

French Institute of
Science and Technology
for Transport
Development and
Networks IFSTTAR



ECTRI – FEHRL – FERSI
Young Researchers Seminar 2015

Focused on the source of anger: What about the detection of pedestrians?

Impact of anger on the pedestrian detection and the car-following performance

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IFSTTAR

Context

Definition of anger

- Negative valence
- High arousal

Possible sources

- Not related to driving
- Coming from the driving task



Context



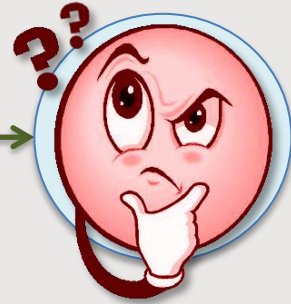
Behavior

Anger expression

(Deffenbacher 2001; 2003)

Driving offenses

Anger



Attention

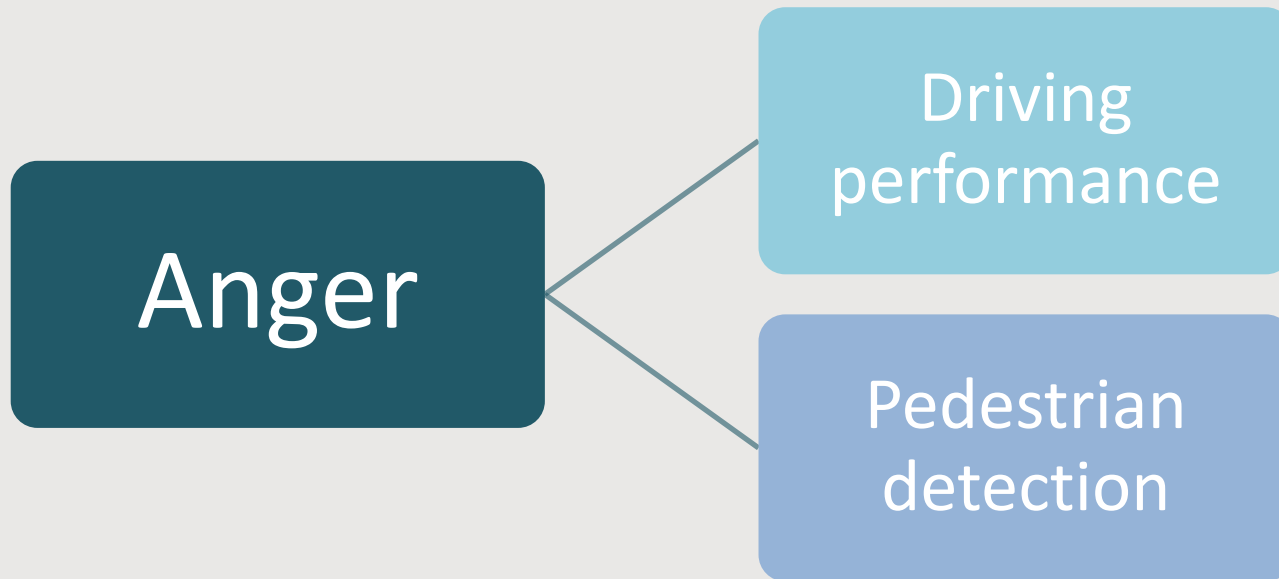
Ruminations

(e.g. Denson 2012; Sukhodolsky 2001)

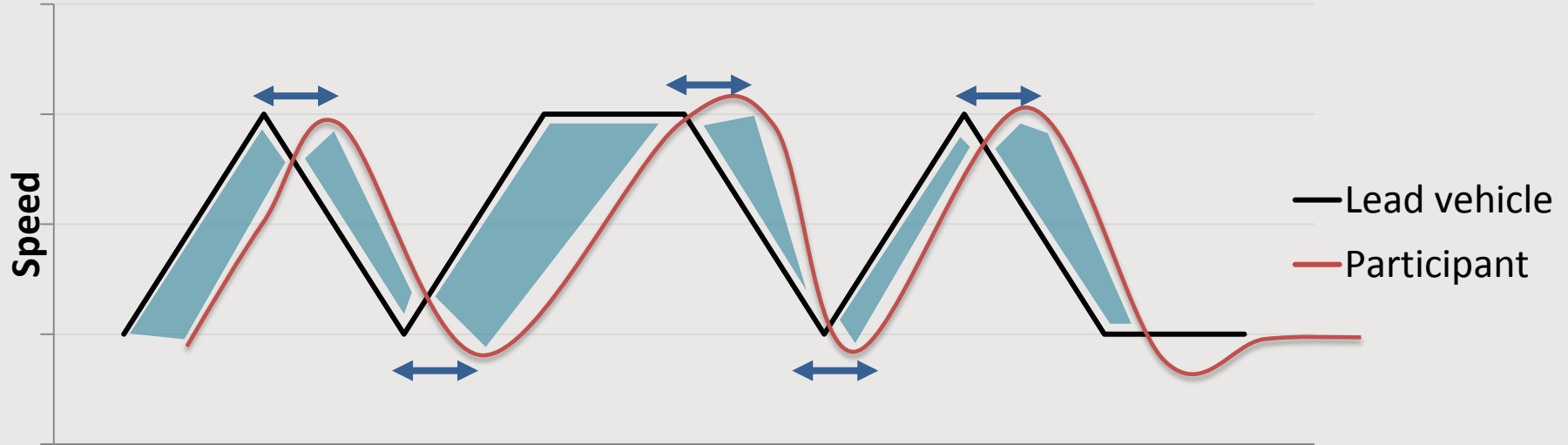
See effects of depression and mind wandering (Lagarde et al., 2004; Galéra et al., 2012)



Aims of the study



Car-following task



Coherence

Modulus

Delay

(Brookhuis et al., 1994)



Car-following studies

Diverted attention

- Distractive task {
 - ↑ Delay & inter-vehicular time (*Ranney et al., 2005*)
 - ↓ Coherence (*Ward et al., 2003*)

Music / Arousal

- No impairment under a monotonous environment
(*Ünal et al., 2013*)

→ Impact of Anger on
car-following



Anger & attention

Attentional focus

- Focus on the source of anger

(Fox et al., 2002; Harmon Jones et al., 2013)

Superficial visual processing

- More time necessary to make corrective actions

(Stephens et al., 2013)

→ Pedestrian detection



Hypotheses

Anger

Car following

Tendency to
overreact
(higher
modulus)

Reduced
intervehicular
distance

Pedestrian detection

Shorter
distance of
detection

Focus on the
source of
anger



Participants

35 participants

Anger

- 18 participants
- High trait anger

Control

- 17 participants
- Low trait anger

Groups distribution

- Driving Anger Scale
(Deffenbacher et al., 1994)

Age

- 25 – 45 yrs

Experience

- Driving licence > 3 years



Procedure

Training

- 20 min
- Car following
- Pedestrian detection

Experimental1

- 10 min
- Car following
+
Pedestrian
detection

Induction

- 15 min
- Anger / Control

Experimental2

- 10 min
- Car following
+
Pedestrian
detection



Induction

GazePlot
Media: Glasses Recording
Time: 00:01:31,232 - 00:02:30,706
Participant filter: All Participants
Number of participants included: 1/1 (100%)

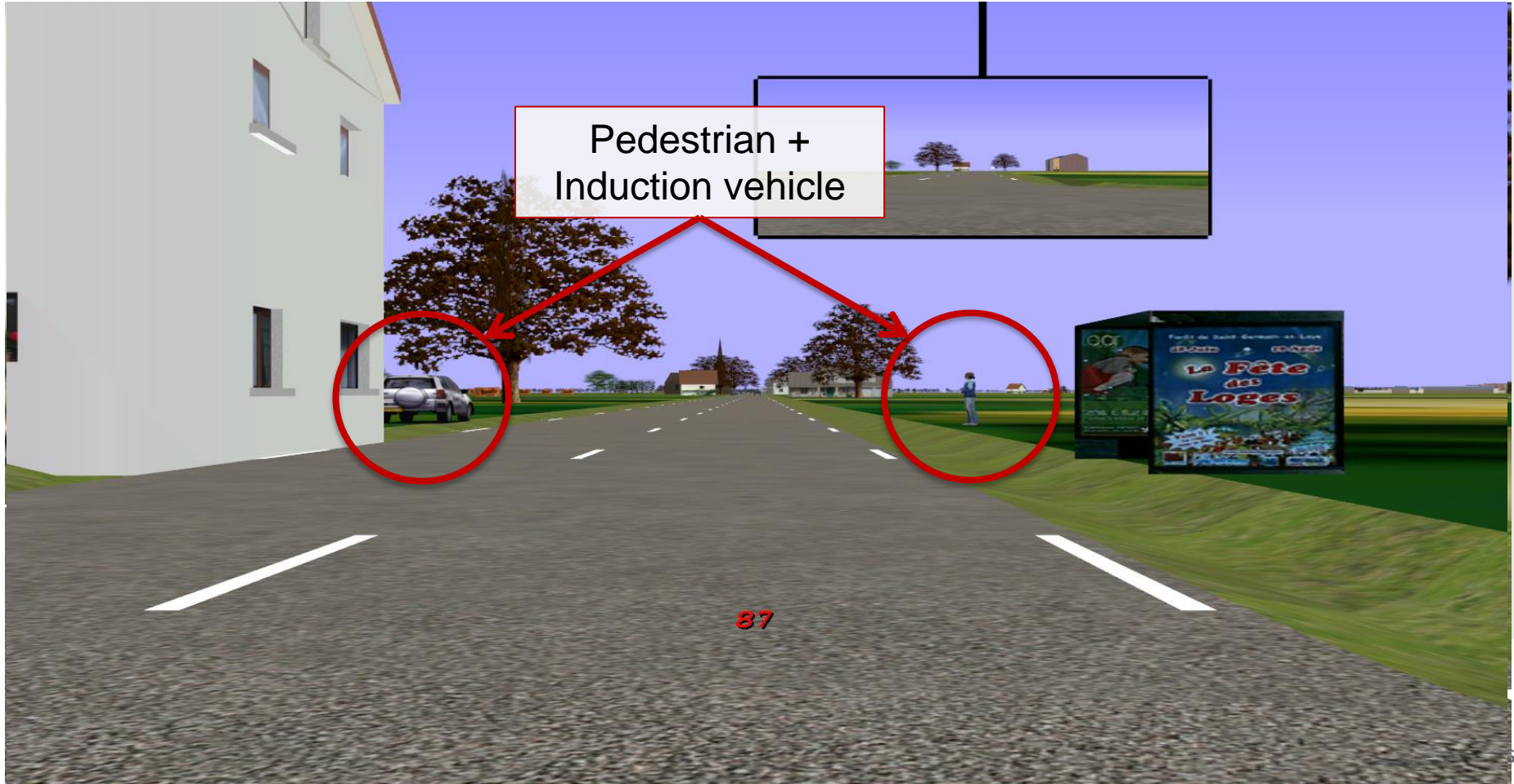


Experimental

GazePlot
Media: Glasses Recording
Time: 00:02:34,632 - 00:03:22,165
Participant filter: All Participants
Number of participants included: 1/1 (100%)



Experimental



Measures

Mood induction

- Brief Mood Introspection Scale
(Mayer & Gaschke, 1988; adapted by Corson & Verrier, 2007)

Driving performance

- Coherence, modulus, delay
- Inter-vehicular time

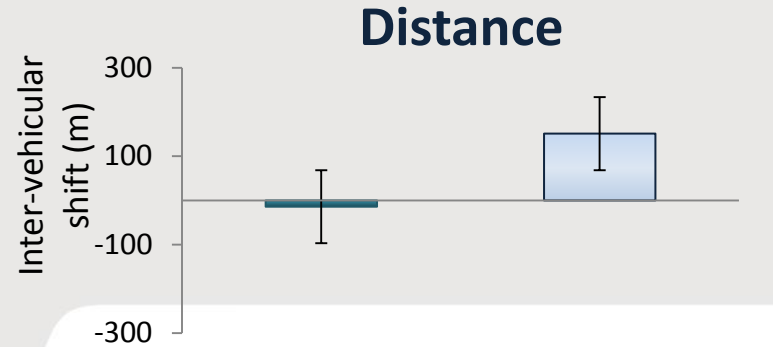
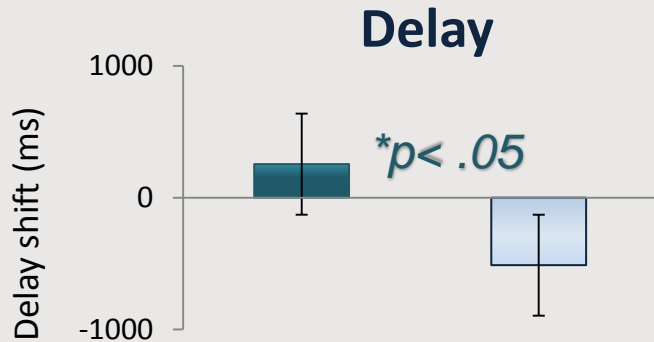
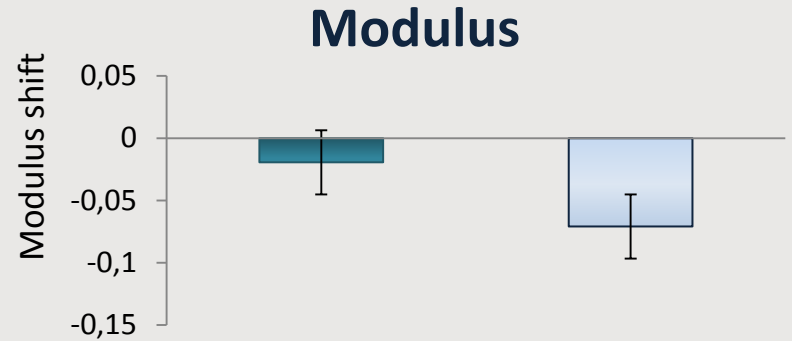
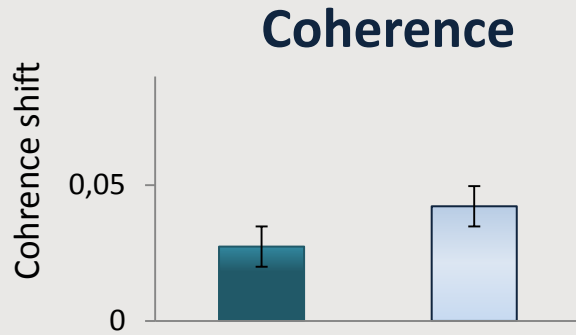
Pedestrian detection

- Distance of detection



Car-following results

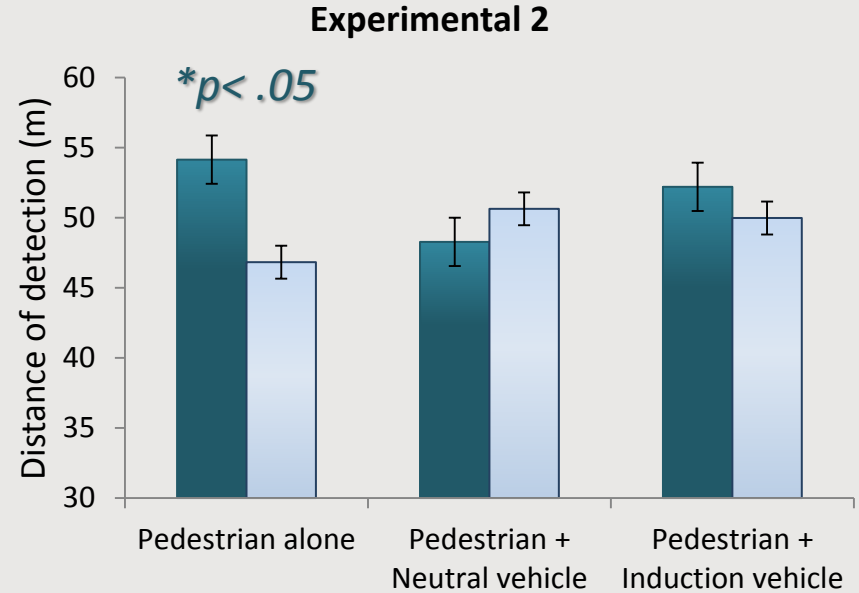
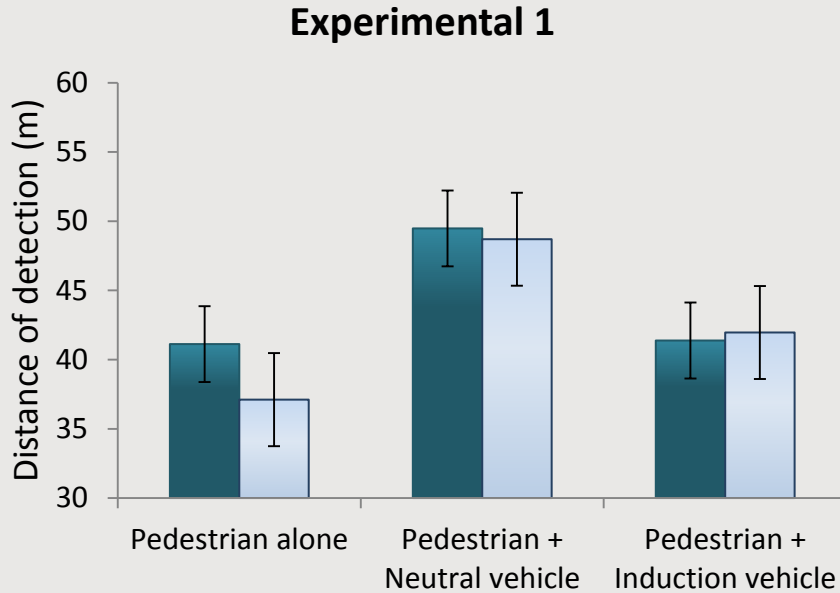
Shift = Experimental 2 – Experimental 1



■ Anger ■ Control

Shift score for each driving performance indicator, according to the mood

Detection task results



15 Distance of detection (meters) for each group according to the pedestrian condition

■ Anger □ Control

Discussion

Driving performance

Overreaction (higher modulus)



- Low level of anger
- Insufficient freedom ?

Reduced intervehicular distance



- Control group seems to adopt a safer following distance

No improvement of the delay for angry drivers

- Attentional disruptions by anger



Discussion

Pedestrian detection

Shorter distance
of detection



- Detection \neq Decision?

Focus on the source
of anger



- Low level of induction?
- Induction vehicle not identified?

Anger > Control : only for pedestrian alone

- Priorization of the detection task?



Perspectives

Analyse eye-tracking data

Use a free driving task

Induce higher levels of anger



Thank you for your attention

Thanks to Jallais Christophe, Fort Alexandra, Chanut Odette, Ndiaye Daniel, Moreau Fabien, Hugot Myriam and Corson Yves to their participation in this study

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Induction results

