Distracted Driving and Risk of Road Crashes Across Drivers of Different Age Groups

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Background and Research Needs

- Naturalistic driving studies have shown
  - Secondary tasks engagement ➡ CNC* ⬆
- Risk increases ~4 times due cell phone use compared to alert driver.
- Only investigated adult/experienced drivers

- Need: Prevalence and Risk for:
  - Novice driver's secondary tas
  - Young adults
  - Senior drivers

* CNC- Crash/near crashes

What Is a Naturalistic Driving Study?

- No experimenter present
- Participants drive as they normally would
- Collected (preferably) in privately owned vehicles
- Unobtrusive instrumentation
- Provide:
  - Detailed pre-crash information
  - Real-life behaviors
  - Rich databases for subsequent mining

Data Acquisition Systems (DASs)

➤ NextGen

- o Highly configurable
- o Quickly installed within any vehicle
- o Large capacity data collection
- o Provides a wide array of I/O options
- o Distributed sensors network, including NTSC cameras for flexibility

NextGen DAS

SHRP 2…at a Glance

- The Second Strategic Highway Research Program Naturalistic Driving Study (SHRP 2 NDS)
- Largest naturalistic driving study ever undertaken
  - 3,542 drivers, diverse age/gender groups
  - 4,368 data years; 5,512,900 trip files
  - Up to 2 years of data collection per participant
  - Light vehicles & SUVs
- Six data collection sites
- Data useful for next generation of researchers
  - > 1,600 crashes
  - > 2,900 near-crashes ("it would have been a crash, but…")
  - 32,475,671 miles of driving
  - **~2 petabytes of data (1 PB = 1,024 TB = 1,048,576 GB)**
- Huge logistical challenge…

Seattle, WA
Buffalo, NY
State College, PA
450 DAS
Bloomington, IN
150 DAS
Durham, NC
300 DAS
Tampa, FL

Please no Recording/Picture taking of the following slides.

Thank you!

Video Coding and Analysis

- High g-force and/or short TTC events ➡ CNC
  - Coded 5 sec before/ 1sec after each crash & near crash onset
- Random sample of non-crash road segments
  - Stratified sampling by Vehicle Miles Travelled
- Quality Control and Assurance
  - Training, protocols, spot-checking and inter-rater testing
- **Analysis-** Mixed effects logistic regression
  - Random intercept (account for within-driver correlations)

Preliminary SHRP2 Prevalence Results

	Age 16-20	Age 21-29	Age 30-64	Age 65-98
Overall distraction	58%	57%	52%	40%
Overall cell use	9%	11%	5%	0.9%
Cell talking	3%	6%	3%	0.7%
Cell visual-manual tasks	5%	6%	2%	0.2%
Talking/singing	12%	10%	6%	4%
Interact with passenger	18%	15%	15%	15%
Drinking	1%	1%	2%	0.8%
Eating	2%	2%	3%	1%
Look outside of vehicle	0.7%	0.8%	1%	1%
Reaching for in-vehicle objects(not cellphone)	0.9%	1%	1%	1%
Operate in-vehicle device	4%	4%	3%	3%

Preliminary SHPR2 Crash Risk Calculations by Age

Secondary Task	ORs by Age Group			
	Age 16-20	Age 21-29	Age 30-64	Age 65-98
Overall distraction	**2.1**	**2.7**	**1.5**	**1.7**
Overall cell use	**3.4**	**4.0**	**2.2**	**5.3**
Cell talking	**2.2**	**2.8**	1.5	2.3
Cell visual-manual tasks	**4.2**	**5.9**	**3.2**	**19.0**
Talking/singing	1.4	**2.1**	1.4	0.9
Interact with passenger	**1.5**	1.6	1.0	1.0
Drinking	1.6	**3.1**	1.6	1.0
Eating	2.0	**3.6**	0.3	2.8
Look outside of vehicle	**10.6**	**8.0**	**5.7**	**5.6**
Reaching for in-vehicle objects(not cellphone)	**7.9**	**12.4**	**10.8**	**6.6**
Operate in-vehicle device	**2.2**	**3.5**	1.7	2.0

Driving Transportation with Technology

VTTI

Conclusions

- Many types of secondary tasks increase crash risk for drivers of all ages—not just wireless devices.

- Risk of crash occurrence for novice drivers is highest for those tasks that require their eyes off the road.
  - Talking on cell phone increases risk for younger drivers.

- Supports hand-held

device bans for novice drivers.

- Supports texting ban for drive

QUESTIONS??

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