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► To cite this version:

Béatrice Cahour, Jean-François Forzy, Clémence Martin. Feelings and strategies of senior drivers: ways of coping with fear ?. ECCE 2010 (European Conference on Cognitive Ergonomics), Aug 2010, Delft, Netherlands. pp.23-31. hal-00671723

HAL Id: hal-00671723

<https://hal.science/hal-00671723>

Submitted on 1 Mar 2012

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Feelings and strategies of senior drivers: ways of coping with fear ?

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ABSTRACT

Motivation - This study explores the way senior drivers (compared to younger ones) adapt to the growing difficulties they have in being attentive and reactive when driving.

Research approach - The approach is based on video analysis and post-activity verbalisations ; we videotaped 12 subjects' natural drive in a big city, and conducted video-based interviews.

Findings - The analysis indicates that seniors are more frightened than younger drivers and less aggressive, and that they express more their emotions verbally right after the drive than mimically during the drive. We also distinguish two profiles of senior drivers: one is hyper-vigilant, hesitating and very anxious, and the other one is deliberately delegating the control and the attention to the other drivers, is quieter and has a smoother driving.

Implications and message - We conclude on the importance of the emotional comfort in the strategies of adaptation chosen by the drivers, and propose some advices for designing help systems for seniors.

Keywords

Driving, seniors, emotions, video-based interviews, attention overload, coping strategies.

INTRODUCTION

Seniors have to face a loss of some capabilities and some activities become uncomfortable for them: when driving one needs to adapt very quickly to a complex and dynamic situation, evolving constantly and very

rapidly, with a lot of information that drivers need to be attentive to (other drivers, signalisations, pedestrians, motorcycles,...) and risking always an accident if one is not attentive and reactive enough.

We will analyse here how they adapt to this situation of driving which becomes uneasy to them, and we will give insights of the direction in which some help systems should be developed to assist them in this complex activity. The purpose of this paper is then to specify the nature of the feelings and strategies of elderly persons during natural driving and to observe if they are different from younger people.

Situated cognition has developed this now well-known idea that the activity is embedded in a specific context which can have an important effect on the activity itself (Suchman 1987). We then adopt a methodological stance which is based on getting observations of what is going on during the activity, analysing this activity in its context of occurrence. To this approach, we add a phenomenological viewpoint which considers also the lived experience of the users and workers (McCarthy & Wright 2004), by using post-activity interviews where the subject remembers the situation, with or without a video trace of the activity (Cahour 2008, Light 2006).

The lived experience is not only of a cognitive and sensorial nature but it is also of an emotional one, and our work focuses on this articulation between the way people think and act and between the way they feel.

We have already studied the driving situations where the drivers feel emotionally comfortable or uncomfortable, the cognitive and social sources of the discomforts, the coping strategies they adopt in the difficult situations (Cahour 2008) and how people feel

¹ During this study, Clémence Martin was a student at CNAM-Paris Master2, financed by Renault DTAA (Automotive Advanced Technology Department).

more or less confident in the use of a cruise control system (Cahour & Forzy 2009).

We want to study here how seniors adapt to the complex situation of driving, how they feel in this situation and which are their strategies.

According to us, the constant adaptations to the evolving situation which are needed when driving consist in a psychological compromise between the willing of achieving some actions with success (e.g. driving correctly and avoiding accidents) and the willing of well-being and positive emotions. Nevertheless, especially in these types of situations where the subjects deal with risk, the role of the emotions (in a wide sense, including, basic and complex emotions, conscious or not) cannot be ignored. It is now well-known that emotions have an impact on action tendency (Frijda 1986) and on decision making (Damasio 1994). Though this importance of the emotional comfort of drivers is totally absent of famous models of drivers' behaviour in cognitive ergonomics. That is the case of Fuller (2005) for instance, who proposes that a key goal of drivers is the task difficulty homeostasis, defined by an interaction between the task demand and the driver capability. The driver capability includes what they call the "human factors", mixing rapidly the personality, the drug absorption, the tiredness, the emotions, etc. This model then ignores the specific way the emotions lived by the drivers influence their driving behaviour and the strategies they adopt, except when the drivers avoid the threatening situations. Emotional dimensions are also rather absent in Wilde's homeostasis model (1988) which is focused on subjective risk and cost-benefit estimation.

Nevertheless we can find now some studies about the influence of emotions on driving (cf Pêcher & al 2009 for a review) which indicate that a feeling of anger leads to risk-taking, speed acceleration and aggressive conduct. The effects are not that clear for anxiety which can lead to risk-taking or to prudence, nor for excitation (induced for instance by a music with a rapid tempo), since sometimes it lowers the speed, or at the contrary it can augment it. These results are found in experimental settings, where emotions are induced. It is then easier to have measures of performance and conduct than in a naturally evolving environment, though we can question the validity of these simulation methods.

We already know that seniors have increasing visual difficulties, especially a lowered peripheral acuity for seeing around, and a lowered dynamic acuity for evaluating movements and speed (Gabaude 2003). They also have some problems of selective attention, for selecting the most useful and relevant information in a context where a lot of information are available, and for not paying attention to the less important information (Hakamies-Blomqvist & Wahlström, 1998). Divided attention is also more problematic; it concerns the ability of taking into account information coming from different sources. It is necessary in most driving situation where the driver needs to manage

simultaneously signs on the ground, dynamic signs (e.g. lights) and trajectories of the other drivers.

Taking and executing decisions are processes that are slowed down, elderly drivers consequently tend to have an irregular driving, hesitating and faltering (Charlton, 2006), mixing sudden and impulsive reactions (turning or braking brusquely) with slow and hesitating actions

It is not clear in the literature whether they take more or less information in the environment. In spite of these losses of capabilities, they do not have more accidents (Widroither et al., 2000; Bekiaris & Baten, 2002); this can be explained by the use of compensatory strategies, the main one being to drive slowly (Ibanez-Guzman, 2008).

This exploratory study aims at understanding what are their emotions during complex situations of driving, if they are different from younger adults' and if there is an impact on their activity of driving, the way they react and perceive the environment.

METHODOLOGY

To extract the specificities of the seniors' way of driving and their emotional feelings, we compared two groups of six subjects during their driving activity, one with seniors and one with younger adults, but we will focus on the seniors when presenting the analysis.

Population

Six seniors aged from 67 to 87 years old, and six younger adults of 30-35 years old, as much men as women in each group. They were known by one of the researchers, so that they would feel more rapidly comfortable and trustful in the interactions with them.

Gathering data about natural activity

We asked the 12 subjects leaving in or near the big city of Paris to prepare with us a route that they knew a little bit, including several locations of intersections : (1) a large roundabout, (2) an insertion on a rapid way, and (3) some complex crossings. These three situations were chosen for their known difficulty for the seniors and the emotional discomfort that they can generate (Cahour 2008). The intersection situation is known to be problematic for older drivers ; it is complex since the sources of information are numerous, there is a need of peripheral attention, in front but also on the sides, and it implies changes of rhythm (braking and accelerating) and changes of trajectories (change of file, turn), all that in a limited span time. On a cognitive level, intersections require an attention quality which is more intense and larger than in most other situations, and a fast decision taking.

Our main point was to study a situation of natural driving, and we were then faced with the difficulties of this choice. We could have chosen a same route for all the subjects, but then it would have been familiar to some subjects and unfamiliar to others. Also the traffic

conditions are never the same in a natural situation of driving, and the behaviour and feelings of a driver depend as much on the other drivers as on the infrastructure. Then in any case we would not have had strictly comparable situations (like we have in experimental situations with simulators for instance). It seemed more interesting to have an equivalent level of familiarity and also a preparation with the subjects, because then they would feel more at ease, less worried about a route that they do not know, especially for older drivers. That was a very important point for us: that the subjects do not feel in a difficult situation but in an “as usual as possible” one. We want to highlight the fact that even when studying natural activities we often partially “arrange” them, asking the subjects to drive with us, with cameras here and there, knowing that afterwards we will debrief the activity and that researchers will analyse the videos. It is then essential to limit as possible the sources of potential “unnaturalness” if we want the subjects to act and feel as they do during their everyday driving, and when we study emotions, one has to be very cautious about not creating tensions linked to the research situation ; (it is also the case in experimental situations of course. Any situation of research is potentially stressful for the subjects, and we need to limit this effect.

Videotaping of the driving:

The twelve subjects drove for half an hour, in their own car (to avoid stress linked to an unknown car), and we videotaped :

(1) the driving scene with a subjective camera, i.e. very light micro-camera fixed on the forehead (it records what the subjects were seeing, even when they turn their heads). This subjective viewpoint which records what the subject was seeing and hearing during the activity is then used during the video-based (or self-confrontation) interviews; it “re-situates” the subjects and helps them to have a vivid memory of the past activity. It allows us to work on the impact of the situation on the emotions and strategies of the drivers.

(2) the face of the driver is also videotaped by a small camera fixed on the screen board to observe and analyse their mimics and expressive behaviour.

Photo 1

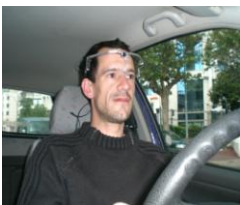


Photo 2



Photo 1: the face of a subject with the subjective camera

Photo 2 : the driving scene filmed with the subjective camera

Video-based interviews to know the subjective experience of the subjects

Right after, we had video-based interviews, also called ‘self-confrontation’ interviews (Mollo & Falzon 2004) lasting around one hour and a half, and videotaped too. During the video-based interviews, the subjects are watching the subjective video of the driving scene that they were seeing and hearing, in order to re-immerses them in the situation. We stopped regularly the video, and asked them what were their thoughts, sensorial perceptions, focus of attention or feelings at that moment. We question them without influencing them, following the techniques of the Explicitation Interview from Vermersch (1994). The video support and the type of questioning that we use keeps the subjects in touch with the remembering of their driving activity, bring them again in the situation, and this is essential for limiting the reconstructions and rationalisations which can arise with the post-verbalisations.

Analysing emotions and strategies

Our methodology is based on the observable behaviour and also on the subjective verbalisations of what was going on (What Theureau 2004 calls an “extrinsic” and an “intrinsic” viewpoint). The analysis then consisted in analysing the mimics of the drivers on one hand and the video-based interviews on the other hand.

Analysis of the affective states :

The affective states of the drivers were analysed from these two sources: (1) what they show of their emotions, and (2) what they say, right after the drive, about their lived emotions during the drive.

The *verbal descriptions* of emotions during the interviews were categorised in seven categories. These categories were constructed in a bottom-up way, from the empirical data of the interviews (cf following table) but also based on our knowledge of the classes of basic and complex emotions.

For instance, the category called “fear, stress” includes verbalisations like the following: “I apprehend; it’s oppressive; it’s stressful; I was paralysed by scare; I’m afraid...”

Of course in the verbal description, the subject generally talks about the origin of the emotion in the situation, and this link between the situation and the emotion is a very important advantage of subjective verbalisations. As observer, we can conclude sometimes that a driver expresses fear from his face, but we are not sure about what is provoking this fear.

The *analysis of the mimics* was inspired by Ekman & Friesen’s facial action coding system (1978) but we did not apply it strictly. We looked at the muscular traits that they are considering (eyebrows, around eyes and lips,...), also sometimes at gestures (like the hand on the chin for doubt) and at their association to a type of emotion. When there was an ambiguous mimic which was difficult to code, then another judge was asked to

evaluate its meaning; if it was also ambiguous for her, or if her interpretation was different, then the mimic was coded as ambiguous. We tried to classify the emotions expressed in the seven categories found in the verbalisations.

Analysis of the strategies:

The analysis of the strategies were based on the video recording of the video-based interview, where we can observe the driving scene and listen to the subjectively lived experience of the subject during this situation. The subjective experience is constituted of actions, perceptions, emotions and all sorts of thoughts (linked to intentions, strategies, evaluations, etc) dependant most of the time of the surrounding context. The video-based interviews were transcribed and the verbalisations we focused on are the descriptions of (1) emotional states and the way seniors cope with them (2) cycles of perception-thought-action (3) what is perceived in the environmental context. Of course, through the verbalisations, we are only informed about the emotions, perceptions, thoughts and actions which are accessible to a reflexive consciousness by the drivers.

FINDINGS

Emotions of seniors and young adults when driving²

	Mimics		Verbalisations	
	Young adults	Seniors	Young adults	Seniors
Fear, stress	8	18	38	70
Joy, contentment	2	0	32	4
Surprise, doubt	34	46	52	106
Anger,impatience	1	2	23	3
Confidence,relief	16	8	170	119
Trouble, frustrat°	11	5	192	241
Shame, culpab.	0	0	1	9

First of all we need to notice that we had difficulties for coding *the mimics* which are often ambiguous. For instance a same mimic can sometimes be interpreted as doubt or anger or frustration or shame. We found 55% of ambiguous mimics for young adults and 49% for seniors. The results then need to be considered with caution, but it is a result per se to observe the difficulty of interpreting mimics; maybe we could only distinguish positive and negative expressions, but even

² This table is extracted from Martin's dissertation for a Master2 of ergonomics in CNAM-Paris, which was tutored by B.Cahour and financed by Renault.

then an expression of surprise is sometimes difficult to categorise as positive or negative.

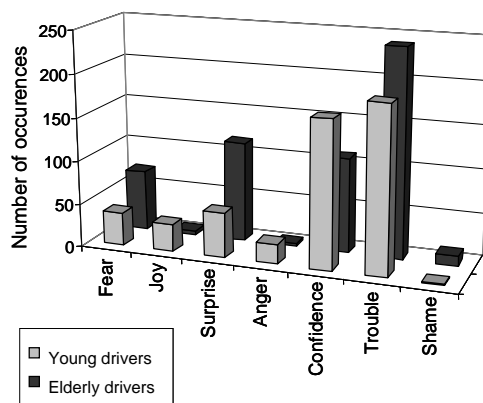


Photos of ambiguous mimics : doubt, fear, impatience, frustration?

One clear result is that seniors express less facial emotions than younger adults (157 versus 221) but, afterwards, when describing how they lived the situation, they verbally express as much emotions as the younger adults (552 versus 508). This can be explained by Rimé's (2005) observation that seniors tend to control more their emotions, to have more distance regarding them. We can make the hypothesis that older persons feel as much emotional states (since when describing what happened they evoke a lot of affects) but that, during the situation, they try to control them and not let them grow in amplitude.

We can also see that seniors' *verbal description* of their lived experience includes more negative emotions than younger adults' verbalisations: fear and stress, doubt and surprise, trouble and frustration, shame, are more often present in the description of how they experienced this driving situation. They also feel less anger and less positive emotions.

Figure 1 : Emotions verbally described by elderly and young drivers during the video-based interviews



The differences between young and elderly drivers are significative with a khi2 test for each emotion (p < 0,05).

Elderly drivers seem as much affected than younger ones, even if they show it less, but the nature of their feelings when driving are different: they are less

aggressive towards the others, less dominant and self-confident, and they feel more fear and doubts in this risky situation that they cannot master as well as before.

We will see in the qualitative extracts that this can be explained by the fact that they feel less power of perception and action than when they were younger; they regularly feel overwhelmed by the number of information they need to treat and it is stressful and frightening for them.

Two contrasted profiles of senior drivers

Now we will go more in the detail of the protocols to analyse the link between the emotions of the seniors and the strategies they adopt to cope with the risky and stressful activity of driving. We observed two contrasted profiles of senior drivers that we will develop. They are interesting for understanding the evolution of older drivers' possible ways of coping with the increasing fear and difficulty of driving.

A) The profile of Mrs A: hyper vigilant and anxious

The subject Mrs A that we will present below is particularly anxious; two other elderly subjects have similar feelings and driving activity than Mrs A ; two others have a mixed profile (sometimes frightened sometimes confident) and the last one, Mr B, will also be presented here since he is specific and interesting regarding the coping strategies that seniors can adopt to adapt to their growing difficulties.

* Fear and doubt paralysing the action in complex crossroads

A first extract of Mrs A's verbalisation³ during the video-based interview will sustain our analysis:

« This crossroad is complex because there are five axes which join, it's not very comfortable ; because the lights which are not green at the same time I don't know if they are well synchronized, here I'm the first so I wait with apprehension when the light will turn green, because at that time I still didn't know what I had to do to turn on the left, I don't see anything on the ground, there isn't central reservation nor anything, well I must start! I move forward but here I'm afraid then I brake, I'm afraid because I suddenly realize that maybe I'm totally wrong...because in fact I am not allowed to turn left, do I have the right? Someone is hooting behind me (we hear "move on, stupid!"); a young excited I'm sure, and it's paralysing me still more, the situation with too much information everywhere, the horn, the injury, there everything is mixed in my head, I don't feel good at all, I try to convince myself that things will go all right, I try to stay calm”

Mrs A arrives here in a situation that is for her typically “complicated” because there are five axes, and she is

suspicious regarding the synchronization of the lights (which is rather rare). This context makes her feel not confident, also because she is afraid to be hooted, especially because she is the first on the line, and cannot apply the strategy of mimesis (following and doing as the one in front) that she often uses. She has doubts about the way she has to turn there, not seeing signs on the ground (which is often her reference) and she will finally even doubt of having the right to turn there. This frightening thought is paralysing her and a verbal abuse and hook, added to the fact that there are “too much information” is provoking confusion and a feeling of uneasiness. She then tries to cope by trying to stay calm and reassure herself (she mentions several cases of emotion-focused coping like that). Finally, she turns without problem.

We clearly see in this extract how the situational context (here a lot of sources of attention, a lack of clear signs on the road, an uncertainty about her rights, and aggressive behaviours around) generates emotions of fear and doubt which have an impact on the decisions and actions, provoking hesitations and even paralysis of the action.

* Negative anticipations

Another characteristic of this profile of senior driver is her tendency to produce negative anticipations, feeling apprehension before she arrives in specific places, like before arriving on a big Parisian roundabout, before crossing the railway of the tramway, or before an on a rapid way, as for instance the ring :

“We go down to the Parisian ring now, there too I have an apprehension... here is the famous ring, I blow – you blow? – yes, to relax... (she sees that the ring is crowded) – (...) I feel released, I prefer when the ring is blocked... it's easier to fit into”

She is afraid in advance when she knows that she arrives in a place which will be complex for her and especially risky (like the risk of being blocked when a tramway arrives, or a difficult insertion on a rapid way which requires rapid perception of the flow and rapid decision).

* Focus on the sources of anxiety

Mrs A tries to treat a lot of information but in fact she focuses on sources of anxiety and misses some other sources of potential danger. It is the case when she focuses on pedestrians of a market and does not pay attention to a car which hoots her, or when there are motorbikes, in a more general statement: “I'm always hyper vigilant, especially towards motorbikes which pass quickly and anywhere, because I can't anticipate them... I try to forget them, then I'm surprised and it's not comfortable, but otherwise I'm so frightened that I only look at them, so it's better not to think of them”.

She then tries to have a deliberate strategy of not focusing on them because she is aware that it is dangerous.

* Attention overload

³ All the verbal extracts are translated from French. The expressions linked to emotions are underlined.

Last characteristic when she drives is an attention overload which generates a lot of stress : *“here the boulevard of the death... there are too much things, roads crossing, motorcycles coming from nowhere, and above all too much things on the ground, and for me it's hard because the marks on the ground are the biggest reference”*.

Most of the elderly subjects express this feeling of being overwhelmed by the quantity of information that they need to treat during driving. The consequent actions can be sometimes problematic, like when one of them stops on a pedestrian crossing because he hasn't seen the red light, or when she has not seen the priority sign and then is in conflict with other drivers, or when they nearly hit a motorcycle because he has not checked in the mirror.

At the end of the interview, Mrs A is concluding *“now everything is frightening me”* and *“I think that soon I will quit driving”*.

We can see in the analysis of this profile of worried drivers how emotions and driving reactions are intimately interrelated. It seems that the trip is a succession of periods of fear and release which have an impact on cognition (e.g. doubt about the legality of the intention) and perception (e.g. attention focus on the source of anxiety) and then on the driving behaviour.

Mrs A is not the only one acting and feeling like that in our study, she is not an exceptional case, at least two other subjects have similar reactions and worries. We will see also that Mr B was reacting like that (with a lot of fear and overwhelming) before he decided to change his global attitude of driving.

This profile has similarities with a type of reaction described by Krone (1993) where sensitive persons are all the time waiting and preparing themselves for reacting for an aversive situation, their fear of losing the control leads them to look for all the potentially threatening element because they want to be able to predict.

In terms of performance, we have not performed systematic analysis but we can just say that during this driving session Mrs A has been involved twice in quasi-accidents where she was surprised and embarrassed because she had not seen some driver coming from the side (apparently she estimates that she should have). Also the researcher who was in the back of the car had a feeling of worry and fear during this driving session.

B) The profile of Mr B: delegating control and quiet

Mr B is the older of our subjects and it seems that he was before more or less like Mrs A (*“I would have finished paranoiac and I would have stopped driving”*). But now he has adopted a voluntary strategy which consists in distancing himself, not caring much about the others but deciding that the others must pay attention to him since he has not anymore the ability to pay attention far away from his direct surroundings.

* Limitation of the attention zone and detachment to avoid overwhelming and fear

“I'm too old to take care of everything, the information now when we drive, we are bombarded with it, I feel lost under the quantity, so I decide simply not to pay attention to it... I concentrate only on the road, the cars just in front of me or opposite to me, sometimes on the side but still it depends on the manoeuvre that I need to make”.

He has strategies to avoid the need of looking around (following example of roundabout) and he is not caring about his social image, he does not care about how the others judge him

“On the roundabout, I do as usual – as usual? – I stay on the right side, it's not the rule but I don't care, I don't want to be stuck in the middle by persons who drive too fast and have not the decency to let me go through ... At worst, they think I'm an old full who mismatched the exit, who is lost, but I don't care... at least I'm not afraid anymore, I'm detached”

He also describes *“Sometimes I'm in my small bubble”*, not paying much attention around, relying on the others, without really trusting them but feeling more comfortable when focusing only on five meters around his car.

He does not pay much attention to the others around in our driving sequence (he mainly pays attention in front of him), except when there is a high risk for himself or for pedestrians. It is the case when a bus may come from behind when he wants to turn right, he is attentive *“because it's not me the strongest”*, or with some pedestrians who are hesitating, and with a women driving before him who is irritating and worrying him because she has an *“hesitating and bizarre”* behaviour. Though he does not care much about a motorcycle who hoots him because he nearly bumped into him *“I had seen him... he can avoid me, I am not as mobile as he is in my trajectories, then it is his job to avoid me!”*. He is then in this logic that the others should pay attention to him, more than he should pay attention to them since he has less abilities than them.

* Less hesitation

This strategy that he adopted to avoid attention overload and fear allows him to become more indifferent and then less hesitating. Contrary to Mrs A, arriving on the ring, he is confident: *“the ring, easy; the secret of a successful insertion is not to hesitate and not to care, I do that very well”*

The strategy of focusing his attention on the essential elements and of delegating the control to the others is deliberate: *“Now I know that I'm quickly overwhelmed by all that has to be taken into account when driving, so a bit obliged, I decided to take care of the main thing, otherwise I would have finished paranoiac and I would have stopped driving... I rely on the others to pay attention to me... with the detachment I am less hesitating than before... but well, the others are not*

doing everything, I do my part of the job nevertheless, I drive slowly”

Delegating the responsibility of the control of the situation is the solution he found to avoid too much emotional discomfort and it actually allows him to have a smoother way of driving. He says that he has a less hesitating driving behaviour than before, we did not observe risks of accidents like for Mrs A and the researcher who was sited in the back of his car felt more secure than with many of the other subjects because the driving mode was actually rather smooth.

This profile has similarities with the description by Krone (1993) of persons who are repressing the consideration of threatening elements of the situation. They put aside the negative elements of the situation and neglect them by reducing their negative meaning, though their physiological activity may be high. Regarding Mr B that would be interesting to check this potential discordance ; some verbalisations indicate that he may turn angry in some rare situations and have intense emotions sometimes, which would confirm this process of voluntary repression of the negative perceptions but still a potential fear behind this strategy.

CONCLUSION

From these analyses we conclude that the adaptation strategies to the evolving situation that drivers develop, emerge from a psychological compromise between the willing of mastering the situation by being attentive and avoiding accidents, and the willing of well-being and of avoiding very negative emotions like stress and fear. We understand from Mrs A and Mr B's descriptions that at some point the emotional discomfort generated by the fear of not controlling the situation is so intense that seniors must transform their viewpoint and lower their willing of efficiency, either by stopping driving like Mrs A intends to do, either by radically changing his strategy and accepting a loss of control like Mr B did. They cannot anymore cope with the fear and anxiety, they try to have a peripheral attention but, at a certain threshold, they must accept their limited control and delegate the responsibility of paying attention to the others, or else they stop driving.

Seniors' verbal descriptions of their lived experience indicate more negative emotions than younger adults' verbalisations: fear and stress, doubt and surprise, trouble and frustration, shame, are more present and they mention less anger and less positive emotions.

When we analyse Mrs A and Mr B conduct, we observe that they look very different and even opposite but when he says *“at least I'm not afraid anymore”*, we understand that before he was scared like her, and that their strategies are attempts to cope with fear.

Of course this conclusion should be confirmed and refined with a larger number of subjects. A limitation of the study is the small number of subjects that we could videotape and interview afterwards. We cannot generalise already but, like for all the qualitative

empirical studies, some universal characteristics can be found in very singular cases. Studying deeply singular cases is more costly but it is also very rich in that it can give a more global view on the complexity of the activity and multiplicity of sources which are motivating the conduct. We then can gain meaningful cases that we can try to confirm with a larger panel of subjects.

The methodology we used to explore the activity and the emotions of the elderly drivers is based on observation of the mimics, of the front scene and on video-based interviews right after the activity. We observed that the analysis of mimics is very complex because the interpretation of half of them is pose problems of disambiguation. Having the subjects verbalize their lived experience, that is their thoughts, focalisations, perceptions and emotions, appears to be a very fruitful method, also because they describe what is the source of their emotion in the situational context; this is essential for design purposes, we need to know precisely what is generating fear, trouble, doubt and other emotional discomfort in the context of driving to be able to design assistance systems or relevant training (Cahour 2008).

After this exploratory study we wonder what would be the best way to help the elderly. Our present study suggests clearly that we can help them, certainly not by adding help systems which require additional attention since their attention ability is already overloaded; it could be dangerous to add new information, at least in a visual mode, and the existing visual information should not be placed in the periphery.

The most relevant way to limit their difficulties would be to help them making visible their driving intentions to the others, in ways which still have to be imagined. Nowadays there is only an indicator for showing that we intend to turn left or right and the warning lights that we can use only to signal a big problem (breakdown) or danger (e.g.traffic jam). There is no tool for signalling that we are hesitating, lost, afraid, and that maybe the others should pay particularly attention to us. We could also imagine some training where older persons are taught to focus on fewer elements of the situation and to have a smoother driving.

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