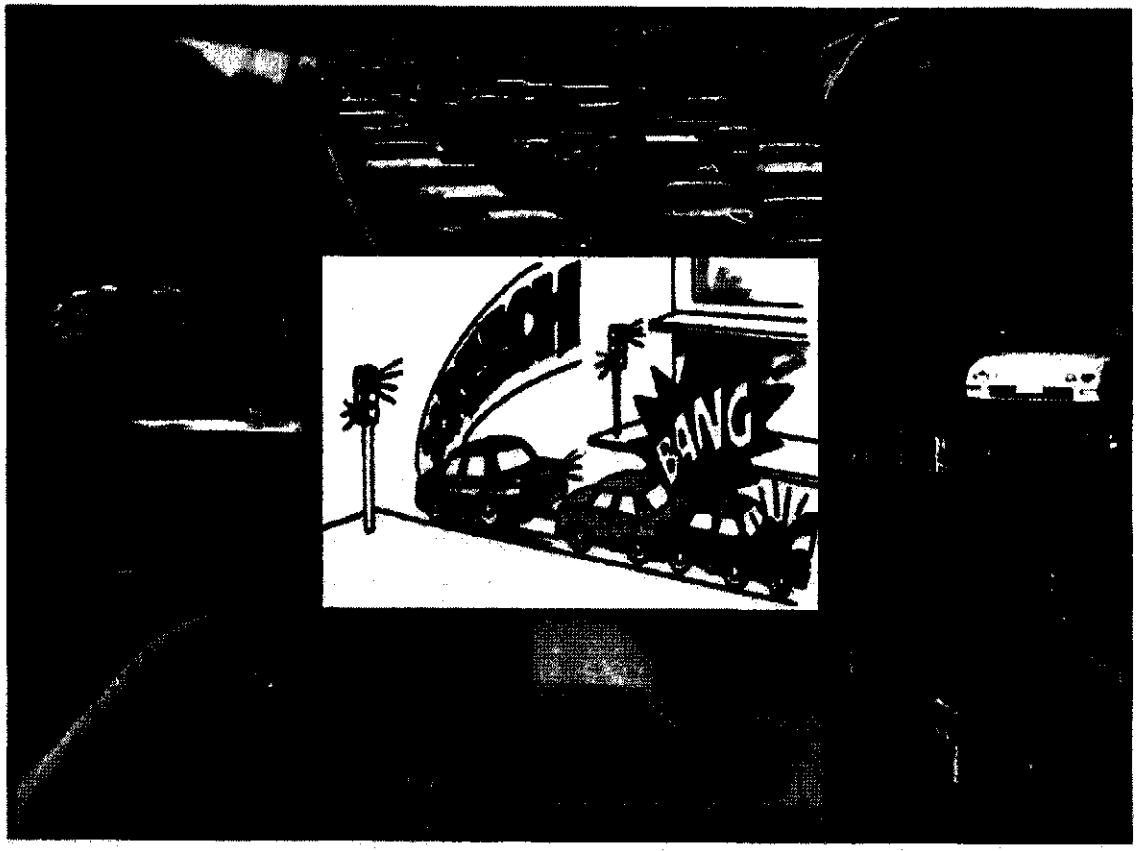
The Relationship Between On-Road Wireless Phone Use and Crashes



NHTSA Advanced Research and Analysis

July 2003

What is Distraction?

Distraction refers to the diversion of attention away from the primary task of driving due to other visual, cognitive, auditory or biomechanical activities.

- **At least 25% of crashes are distraction related.**
- **Examples of sources of distraction include:**

Animals	Eating/Drinking	Reading
Cell Phone	Passengers	Rubber-necking
Children	Radio	Smoking

- **It is not necessary for such activities to result in adverse consequences to be considered a distraction.**

How Do Cell Phones Cause Crashes?

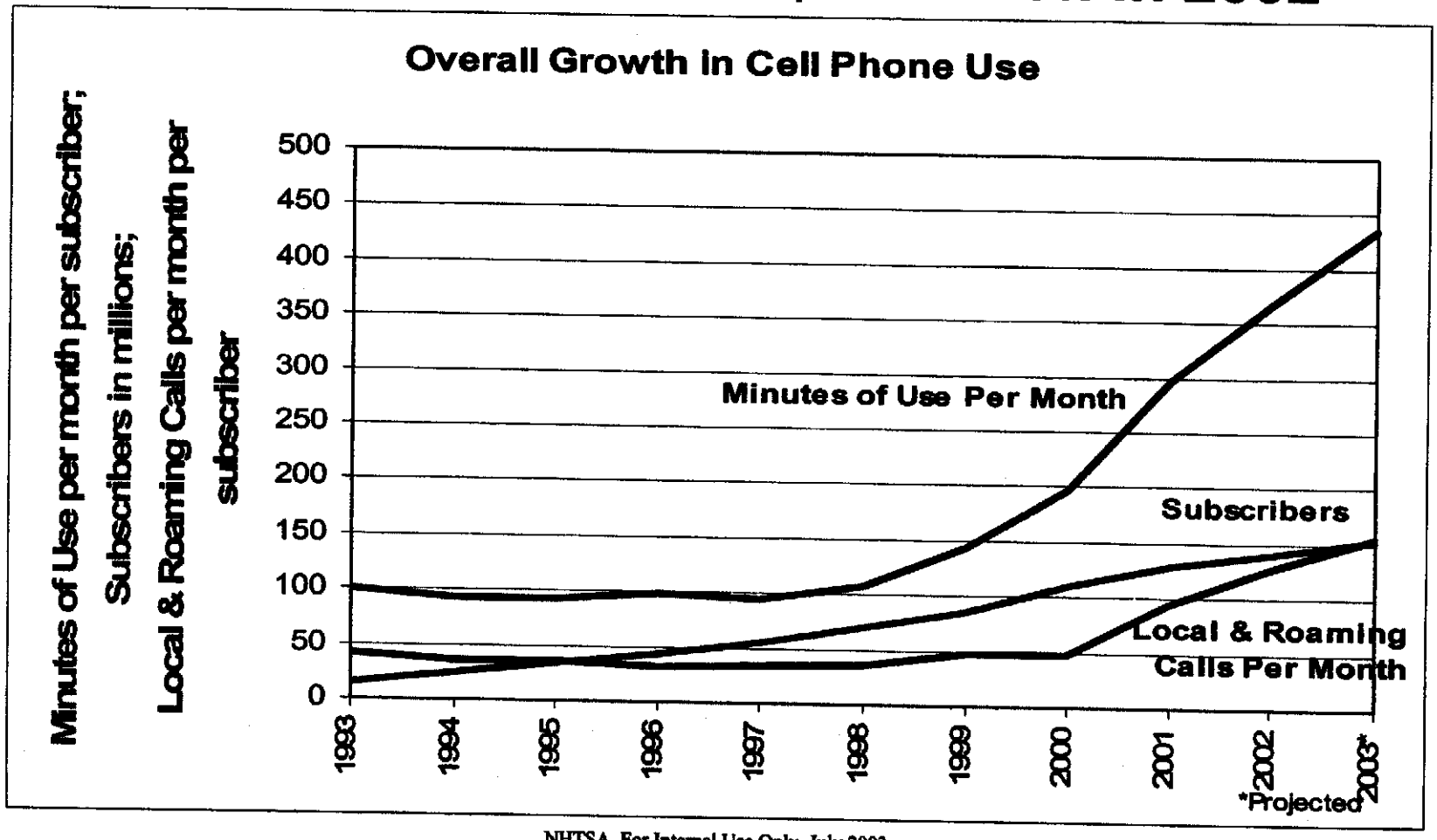
- **Review of cell phone related crashes provides insight into how driver actions and responses associated with cell phone use lead to crashes.**
- **There are four categories of distraction:**
  - **Visual** – e.g., Looking away from road to dial a number
  - **Biomechanical (manual)** – e.g., Manipulating a device
  - **Cognitive** – e.g., Lost in conversation or thought
  - **Auditory** – e.g., Startled by ringing phone
- **These forms of distraction most often occur in some combination.**

Briefing Outline

- Industry Data and Position
- Current Cell Phone Usage Rates
- Crash Data and Cell Phone Use
- Concerns of the American People
- States' Legislation/regulations
- Research Studies
- Estimated Crash Risk
- NTSB Recommendations
- Dr. Runge With Policy Discussion

Cell Phone Growth

Service Revenues of $78 Billion in 2002



NHTSA, For Internal Use Only, July 2003

CTIA Safety Tips

1. Get to know your phone and its features, such as speed dial and redial.
2. When available, use a hands free device.
3. Position your phone within easy reach.
4. Let the person you are speaking to know you are driving; if necessary, suspend the call in heavy traffic or hazardous weather conditions.
5. Do not take notes or look up phone numbers while driving.
6. Dial sensibly and assess the traffic; if possible, place calls when you are not moving or before pulling into traffic.
7. Do not engage in stressful or emotional conversations that may divert your attention from the road.
8. Dial 9-1-1 to report serious emergencies -it's free from your wireless phone!
9. Use your phone to help others in emergencies.
10. Call roadside assistance or a special non-emergency wireless number when necessary.

NHTSA Surveys

- 2000 NOPUS
  - 4% of drivers using a handheld or hands-free cell phone during daylight hours
  - Estimated Exposure Time: 4.7 million hours per day in daytime
- 2002 NOPUS
  - 6% of drivers using a handheld or hands-free cell phone during daylight hours
  - Estimated Exposure Time: 7.4 million hours per day in daytime
- 2002 National Survey of Distracted and Drowsy Driving Attitudes and Behaviors
  - Estimated 792 million trips each week in which drivers take incoming cell phone calls (19% of estimated 4.2 billion weekly trips)
  - Drivers who use cell phones reported an average of 4.5 minutes per call while driving

Crash Data

- Cell phones not often reported as a contributing factor at the PAR Level
- Some states have initiated special studies
  - California
  - New York
  - Virginia
  - Wisconsin
- Identifying cell phone use as a contributing factor in a crash is very difficult without a witness or access to phone records even with more in-depth crash investigation

Legislative Update: Public Opinion

Surveys of public opinion confirm the driving public's concern over the safety of using cell phones while driving and willingness to accept some restrictions. However, there are clear differences in the opinions of users and non-users. For example, data from 2002 national survey indicate that:

– 88% of all drivers support increased public awareness of the risks of wireless phone use while driving.

– 57% of all drivers supports a ban on all wireless phone use while a car is moving (except for 911 calls). About one-fourth of drivers who use cell phones support such a ban compared to 69% of drivers who do not use cell phones.

– 62% support increased fines for traffic violations involving cell phone use. About 40% of drivers who use cell phones support such fines compared to about 70% of drivers who do not use cell phones.

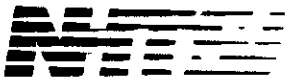
Legislative Update: State Activity

- **NY is still the only state to restrict use of hand-held phones while driving by general public.**
- **Several local jurisdictions have also restricted hand-held cell phone use while driving.**
- **Several states have restricted use of cell phones by novice drivers and/or school bus operators.**
- **Several states have established Task Forces and/or have set up special data collection activities on this issue.**
- **A few states have prohibited local restrictions.**
- **More than 30 states have considered legislation on the issue in the last year.**

Legislative Update: State Activity

- **New Jersey enacted legislation in 2002 that prohibits the holder of a driver examination permit from using any interactive wireless device while operating a motor vehicle, with emergency exceptions.**
- **Maine enacted legislation in 2003 that requires persons under 21 to obtain an instruction permit and receive education and training prior to obtaining a driver's license. This legislation also prohibits drivers with only an instruction permit from using a mobile telephone while driving.**
- **Arkansas, Illinois, Massachusetts, New Jersey, Rhode Island, and Tennessee have enacted legislation that prohibits the use of cell phones while operating a school bus.**

Hand-held vs. Hands-free



- Both hand-held and hands-free architectures increase risk while driving although the mechanisms may differ.
- Whereas hands-free phones may have some performance benefits, evidence indicates that drivers who use hands-free phones use them more frequently and for longer durations.
- It should be noted that hands-free phones come in many forms, and they differ significantly in demands on the driver.
  - Headsets, earpieces, and speakerphones
  - Some with voice dialing
  - Some with both voice dialing and voice command

Experimental Research

- Large body of independent and NHTSA-sponsored studies (dozens of studies since the early 1990s) directed at issues associated with cell phone use while driving and traffic safety
  - In the laboratory
  - Using driving simulators
  - On-the-road research (controlled and naturalistic)
  - Observational research such as NHTSA's National Occupant Protection Use Survey (NOPUS)

NHTSA Experimental Research

- Test Track
  - Examined distraction from a number of in-vehicle devices, including cell phones

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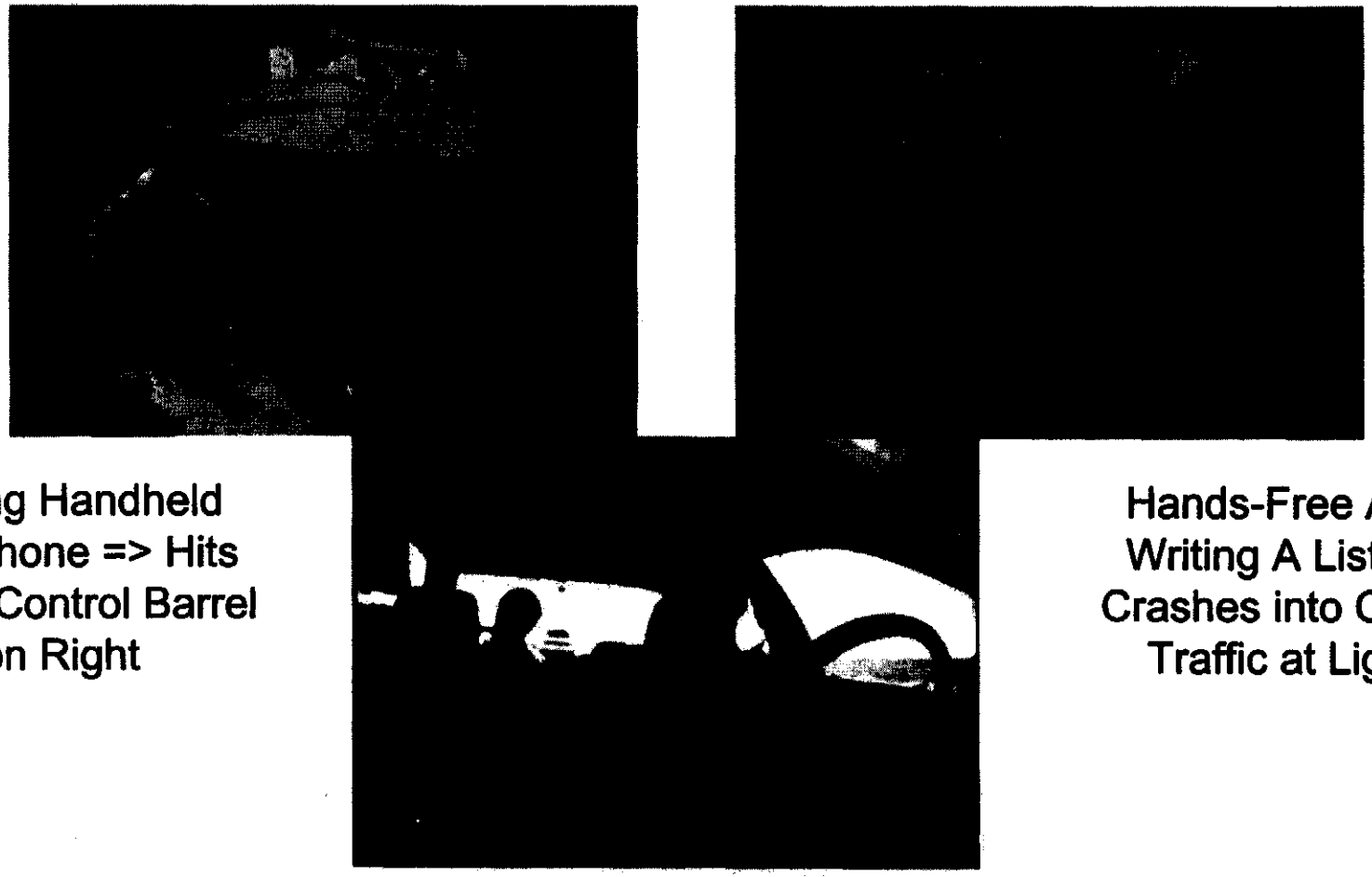
Experimental Research: Test Track



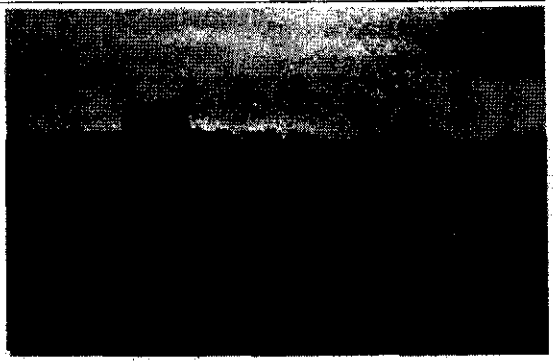
Dialing Handheld Cell Phone => Hits Traffic Control Barrel on Right

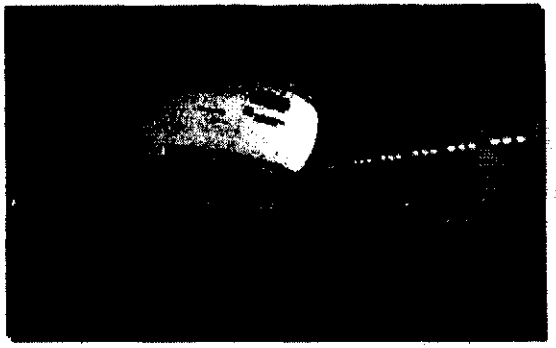
Hands-Free And Writing A List => Crashes into Cross Traffic at Light

Destination Entry Navigation Display => Runs Off Road

NHTSA Experimental Research

- Test Track
  - Examined distraction from a number of in-vehicle devices, including cell phones
- NADS
  - Examination of driver performance and behavior using different cell phone architectures





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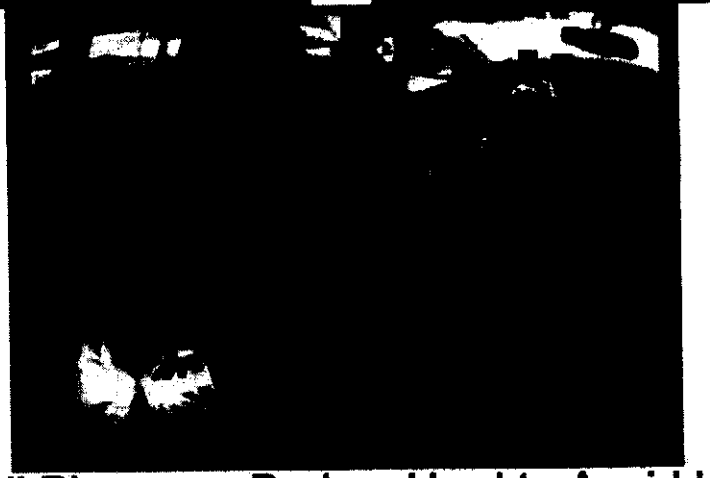
Experimental Research: NADS

Hands-Free Phone Task => Crashes into Forward Vehicle

Handheld Phone Task => Runs of Right Side of Road

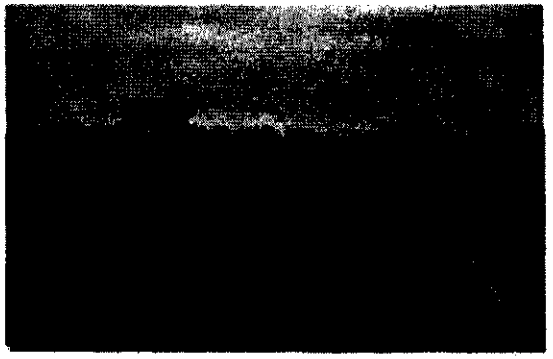


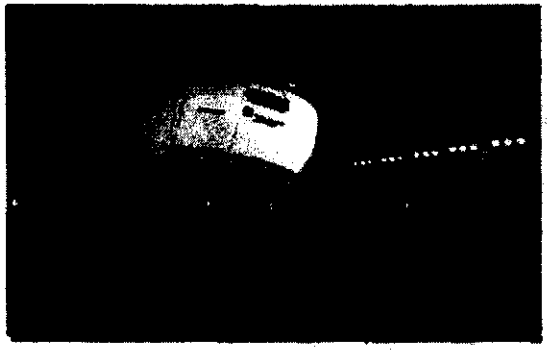
Dialing A Handheld Cell Phone => Brakes Hard to Avoid Hitting Forward Vehicle

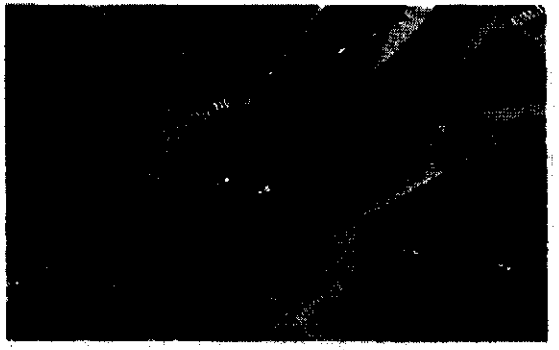
***Important: Video images of NADS study participants are subject to confidentiality agreements and may not be shown in the public domain without the express permission of the participants.

NHTSA Experimental Research

- Test Track
  - Examined distraction from a number of in-vehicle devices, including cell phones
- NADS
  - Examination of driver performance and behavior using different cell phone architectures
- Naturalistic
  - 100-car naturalistic study that will capture cell phone use under typical on-road driving conditions







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Experimental Research: Naturalistic

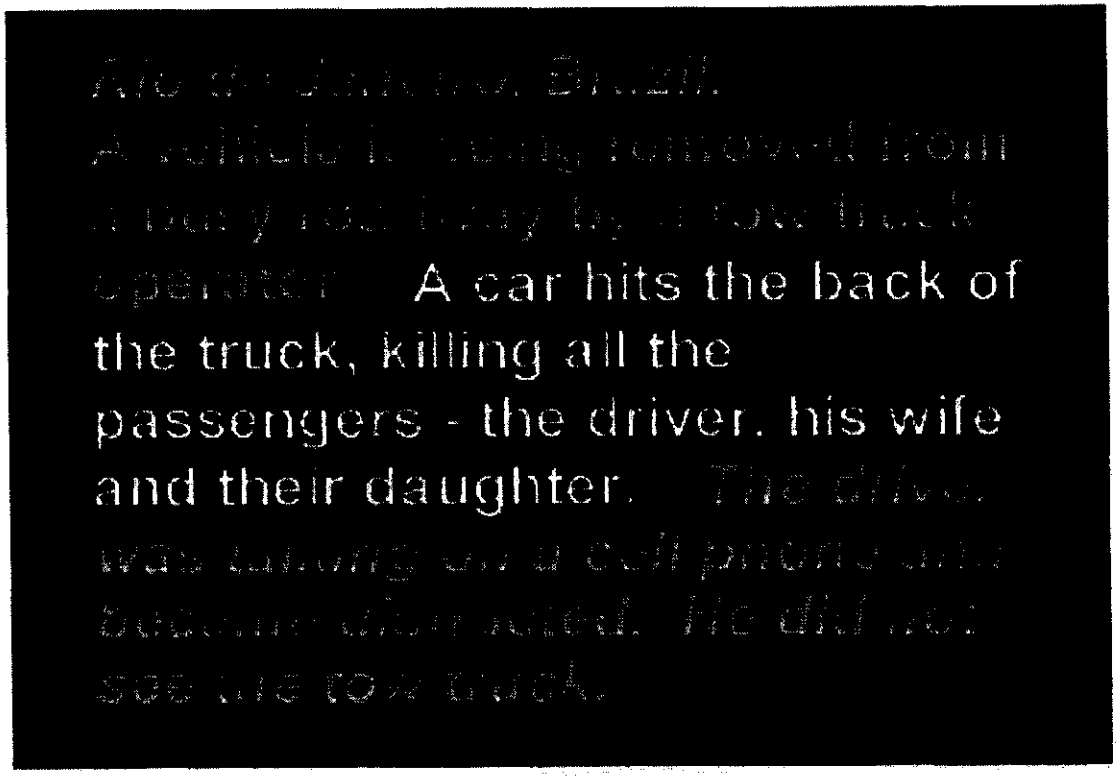
Eating While Driving
=> Crashes into
Forward Vehicle

Handheld Phone
Conversation
& Personal Hygiene

Answering Handheld Cell Phone => Runs off Right Side of Road

***Important: Video images from 100-Car Naturalistic Driving Study are subject to confidentiality agreements and may not be shown in the public domain without the express permission of the participants. Public display of video at this time will compromise integrity of current study.

A Tragic Example



Cost Benefit Studies

- **AEI-Brookings Joint Center for Regulatory Studies**
  - **1999 78 fatalities per year (range 10-1000)***
- **Harvard Center for Risk Analysis**
  - **2000 900 fatalities per year**
  - **2002 2,600 fatalities per year** (includes responsible drivers and others)
- **Both groups conclude that benefits and costs do not justify restrictions.**

Notable Comments from 2000 Harvard Study

- "The weight of the scientific evidence to date suggests that use of a cellular phone while driving does create safety risks for the driver and his/her passengers as well as other road users."
  - However, they note that the magnitude of this risk is unknown
- "It is not clear whether hands-free cellular phone designs are significantly safer than hand-held designs, since it may be that conversation per se rather than dialing/handling is responsible for most of the attributable risk due to cellular phone use while driving."

(Source: Lissy, Cohen, Park, & Graham, 2000)

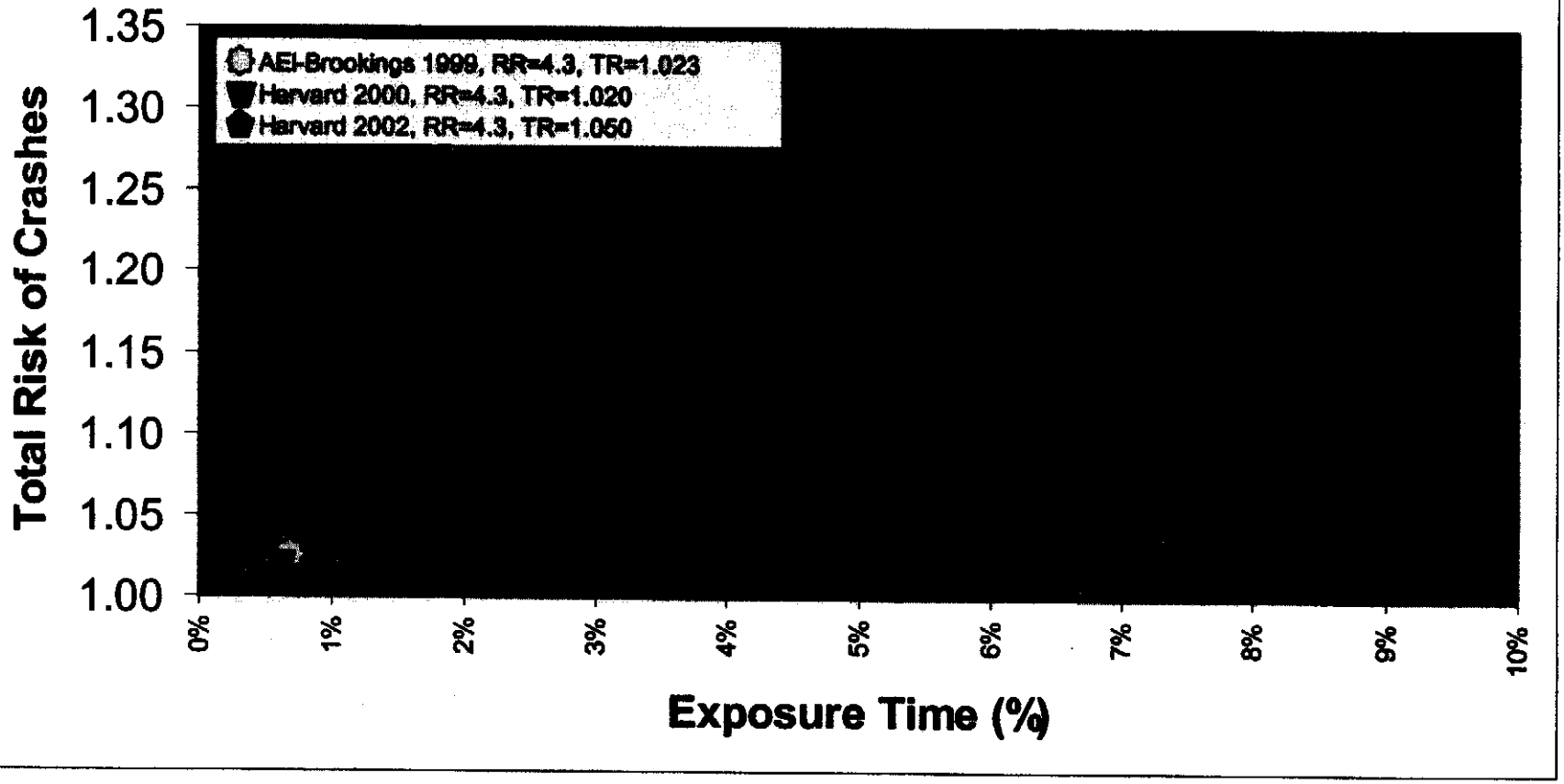
NHTSA Estimates of Exposure While Driving in 2002

Percent of Daylight Driving Time Spent Using a Cell Phone (2002 NOPUS)	6%
Number of Drivers Using Cell Phones During the Average Daylight Moment (2002 NOPUS)	801,000 drivers per moment
Daylight Hours of Cell Phone Use While Driving Per Day (derived from 2002 NOPUS data)	7,440,000 hours per day
Daylight Miles Driven Using a Cell Phone Per Day (derived from 2002 NOPUS data)	243,800,000 miles per day
Trips While Taking Incoming Cell Phone Calls Per Day **Trips While Making Outgoing Cell Phone Calls Per Day** (derived from National Survey of Distracted and Drowsy Driving Attitudes and Behaviors 2002)	113,000,000 trips per day 111,000,000 trips per day

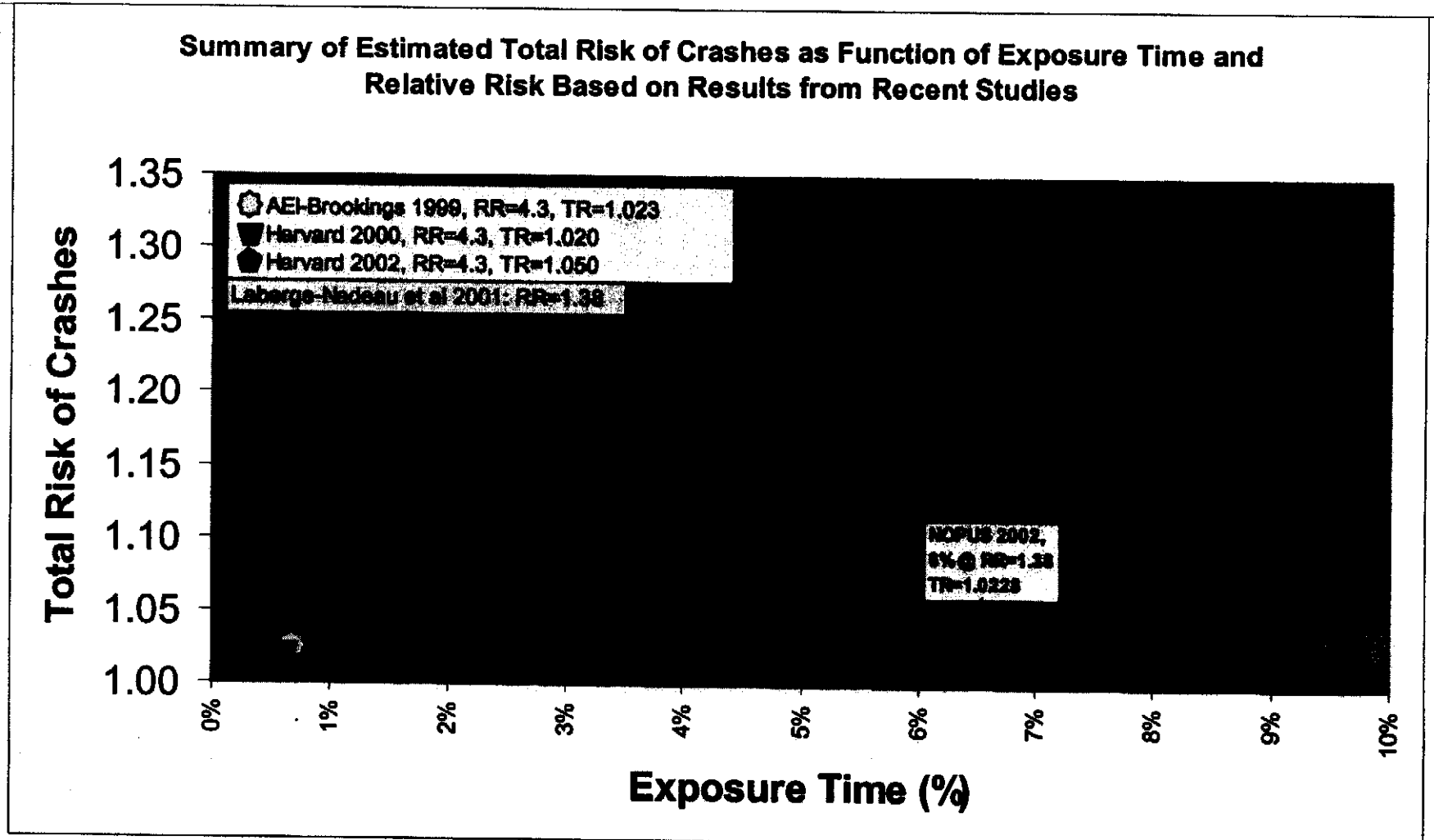
Relative Risk Models

- Purpose – Predict Increase in Total Risk of Crashes
  - Estimate the Increase Risk Due to the Distraction
  - Estimate the Duration of the Distraction Activity
- Most Published Analyses Have Used a High Relative Risk (RR) Factor (4.3) Based on Earlier Research and Low Exposure
- Recent Studies Indicate a Much Smaller RR (1.38)
- Recent Studies Also Indicate a Much Larger Degree of Exposure

Plotting Estimates of Total Risk of Crashes Across All Drivers



Plotting Estimates of Total Risk of Crashes Across All Drivers



NHTSA 2002 Crash Estimates Given 6% Exposure Time (ΔT=.06)

Conservative Risk Levels

Year 2002	RR=1.0	RR=1.2	RR=1.38	RR=1.5
Total Risk	1.0000	1.0120	1.0228	1.0300
Estimated Total Police Reported Crashes in which Cell Phone Use Was Not a Contributing Factor to the Crash	6,279,356	6,204,897	6,139,378	6,096,462
Estimated Police Reported Crashes in which Cell Phone Use Was a Contributing Factor to the Crash	0	74,459	139,978	182,894
Estimated Total Crashes (*CP) (Reported plus Non-reported)	0	127,853	240,355	314,046
Estimated PDO Crashes (*CP) (Reported plus Non-reported)	0	98,214	184,636	241,243
Estimated Injury Crashes (*CP) (Reported plus Non-reported)	0	29,184	54,864	71,685
Estimated Fatal Crashes (*CP)	0	455	855	1,117
Estimated Fatalities (*CP)	0	508	955	1,248

*CP = Cell Phone Was a Contributing Factor to the Crash

Note that calculations assume distribution of crash severity (fatal, injury, PDO) is same for total police reported crashes and for crashes in which cell phone use was a contributing factor to the crash; and equivalence in relative risk is assumed across for daytime and nighttime.

Distribution of Estimated Fatalities in which Cell Phone Use was Contributing Factor By State For 2002, RR=1.38

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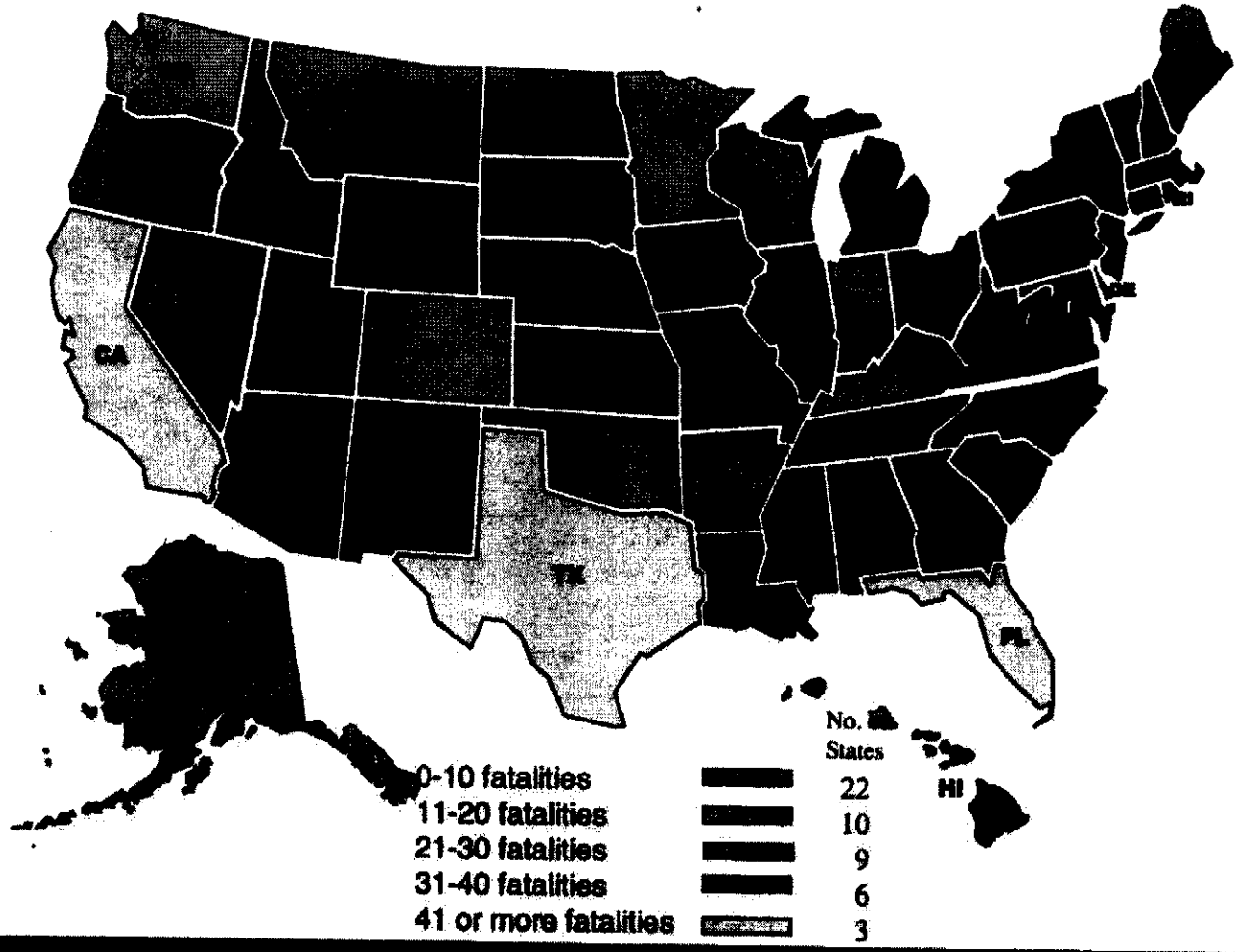

Future Directions in U.S. Mobile Phone Use

- **Results from 2002 quarterly Telephia surveys indicate the following:**
  - **About 35% of young adults (ages 18-24) use their wireless service for more than 500 minutes per month, compared to 20% of all users.**
  - **Use of SMS and other 2-way messaging services has increased from 12% in 2001 to 20% in 2002.**
  - **45% of young adults say they frequently use wireless data services, including SMS and the wireless internet, compared with 22% of all users combined.**

NTSB Report / Hearing

- Single crash that took the lives of 5 persons, including a driver who was using a wireless phone at the moment she lost control of her vehicle.
- Interstate 95/495 (the Capital Beltway) near Largo, Maryland
- The Board found that the probable cause of the crash was the Explorer driver's failure to maintain control of her vehicle in the windy conditions due to a combination of inexperience, unfamiliarity with the vehicle (she had just purchased it that evening), speed and distraction caused by use of a handheld wireless telephone.

NTSB Recommendations

June 3, 2003

Safety Recommendations to NHTSA

1. Develop in conjunction with The Advertising Council, Inc., a media campaign stressing the dangers associated with distracted driving.
2. Develop in conjunction with the American Driver and Traffic Safety Education Association a module for driver education curriculums that emphasizes the risks of engaging in distracting behavior.
3. Determine the magnitude and impact of driver-controlled, in-vehicle distractions, including the use of interactive wireless communication devices on highway safety and report findings to the United States Congress and the States.

Safety Recommendations to the States

4. To the 49 States that do not have such legislation, enact legislation to prohibit holders of learner's permits and intermediate licenses from using interactive wireless communication devices while driving.

Last Official NHTSA Statement

- **"NHTSA's consumer information will now include advice that growing evidence suggests using a wireless phone or other electronic device while driving can be distracting and drivers should not talk on the phone or use other devices while their vehicles are in motion."** *[Emphasis added]*
  - Rosalyn G. Millman, NHTSA Acting Administrator, July 18, 2000
- **This NHTSA position has not been widely publicized.**

Safety Tips from Transport Canada

Transport Canada Fact Sheet RS200-06 (TP2436E, December 2001) [65, 66]

- "Transport Canada recommends against using cell phones while driving. It is distracting and increases the risk of collision. Your primary concern is the safe operation of the vehicle."

To avoid collisions arising from the use of cell phones:

- Turn the phone off before you start driving. Let callers leave a message.
- If there are passengers in the vehicle, let one of them take or make a call. If you're expecting an important call, let someone else drive.
- If you have to make or receive a call, look for a safe opportunity to pull over and park.

GSA (2002)

- ***Recommended policy (FMR Bulletin B-2) on the use of wireless phones while driving motor vehicles owned or leased by the Federal Government. Federal agencies should:***
  - **Discourage the use of hand-held wireless phones by a driver while operating motor vehicles owned or leased by the Federal government.**
  - **Provide a portable hands-free accessory and/or hands-free car kit for government owned wireless phones.**
  - **Educate employees on driving safely while using hands-free wireless phones.**

NHTSA Proposed Policy

Recommendations to OST, July 2002

The driver's primary responsibility is to operate the vehicle safely. This requires undivided attention and focus on the driving task.

Using wireless communications devices while driving can be distracting and increase the risk of crash and injury. Therefore, NHTSA recommends that drivers not use these devices while driving, except in emergency. This recommendation applies to both hand-held and hands-free devices.

NHTSA Proposed Policy

Guidelines for Implementation, July 2002

- **Drivers who use wireless communication devices should not use them while driving. Instead, drivers should do at least one of the following:**
  - **Stop the vehicle in a safe location that is off the road, well away from traffic, before they receive or place their calls.**
  - **Allow a passenger to receive or place calls.**
  - **Use the phone's voice mailbox feature if so equipped, and return the call when not driving.**
- **All drivers should follow these guidelines, and employers are urged to adopt policies implementing them.**