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Driver Distraction: Toward a common definition

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Acknowledgements

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Overview

- discuss key issues
- propose a definition of driver distraction that is distinguishable from driver inattention
- discuss the definition in relation to the key issues
- conclusions

York, England



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Introduction

- “driver distraction” poorly defined
- many papers devoid of definition
- need valid and workable definition
- should embrace a common definition
- lack of common definition is problematic:
 - can make inter-study comparisons difficult
 - can lead to vastly different estimates of role of distraction in crashes and near- crashes



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Distraction - Dictionary Definitions

- “a thing that prevents someone from giving full attention to something else” (New Oxford American dictionary)
- “to draw away or divert, as the mind or attention” (Macquarie dictionary, Australia)
- “Something that distracts the attention and prevents concentration” (Oxford Dictionary)



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Driver Distraction....

- “diversion of attention from the driving task that is compelled by an activity or event inside the vehicle” (Treat, 1980, p. 21).
- “a shift in attention away from stimuli critical to safe driving toward stimuli that are not related to safe driving” (Steff & Spradlin, 2000).
- “driver distraction occurs when a driver is delayed in the recognition of information needed to safely accomplish the driving task because some event, activity, object or person within or outside the vehicle compelled or tended to induce the driver’s shifting attention away from the driving task.” (Stutts et al., 2001).
- “a disturbance imposed within a lateral or longitudinal control vehicle loop” (Sheridan, 2004).
- “distraction can be defined as misallocated attention” (Smiley, 2005).
- “a diversion of attention from driving, because the driver is temporarily focusing on an object, person, task, or event not related to driving, which reduces the driver’s awareness, decision-making, and/or performance, leading to an increased risk of corrective actions, near-crashes, or crashes” (Hedlund et al., 2006).
- “a form of inattention that shifts attention away from the task at hand (Williamson, 2008).”

England - somewhere



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1. Labelling

Driver distraction - when “...circumstances act to displace the primacy of the social role “driver” in the person’s on road behaviour.”

Distracted driving - when “...the individual retains the primary role as the “driver” but circumstances act to divert attention from the appropriate course of action to other momentarily inappropriate components of the driving task or the external environment.”

Hancock, Mouloua and Senders (2008)



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2. Mechanism

- shifting, diversion, taking, re-directing, withdrawal or disturbance of attention?
- Definitions of distraction “...must consider the presence of an event or occurrence that causes a driver to allocate attention, which might otherwise be focused on the driving task, to a separate activity.”

(Pettitt, Burnett and Stevens , 2005)

- but few actually do....



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3. Intentionality of engagement

- does driver distraction pertain only to situations in which the driver's attention is captured *involuntarily* by a source of distraction?
- One definition states that distraction is no more than “misallocated attention” – but....

4. Source of Distraction

- Many cite no specific or general source of distraction
- Sources that **are** cited vary eg:
 - events
 - objects
 - activities
 - people,
 - “stimuli that are not related to safe driving”
 - “things that are not primarily relevant to the driving task (driving safely)”.
- driving-related or not driving related?
- within or outside the vehicle?



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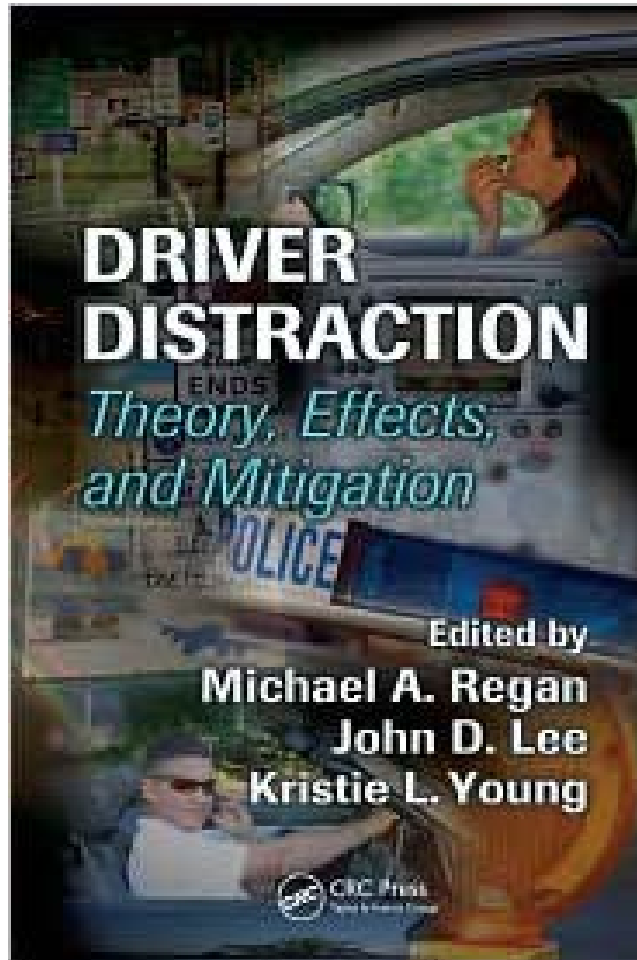
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5. Distracted from What?

- Definitions vary in terms of *what it is* that a driver is distracted from when they are distracted
- Examples: “the driving task” (a task), “stimuli critical to safe driving” (stimuli), “driving (an activity)”, and “driving safely” (an activity)
- There is a confounding of tasks, stimuli and activities



What can I say?

- 34 chapters
- 40+ authors
- theory, effects and mitigation
- and more....
- excellent



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6. Impact

- most definitions highlight the ***impact*** of distraction on something – eg “the driving task”, “stimuli critical to safe driving” or some other activity, task or stimulus.
- “the somethings” vary widely in their degree of specificity

In Short...

There is a lot variation between definitions, and even variation between the labels assigned to the definitions.



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Toward a common definition

- “*Driver distraction* is a diversion of attention away from activities critical for safe driving toward a competing activity.” (Lee, Young & Regan, 2008, p. 34)
-
- “*Driver inattention* represents diminished attention to activities that are critical for safe driving in the absence of a competing activity.” (see Lee, Young & Regan, 2008, p. 32)

1. Labelling

- we prefer “driver distraction” – which in our definition applies both to individuals in their primary social role as “driver” and to any other roles they may revert to during the course of driving
- We prefer this label because it implies that the driver, not the process of driving itself, is distracted



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2. Mechanism

- The ***mechanism*** of distraction is the “diversion of attention”.
- We prefer “diversion”, as it implies that the distribution of attention is a **dynamic** process.
- We define 5 forms of distraction:
 - “visual distraction” (vision);
 - “auditory distraction” (hearing);
 - “olfactory distraction” (smell);
 - “tactile distraction” (touch);
 - “gustatory distraction” (taste); and
 - “internal distraction” (generated by the mind).



2. Mechanism (Cont...)

Distraction vs inattention:

“...distraction involves an explicit activity (e.g., dialling a cell phone) that competes for the attention of the driver...

“....as compared with a cognitive state (e.g., drowsiness or fatigue) that leads to diminished capacity to attend to the roadway.”

([Lee, Regan and Young, 2008](#))



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2. Mechanism (Cont...)

- Daydreaming – distraction or inattention?
- We think it's "internal distraction"
- Internal thoughts are triggered involuntarily, by the mind, and the mental abstractions themselves may involve people, objects, events and activities.
- Whilst the triggering events are not overt, they exist internally.

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Intentionality of engagement

- We make no distinction in our definition between competing activities that are driver-initiated or non-driver initiated.
- At a micro level, the mechanisms by which the **voluntary** diversion of attention is initiated are probably no different from those that **involuntarily** divert our attention.
- We may, for example, *think* about something that reminds us of the need to make a telephone call.
- In one sense we might argue that the decision to make a phone call is voluntary. However the mechanisms that trigger the decision to divert attention from driving to initiate the phone call may be involuntary.



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Sources of distraction

There is in our definition a defined **source** of distraction (which we call a “**competing activity**”) which triggers the diversion of attention away from activities critical for safe driving.



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Sources of distraction (Cont...)

The competing activity can:

- (a) derive from actions performed on sources of distraction residing inside or outside the vehicle
- (b) include both driving and non-driving-related activities that compete for the driver's attention. Driving is a complex, multi-task, activity, making it likely that the demands of one element of driving will interfere with another, more critical, element.
- (c) involve internal distraction, such as daydreaming



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Distracted from what?

- Distraction involves a failure to pay attention to “[activities critical for safe driving](#)”, whatever they may be at a particular point in time.
- There is currently “no assured method of specifying, apriori, exactly what each driver should be paying attention to at each and every moment in time, and hence what they should be attracted to.”
([Hancock, Maloua and Senders, 2008](#)).



Impact

- Does a distracting activity have to have some measurable impact on driving in order to be classified as distracting?
- Defining distraction in terms of specific outcomes is problematic because the presence or absence of distraction then depends on a somewhat arbitrary selection of measures and combination of roadway events.
- In our definition there is no explicit assumption that the diversion of attention away from activities critical for safe driving toward a competing activity will have an **impact**, positive or negative, on activities critical for safe driving.
- However, the reference to “activities critical for safe driving” rather than to “driving” implies that the diversion may increase crash risk and hence has potential to impact on driving performance.



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Conclusions

- In framing definition, have said nothing about:
 - the psychological mechanisms by which activities critical for safe driving may be impacted by distraction (e.g., via “resource competition”; breakdowns in control, etc)
 - the impact of distraction on activities critical for safe driving (e.g., delayed reaction time to a braking lead vehicle); or
 - the factors that moderate the impact of the process on safe driving (e.g. secondary task demand, driver characteristics, driving task demand).



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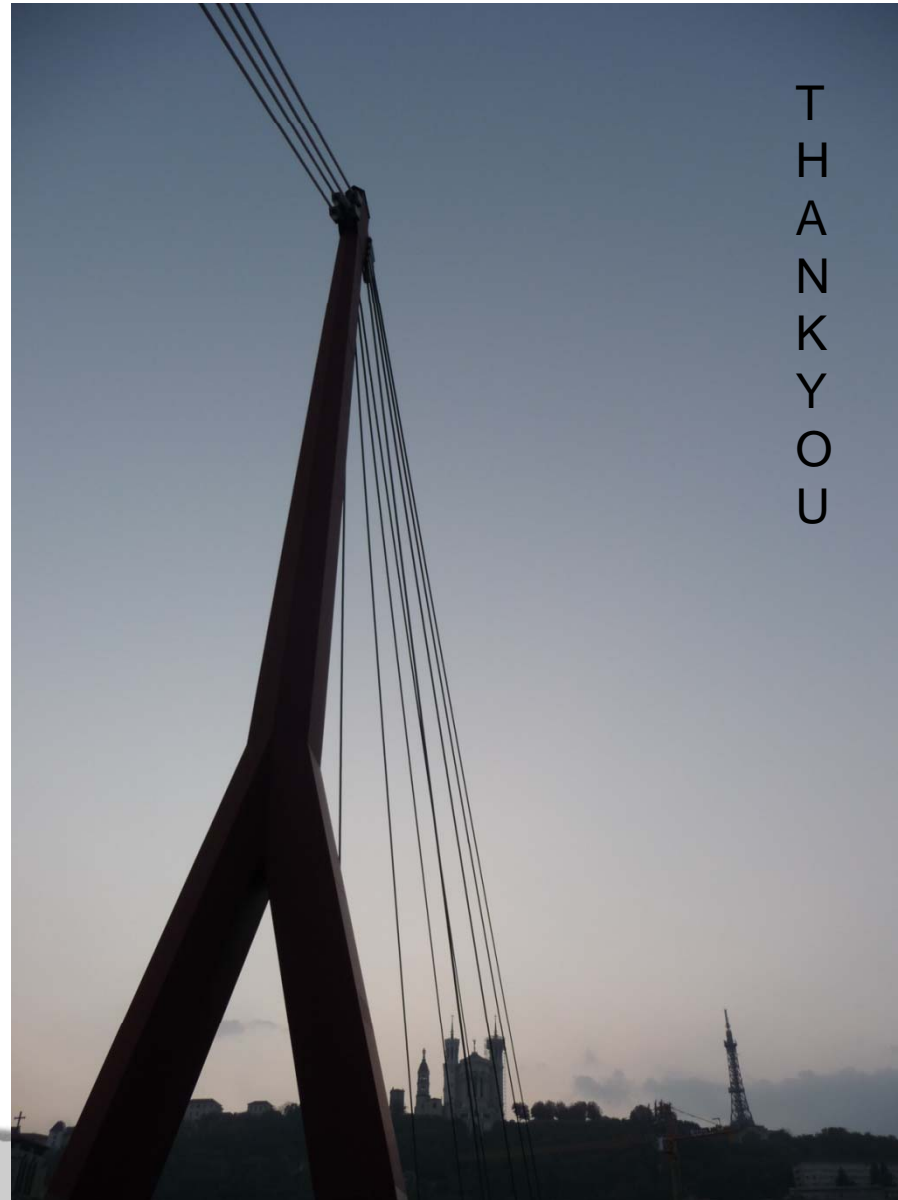
Conclusions (Cont...)

- Driver distraction is different from driver workload
- Workload refers to the *amount* of attention required for performance of an activity, or activities.
- Distraction refers to the *distribution* of attention between competing activities.
- Properly defining distraction is arguably one of the most important first steps in managing distraction as a road safety issue.



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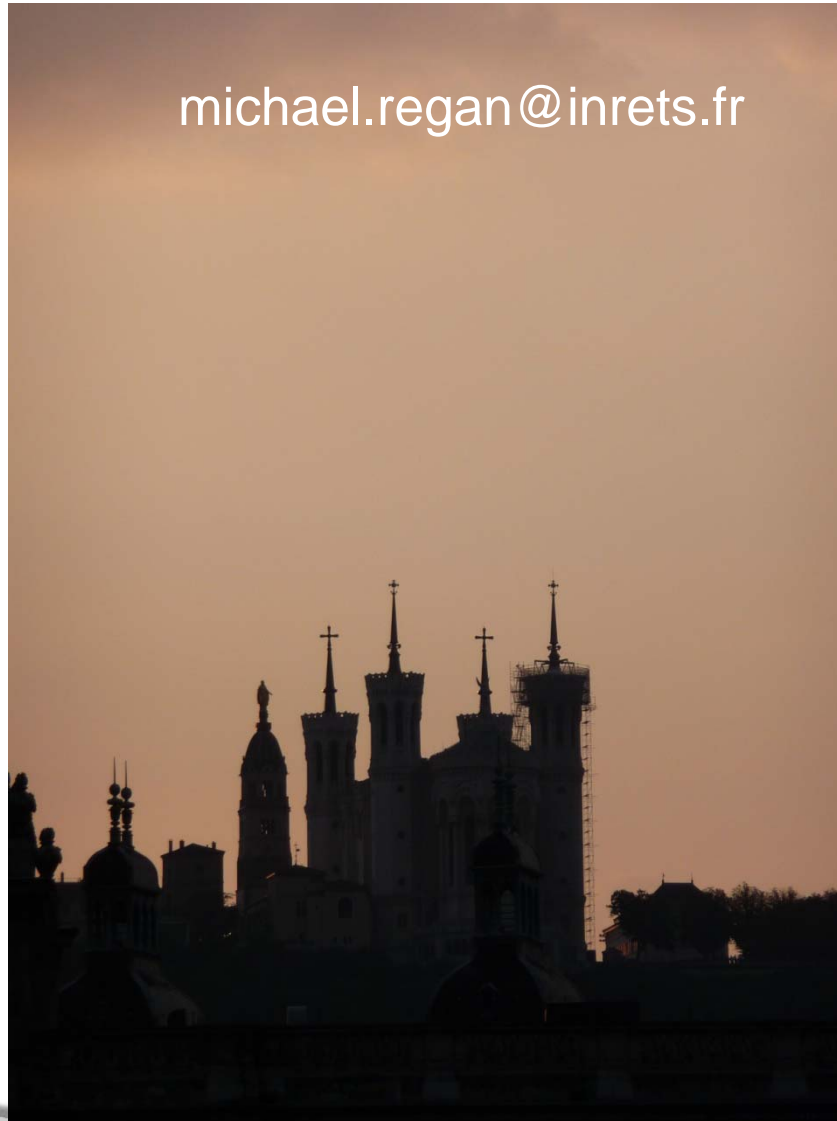
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The End

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