Distracted Driving and Crash Risk Across Drivers of Different Age Groups

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Naturalistic driving studies have shown:
- Secondary tasks engagement \( \rightarrow \) CNC* \( \uparrow \)
- Risk increases \( \sim 4 \) times due cell phone use compared to alert driver.
- Only investigated adult/experienced drivers

Need: Prevalence and Risk for:
- Novice drivers
- 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
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...
Please no Recording/Picture taking of the following slides.

Thank you!
Video Coding and Analysis

- High g-force and/or short TTC events → crash
  - Coded 5 sec before/1 sec after each 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)
Prevalence of Secondary Task Engagement

Percent of Control Segments

Overall Distraction
Overall Cell phone
Cell phone visual-manual
Cell phone: Talking

16 - 20 Year Olds
21-29 Year Olds
30-64 Year Olds
65 + Year Olds
Crash Risk by Secondary Task Type

Odds Ratio (Risk Calculation)

16 - 20 Year Olds  30-64 Year Olds  65 + Year Olds

Overall Distraction  Overall Cell phone  Cell phone visual-manual  Cell phone: Talking
Other High Risk Secondary Tasks

- Interacting with passenger increased risk for 16-20 year old drivers (OR: 1.4)

- For all ages:
  - External distractions (10 for 16-20 YO)
  - Reaching for objects (12 for 21-29 YO)
  - Operating in-vehicle devices (3.5 for 21-29 YO)

- 21 to 29 YO had highest risk on many of the secondary tasks
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 drivers of all ages.
Sponsors

- Transportation Research Board – National Academies of Science
QUESTIONS??

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