Distracted Driving and Risk of Road Crashes Among Novice and Experienced Drivers

Charlie Klauer, Feng Guo, Bruce Simons-Morton, Marie Claude Ouimet, Suzie Lee, and Tom Dingus

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Background

- Previous naturalistic driving studies have shown that some secondary tasks increase involvement in CNC.
- Case-crossover studies have estimated risk of cell phone use to be ~4 times that of alert driver.
- These studies were conducted on adult/experienced drivers...we wanted to look at novice driver’s secondary task engagement
  - prevalence
  - risk
100 Car Naturalistic Driving Study: Method

- Collected data on 100 private and leased vehicles in metro Washington, DC.
- Drivers were not coached or instructed to perform any specific actions other than drive as they normally would.
- Instrumentation is unobtrusive
- Collect continuous data for 12 months
Naturalistic Teenage Driving Study: Method

• Instrument 42 private vehicles with highly capable data collection systems
  • Collected continuous data beginning within 2 weeks of licensure and continuing for 18 months
    • 25 teens ‘own’ vehicle/17 teens share vehicle with parents
    • 50% male/50% female participants
  • Video, video snapshots, driving performance data, and questionnaire data
Case Cohort Design

- ID crashes/near crashes (CNC) by reviewing high g-force and/or short TTC events
  - Coded 5 sec before/1 sec after each crash & near crash onset
- Random sample of non-crash road segments
  - Stratified sampling by VMT
- Mixed effects logistic regression
  - Random intercept (account for within-driver correlations)
Percent of control samples over time where novice and adult drivers engaged in high-risk secondary tasks.
### Secondary Task Engagement and CNC (Random Effects Logistic Regression)

<table>
<thead>
<tr>
<th>Secondary Task</th>
<th>NTDS (Novice Drivers)</th>
<th>OR</th>
<th>95% CI</th>
<th>100-Car Study (Experienced Drivers)</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone - Texting</td>
<td>4.3</td>
<td>1.9/10.0</td>
<td>n/a</td>
<td>Phone - Dialing</td>
<td>7.8</td>
<td>2.7/23.1</td>
</tr>
<tr>
<td>Phone - Dialing</td>
<td>7.8</td>
<td>2.7/23.1</td>
<td>2.5</td>
<td>1.4/4.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phone - Talking</td>
<td>0.8</td>
<td>0.4/1.5</td>
<td>0.7</td>
<td>0.5/1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phone - Reaching</td>
<td>4.7</td>
<td>1.8/11.7</td>
<td>1.4</td>
<td>0.3/6.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object (not phone) - reaching</td>
<td>7.8</td>
<td>3.5/16.8</td>
<td>1.2</td>
<td>0.6/2.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roadside Object - looking</td>
<td>3.7</td>
<td>1.7/8.5</td>
<td>0.7</td>
<td>0.4-1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio/HVAC – managing</td>
<td>1.4</td>
<td>0.8/2.7</td>
<td>0.5</td>
<td>0.3/0.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle Operations - performing</td>
<td>2.5</td>
<td>0.9/7.3</td>
<td>0.6</td>
<td>0.2/2.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eating</td>
<td>3.3</td>
<td>1.5/7.2</td>
<td>1.3</td>
<td>0.7/2.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drinking (non-alcoholic)</td>
<td>1.3</td>
<td>0.3/5.7</td>
<td>0.4</td>
<td>0.2/1.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Risk of Single Longest Glance

Odds Ratio

Greater than 1s versus <1s
Greater than 2s versus <2s
Greater than 3s versus <3s
Greater than 4s versus <4s
Greater than 5s versus <5s

1.7
3.8
6.0
7.2
8.9
Risk of Time Eyes Off Forward Roadway

Odds Ratios

- Greater than 1s versus <1s
- Greater than 2s versus <2s
- Greater than 3s versus <3s
- Greater than 4s versus <4s
- Greater than 5s versus <5s

Odds Ratios: 1.2, 1.7, 2.6, 3.5, 5.9
Risk of Single Longest Glance While Using Wireless Device

- Greater than 1s versus <1s: Odds Ratio 1.3
- Greater than 2s versus <2s: Odds Ratio 5.5
- Greater than 3s versus <3s: Odds Ratio 66.0

Odds Ratios
Conclusions

- Prevalence of high risk secondary task engagement increases over time for novice drivers.
- Risk of CNC occurrence for novice drivers is primarily for those tasks that require their eyes to be averted from the forward roadway.
  - Tasks like talking did not increase risk.
- The longer novice drivers look away from the road, their risk increases.
- This research supports hand-held device bans for novice drivers.