

Distracted Driving: What Research Shows

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I would
put
a picture
here,
but it
would just
distract
you.

Objectives

- Review research on hazards of distraction
- Make individuals more aware of their distraction habits



Distraction—Definition

Diversion of attention from what should be paid attention to.

Categories of Distractions

- Visual—Eyes on what we are doing
- Mechanical—Hands on
- Cognitive—Mind on what we are doing

Driving while doing something other than driving.



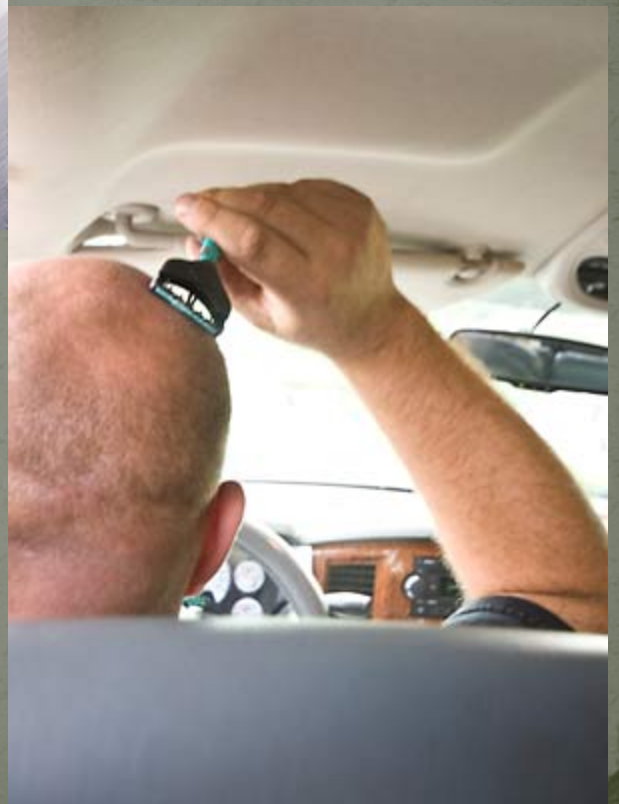
Driving while doing something other than driving.



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Driving while doing something other than driving.



How Dangerous Is Cell Phone Distraction?

- Driver distraction is 18% of crashes
- Caused 3,450 deaths & 391,000 injuries in 2016
- Talking on a cell phone increases the crash risk 4 times
 - The rate equal to that of drunken driving at .10 level



Large-Scale Naturalistic Driving Study

- Drivers own vehicles
- Instrumentation with video
- Over 2000 drivers

Relative Increase of Crash Risk

Activity	Car	Truck
Eating and drinking;	3.3	--
Reaching for object	7.68	6.72
Texting	4.33	23.24
Talk/listen to CB	--	.6
Interact w/dispatching device	--	9.93
Personal grooming;	3.1	4.48
Reading, including maps;	3.4	7.02
Adjusting a radio, music player	.6	--
Interact with passenger	.3	.35

Committed traffic violations:

75% -- Drivers using cell phone

25% -- Drivers not using cell phone

Braking Distance at 70 MPH

Item	Feet	Meters
Normal reaction	102	31
Alcohol affected	114	35
Cell Phone in Use	148	45



Which is Worse, Hands-Free or Hand Held?

Variable or Condition	Mean Increase in Reaction Time (seconds)	Standard Deviation (seconds)	Number of Studies	Number of Participants
Task				
Handheld Phone	.21	.16	5	157
Hands-Free Phone	.18	.29	16	518

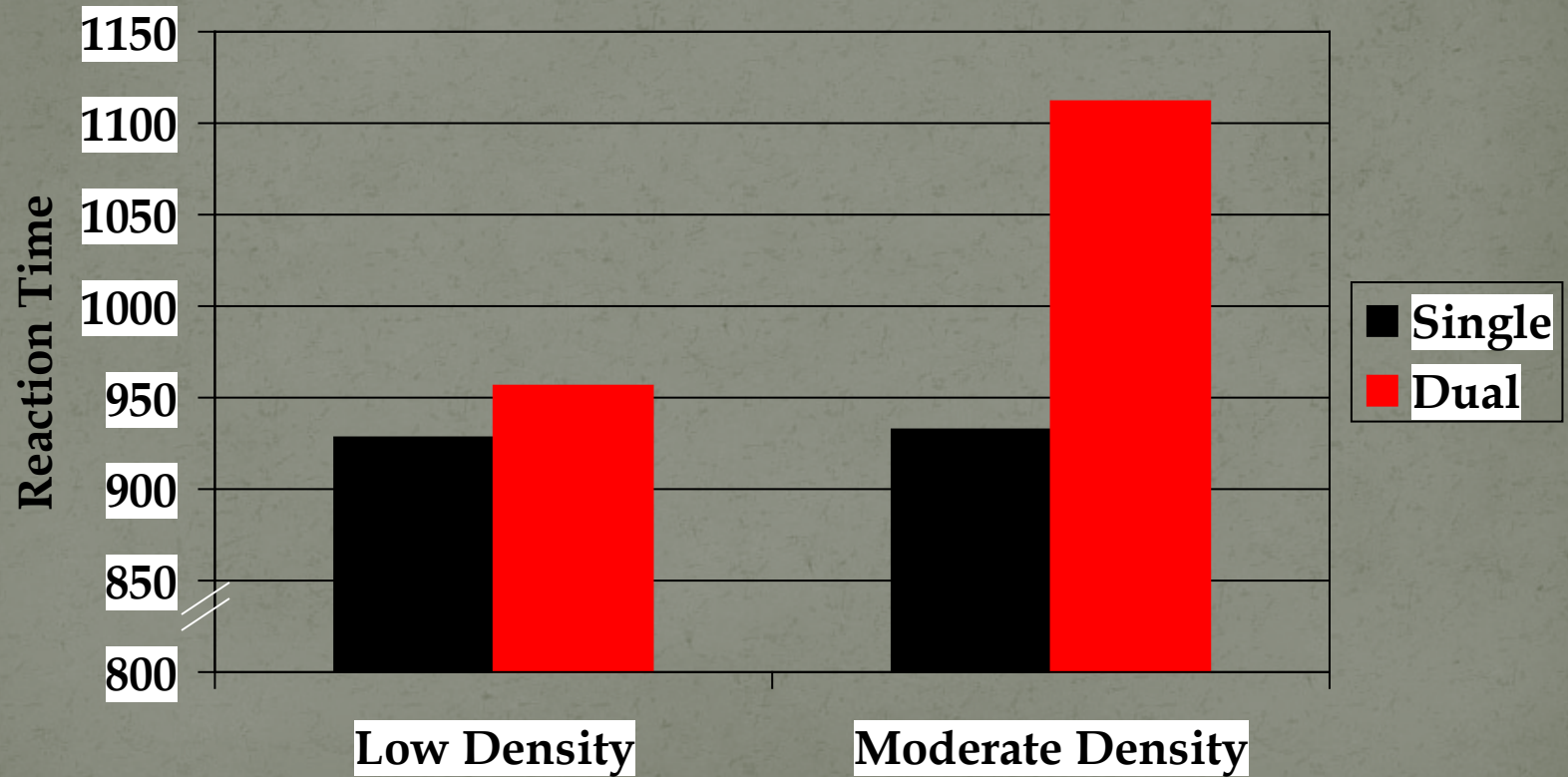
Conversations using any cell phone technology diverts the driver's mind from driving.



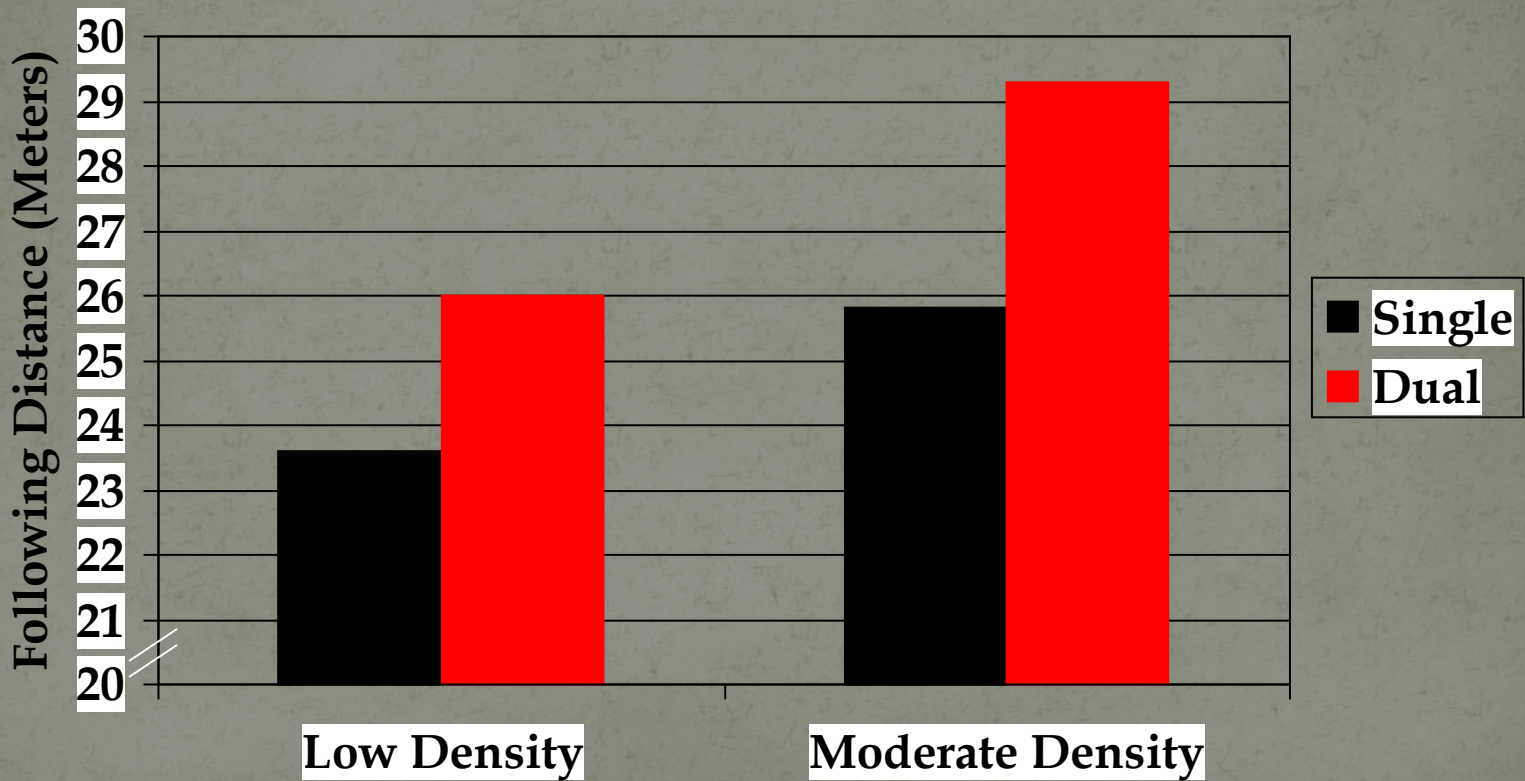
Does talking on a cell phone interfere with driving?

- Car-following paradigm
 - Follow periodically braking pace car
 - Required timely and appropriate reactions
 - Hands-free cell phone (set-up in advance)
 - Naturalistic conversations
- Conditions
 - Single (driving) vs. dual-task (driving & talking)
 - Low & moderate traffic density

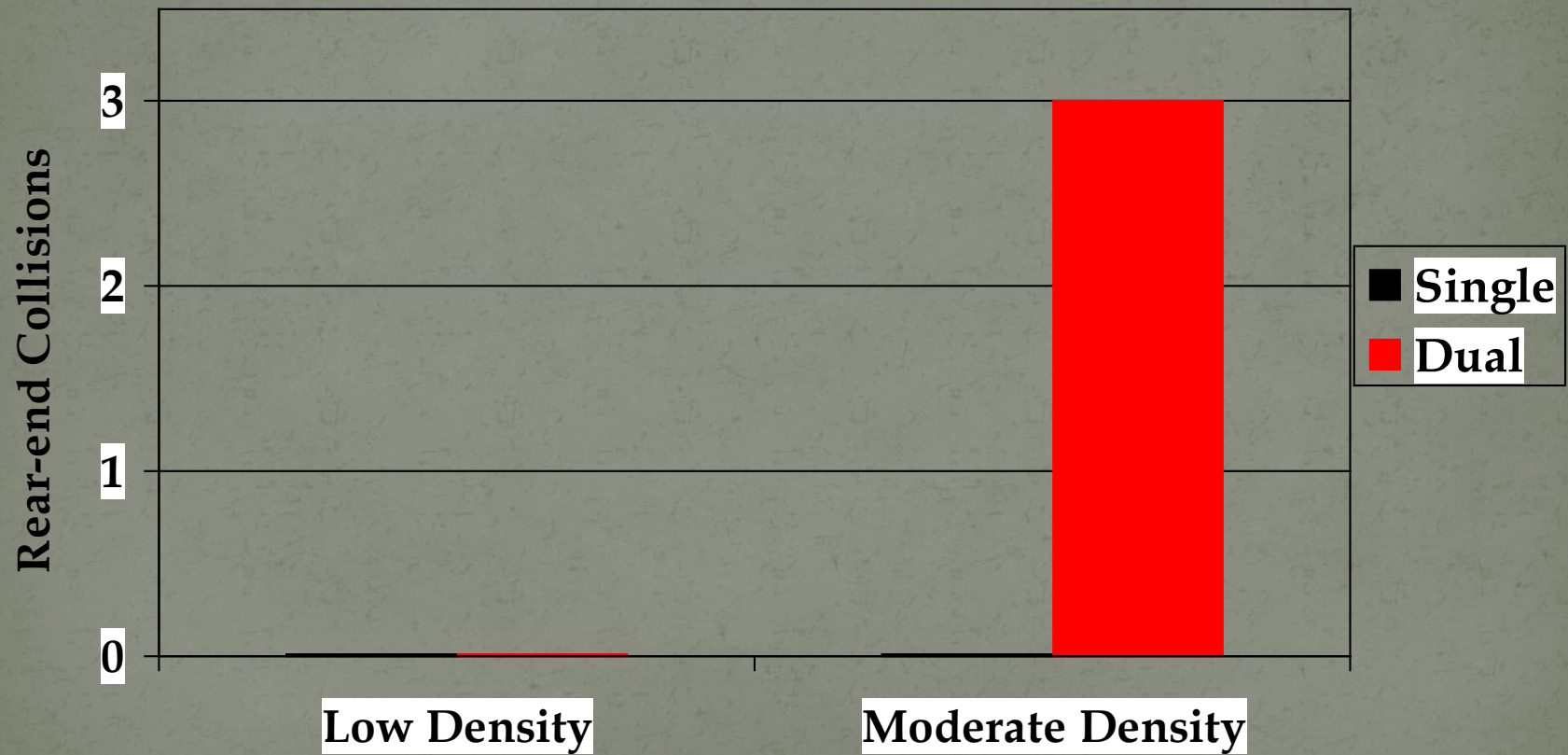
Reaction Time



Following Distance



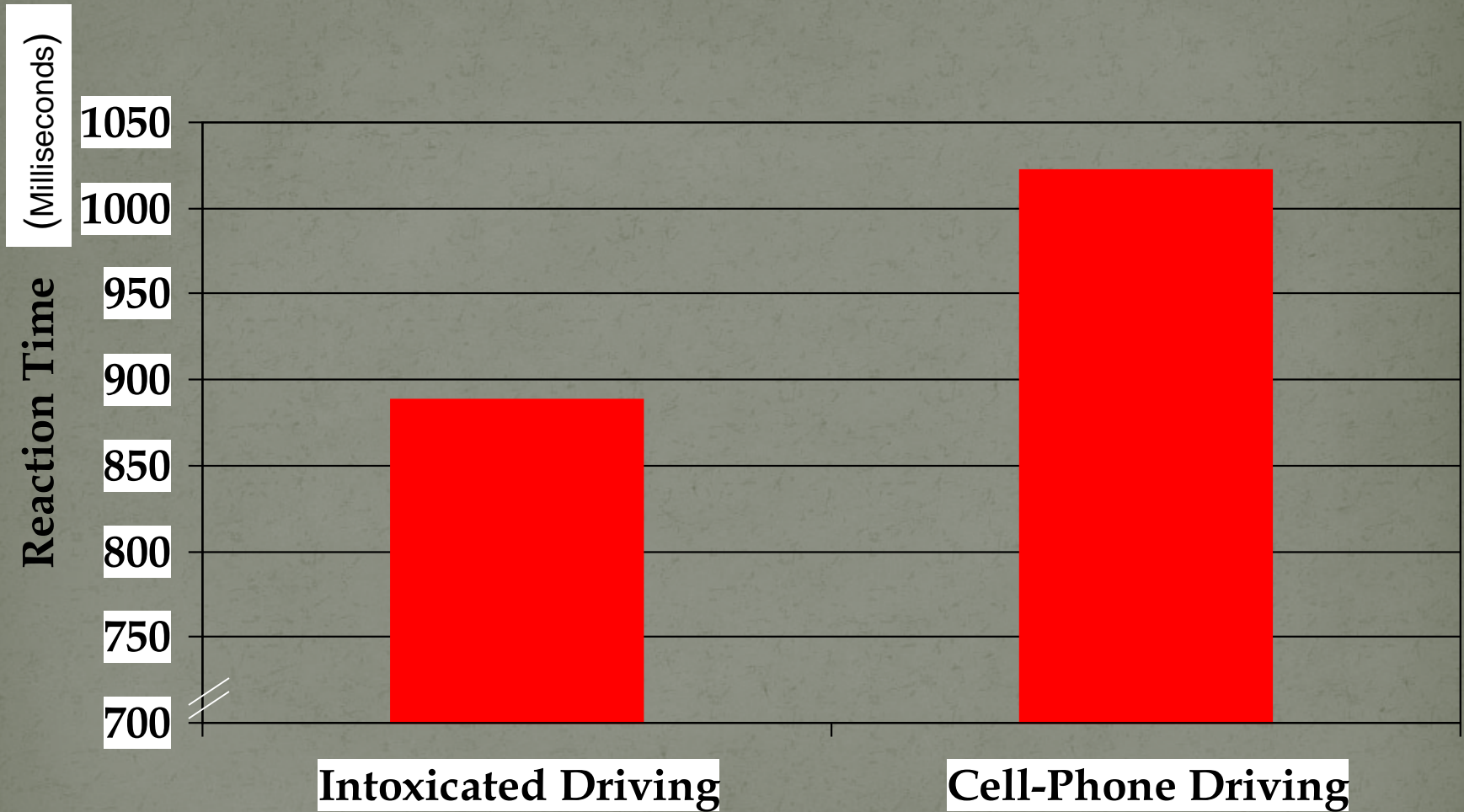
Rear-end Collisions



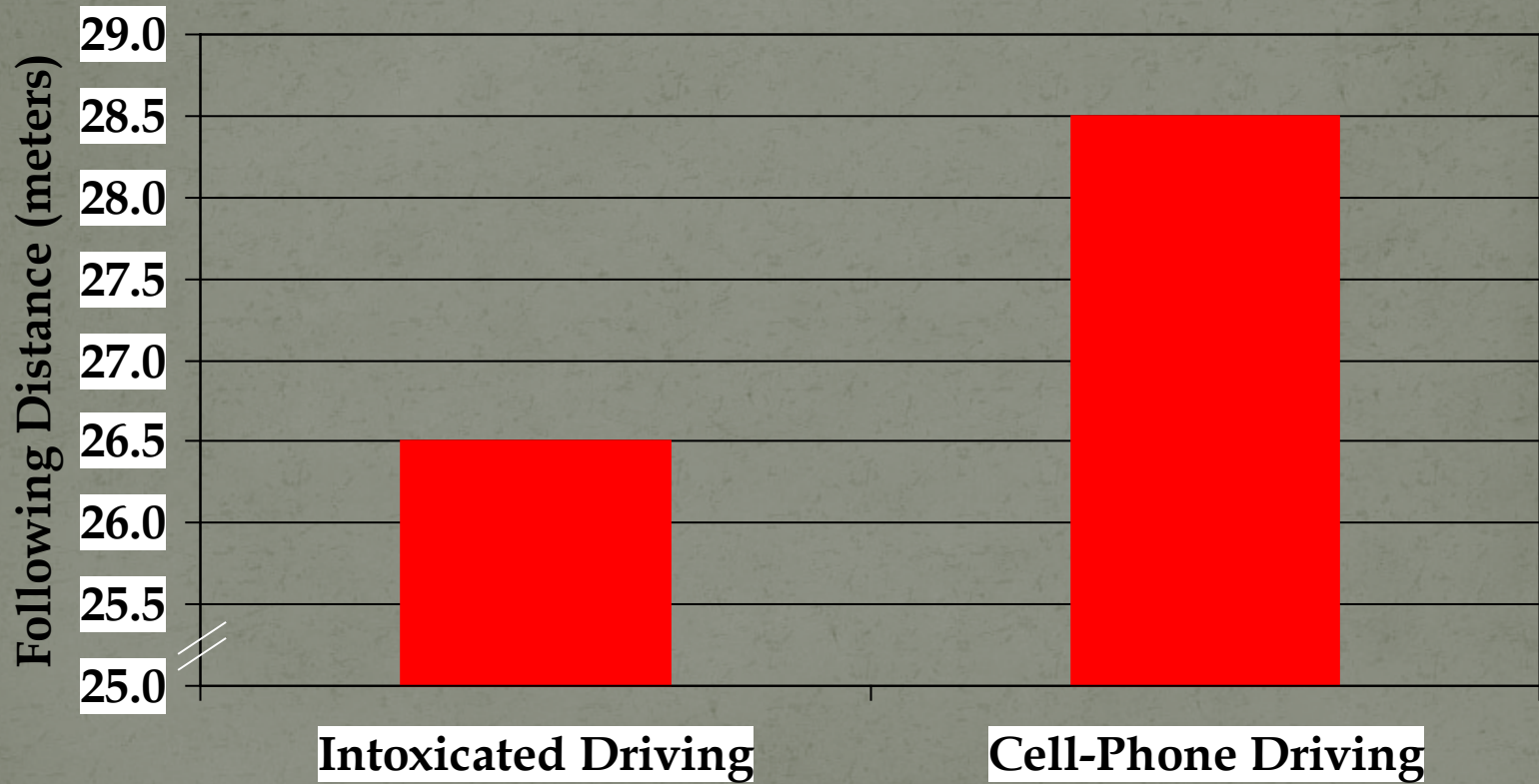
Cell Phone Driver vs. Drunk Driver

- Car-following paradigm
 - Follow periodically braking pace car
 - Required timely and appropriate reactions
- Conditions
 - Single-task driving
 - Cell-phone driving *
 - Intoxicated driving (BAC= 0.08 wt/vol)
 - * Hands-free = Hand-held

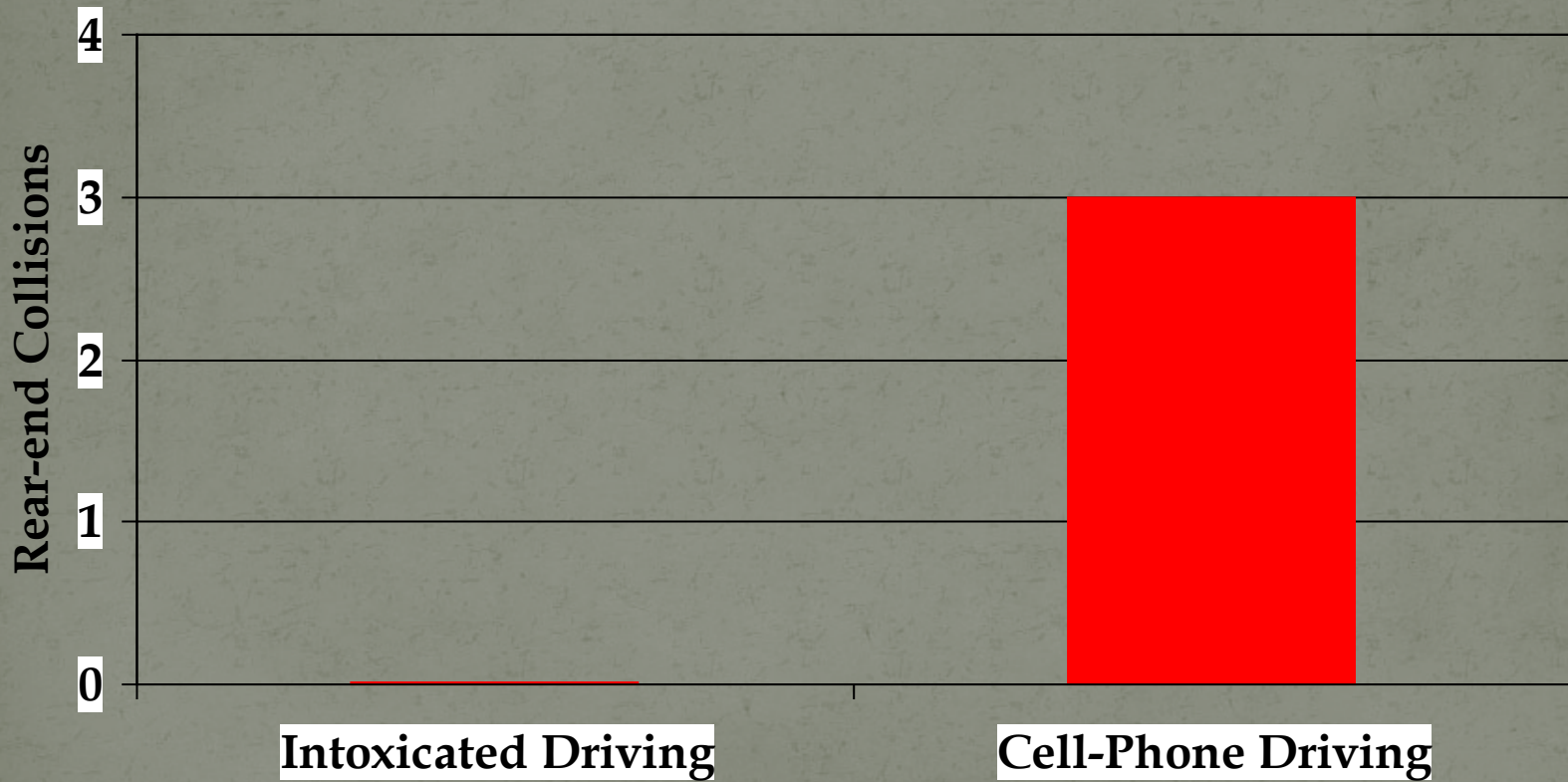
Reaction Time



Following Distance

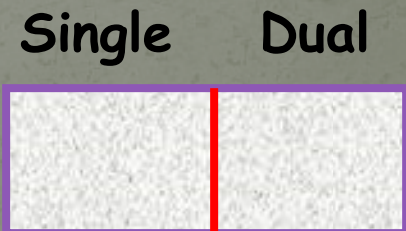


Rear-end Collisions

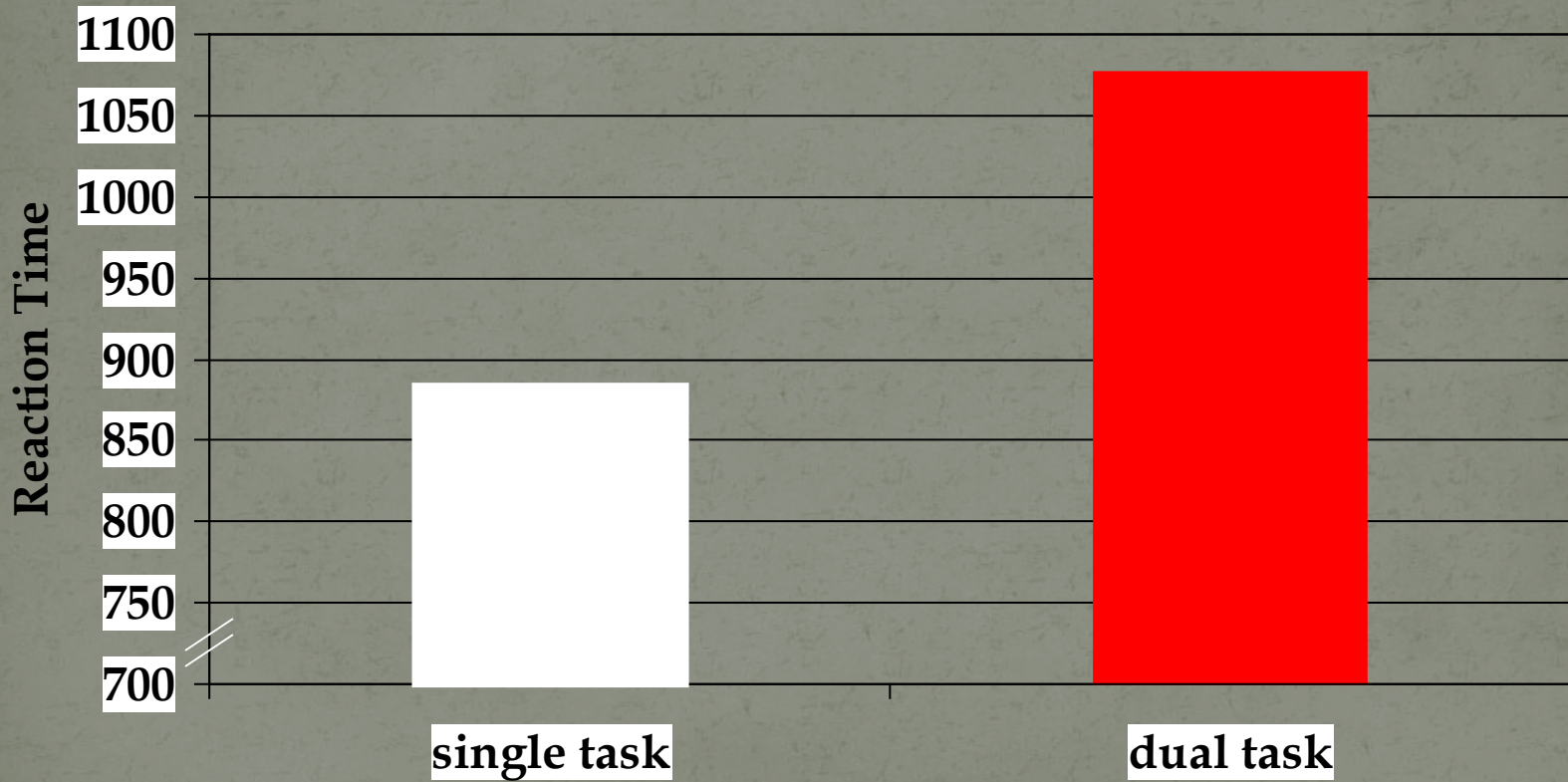


Text messaging

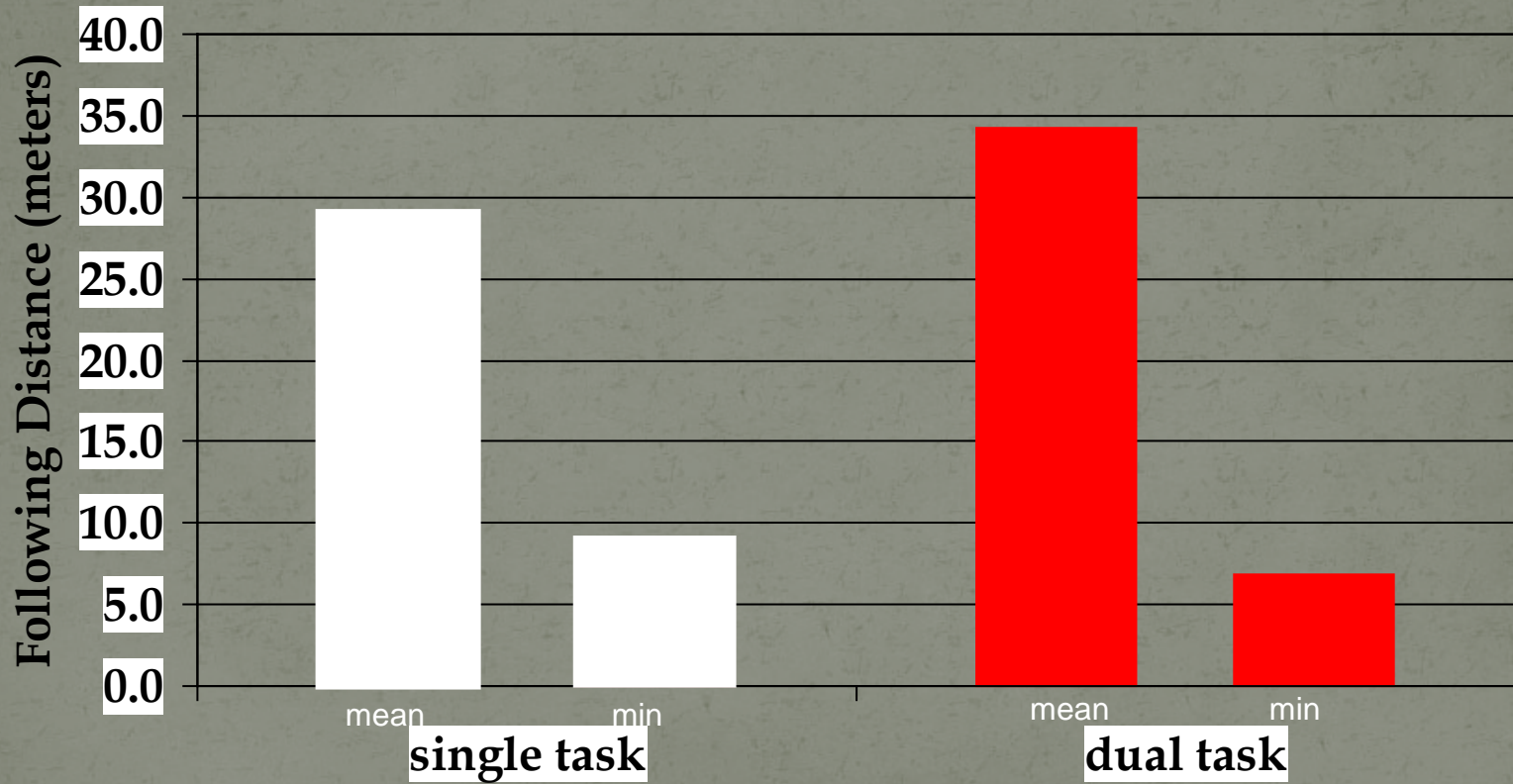
- Car-following paradigm
 - Follow periodically braking pace car
 - Required timely and appropriate reactions
- Conditions
 - Driving vs. driving & texting



Reaction Time



Following Distance



Rear-end Collisions

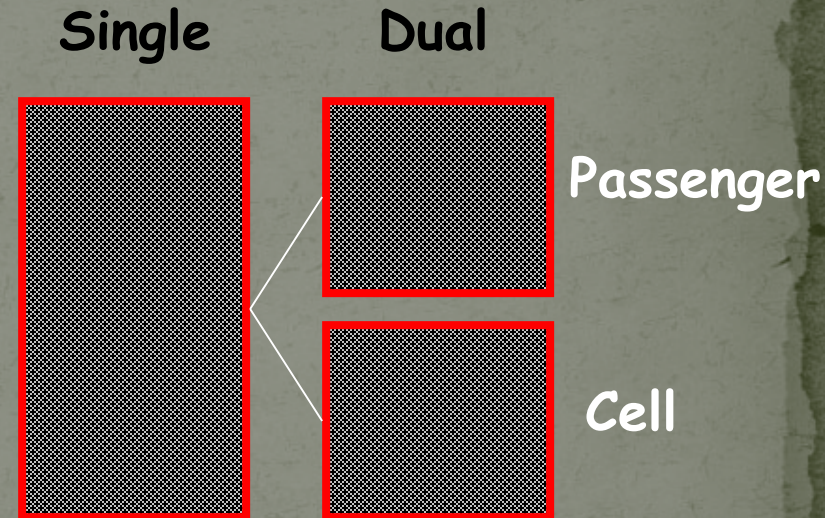




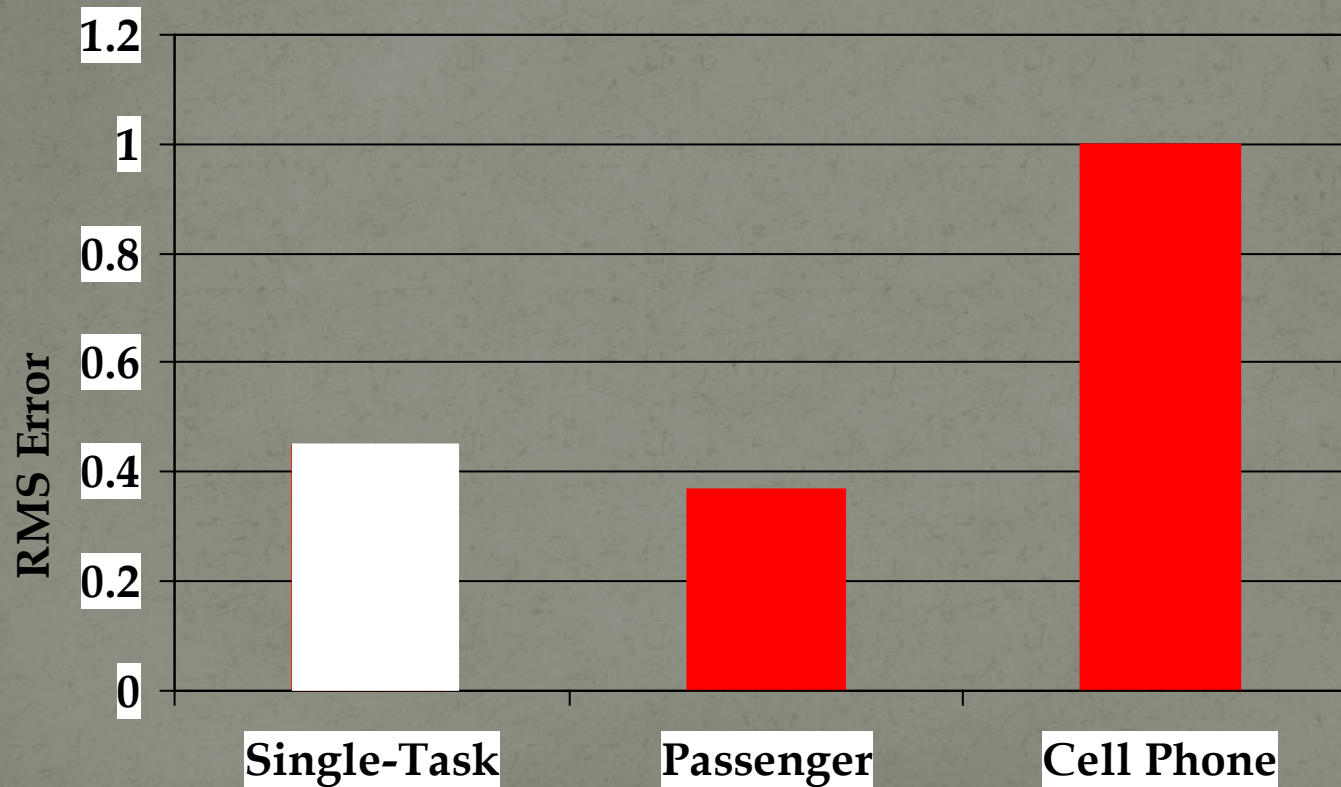
Cell Phone vs. Passenger Conversations

Conditions

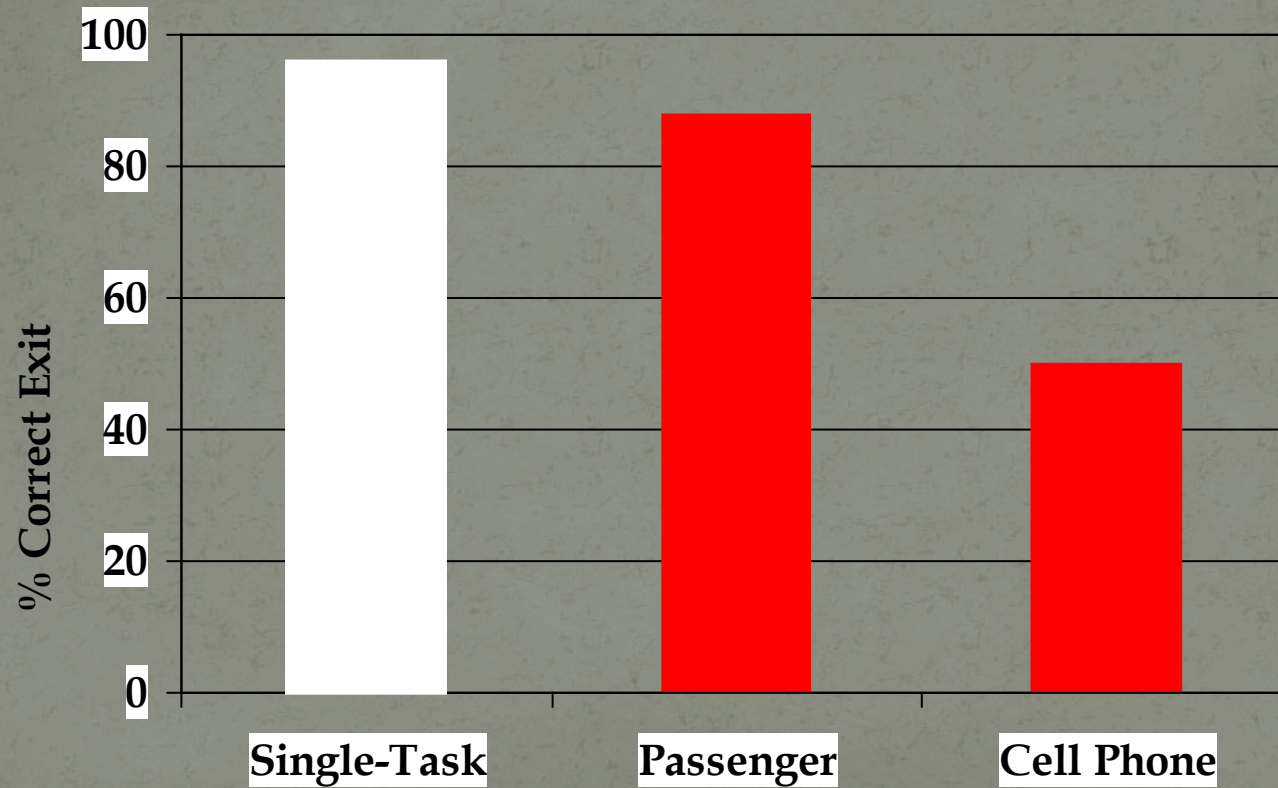
- Driving without distraction
- Conversing on cell phone
- Conversing with passenger



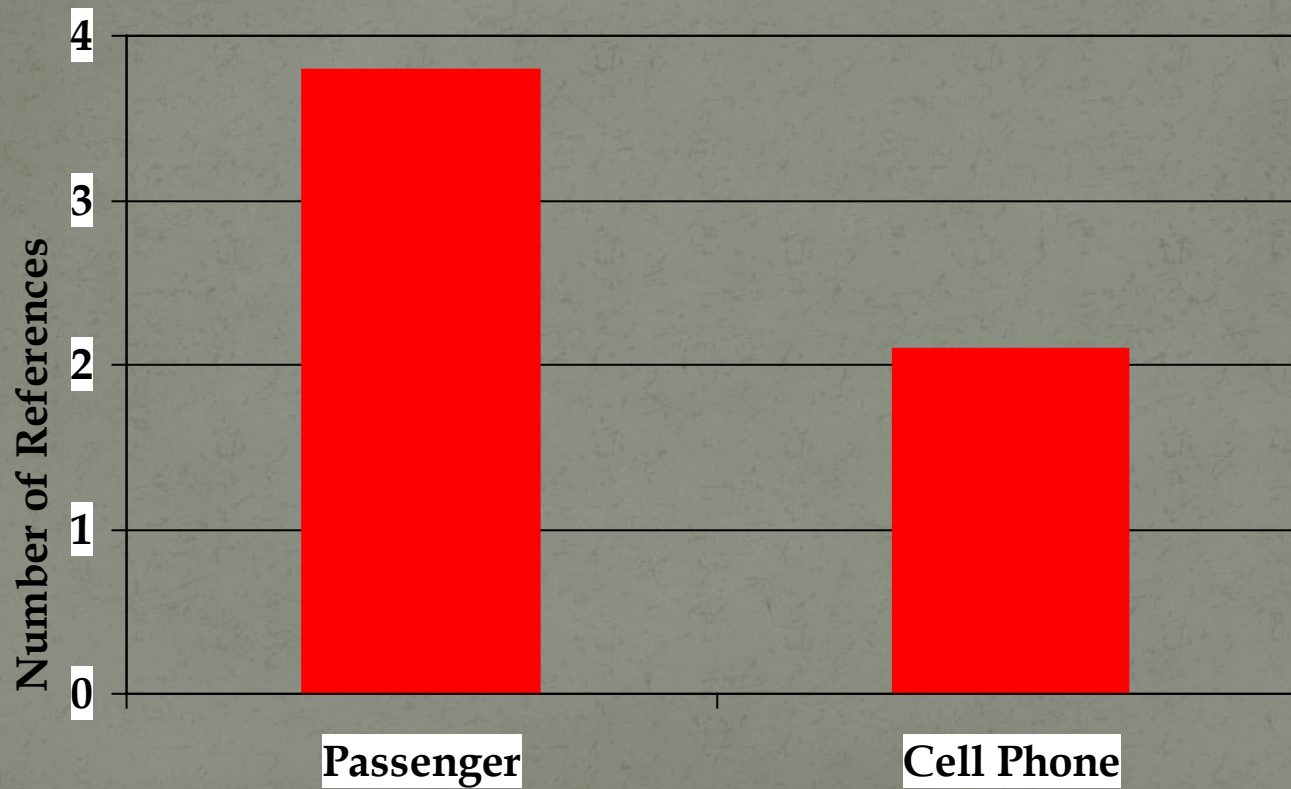
Cell Phone vs. Passenger Conversations Lane Keeping Errors



Successful Navigation

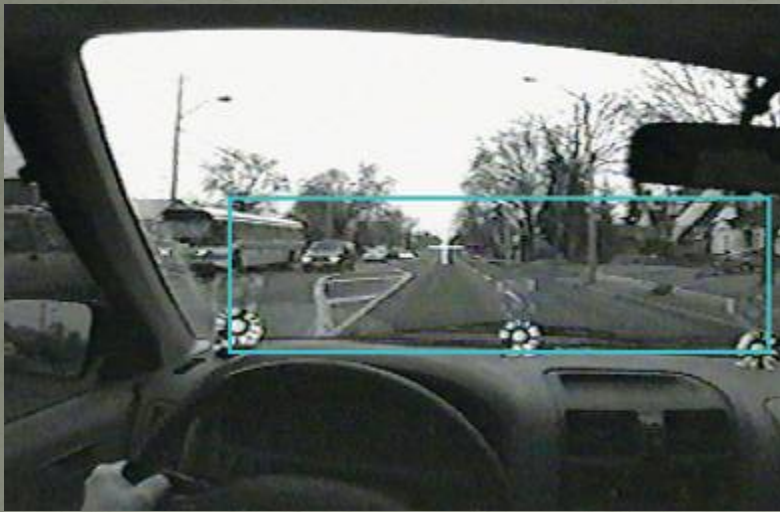


Traffic References

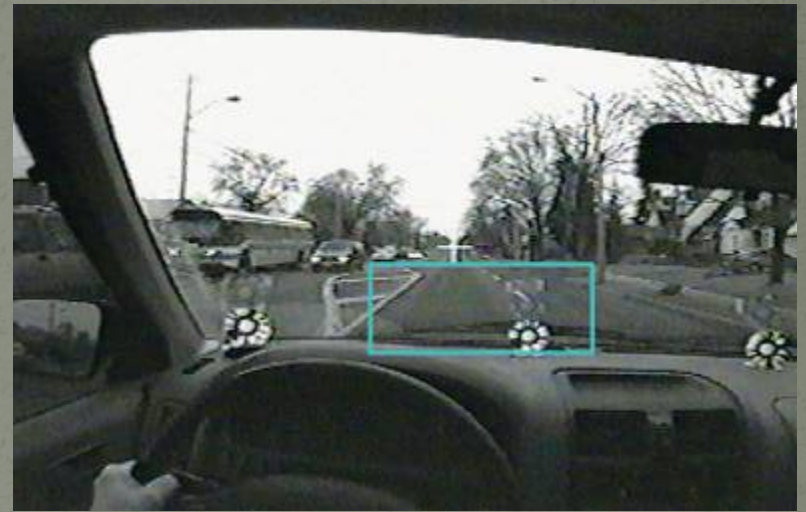


Inattention Blindness

A narrowed scope



Where drivers not using a cell phone looked



Where drivers using a hands-free cell phone looked

Source: Transport Canada

Inattention Blindness

- A type of cognitive distraction
 - “looking” but not “seeing”
- Cell phone drivers less likely to see:
 - High and low relevant objects
 - Visual cues
 - Exits, red lights and stop signs
 - Navigational signage
 - Content of objects

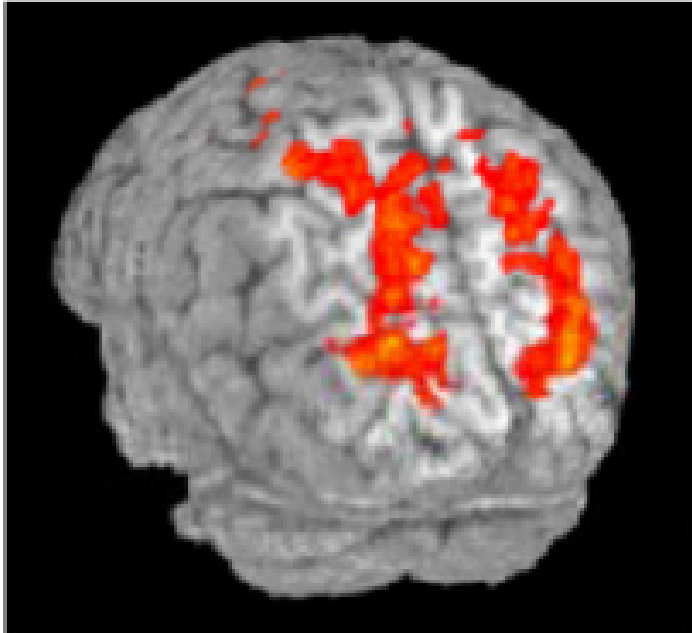
Source: Transport Canada

Brain Processes in Driving & Language

- Experienced drivers steer a car in a virtual reality display while a MRI scan is being done
- Measure: Brains activation



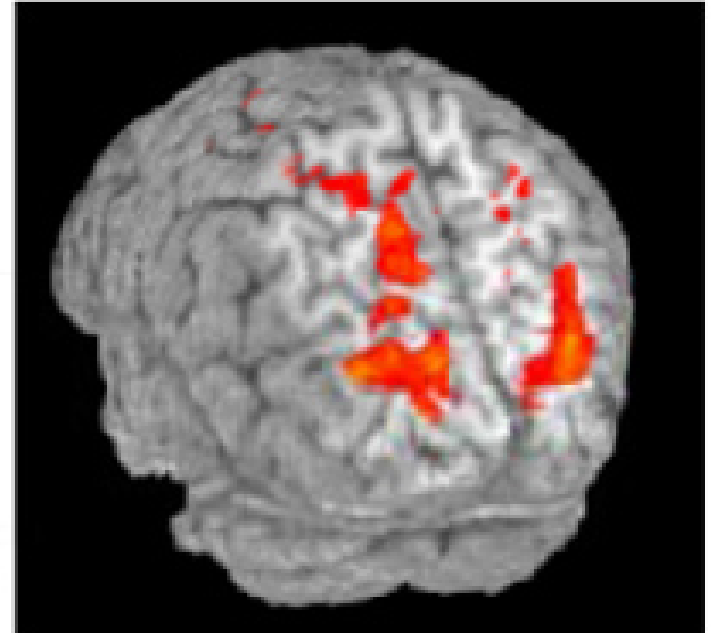
Driving Without Distractions



L

R

Driving While Gabbing



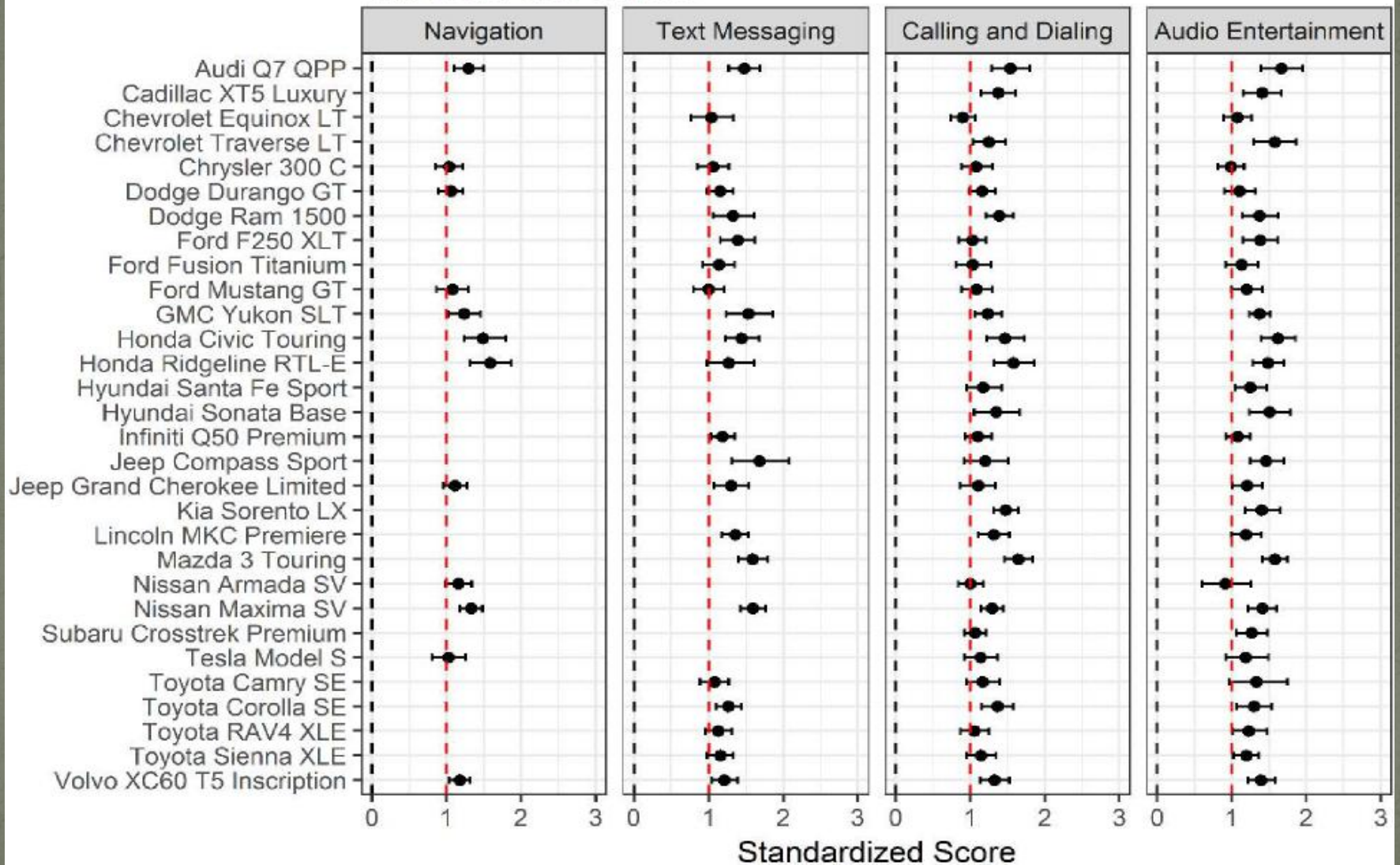
37% decrease in parietal lobe activity when listening

Spoken language especially distracting

- Auditory tasks take precedent over visual tasks
- Processing is automatic, it can't be "turned off" or ignored
- Language processing takes away resources from other concurrent tasks
- Safety Implications: Don't talk to someone performing a critical task

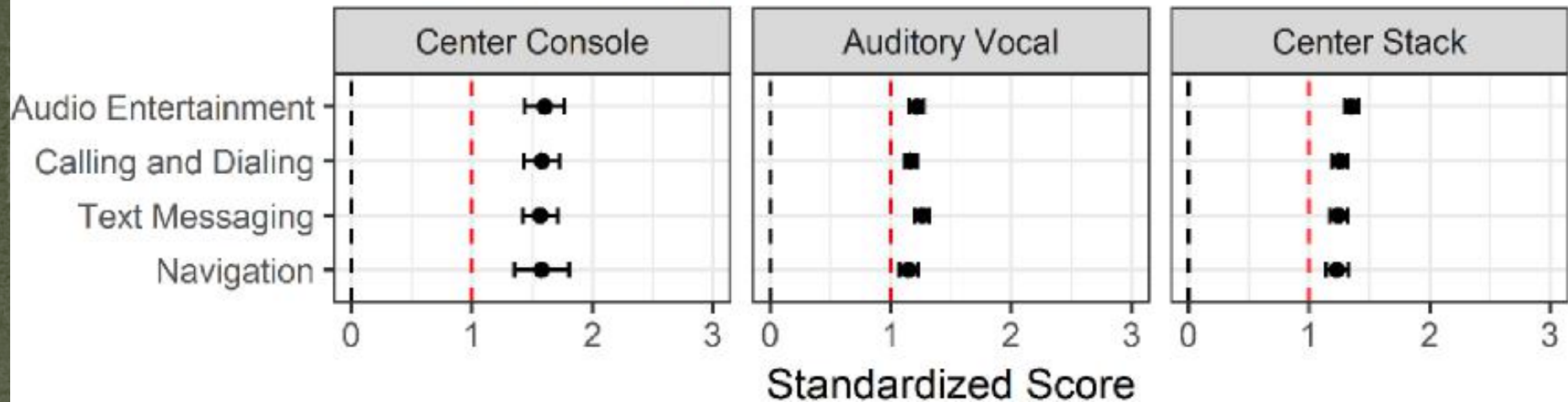
Cognitive Demand by Vehicle and Task Type

2017 Model Year Vehicles



Cognitive Demand by Task Type and Modality

2017 Model Year Vehicles

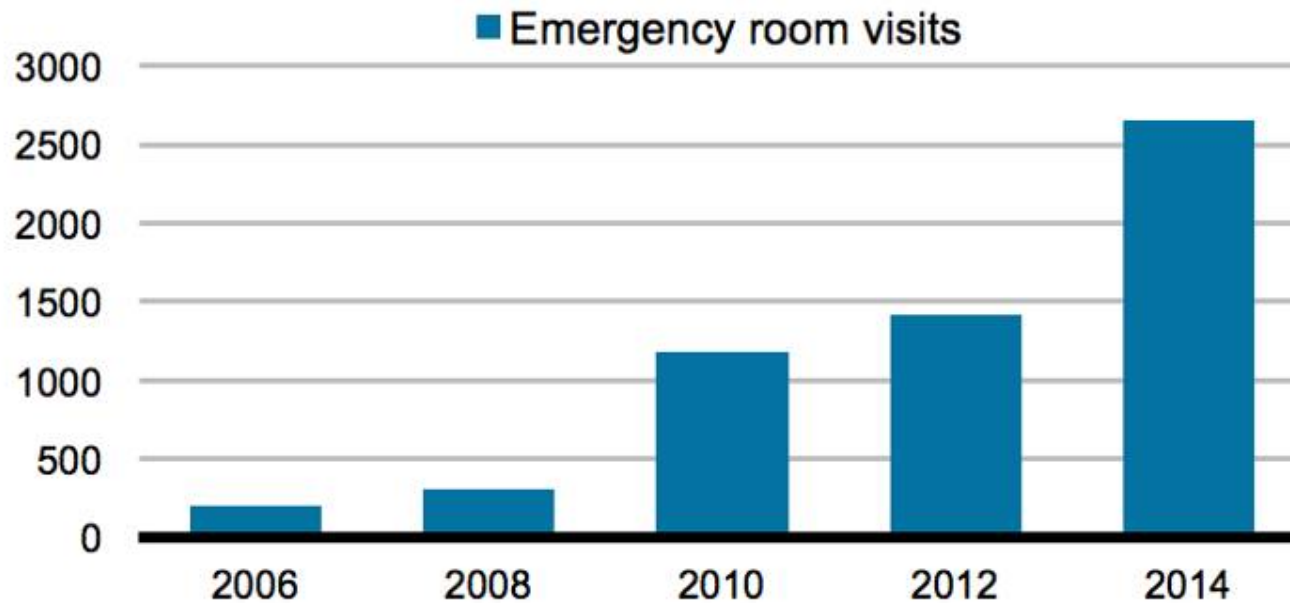


Walking and Cell Phones

- Distracted walking is no different than distracted driving

Rising Risk

U.S. injuries per year involving distracted pedestrians using cellphones, based on the Consumer Product Safety Commission's sampling of emergency room visits



Source: Consumer Product Safety Commission / WSJ Research | WSJ.com



Walking and Cell Phones



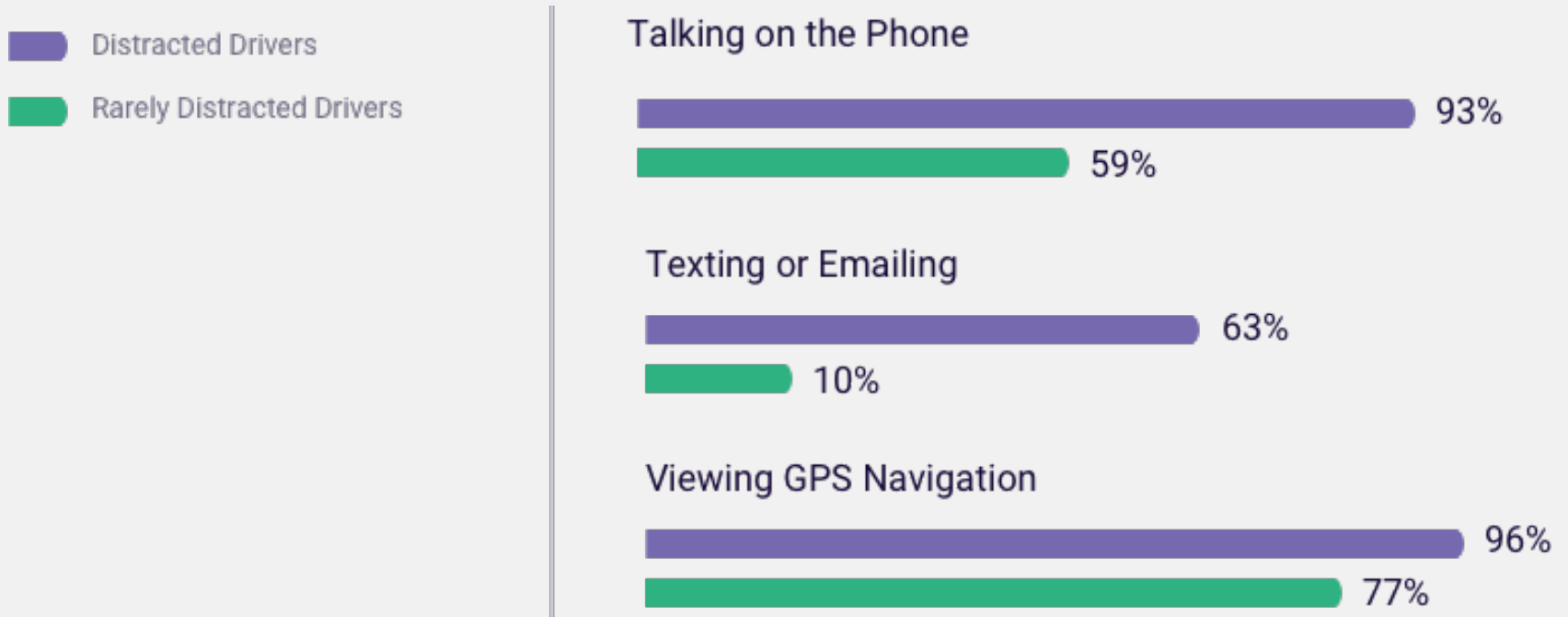
Outcomes	Cell phone user	Single	Music player	Pair
Crossing time	82.5 sec	74.8 sec	73.7 sec	86.2 sec
Changed direction	29.8 %	4.7 %	11.1 %	17.3 %
Weaving	21.3 %	14.0 %	5.6 %	9.6 %
Acknowledge others	2.1 %	11.6 %	13.0 %	7.7 %
Stopped	4.3 %	2.3 %	9.3 %	11.5 %
Near collisions	4.3 %	0 %	1.9 %	0 %

Unicycling Clown



<u>Question</u>	<u>Cell Phone user</u>	<u>Single</u>	<u>Music Player</u>	<u>Pair</u>
<u>What did you see?</u>	<u>8.3 %</u>	<u>32.1 %</u>	<u>32.1 %</u>	<u>57.1 %</u>
<u>Did you see the clown?</u>	<u>25.0 %</u>	<u>51.3 %</u>	<u>60.7 %</u>	<u>71.4 %</u>

Even self-identified “rarely distracted drivers” engage in risky behaviors



groenbrothers.com



**I WANT YOU
TO TURN OFF
YOUR CELL PHONE**

Cognitive Demand by Vehicle

2017 Model Year Vehicles

