GIEU 2011 China Trip
Improving Road Safety in China - Engineering, Enforcement, and Education

Jingwen Hu, PhD
UMTRI-Biosciences

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Global Intercultural Experience for Undergraduates (GIEU) Program

• Funds global educational projects that expand learning beyond traditional classroom boundaries
• Sends groups of 12-15 undergraduate students to exciting locations in the U.S. and around the world for 3 – 4 weeks
• Faculty members need to propose site locations and “themes” of the trip
• The program commenced in 2002
14 Teams: Chile, Chinax2, Detroit, El Salvador, Gabon, Greece, Indonesia, Italy, Kenya, New Zealand, Spain, Viet Nam and Laos, Virgin Islands
GIEU 2011 China Team
GIEU 2011 China Trip

• Time: July 10 – August 6 (4 weeks)
• Location: Tianjin & Beijing
• Objective:
  – For GIEU students to experience the "Chinese Transportation Culture" through interactive activities with Chinese people to explore road safety in Chinese society
Host Institutions

• Xinhua Middle/High School in Tianjin

• Tsinghua University in Beijing
Tasks

- Partner with Chinese students to investigate the seatbelt and child safety seat use rate through observations.
- Conduct interviews with Chinese people to get their opinions of road safety.
- Visit automotive companies, car dealers, and transportation research centers.
- Experience first-hand, modern Chinese culture.
Road Safety in China

- China is experiencing dynamic urbanization and motorization due to rapid economic growth.
- Road traffic injury has become a major public health problem in China.
- Reducing road traffic injuries not only requires safer cars and better roads through "Engineering", but also requires safety laws with stronger "Enforcement" and higher public awareness through "Education".
Road Safety in China

- Every year, nearly 100,000 people die from car accidents in China.
- The effectiveness of seatbelt use to reduce fatality is 55%.
- The effectiveness of child restraint to reduce fatality is over 60%.
- The seatbelt use rate in China is unclear.
- There is no regulation for child seat use in China.
Chinese Transportation Culture

Modern China

No Child Seat

Mixed Traffic

Bike Routine
Road Safety in China

Each bubble represents a province in China or a state in the US

From Zhang et al. (2011) AAP
A Cab Tour in Tianjin
After A Cab Tour in Tianjin

Dirt mark from seat belt
Chinese Invention

Seat belt warning system deactivator
Steps to Quantify Seat Belt Use Rate

1. Define area and vehicle type
2. Select observation sites
3. Select observation date and time
4. Observation training
5. Conduct observation at sites
6. Estimate the seat belt use rate

David Eby, UMTRI-2000-19
• Conduct observation at sites
  – Count all target vehicles on all designated traffic lanes for 5 minutes and record this number on the site form
  – Observe seat belt use for 20 minutes
    • Whether the driver and the front seat passenger are using a shoulder belt in lane 1
  – Count all target vehicles on all traffic lanes for 5 minutes and record this number on the site form
Seat Belt Use Rate in the US

Year

1983 1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005 2007

Seat Belt Use, In Percent

0 10 20 30 40 50 60 70 80 90

Seat belt use law

Nationwide Campaign

Chinese seat belt law

Seat Belt Use Law

1983

1985

1987

1989

1991

1993

1995

1997

1999

2001

2003

2005

2007
Seat Belt Survey in China
Seatbelt Use Rate Results

• In total, we’ve observed
  – 275 sites
  – Occupants from 20,626 vehicles
  – 28,335 occupants
  – 37,675 vehicle counts
## Seatbelt Use Rate In Tianjin

<table>
<thead>
<tr>
<th>Areas</th>
<th>Driver</th>
<th>Front Seat Passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ancient Culture St.</td>
<td>3.5%</td>
<td>1.7%</td>
</tr>
<tr>
<td>TEDA</td>
<td>8.6%</td>
<td>4.3%</td>
</tr>
<tr>
<td>Random</td>
<td>2.2%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Xinhua</td>
<td>4.7%</td>
<td>1.5%</td>
</tr>
<tr>
<td>CATAR</td>
<td>1.4%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Dagang</td>
<td>2.2%</td>
<td>0.4%</td>
</tr>
<tr>
<td><strong>Weighted Average</strong></td>
<td><strong>3.7%</strong></td>
<td><strong>1.7%</strong></td>
</tr>
</tbody>
</table>
## Seatbelt Use Rate in Beijing

<table>
<thead>
<tr>
<th>Areas</th>
<th>Driver</th>
<th>Front Seat Passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tsinghua</td>
<td>34.7%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Chaoyang</td>
<td>12.8%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Yuanmingyuan</td>
<td>24.8%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Beijing Zoo</td>
<td>27.2%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Heaven Temple</td>
<td>23.8%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Summer Palace</td>
<td>25.0%</td>
<td>7.0%</td>
</tr>
<tr>
<td>798 Art Space</td>
<td>28.2%</td>
<td>5.8%</td>
</tr>
<tr>
<td>Weighted Average</td>
<td>25.2%</td>
<td>5.0%</td>
</tr>
</tbody>
</table>
Cab Drivers Belt Tampering
## Driver seatbelt use, driver gender and automobile types

<table>
<thead>
<tr>
<th>Cities</th>
<th>Male</th>
<th>Female</th>
<th>CAR</th>
<th>ECO</th>
<th>SUV</th>
<th>TAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beijing</td>
<td>57.5% (89.0%)</td>
<td>67.8% (11.0%)</td>
<td>60.9% (84.3%)</td>
<td>43.6% (11.6%)</td>
<td>61.2% (4.0%)</td>
<td>72.0% (20.1%)</td>
</tr>
<tr>
<td>Tianjin</td>
<td>35.4% (90.8%)</td>
<td>51.5% (9.2%)</td>
<td>41.0% (78.0%)</td>
<td>32.5% (15.3%)</td>
<td>50.1% (6.8%)</td>
<td>49.4% (9.0%)</td>
</tr>
</tbody>
</table>
Fact or Fiction?

• Seat belt use rate in China is declining
• City difference is significant in terms of seat belt use rate
• With a primary law, seat belt enforcement is not enough in China
## Child Restraint Survey

<table>
<thead>
<tr>
<th>Type</th>
<th>Infant</th>
<th>Convertible</th>
<th>Combination Booster</th>
<th>Booster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position</td>
<td>Rear-facing</td>
<td>Rear or Forward</td>
<td>Forward-facing</td>
<td>Forward-facing</td>
</tr>
<tr>
<td>Weight</td>
<td>5 – 30 lbs</td>
<td>5 – 65 lbs</td>
<td>20 – 100 lbs</td>
<td>40 – 100 lbs</td>
</tr>
<tr>
<td>Height</td>
<td>Up to 32 inches</td>
<td>Up to 49 inches</td>
<td>Up to 60 inches</td>
<td>Up to 60 inches</td>
</tr>
<tr>
<td>Age</td>
<td>0 – 2</td>
<td>0 – 8</td>
<td>1 – 12</td>
<td>4 – 12</td>
</tr>
</tbody>
</table>
1. 您的年龄
   a) 小于25
   b) 25-35
   c) 35-45
   d) 45-55
   e) 55以上

2. 您的文化程度
   a) 小学及以下
   b) 初中
   c) 高中
   d) 大学本科
   e) 研究生及以上

3. 一般情况下，您在下列情况下使用安全带的比率是多少？（请选择比例）
   a) 自己开车
   b) 前排乘客
   c) 后排乘客
   d) 不确定
   e) 从不

4. 您是否同意一般而言使用安全带是重要的？
   a) 完全同意
   b) 基本同意
   c) 无所谓
   d) 基本不同意
   e) 完全不同意

5. 如果一个中国司机使用安全带，您觉得最重要的是什么？（可选两个）
   a) 已经形成习惯
   b) 避免发生事故
   c) 安全
   d) 公司规定
   e) 安全意识
   f) 其他（请注明：）

6. 如果一个中国司机不使用安全带，您觉得最重要的是什么？（可选两个）
   a) 不舒服
   b) 太麻烦
   c) 速度低不需要
   d) 经常开车不需要
   e) 安全
   f) 其他（请注明：）

7. 对于提高国人的安全带使用率，您觉得最重要的方法是什么？（可选两个）
   a) 加强宣传（电视公益广告、宣传牌等）
   b) 提高法律的效能
   c) 加强执法，增加罚款
   d) 改善安全带的设计使之更好用
   e) 在车内增加安全带提示
   f) 家庭和朋友的督促和鼓励
   g) 其他（请注明：）

8. 如果有12岁以下的小孩在您的车里，您一般会让谁（他）坐在哪个位置？
   a) 前排乘客位置
   b) 后排乘客位置
   c) 不确定
   d) 从不

9. 如果有12岁以下的小孩在您的车里，您一般会让他（她）坐哪种儿童座椅？
   a) 没有座椅
   b) 安全带
   c) 汽车座椅
   d) 儿童增高垫
   e) 儿童安全座椅
   f) 其他（请注明：）

10. 如果有12岁以下的小孩在您的车里，您一般会让他（她）坐哪种儿童安全带？
    a) 自定义
    b) 系好安全带
    c) 防护装置
    d) 其他（请注明：）

11. 您觉得多少种安全带是最重要的？
    a) 不知道需要
    b) 法律没有要求
    c) 安全带很重要
    d) 没有考虑过如何选择安装儿童座椅
    e) 小孩会熟，不需要用
    f) 其他（请注明：）

12. 您觉得提高国人的汽车儿童座椅使用率的最有效方法是什么？（可选两个）
    a) 制定法律，不用儿童座椅会被罚款
    b) 加强宣传（电视公益广告、宣传牌等）
    c) 设计更便宜的儿童座椅
    d) 设计和汽车座椅集成一体化的儿童座椅
    e) 其他（请注明：）
Questionnaire Survey
Car Seat Survey & Questionnaires

• In total, we observed and interviewed:
  – More than 300 parents of children 0-12 YO
  – About 5% parents used child restraints

• In total, we conducted 587 questionnaires for people’s attitude on seat belt and car seat.
Questionnaire Results

• Your Age
  a) <25  
  b) 25-35  
  c) 35-45  
  d) 45-55  
  e) >55
Questionnaire Results

• Your education level:
  a) Elementary school  1.7%
  b) Middle school  8.1%
  c) High school  22.6%
  d) College  50.4%
  e) Post graduate  17.2%
In general, what percentage of the time (%) is it that you will wear a seatbelt in the following situations?

a) you as the driver of the car 59.8%
b) you as the front seat passenger 46.3%
c) you as the back seat passenger 25.6%

What caused the difference between observation and questionnaire?

Social desirability? Vs. Bad timing?
Questionnaire Results

• Do you agree that it is important in general to wear a seatbelt when you drive a car?
  a) Disagree 5.5%
  b) Somewhat Disagree 3.8%
  c) Neither agree or disagree 7.6%
  d) Somewhat Agree 16.0%
  e) Agree 67.2%
Questionnaire Results

- Regarding the reasons why Chinese drivers don’t wear seatbelts, what do you think the most important reasons are?
  a) uncomfortable 19.2%
  b) too much trouble 30.7%
  c) not needed at low speeds 12.8%
  d) only traveling short distances 9.4%
  e) Low safety awareness 20.7%
  f) trust their own driving skill 6.7%
  g) other reasons 0.4%
Questionnaire Results

Regarding the best interventions to increase seatbelt use rate in China, what do you think the most useful interventions are?

a) safety promotions (television ads or signs) - 22.8%
b) driving school training and education - 14.7%
c) law and enforcement improvement - 25.5%
d) make seatbelts more comfortable - 13.4%
e) improve seatbelt warning signals inside the car - 12.9%
f) promote/ask family and friends to encourage drivers to use seatbelts for safety - 9.1%
g) others - 1.6%
Questionnaire Results

• If there are kids younger than 12 in your car, where do they usually sit?
  a) front seat 7.1%
  b) back seat 69.5%
  c) no consistency 13.9%
  d) I don’t drive 9.5%
Questionnaire Results

• If there are kids younger than 12 in your car, what kind of restraint system does he/she wear?
  a) No restraint 16.7%
  b) Seat belt 40.1%
  c) Child safety seat 34.2%
  d) Booster seat 4.3%
  e) Others 4.7%
Questionnaire Results

• Regarding the reasons why Chinese drivers don’t use child safety seat, what do you think the most important reasons are?
  a) Don't know it is necessary 25.4%
  b) No law 24.3%
  c) Child seat is too expensive 19.3%
  d) No resources to learn the importance and how to install them 15.2%
  e) Child complaints 15.6%
  f) Other reasons 0.1%
Questionnaire Results

• Regarding the best interventions to increase child seat use rate in China, what do you think the most useful interventions are?
  a) law enforcement  
  b) education (more signs, commercials, TV program, etc) 
  c) cheaper child seat 
  d) integrated child seat design within the vehicle 
  e) others 

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>law enforcement</td>
<td>23.3%</td>
</tr>
<tr>
<td>education (more signs, commercials, TV program, etc)</td>
<td>35.1%</td>
</tr>
<tr>
<td>cheaper child seat</td>
<td>15.6%</td>
</tr>
<tr>
<td>integrated child seat design within the vehicle</td>
<td>24.2%</td>
</tr>
<tr>
<td>others</td>
<td>1.6%</td>
</tr>
</tbody>
</table>
Drink and Drive in China

Everything that has been done to reduce “drink and drive” in China, can be done to increase seatbelt use rate in China.
What We’ve Learned?

• Seat belt and child seat use rate are extremely low in China.

• China needs a systematic approach, including engineering, enforcement and education to improve road safety
  – Law ≠ Enforcement
  – Consistent enforcement
  – Public awareness
    • Law / benefit / safety technology
  – Science → Decision
Media Coverage

- 4 newspapers
- >10 websites
- Radio station
- Local TV
Documentation

• Team blog: [http://gieuchina.tumblr.com/](http://gieuchina.tumblr.com/)
Acknowledgement

• GIEU program
• Xinhua High School
• Tsinghua University
• UMTRI-Biosciences Group