per person, is quite similar between men and women in all three cities: around 3.65 in Lyon, 3.9 in Grenoble and 3.8 in Saint-Etienne. Women are slightly more mobile than men in Grenoble and slightly less so in Saint-Etienne. The differences between men and women are more visible if we observe mobility based on the main occupation. Women working part-time are those who on average make the most trips in a given day of the week (4.88 for the Grenoble area). They are substantially more active than men (4.44 for the Grenoble area) while overall, an inhabitant of the Grenoble area makes 3.9 trips per day on average. In the "students" and "retiree" categories, men appear to be slightly more mobile.

In terms of modal share, men figure as the largest users of private cars (in the Lyon area 52% for men, 46% for women), while women are more inclined to walk (29% for men, 36% for women). Public transport users are mostly females, while cyclists and motorised two-wheelers are mostly men. The three urban areas have similar trends although the volumes of each mode vary: in Saint-Etienne, the use of the car is higher while the share of public transport is higher in Grenoble and in Lyon. The modal share for cyclists is also higher in Grenoble.

These observations are consistent with national trends that reflect increasing use of the car for commuting (almost 41% in 1973 and a little more than 72% in 2007). According to the national HTS, more men than women travel to work by car, although women are starting to catch up (Roux, 2012). Women, who on average live closer to their workplace, use more public transport and walk more in comparison to men. Motorized two-wheelers are

- Source: the standard CERTU household travel survey of the Saint-Etienne area realized in 2010 (350 000 inhabitants). To avoid overloading the text, we use shorter references to data sources: «HTS Lyon 2006», «HTS Grenoble 2010» et «HTS St-Etienne 2010».

used marginally by women (Roux, 2012). The same observation can be made with commuting data from INSEE (French national statistics institute): whatever the French region, fewer employed women than men leave their hometown to get to their workplace (Houillon, 2004). However, a more specific analysis of the Lyon HTS (CERTU & Grand-Lyon, 2005) or the Savoie metropolitan area HTS (CETE de Lyon & Métropole Savoie, 2010) have shown that differences in the use of transport modes is not significantly linked to gender or to professional activity.

The difference between men and women in modal share is mainly linked to a smaller number of driving licences among women, whatever their age. In total, in the Grenoble area, 23% of women of driving age do not have a licence, compared to 10% of men. Analysis by age group reveals two categories for which licence possession is lower: over 65 years old and under 24 years old, where more than 35% of women do not have the opportunity to drive a car. Even if this difference between men and women is gradually decreasing, and the number of women with a driving licence is on the increase³, the contrast is still an explanatory factor of mobility differences. In summary, we can say that women travel as much as men (sometimes more: part-time workers) but differently: more by foot or by public transport and less often by car, which is explained by a lower driving licence rate.

2.3. Daily activities: a deeper analysis of differences highlighted by the “urban pulse” tool

The analysis of daily activities offers a more accurate reading of the pace of life for men and women. On their way from home (or on their way back home), activities conducted by women mainly concern purchases (16%), drop-offs or pick-ups (14%) and work (13%). When men leave their home, it is directly to go to work (19%) or to school (14%). Women tend to drop off or pick up others and take care of purchases.

Other studies provide a deeper insight into the differences between men’s and women’s daily activities. In particular a daily schedule survey conducted by INSEE in 2009-2010 shows that, in the “private” sphere, there remain major differences between the sexes when it comes to the management of daily activities linked to the family, leisure and children. Although today women are catching up with men in terms of driving licence rates, differences still exist in the use of modes of transport⁴ or the use of their time.

To go further than a simple cumulative estimate of activities and trips, it is interesting to use the “urban pulse” tool to differentiate daily behaviour in terms of time and space. The analysis of the urban pace of life provides an insight into the activities of the residents of the three urban areas, throughout the day. Unlike the 2010 INSEE “schedule survey”, the “urban pulse” tool, based on HTS data, does not provide precise knowledge of the activities undertaken within the home. However, they help provide a more spatial vision than the national survey, even if it remains on major types of activities within a personal schedule.

3. Time distribution of men and women: who does what?

3.1. Time spent per activity: differences between active males and females

To refine the programme of activities throughout a day, we calculated the time spent per activity. Thanks to HTS data, we know that Mrs X left her home at 8:00am to arrive at her workplace at 8:20am, etc. We can deduce that, between 4:00am and 8:00am she was at her home, that she was travelling between 8:00am and 8:20am and that from 8:20am she was at work, etc. Nine categories of daily activities were cross-analysed with the main occupation, retaining only the people who travelled at least once during a day. For example, according to the Lyon HTS conducted in 2006, a woman working full-time spends 6h32 at work and 46 minutes travelling in her day.

The following table presents only an excerpt of the analysis of this data, which provides a deeper insight into the differences between men’s and women’s daily schedules. First, we observe that both men and women spend most of their time at home, about 16 hours a day on average. However, working women spend more time at home than working men (30 minutes to 1hour 20 minutes difference), equivalent to the students/pupils and retirees. In Saint-Etienne, women spend on average 30 minutes more at home than their counterparts in Lyon or

³ Although one woman out of three did not have a driving licence in France in 1974, 76% of women had a driving licence in the first years following 2000 (INRETS-DEST, 2001). Robin (2010) shows from the national transportation survey (ENTD) that 76% of women over 55 years old possessed a license, compared to 64% in 1994 and 47% in 1982. This catching up phenomenon is also reflected in the frequency of car use, since 80% of women with a license drove regularly (every week) in 2008, compared to 77% in 1994 (+3 points)

⁴ Some authors suggest discrimination in terms of car access within the household (Paulo, 2007)

Grenoble. This is probably due to the nature of the population, since the Saint-Etienne area has proportionately more retired women and women who stay at home than the two other urban areas.

Figure 1- Average time spent per activity by the inhabitants of Greater Lyon who travelled (source: standard HTS Certu, Cete de Lyon)

Greater Lyon 2006	Full-time workers			Part-time workers		
	Women	Men	Diff. women-men	Women	Men	Diff. women-men
1- Home	14h 57	13h 46	+ 71 min	17h 06	16h 13	+ 53 min
2- Work	6h 32	7h 12	- 40 min	4h 09	4h 11	- 2 min
3- Study	0h 01	0h 00	+ 1 min	0h 00	0h 05	- 5 min
4- Purchases	0h 20	0h 12	+ 8 min	0h 28	0h 13	+ 15 min
5- Drop-offs or pick-ups	0h 09	0h 05	+ 4 min	0h 11	0h 03	+ 8 min
6- Leisure	0h 14	0h 15	- 1 min	0h 15	0h 19	- 4 min
7- Others	0h 35	0h 35	0	0h 41	0h 58	- 17 min
8- Travelling	0h 46	0h 55	- 9 min	0h 46	1h 01	- 15 min
9- Outside investigation area	0h 22	0h 56	- 34 min	0h19	0h 54	- 35 min

The time spent at work, about 6 hours for full-time workers and 4 hours for part-time workers, is practically equivalent for men and women but situations may vary: a man working full time will tend to work longer hours than women (especially in the Lyon area where men remain 40 minutes more at work than women). On the other hand, women part-time workers spend either the same or significantly more time at work than men part-time workers: in Grenoble they spend 1 hour more at work than men. There is less contrast in the time spent in studies for students/pupils (about 6 hours), with a slightly longer time for males than females.

In the three urban areas, the time spent on purchases is systematically more significant for women when they work, but equivalent to students/school pupils and retirees. The same observation can be made for the time spent on drop-offs and pick-ups, with women working full-time or part-time spending twice as much time on this activity than men, whereas the difference does not appear for the other categories. On the other hand, women spend less time on leisure activities than men. The difference between men and woman is especially marked for leisure activities for students/ pupils and part-time workers. For example, a female part-time worker in the Grenoble area spends on average 15 minutes per day on leisure activities, compared to 24 minutes for men in the same situation.

The time spent travelling is generally less for women. Once again, this difference concerns the employed while there are fewer contrasts for other categories. We can assume that men, who are more motorized, spend more time travelling because they work further away from home. The study showed that, for women, juggling domestic obligations, work and other daily activities creates a need for their workplace to be near home (Nelson, 1986). Finally, the time spent outside the geographic area of investigation is also significantly less for women who work. An employed man spends 30 minutes to 1 hour more outside the investigation area than women. The opposite is true for students/pupils where it is women who spend more time outside the investigation area than their male counterparts. It can be noted that in Saint-Etienne, active men working full-time spend more than 2 hours per day outside the perimeter of the HTS. That is twice the time spent by their counterparts in Grenoble or Lyon and probably a sign of a more difficult access to local employment.

Figure 2- Average time spent on activities by the inhabitants of the Lyon, Grenoble and Saint-Etienne urban areas who travelled (source: standard HTS Certu, Cete de Lyon)

Time spent	Home	Work	Purchases	Drop-offs-pick ups.	Leisure	Others	Travelling	Outside investigation area
Female full-time workers	15 h	6 h	18 min	9 min	14 min	38 min	44 min	31 min
Female part-time workers	17 h	4 h	26 min	12 min	15 min	42 min	46 min	19 min
Difference in comparison with men	1 h less for men	= / more time for male full-time workers; time is less for male part-time workers	10 min less for men	5 min less for men	10 min more for men	=	15 min more for men	45 min more for men

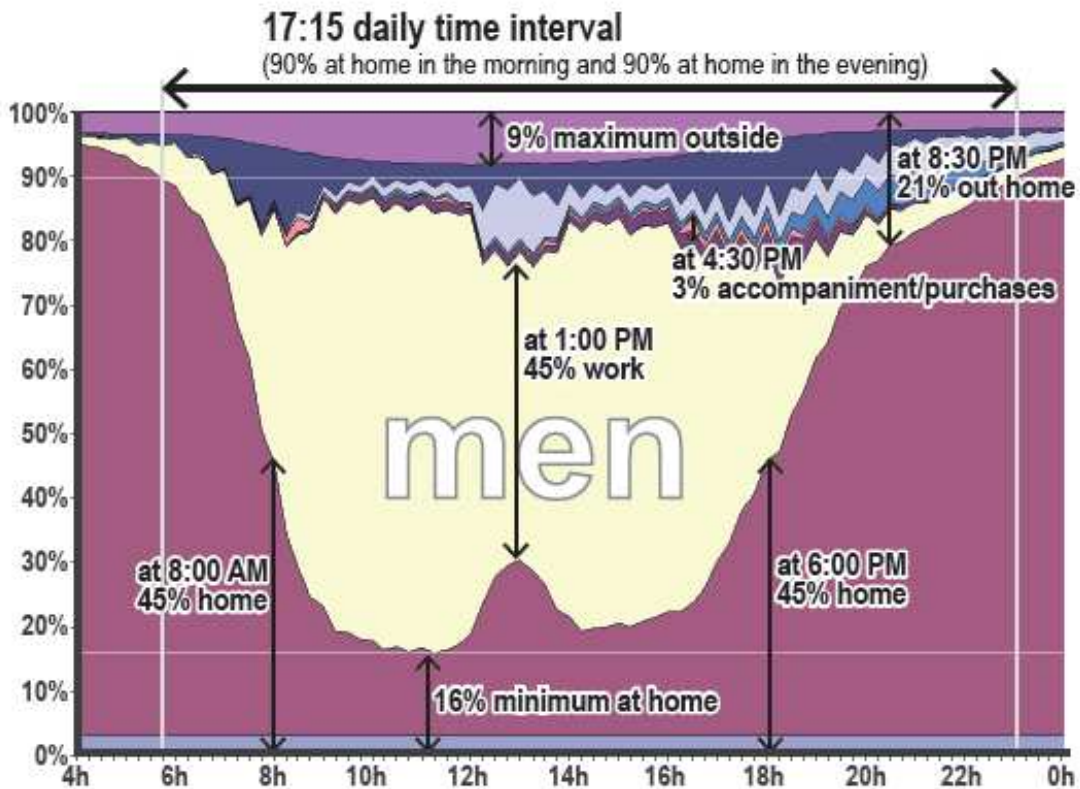
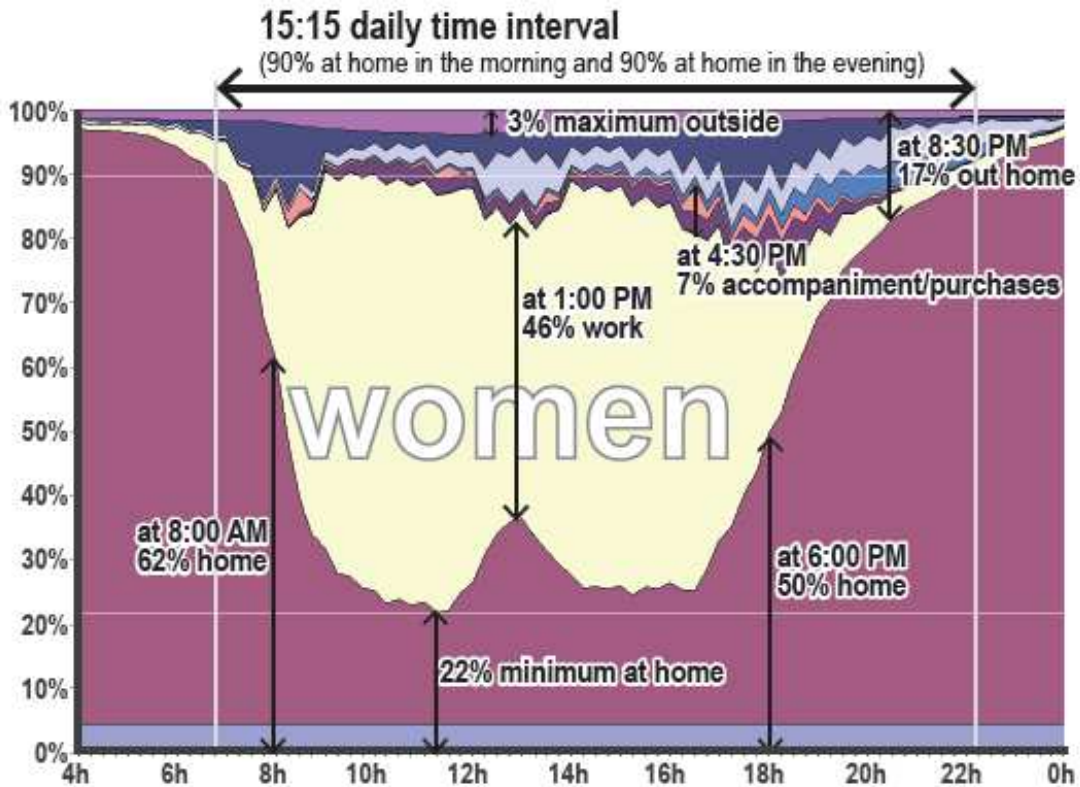
Thus, for a broadly equivalent time spent at work, a woman spends more time at home. The active woman whether a full-time or part-time worker spends more time on purchases and drop-offs/pick-ups than an active man and less time on leisure activities and travelling. On the other hand, men are more likely to travel outside the HTS investigation area, generally to attain more qualified jobs. Working years coincide with the period in family life when one raises children. Women still tend to take care of the daily management of the family. The distribution of the daily activities of women and men confirm that even when they work, it is women who manage the activities or the tasks of the household. Spare time for part-time workers tends to be used to look after children in the case of women and for leisure activities in the case of the men⁵.

3.2. Daily activities: a more intense programme for women who work

It is possible to refine the analysis of the time spent on daily activities by offering a two-dimensional reading. On a graph, we crossed the rate of presence of men or women with one of the 9 categories of activities within daily schedules. The form of the graph highlights the share of men and women that carry out a given activity. The students/pupils and retiree categories present few gender differences in the schedule. For students/pupils, we can note a similar share between men and women. The peak in travelling at around 8:00am is very pronounced with male or female students/pupils, while presence at home is rather similar: at least 13% of men, at least 15% of women. For retirees, the pace of life of men and women is also rather similar. Once at retirement age, the pace of life of couples tends to resynchronise. Thus, men's and women's schedules are relatively similar for categories that do not have children or no longer look after children. On the other hand, among the employed, contrasts appear in the sequence of daily activities that we have sought to analyse more deeply.

⁵ The daily schedule survey conducted by INSEE in 2010 tends to confirm this, since employed men spend 2h06 every day on household activities compared to 3h27 for women. In contrast, men spend 3h28 on leisure activities, compared to 2h48 for women.

Figure 3- Diagram of the daily share of activities for women/men working full-time in the Lyon, Grenoble and Saint-Etienne urban areas (source: standard HTS, Certu, Cete Lyon)



Reading: at 7:00am, 90% of women are at home, 4% will not leave their home while the remaining 86% will conduct (or have already conducted) at least one activity during the day.

The first differentiating criterion between employed men and women concerns time spent at home. We already found that on the whole, women spend 1 hour more at home than men. We can find this trend in the sequence of daily activities, as at any given time of the day at least 20% of full-time women workers are at home, compared to 16% of men. The same finding is made for the lunch break of the employed, where women are more numerous at home: 38% of women compared to 31% of men. These rates of presence at home are close to average within the Lyon and Grenoble areas, while they are systematically higher for the inhabitants of the Saint-Etienne area.

Outside the home, accompaniment (picks ups or drop offs to the nanny, to nursery, to school...), are more frequent for women and tend to be concentrated around 4 school time slots: 8:30am, 11:30am, 1:30pm and 4:30pm. Similarly, purchases are clearly visible among women from 10am onwards, but are mainly found late afternoon, between 5 pm and 7 pm. Leisure activities mainly take place at the end of the day and are more marked for men. Other activities (administrative tasks, looking for a job, eating outside the home, visits...) are generally concentrated during the lunch break and the evening for men, while they are more evenly spread throughout the day among women. The explanation for this phenomenon relates back to the nature of the activities that fall within the category referred to as "others" and which we can assume are different for men and for women. Men are more likely to spend their lunch breaks outside the home, which explains the concentration of activities in the "others" category during this period. Women tend to conduct these other activities (administrative tasks for example...) in the morning and during the afternoon. The distribution of these activities in a day tends to confirm that the chores of women (e.g. picking up children from school and meal preparation) are more numerous and more sensitive to time constraints than those undertaken by men (e.g. DIY activities) (Mac Donald et al, 2005).

The sequence of the "work" activity presents the same form for men and women. Presence at work is therefore approximately the same with one difference: time of arrival at work, which is earlier for men. In the Grenoble area, 32% of men working full-time are at work at 8:00am, compared to 22% of women. Women make up for this later start at work during their lunch break: at 1:00pm, about 45% of men remain in their workplace, compared to 48% of women. We can equally note that the "outside" category, which generally corresponds to a professional activity outside the investigation area, varies from 4 to 8% for men (implying that at least 4% of men are outside the investigation area all day) and from 2 to 4% for women, with a peak in the middle of the day. Finally, trips are much more marked for men, and are primarily made earlier in the day during peak hours and during the lunchtime period. For women, the time spent travelling is quite similar to men, although trips are spread more throughout the day. Indeed, they visibly travel more in off peak periods.

The main piece of information on daily schedules provided by the graphs concerns the overall duration of men's and women's daily activities. For this, we can observe the period of the day at which less than 90% of the employed are at their home (in other words, the time that begin to leave the home and the time at which they are almost all returned). On average, for men, this period spreads from 5:45am to 11:10pm and for women from 6:45am to 10:15pm. In all the urban areas analysed, the duration is shorter for the women. The overall period during which women conduct their activities outside the home is at least 2 hours less than that of men! In other words, women carry out as many, or even more activities, but within a shorter period of time!

4. Spatial distribution between men and women: who is where?

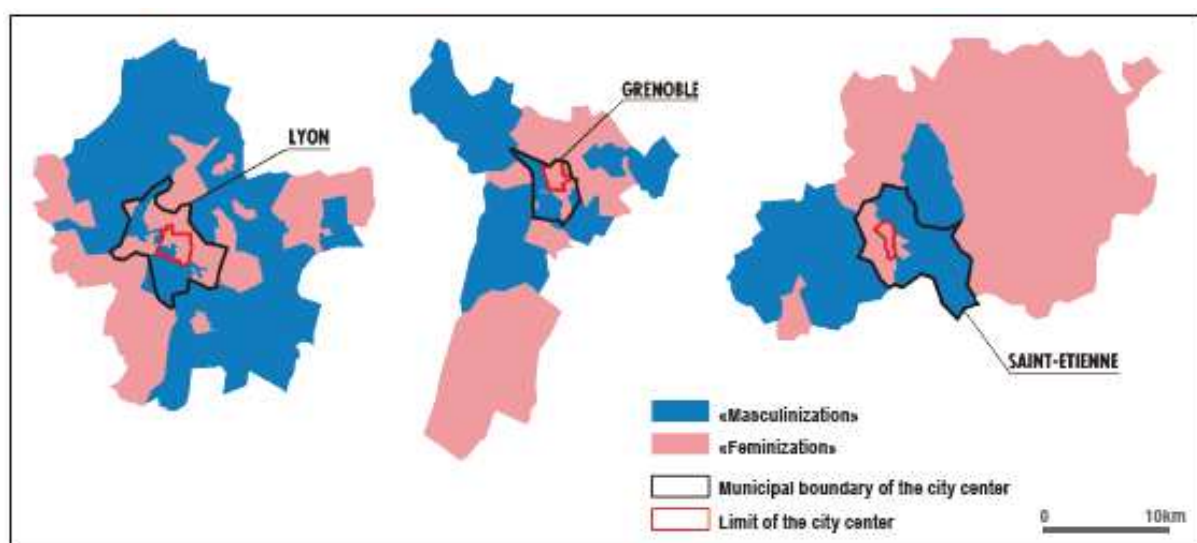
4.1. Location throughout the day: are some areas more feminine than others?

Territorial analyses based on urban or peri-urban residence, show that travel behaviour remains relatively homogeneous⁶. Peri-urban residents use their cars more and travel further, but the daily activities of households in cities and peri-urban areas is quite similar. One of the explanations concerns the double territorial status of the household; in other words, the travel behaviour differences between men and women level out spatial urban/peri-urban residential differences. It remains to be understood how this "double status" of men and women is translated from a spatial point view? In addition to temporal differences in the daily activities of the men and women, are there also differences in spatial presence within territories (and not only from a residential point of view)? At a given time of day, do territories "have a gender" to resume the expression of Bard (2004)?

⁶ Refer to the thesis by Clotilde Minster (IFSTTAR) "Mobility analysis of inhabitants of rural locations as a contribution to comprehension of the demographic revival and sustainability of these spaces"

Today, urban planning strategies are essentially based on analyses of the resident population in a city. The “urban pulse” tool allows an observation of the population that is physically present at a given time and shows if between two periods of one day, certain areas have a stronger female presence than others, or on the contrary if some areas have a stronger masculine presence. Thanks to HTS information, we know that Miss X left place A at 8:00am and arrived at place B at 8:20am, etc. We can deduce that between 4:00am and 8:00am she was at place A, that between 8:00am and 8:20am she was travelling and that from 8:20am she was at place B, etc. The analysis proposes to observe the share of women present per sector at two moments of a given day. The comparison is made between 4:00am, time at which the great majority of inhabitants are still at their home and 10:30am, time at which most daily activities have begun (school, work, purchases,...). If we observe the densities of inhabitants at 4:00am and the densities present later in the morning, the gender of the territories obeys a daily rhythm. Certain areas that have a stronger masculine presence at night have a stronger feminine presence in the morning and vice-versa. We can identify if a district or a town is «feminized» (this implies that the ratio of women present has increased) or if it is «masculinized » (this means that the ratio of women present decreased).

Figure 4- «Feminization » or « Masculinization » of the Lyon, Saint-Etienne and Grenoble urban areas (source: standard HTS Certu, Cete Lyon)



Overall, we can note common trends for the three urban areas studied: the densest central areas tend to become more feminized while the suburbs see the share of men grow. As confirmed by INSEE data, the nature of employment in each geographic area seems to explain why an area becomes feminized or masculinized. However, although jobs have an impact on the travel behaviour of the population, this is not the only reason for the daily movements of men and women. Indeed, the location of shops and other facilities, especially those related to children, (nurseries schools,...) can also account for the masculinization or feminization of certain areas.

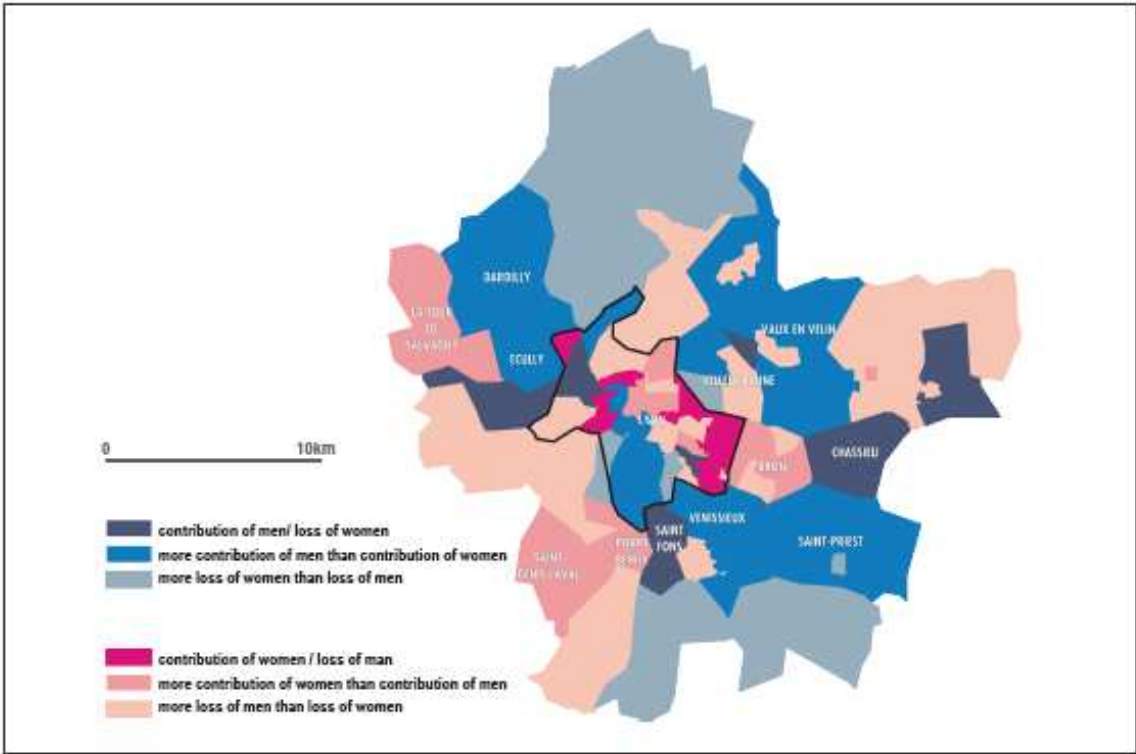
4.2. «Masculinization» or «féminization» of a city: towards a typology of urban areas

In addition to identifying general trends, we can conduct a deeper analysis by identifying the intensity of daily movements: does the area become more feminized due to the arrival of more women or due to the exodus of men?

An analysis of the spatial nature of men’s and women’s movements in the Lyon urban area, shows that the areas near the city centre feminize or masculinize due to an increase in population in favour of one gender or the other. These areas provide a large number of jobs and are characterized by contrasting economic activities. In certain cases, men and the women literally switch areas: some come whilst others leave. For example, the eastern part of Lyon (an area with hospitals) is marked by an arrival of women and a loss of men, while in the suburban towns of Chassieu or St-Fons (with numerous industrial jobs) the opposite occurs. Suburban areas, which are not very attractive in terms of job offers, essentially explain the difference between the departures of men and the departures of women. The northern and southern suburbs of Lyon are faced with a greater departure of women than men, while in the eastern and western suburbs there is a more significant departure of men. This tendency can also be found in the urban area of Saint-Etienne where the sectors to the east near the towns of Rive-de-Gier

and Saint-Chamond are feminized mainly due to the departure of more men than women; men leaving their home to work in Lyon area.

Figure 5- « Feminization » or « Masculinization » within the Lyon urban area. (source: standard HTS Certu, Cete Lyon)



The pace of daily activities and the travel behaviour of women raise have an impact on the household’s place of residence. Central locations appear to be important to women, due to their varied activities. The best compromise, taking into account the different types of activity within households would be to live in both dense and mixed environments, with all types of services easily reachable for each individual (Carron, 2007). Central and more “women friendly” locations would help women to juggle both their private and professional life and facilitate daily routines (Butler and Hammett, 1994). On the contrary, living in suburban areas makes daily activities more difficult, especially for women, and will often explain the need for a part-time job, more frequent in these territories (Carron, 2007). The work identified the risk of “spatial entrapment” of women in suburban areas (Nelson, 1986; England, 1993): women are willing to accept lower-paid jobs near their home in order facilitate their work-home balance.

5. Conclusion: a gender time-geography

This article aims to provide a deeper insight into the spatial-temporal dynamics of the daily mobility of men and women through an innovative “urban pulse”, tool developed by the CETE de Lyon. Modelling of the daily pace of life in urban areas in the Rhone-Alpes region (Lyon, Grenoble and Saint-Etienne), provides more precise knowledge of the differences in the behaviour of men and women.

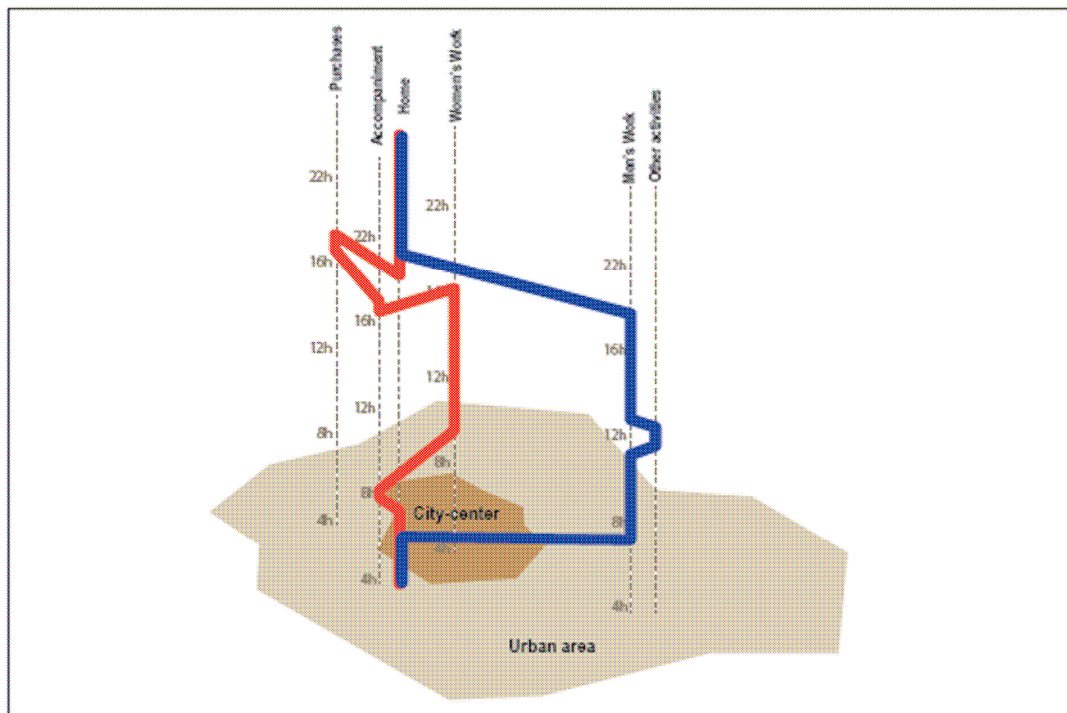
The analysis first shows that there are differences in the pace of life of men and women for the employed, but not for students and retirees. We can question if the differences observed between employed men and women are related to the presence or not of a child as the period of employment corresponds to the period in life during which one raises children. It would therefore be useful to conduct further investigations for the employed category of the population, by integrating the composition of the household: couples with or without children, single parent families, single employees....

This analysis also shows that the location of men and women in time and space is a reflection of a territory’s characteristics. It is closely linked to the nature and the location of economic activities, but undoubtedly also to the availability of facilities and services. Public decision-makers must therefore bear in mind that men and

women do not have the same activities and that their geographic dispersal is different. Facilities and services must be adapted to the different requirements of men and women and take into account whether territories are more feminine or more masculine.

In particular, This work provides a gender “time-geography” which may be characterized by certain clichés: the daily schedule of active women is shorter than that of active men, with more time-related constraints and is therefore differently paced. Travel distances are shorter and less dependent on the car while destinations tend to be closer to the city centre than for men, due to the type of jobs and other facilities. The space-time prism of men and women drawn by this analysis indicates that daily behaviour is still significantly different.

Figure 6- Simplification of space - time behaviour of men and women (CETE Nord-Picardie)



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