



# Self-assessment Questionnaires & Memory tests

***First International Conference on Driver Distraction  
and Inattention***

***Chantal Combe Pangaud***

***Université Lyon2 – LEACM/CRIS – EA 647***

***Armelle Jacquet-Andrieu***

***Université Paris Est – UMR CNRS 8049***

# Research Teams & Technical Research Teams



## **LEACM/CRIS – Université Lyon 1**

Robert Martin (Leader of the AR5)

Armelle Jacquet-Andrieu

Annick Maincent

Chantal Combe-Pangaud

## **INRETS/LESCOT**

Alexandra Fort



## **MMB – Institut des Nanotechnologies de Laboratoire de Physique de la Matière – INSA, Lyon**

Christian Collet

André Dittmar

Claudine Gehin



## **Pôle de Ressources Informatiques (PRI) Institut des Sciences de l'Homme – Lyon**

Gérald Foliot

Didier Leblanc

Nicolas El-Sayegh

## **CERMEP/MEG – Lyon**

Claude Delpuech

Sébastien Daligault

Françoise Lecaiguard

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# 1. Introduction

- This presentation concerns the results of a memorizing test (visual recognition and hearing recall) during an experiment of simulated driving in a magneto-encephalographic environment (MEG).
- The memory tests (questionnaires) are adapted to the measurement of subjective self-assessment: “tiredness” and “facility” perceptions, correlated to simple (ST) and double task (ST/DT: hearing a radio broadcast).
- Each subject has to answer questions and perform these tests in order to determine the **psychological effect** of a DT (paying attention to radio broadcast), during his attentive driving and afferent decision-making (18 driving sessions).
- A debriefing questionnaire is proposed to evaluate the subject’s awareness on DT effect.



# 1. Reminder

- **Double task (DT):** effect on attention and decision-making
- **CNS, ANS, Psychological**
- **30 subjects** (aged 21 to 30)
- **Simulated driving task**
- **2 conditions : ST / DT**
- An exploratory **Group of 6 subjects**



## 2. Psychological measurement

- **Subjective general state:** starting / ending.
- After each session: ***Tiredness*** + ***Easiness***
- Memorizing tests:
  - DT condition: LTM test on radio broadcasts
  - **End of experiment:**
    - **RECOGNITION** of visually encountered objects:
    - **RECALL** of auditive content of radio Broadcast
- Debriefing questions about DT effect



### 3. Psychological hypothesis

- On **general self-assessment** and questions
  - Effect of the 3 hour-long experiment on assessments
  - Subjective consciousness of DT effect on attention
- **EASINESS** and **TIREDNESS**
  - → **DT** sessions perceived as more difficult and more tiring than **ST** sessions
- **Short Time Memory (STM)**
  - Impossible comparisons between **ST** (no testing) and **DT**
- **Long Time Memory (LTM): Recall & Recognition**  
**Radio broadcast listenings** in **DT** better remembered than in **ST**
  - **Rare objects**: better recognition of objects encountered in **ST** Condition than in **DT** condition



## 4. Results

### 4.1. *STM on radio during DT sessions*

- 1 point per correct answer (3 answers per session, **9 DT** sessions)
- **77%** of correct answers → subjects have observed the instructions
- Individual differences :
  - Min **37%**, Max : **95%**
  - Differences in **DT** constraint management
  - Differences in principal task perception despite instructions

## 4.2. General self-assessments

### Effect of experiment on 4-Pt & 5-Pt scales

Table. 1 : Used Scales before / after the MEG examination

<b>a</b>	Nervous	1	2	3	4	Relaxed
<b>b</b>	Tired	1	2	3	4	Rested
<b>c</b>	Weary	1	2	3	4	Enthusiastic
<b>d</b>	Not motivated	1	2	3	4	Motivated
<b>e</b>	Ill at ease	1	2	3	4	At ease

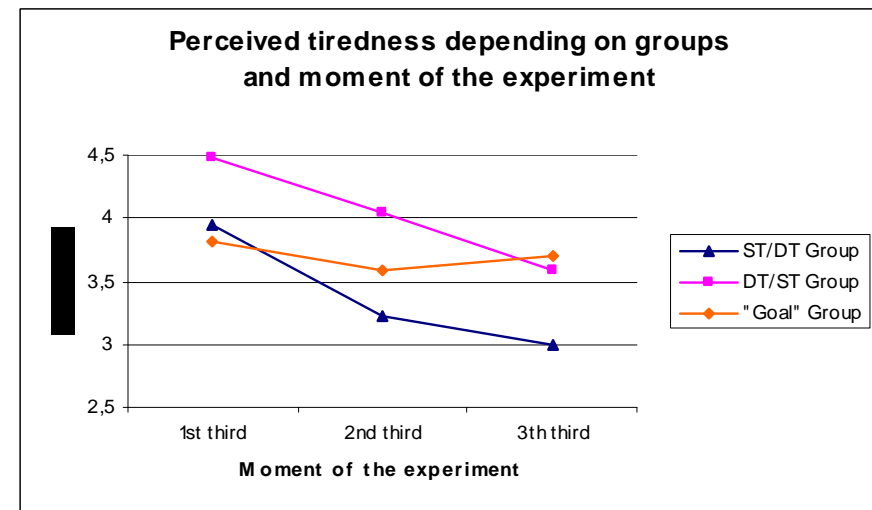
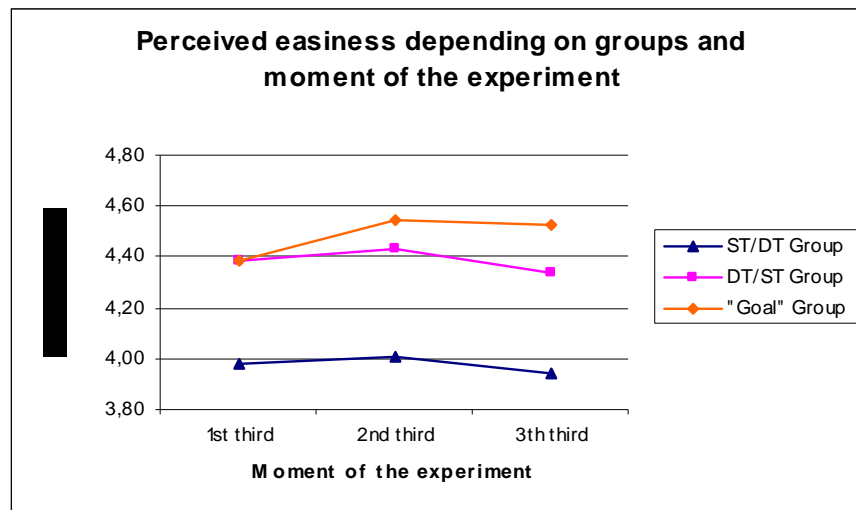
TABLE. 2 : Experiment effect on subjective self-assessments. Comparison between «before/after examination» assessments

Scale	Values	Beginning	Ending	Difference	Sign
<b>a</b>	Mean Std-dev.	3.43 0.73	3.53 0.56	+0.10 t=0.71	No sign.
<b>b</b>	Mean Std-dev.	3.27 0.86	2.48 0.98	-0.78 t=-4.23	P<.0005
<b>c</b>	Mean Std-dev.	3.53 0.63	2.97 0.89	-0.57 t=-3.20	P<.0025
<b>d</b>	Mean Std-dev.	3.73 0.52	3.27 0.74	-0.47 t=-3.50	P<.001
<b>e</b>	Mean Std-dev.	3.40 0.72	3.67 0.61	0.27 t=+2.11	P<.025



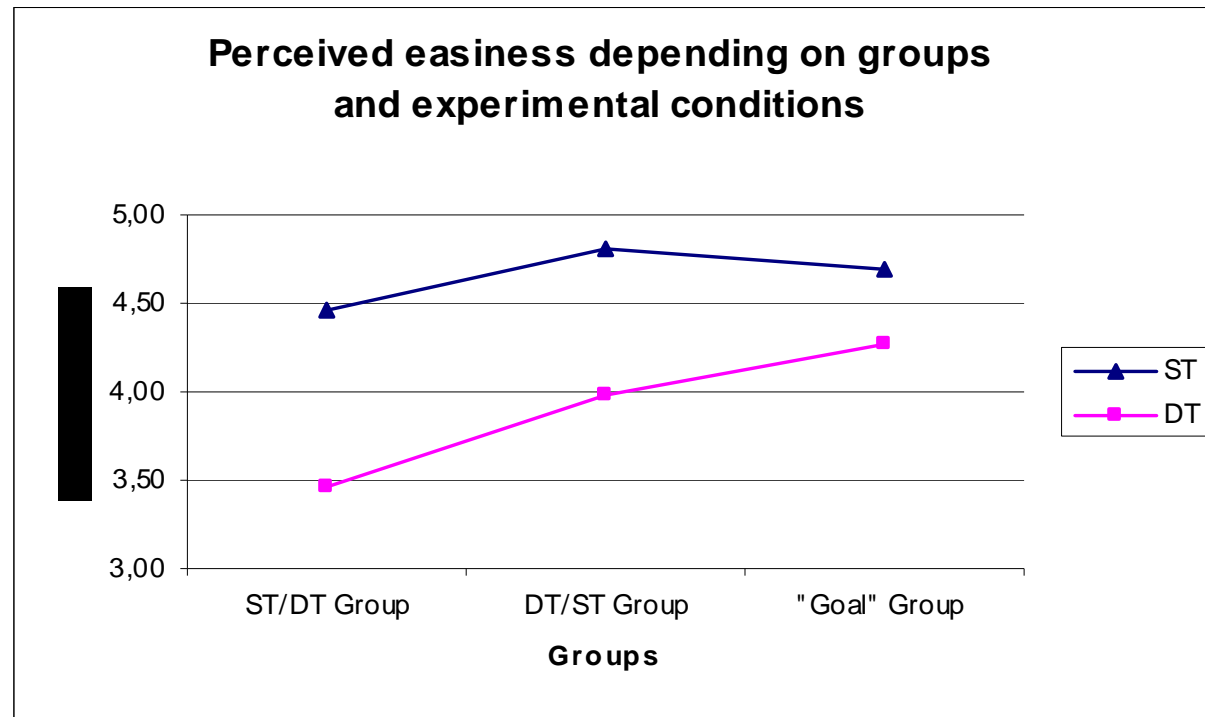
## 4.2.1. Perceived Easiness & Tiredness

### Time effect on *Tiredness* but not on *Easiness*



## 4.2.2. *DT effect on perceived easiness*

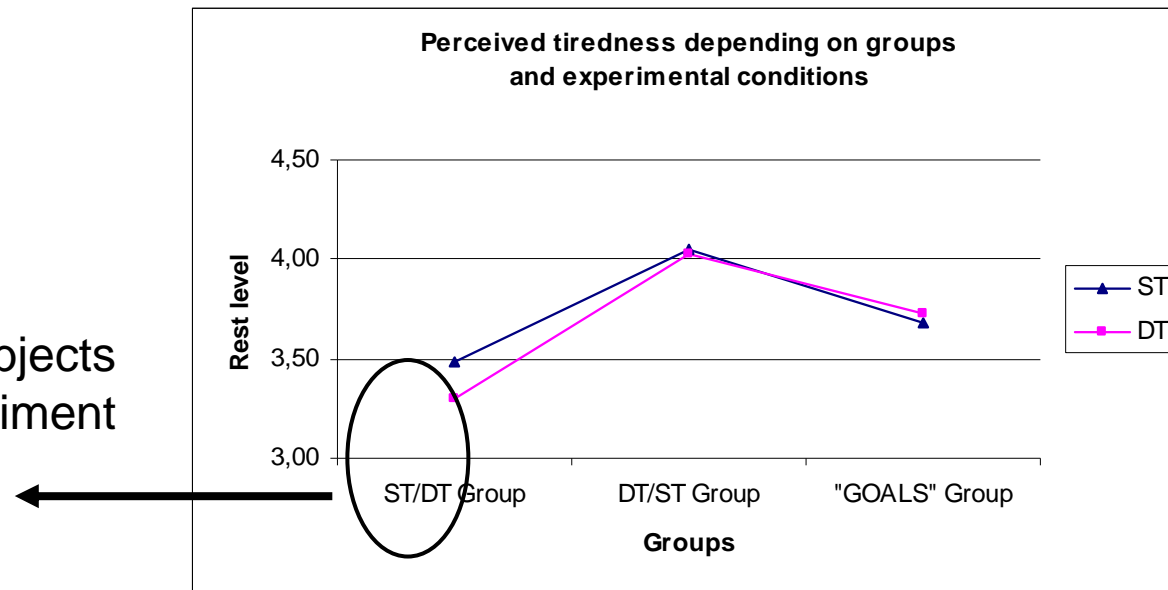
### ST easier than DT



### 4.2.3. *DT effect on perceived tiredness*

**More tired after DT conditions**  
**This is less evident than for easiness**

Due to those subjects  
beginning the experiment  
with a ST condition



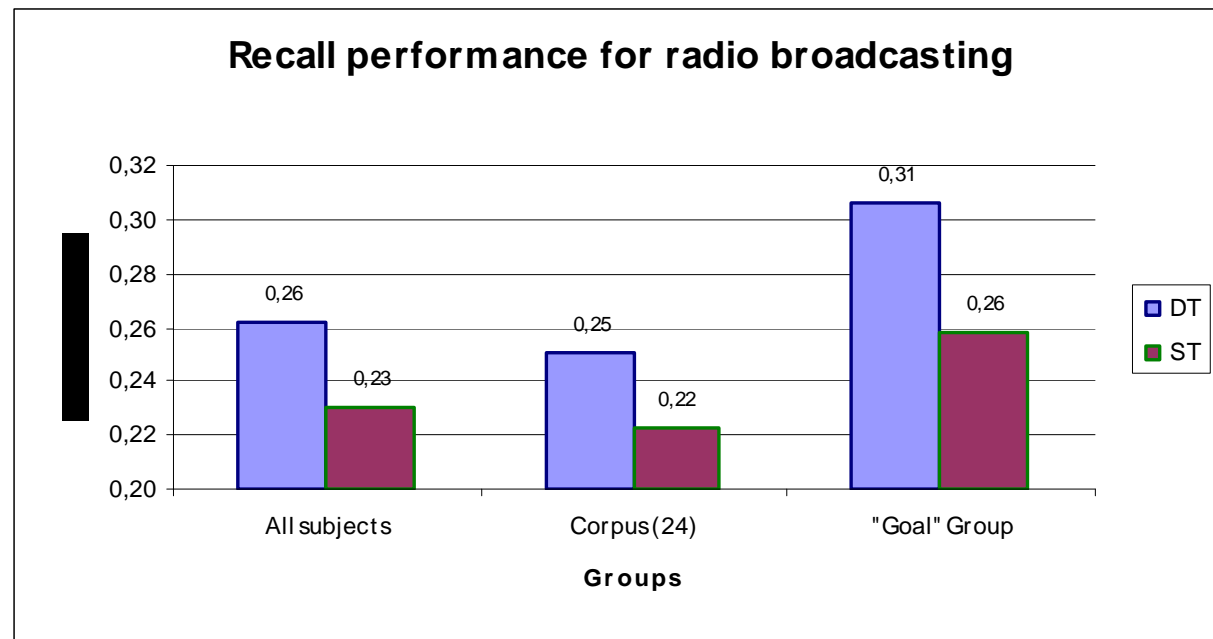
## 4.2.4. *Radio broadcast Recall*

Non significative difference

### Floor effect?

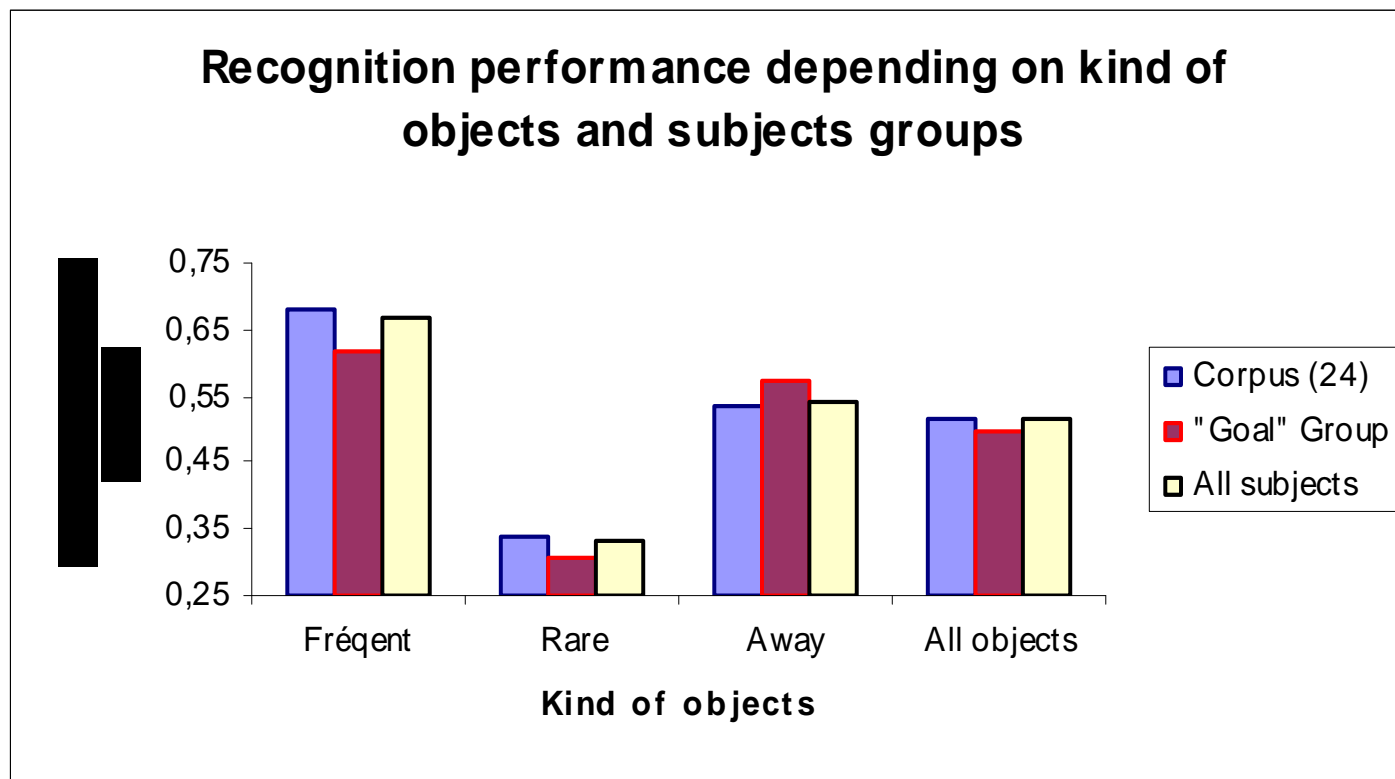
The difference is in the expected direction for all groups of subjects

« Goals » group no better sign.



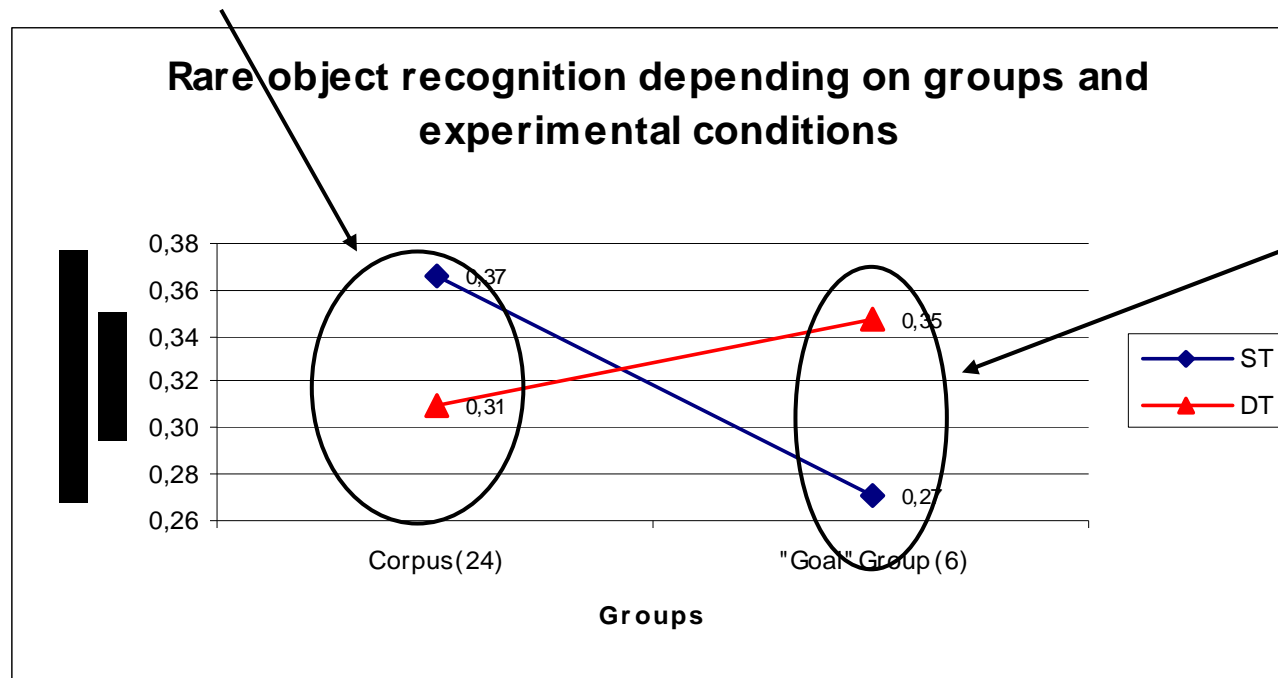
## 5.2.5. *Recognition of visual objects*

« Frequent » and « away » objects well recognized as such;  
rare objects near chance level



## 4.2.6.. Rare objects recognition

Results tend to confirm the hypothesis in the **Corpus group (24)**



Better attention to environment in this group ?



## 5. Conclusions

- Some psychological evidence for DT effect on attention (reports and scales)
- ***Tiredness*** evaluation applies better to perception of the experiment length
- ***Easiness*** applies better to the psychological discrimination between internal states (mental-load)
- **Recall of radio broadcast** not better significative in DT
- **Recognition of objects**: rare objects better recognized if encountered in ST conditions



## References

- [1] Flavell, J.H. & Wellman, H.M. (1977). *Metamemory*, in R.V. Kail & J.W. Hagen (Eds), *Perspectives on the development of memory and cognition*, Hillsdale, N.J.: Lawrence Erlbaum Associates.
- [2] Noël, B. (1977). *La métacognition*. Bruxelles : De Boeck Université.
- [3] Nelson, T.O. & Narens, L. (1990). Metamemory: A theoretical framework and new findings. in G. Bower (Ed), *The Psychology of Learning and Motivation*, vol. 26, pp. 155-160.
- [4] Jacquet-Andrieu, A. (2007). « Langage : fonction neuropsychologique et biologique hautement contrôlée », *Bulag* 32, pp. 211-220.
- [5] Ostrom, T.M. & Gannon, K.M. (1996). *Exemplar generation: Assessing how respondent give meaning to rating scales*, in N. Schwarz & S. Sudman (Eds), *Answering questions: Methodology for determining cognitive and communicative processes in survey research*, San Fransisco: Jossey-Bass Inc. Publishers, pp. 293-318.
- [6] Jouandeau, A. & Combe-Pangaud, C. (1999). Baromètre de satisfaction. Evaluation des représentations mentales des quantificateurs d'appréciation, *Les Cahiers de la Recherche Scientifique en Qualité*, 6, pp. 1-18.
- [7] Combe-Pangaud, C., Martin, R. & Jouandeau, A. (2001). *Le sentiment de facilité, indicateur de la variabilité interindividuelle des réponses*, in A. Flieller & al., *Questions de Psychologie Différentielle*, Rennes, Presses Universitaires de Rennes, pp. 81-86.



# Thank you for your attention



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