

Young Researchers Seminar 2009

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Object localization in jumbled natural road scenes

C. Jallais, L. Paire-Ficout & C. Gabaude



Introduction

CONTEXT

- The context may help to localize objects in the complex scene (Giraudet & Azavant, 2006)
- Driving experience can help drivers in their visual search of road elements (Chapman et al., 2002)
- In driving context: importance of top-down processes in the perception of the traffic scene (Theeuwes, 1996)

Introduction

VISUAL SCHEMAS

- Controlled use of schemas require conscious effort and working memory resources (Kalyuga et al., 2003)
- To be operated under automatic rather than controlled processes → schemas have to be sufficiently practiced (Schneider & Shiffrin, 1977)

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Objectives

- Test the effect of ageing on the localization of target (e.g., pedestrian, traffic light) in a natural driving scene
- Evaluate the impact of distraction on the use of relevant driving schemas in the visual search

Participants

➤ 24 older drivers

- Aged 64 to 83 (M = 71.33; SD = 5.04)
- MMSE > 28
- Driving at least 3,000 km per year

➤ 24 young experimented drivers

- Aged 30 to 46 (M = 28.75; SD = 3.35)
- Driving at least 10,000 km per year

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Method

- Pictures of intersections contained at least one car, one pedestrian, one traffic light and one road marking
- Participants had to decide if short sentences, listened at the same time, were true or false (Dual Task) (ex: a teaspoon is bigger than a tablespoon)
- Three conditions of presentation of all pictures (Biederman, 1981)

Scene presented in a Coherent condition



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Scene presented in a Partly Jumbled condition



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Introduction

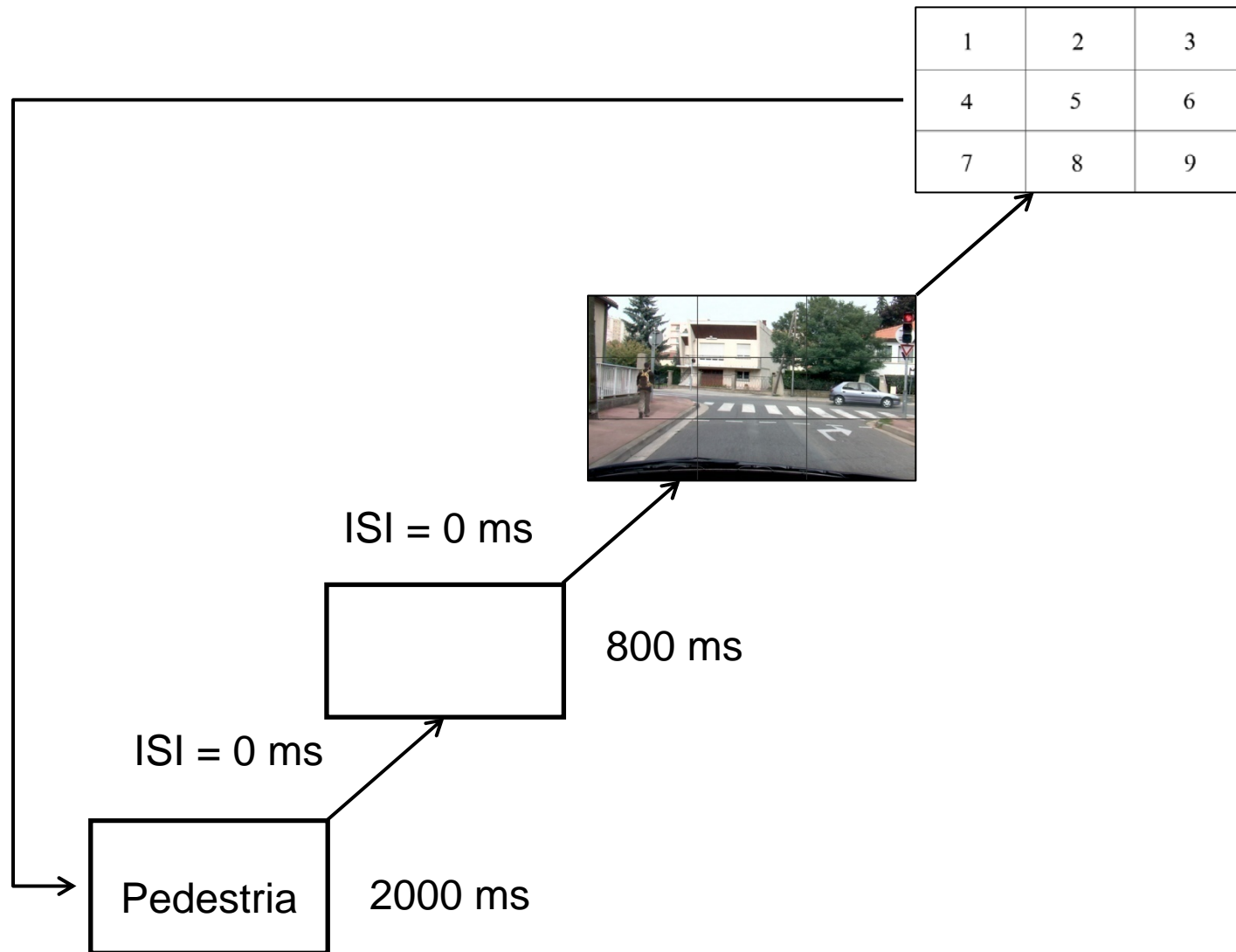


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Scene presented in a Fully Jumbled condition



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Hypotheses

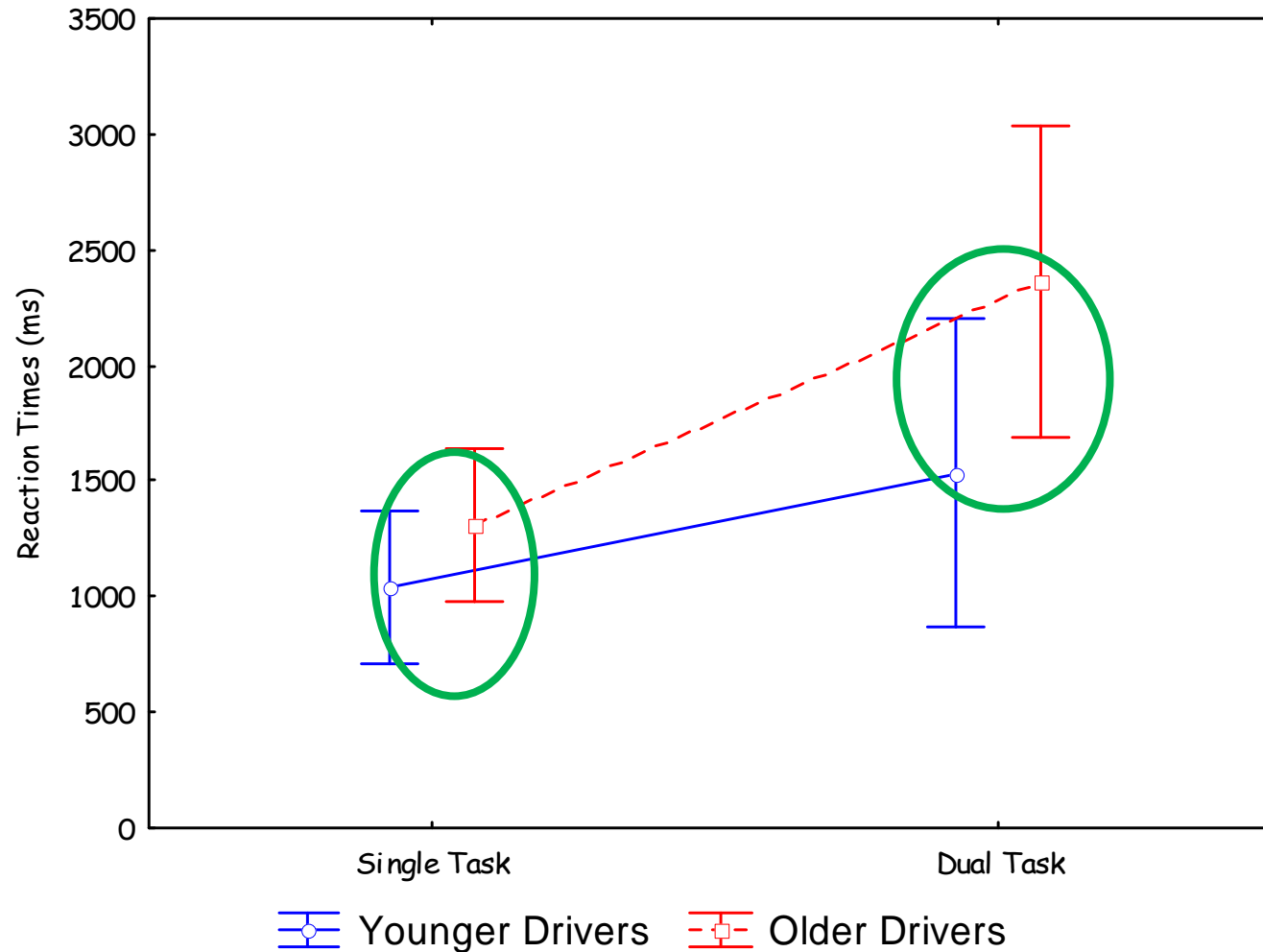
- The reaction times in both partly and original conditions will be shorter than in the fully one due to the use of relevant driving-related knowledge
- Both older and younger drivers will be slower in the fully jumbled than in the original conditions
- Older participants will be slower than younger ones in single and dual task

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Results



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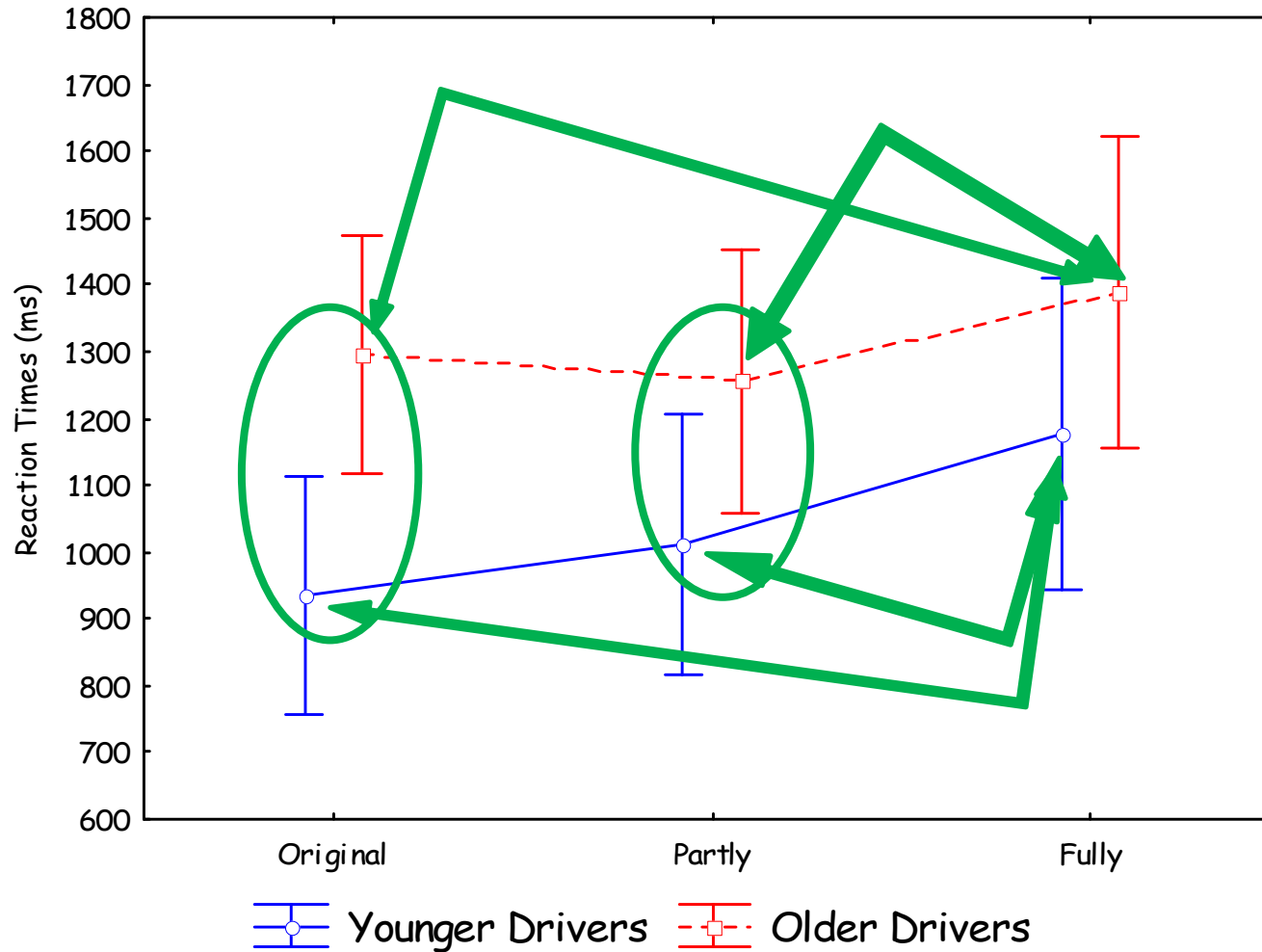


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Results: Single Task

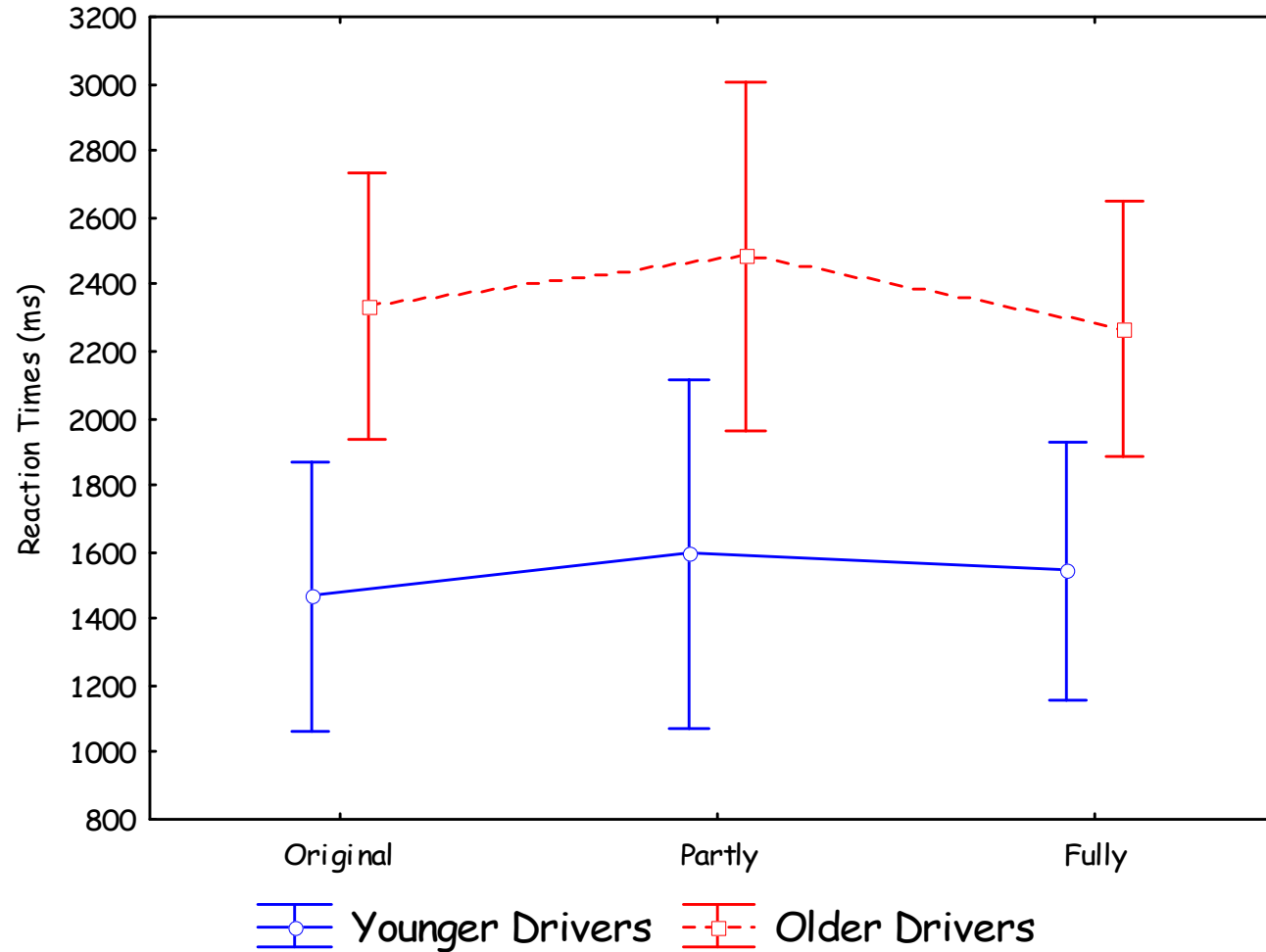


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Results: Dual task



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Discussion

As expected:

- Both ageing and distraction impacted the visual search of participants
- Older drivers were slower than the younger ones along the two tasks
- The differences observed between partly and fully jumbled conditions suggest the use of driving schema

But:


- In the *dual task*, both age groups were not able to use the top-down information to focus on the target

Discussion

- In the dual task → insufficient attentional resources to guide their visual search by top-down processes

Perspectives

- The use of eye-tracking data will help to clarify if participants made initial eye movements to the most relevant area where the target was supposed to be
- Whatever the age and conditions, participants were slower in the localization of road-signs than of road-users



Thank you for your attention

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