Social Influences on Adolescent Health Behavior

Bruce Simons-Morton, EdD, MPH
Senior Investigator and Chief, Prevention Research Branch
National Institute of Child Health and Human Development
National Institutes of Health

7th Annual Michael & Susan Dell Lectureship in Child Health and
Guy Parcel Commemorative Presentation
ECOLOGICAL PERSPECTIVE

Levels of Social Influence

Parents

Peers

Individual

Family & Interpersonal

Neighborhood & Community

Society
Peers can influence teenage driving behavior in which way?

1. Providing physical distractions
2. Social influences like peer pressure
3. Role-modeling
4. All of the above
Peer Influence Processes

Friendship Formation
- Selection – make friends with similar others
- Socialization – become more like friends

Influence Mechanisms
- Pressure
- Social norms
  - Prevalence
  - Expectations
THE GOING PLACES STUDY
Average Combined Substance Use, 6-9th Grade

Adolescents

Friends

N=927

Simons-Morton et al., Prevention Research, 2005
Auto-regressive Latent Trajectory Analyses

n=1484

Simons-Morton, Chen et al., Addictive Behavior, 2005

N=927
Social Influences on Adolescent Substance Use

Summary

- Peer use is a good predictor of adolescent use.
- Peers share norms and behavior.
- Socialization and selection mechanisms operate.
Social Influence and The Young Driver Problem

- MVC leading cause of teen injury and death
- Young Driver Problem is poorly understood
- Model for studying adolescent
  - Learning
  - Risk taking
  - Social influence
What is the most likely reason an inexperienced driver will crash?

1. The driver is not mature enough to maneuver the vehicle effectively
2. The driver is still developing complex skills and judgment
3. The driver is male
4. The driver is in an unfamiliar place

25% 25% 25% 25%
THE YOUNG DRIVER PROBLEM
Driver Fatal Crash Involvement/Million Miles

The graph shows the age distribution of fatal crashes involving drivers, categorized by gender. The x-axis represents age, ranging from 16 to 85+, and the y-axis represents the number of million miles driven. The graph indicates a higher incidence of fatal crashes among younger drivers, with a sharp peak for males aged 16-19 years, followed by a decline and then an increase for older drivers. Females show a similar pattern but with a generally lower rate of fatal crashes across all age groups compared to males. The data suggests that young drivers are at higher risk of fatal crashes.
THE YOUNG DRIVER PROBLEM

Inexperienced Drivers Crash At High Rates

Twisk, Stacy, 2007
Teen Driving Risks

- Inexperience
- Young age
- Risky driving
- Secondary task engagement
- Teen passengers
A. Purpose: examine the variability in novice teen driving performance

B. Overview
   - N = 42 teens and 54 parents, 18-months of driving
   - Continuous data collection
   - Instrumentation: accelerometers, cameras, GPS

C. Outcomes of interest
   - Crash and Near Crash
   - Elevated g-force event rates (kinematic risky driving)
   - Speeding
   - Secondary task engagement/distraction

D. Covariates: surveys at 0, 6, 12, and 18 months
NTDS DATA Collection
Novice Teens vs Experienced Adult
NATURALISTIC TEEN DRIVING STUDY
Crash/Near Crash – Teens and Parents

IRR=3.91

NATURALISTIC TEEN DRIVING STUDY
Crash/Near Crash Trajectory Classes

Guo, Simons-Morton, Klauer, 2013
Why do teens drive better with their parents than when they drive solo or with other teens?

1. Teen drivers know how to drive safely but choose not to when their parents are absent.

2. Teen drivers don’t like driving with their parents.

3. Parents make teens feel more confident.
NatUralistic Teen Driving Study
Teen Risky Driving

Kinematic Risky Driving Rates

IRs for g-force rates/100 miles

Time since licensure (3-month time periods)

Parent driver
Teen driver with no passengers

NATURALISTIC TEEN DRIVING STUDY
Teens know how to drive safely!

**Kinematic Risky Driving Rates**

IRs for g-force rates/100 miles

- Parent driver
- Teen driver with no passengers
- Teen driver with adult passengers

How frequently do you text while driving?

1. Very often
2. Sometimes
3. Rarely
4. Never
Secondary Task Engagement and Crash/Near Crash Among Adult Drivers

<table>
<thead>
<tr>
<th>Secondary Task</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone - Texting</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Phone - Dialing</td>
<td>2.5</td>
<td>1.4/4.5</td>
</tr>
<tr>
<td>Phone - Talking</td>
<td>0.7</td>
<td>0.5/1.1</td>
</tr>
<tr>
<td>Phone - Reaching</td>
<td>1.4</td>
<td>0.3/6.1</td>
</tr>
<tr>
<td>Object (not phone) - reaching</td>
<td>1.2</td>
<td>0.6/2.3</td>
</tr>
<tr>
<td>Roadside Object - looking</td>
<td>0.7</td>
<td>0.4/1.2</td>
</tr>
<tr>
<td>Radio/HVAC – managing</td>
<td>0.5</td>
<td>0.3/0.9</td>
</tr>
<tr>
<td>Vehicle Operations - performing</td>
<td>0.6</td>
<td>0.2/2.7</td>
</tr>
<tr>
<td>Eating</td>
<td>1.3</td>
<td>0.7/2.1</td>
</tr>
<tr>
<td>Drinking (non-alcoholic)</td>
<td>0.4</td>
<td>0.2/1.2</td>
</tr>
</tbody>
</table>

Klauer, Simons-Morton et al., submitted
## Secondary Task Engagement and Crash/Near Crash – Teen Drivers

<table>
<thead>
<tr>
<th>Secondary Task</th>
<th>NTDS</th>
<th>100-Car Study</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Novice Drivers)</td>
<td>(Experienced Drivers)</td>
<td>OR</td>
<td>95% CI</td>
</tr>
<tr>
<td>Phone - Texting</td>
<td>4.3</td>
<td>1.9/10.0</td>
<td>n/a</td>
<td>n/a</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>
</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>
</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>
</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>
</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>
</tr>
<tr>
<td>Radio/HVAC – managing</td>
<td>1.4</td>
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<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>
</tr>
</tbody>
</table>

Klauer, Simons-Morton et al., submitted
TEST TRACK RESEARCH
Cell Phone Use Approaching Signal
TEST TRACK RESEARCH
Intersection Stopping Behavior

Percentage Who Stopped

<table>
<thead>
<tr>
<th>Time 1</th>
<th>Time 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teen</td>
<td>Adult</td>
</tr>
<tr>
<td>N=16</td>
<td>N=16</td>
</tr>
</tbody>
</table>


200' w/phone
Teen Passengers
Teen Passengers Increase Crash Risk

Chen, Baker, 2003

NPTS & NASS/GES

Fatal crashes/10,000 trips
Observing Teen Drivers Leaving High School

10 area high schools; 3000 observations
Compared teen drivers with usual traffic
- Speed - radar gun
- Close following - video

Simons-Morton. Lerner, Singer, AAP, 2005
Teen Driver Speed by Driver and Passenger Type

Simons-Morton et al, AAP, 2005
TEEN PASSENGER SIMULATION STUDY
Purpose: examine the effect of teenage passengers on teen simulated risky driving

Collaboration with University of Michigan Transportation Research Institute (UMTRI)
Simulated Driving Scenarios
Driving Simulator
Confederate Passenger
## Teen Passenger Study #1 (n=58)

### Passenger Effects (ANOVA)

<table>
<thead>
<tr>
<th>Outcome/Condition</th>
<th>Passenger</th>
<th>Solo</th>
<th>T</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>% no stop</td>
<td>30%</td>
<td>23</td>
<td>24%</td>
<td>0.22</td>
</tr>
<tr>
<td>% red time</td>
<td>22%</td>
<td>17</td>
<td>17%</td>
<td>0.16</td>
</tr>
</tbody>
</table>

Bingham, Simons-Morton et al., Health Psychology, in press
## Social Pain from Cyberball

<table>
<thead>
<tr>
<th>Variable</th>
<th>Beta</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyber_AI_subACC</td>
<td>0.308</td>
<td>3.082</td>
<td>0.004</td>
</tr>
<tr>
<td>X Passenger Type</td>
<td>0.264</td>
<td>2.467</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

Falk, Bingham, Simons-Morton, et al., under review
Parent Management of Novice Teen Driving

Hartos, Simons-Morton. 2001
### The Checkpoints Parent-Teen Driving Agreement

**PART I: DRIVING RULES**  These are absolutes — ones that apply to every trip, every time

<table>
<thead>
<tr>
<th>Teen driver will:</th>
<th>Parent will:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Always obey all traffic laws</td>
<td>□ Be a good role model behind the wheel</td>
</tr>
<tr>
<td>□ Never speed, tailgate, or cut others off</td>
<td>□ Point out and discuss safe and dangerous driving situations and practices</td>
</tr>
<tr>
<td>□ Always wear a seat belt and require all passengers to wear seat belts</td>
<td>□ Apply rules fairly and consistently</td>
</tr>
<tr>
<td>□ Never drive after taking any drugs or alcohol or ride with a driver who has taken any drugs or alcohol</td>
<td>□ Consider <em>necessary</em> exceptions to driving limits</td>
</tr>
<tr>
<td>□ Always tell parent/guardian where going and with whom</td>
<td>□ Provide a safe ride home (no questions asked at that time)</td>
</tr>
<tr>
<td>□ Always call home if going to be late</td>
<td></td>
</tr>
<tr>
<td>□ Always call home if for any reason it is not safe to drive or ride</td>
<td></td>
</tr>
</tbody>
</table>

**PART II: DRIVING PRIVILEGES**  These need to be tailored to your teen's driving progress

<table>
<thead>
<tr>
<th>DRIVING PRIVILEGES</th>
<th>Nighttime</th>
<th>Teen passengers</th>
<th>Weather</th>
<th>Road types</th>
<th>Review date</th>
<th>We agree</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checkpoint 1</td>
<td>8 pm</td>
<td>None</td>
<td>Dry</td>
<td>Local</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Month 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checkpoint 2</td>
<td>9 pm</td>
<td>None</td>
<td>Moderate</td>
<td>No high speed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Months 2-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checkpoint 3</td>
<td>11 pm</td>
<td>1</td>
<td>Most</td>
<td>Most</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Months 7-12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**WE AGREE (sign)**  

__________________________  ______________________________  
PARENT  TEEN
A teen should be required to drive with an event recording device installed in the vehicle.

1. Strongly agree
2. Agree
3. Disagree
4. Strongly disagree
5. Unsure
Event Recorders Provide Feedback and Enable Parent Monitoring
DriveCam TeenSafe Driver Feedback

Risk Level
Risk Level is Low as of Tuesday, October 30, 2007

Overall Performance for the Last 12 Weeks

Events
New Events: 0
Overdue Events: 6
View events for Caitlin Butler (teen - girl)
DriveCam Evaluation Study

Randomized Trial:
Group #1: Immediate Feedback to Teen (LO)
Group #2: Lights+ Feedback to Family (DC)

Simons-Morton, Bingham, et al.,
Journal of Adolescent Health, in press
More laws should be developed to ban texting while driving.

1. Strongly agree
2. Agree
3. Disagree
4. Strongly disagree
5. Unsure
Thank you!

Collaborators

UMass

DriveCam Inc

CDM, Inc

U Michigan

Virginia Tech