

# *Fit to Drive*

7<sup>th</sup> International Traffic Expert Congress  
25<sup>th</sup> – 26<sup>th</sup> April 2013  
Berlin



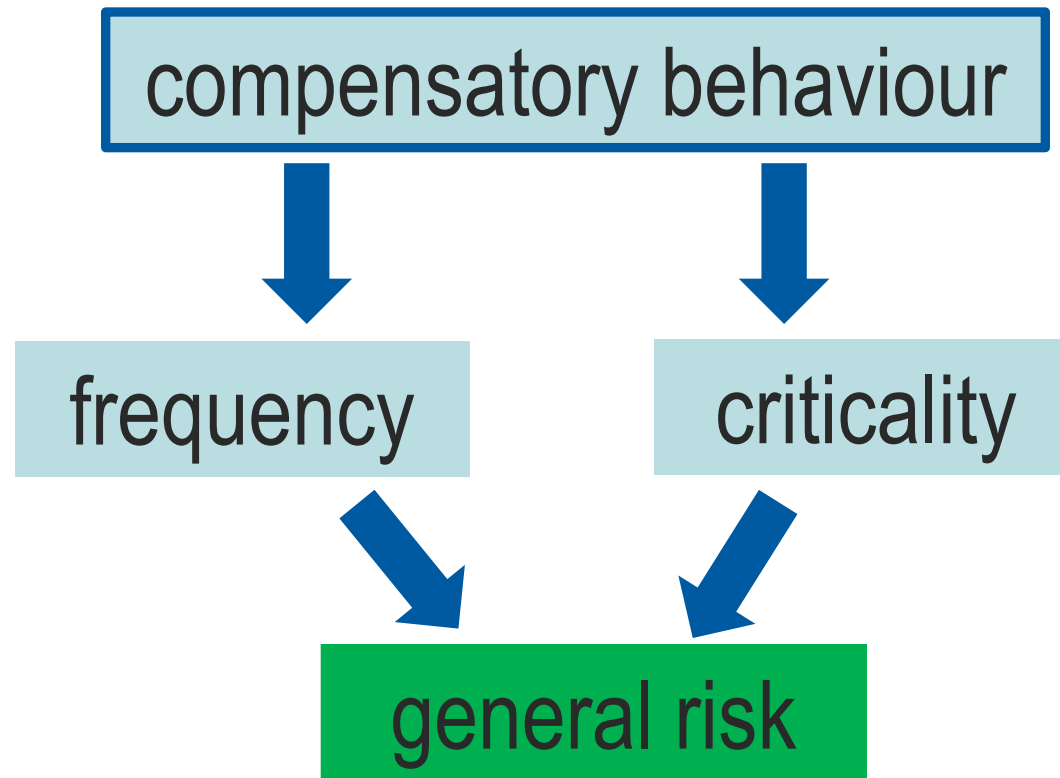
## Compensation strategies of drivers in the interaction with secondary tasks

25.-26. April, Berlin

- Dr. Nadja Schömig & Dr. Barbara Metz
- Wuerzburg Institute for Traffic Sciences WIVW GmbH

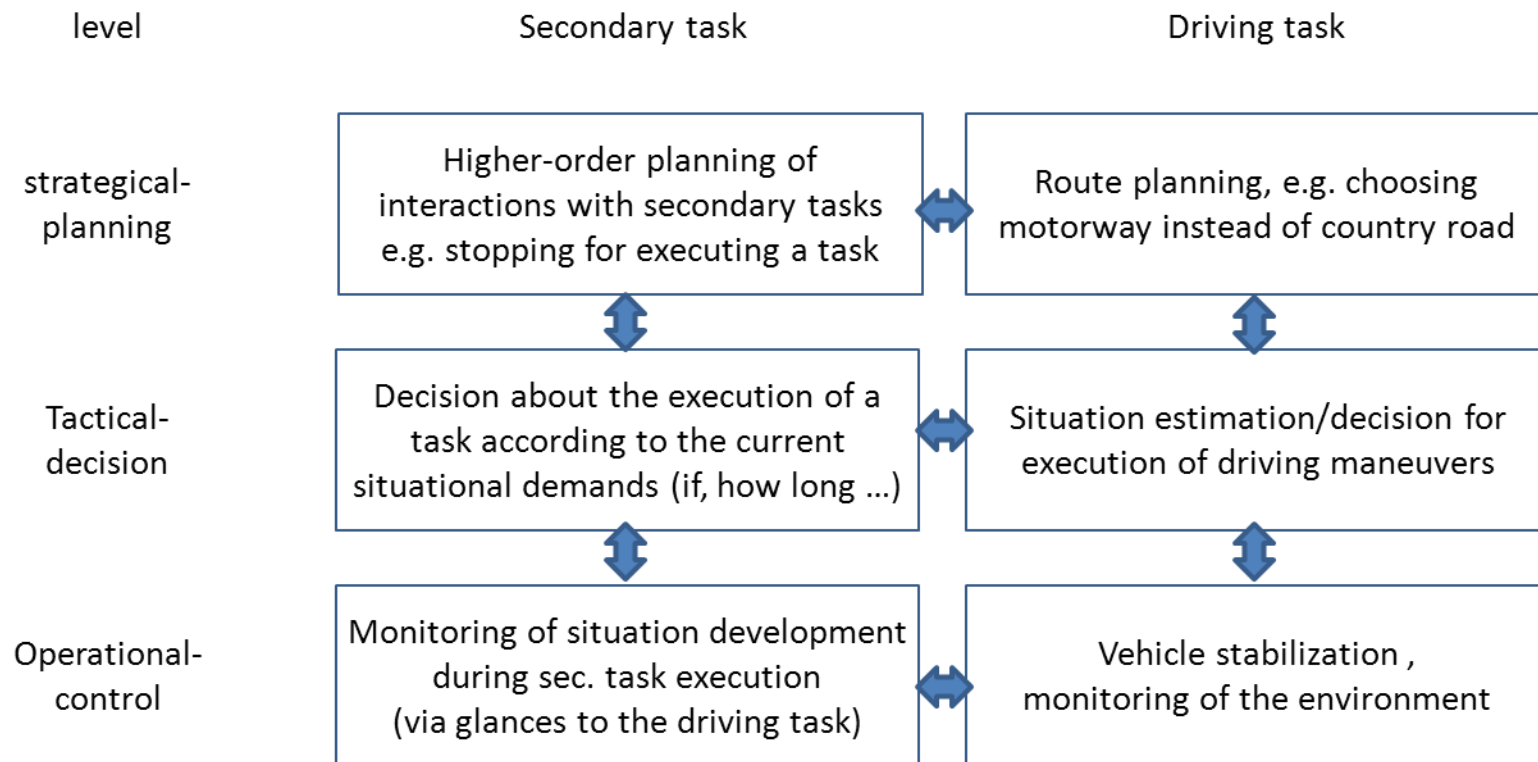


## Risk assessment of secondary task engagement while driving





## Theoretical assumptions for compensational behaviour in the interaction with secondary tasks





## Chosen approaches

- **Simulator study with deciding-to-be-distracted approach**

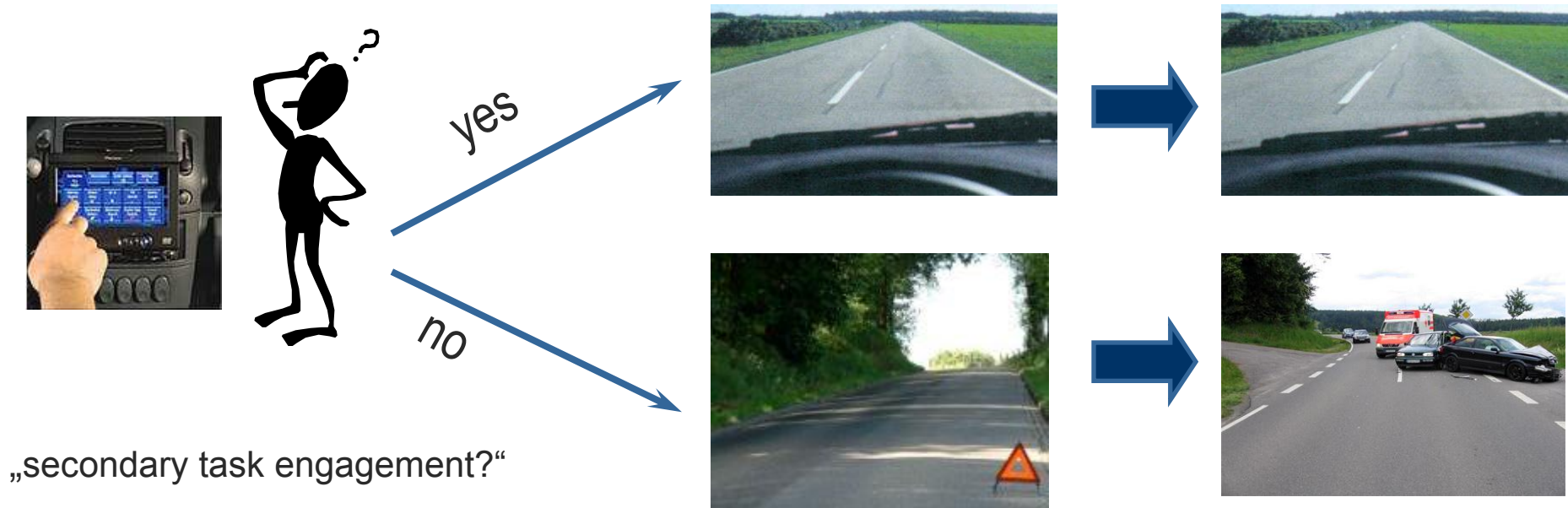
- Schömig, N., Metz, B. & Krüger, H.-P. (2011). Anticipatory and control processes in the interaction with secondary tasks while driving. *Transportation Research Part F*, 14 (6), 525-538.
- Metz, B., Schömig, N. & Krüger, H.-P. (2011). Attention during visual secondary tasks in driving: Adaptation to the demands of the driving task. *Transportation Research Part F*, 14, 369-380.

- **Naturalistic driving study (euroFOT)**

- Metz, B., Landau, A., Hargutt, V. & Neukum, A. (in preparation). Naturalistic Driving Data- Reanalyse von Daten aus dem EU-Projekt euroFOT. Forschungsbericht der Forschungsvereinigung Automobiltechnik (FAT e.V.)
- Sanchez, D. et al. (2012). Deliverable 6.3. Final results: User acceptance and user-related aspects. Published Deliverable of the European Project euroFOT European Large-Scale Field-Operational Tests on In-Vehicle Systems. 7<sup>th</sup> Framework Programme of the European Commission Information and Communication Technologies.



## Simulator study with deciding-to-be-distracted approach







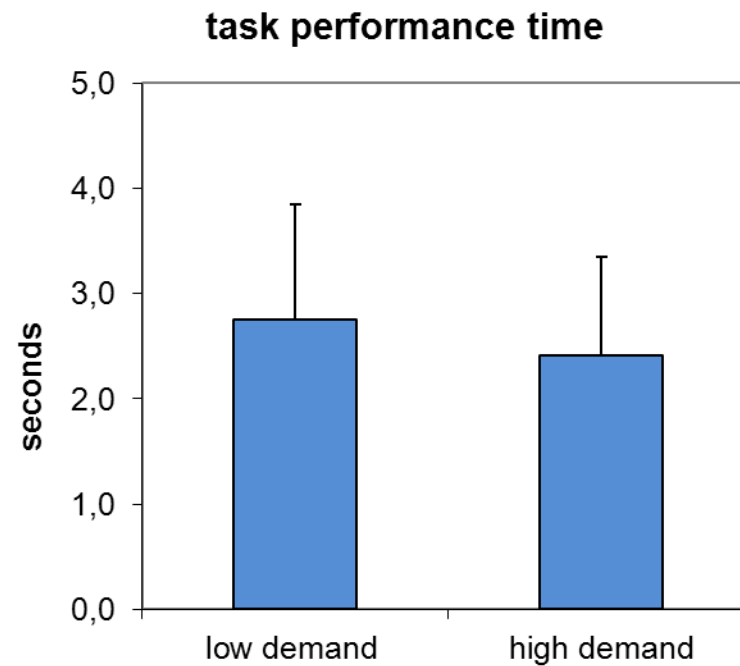
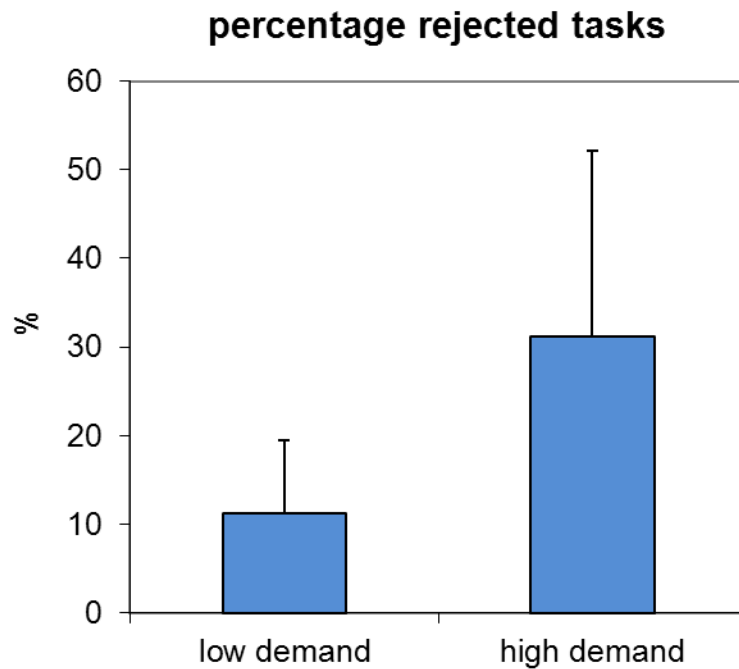
## Drivers decide on secondary task engagement situation-dependently

- **Variation of situation criticality**
- **Secondary task offer shortly before situation**
- **Artificial number task**
- **Situation-dependent decision required**
  - **Within a fix time interval**
  - **Accept/shortly delay/reject the task?**
- **Interruption of task if required by situation**





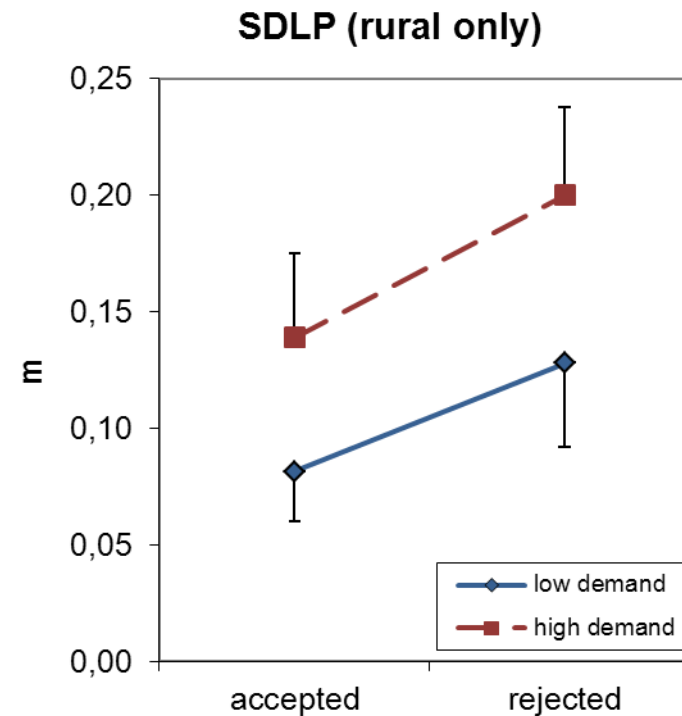
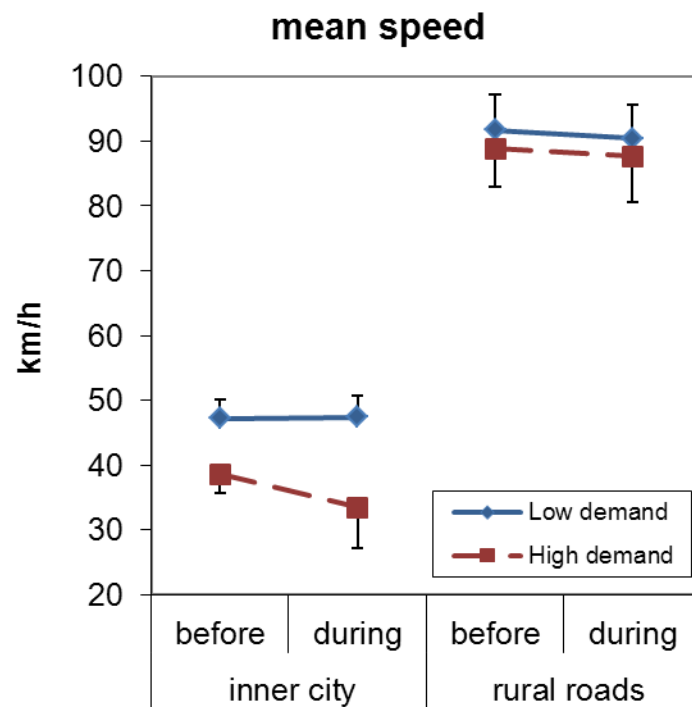
# Compensation w.r.t secondary task interaction



(Schömig, Metz & Krüger, 2011)



## Compensation w.r.t driving performance



(Schömig, Metz & Krüger, 2011)





# Naturalistic driving study (euroFOT)



- Objective driving data for 100 drivers over 3 months
- 40.000 trips with about 15000 hours driving and 1.000.000 km
- Analysed secondary task performance (via CAN-data)
  - usage of navigation system
    - (integrated and portable)
  - Hands-free telephoning



(Metz, Landau, Hargutt & Neukum, in preparation)



## Compensation w.r.t secondary task interaction

Secondary task	standstill	<10 km/h	urban	rural	highway			
			>10 km/h	> 10 km/h	< 110km/h	110-160 km/h	> 160 km/h	
Hands-free telephoning								--
Integrated navigation system	++	++	++	--	--	--	--	--
Mobile device	++	++		--	--	--	--	--

(summarized from Metz, Landau, Hargutt & Neukum, in preparation and Sanchez et al. 2013 )



## Compensation w.r.t driving performance (navigation system only)

		Integrated system			Portable device		
		highway	rural	urban	highway	rural	urban
descriptive	Diff(v)	-	<<	<<	-	<<	-
	m(THW)	-	>	>>	-	>	>>
	sdlp	-	-	-	>>	-	>>
safety-relevant	% crit (THW)	<<	-	-	<<	-	-
	% crit (TTC)	<<	-	<<	<<	-	<<
	% crit TLC	<<	-	-	-	-	-

(Metz, Landau , Hargutt & Neukum, in preparation)



# conclusion

- **Consideration of compensational behaviour of drivers in the interaction with secondary tasks is crucial for a proper risk assessment of distraction effects**
- **Compensational behaviour can be seen on two levels**
  - **Secondary task interaction (situation-dependent decisions)**
  - **Driving performance**
- **Compensational behaviour can be verified by different methods**
  - **Experimental approaches allowing drivers to decide about secondary task engagement**
  - **Naturalistic driving settings**

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