

How Do You Turn This Driving Simulator On?

Tutorial for Traffic Engineering and Roadway Design Research Using Driving Simulation

Sue Chrysler

Linda Ng Boyle

Richard Romano

TRB Annual Meeting January 13, 2013

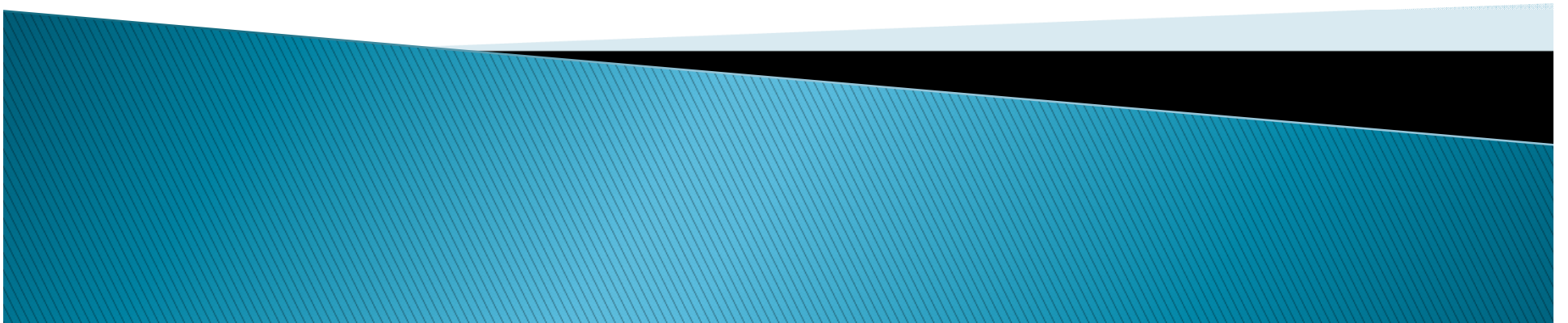
Agenda

- 1:30 Introductions
- 1:45 Hardware Selection and Room Set-up
Richard Romano
- 2:05 Research Topics and Scenarios
Sue Chrysler
- 2:20 Experimental Design Concepts
Linda Ng Boyle
- 2:40 Data Collection Tips
Sue Chrysler
- 3:00 Group Exercise
- 4:00 Discussion and Questions
- 4:30 Adjourn



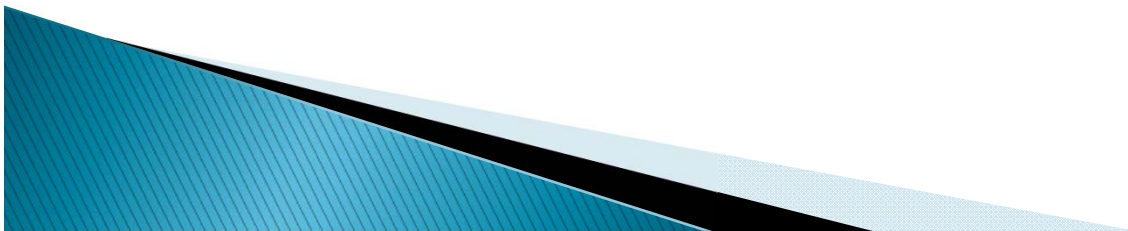
Data Collection Procedures

Sue Chrysler



Data Collection Procedures

- ▶ IRB
- ▶ Recruiting participants
- ▶ Conducting the study
- ▶ Handling simulator sickness



Institutional Review Board (IRB)

- ▶ Federal law for Universities to comply
- ▶ Health and Human Services, Office for Human Research Protections
- ▶ Approve, monitor, and review biomedical and behavioral research involving human subjects
- ▶ Protect participants from physical or psychological harm



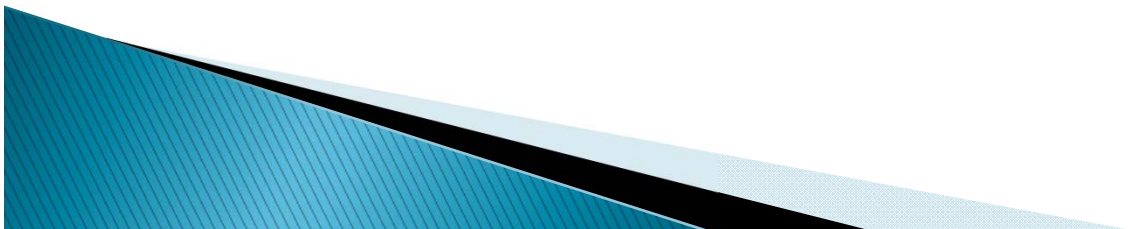
Belmont Report Basic Ethics Principles

- ▶ **Respect for Persons**
 - Individuals should be treated as autonomous agents
 - Persons with diminished autonomy are entitled to protection
- ▶ **Beneficence**
 - Do not harm
 - Maximize possible benefits and minimize possible harms
- ▶ **Justice**
 - To each person an equal share
 - Ensure some classes are not selected differentially due to ease of availability



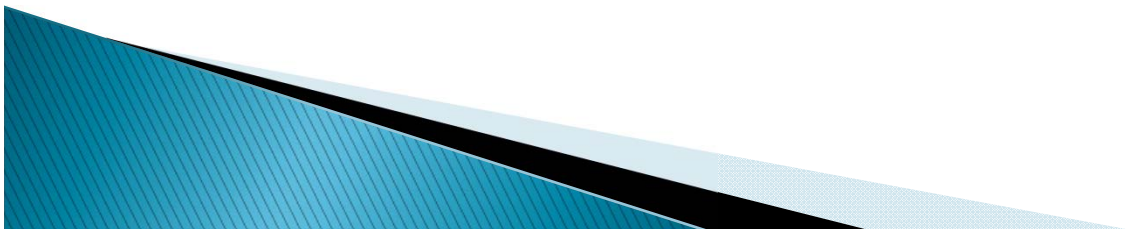
Typical IRB process

- ▶ Check with your University – typically in the Vice President for Research office
- ▶ Complete required training
 - required of all research team members
- ▶ Submit application
 - Includes recruiting information, consent forms, test protocol
- ▶ Receive approval (could be up to 3 months)
- ▶ File annual continuations
- ▶ File any modification
- ▶ Report any adverse events



What is a human subject ?

- ▶ The federal regulatory definition of a **Human Subject**:
 - A living individual about whom an investigator (whether professional or student) conducting research obtains:
 - Data through intervention or interaction with the individual, OR
 - Identifiable private information
- ▶ This means that if you are analyzing previously collected data you still may need IRB approval



Elements of Consent

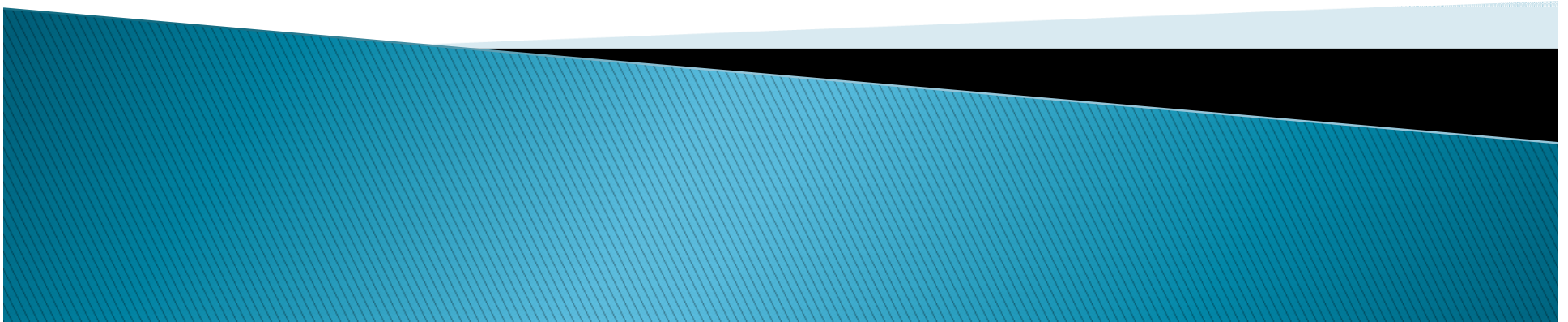
- ▶ Consent is a *process*
- ▶ Provide information that is understandable
- ▶ Allows voluntary participation
- ▶ Allows for withdrawal without penalty
- ▶ Special rules for children, those with diminished mental capacity, novice drivers, pregnant women
- ▶ May need separate video release



Recruitment Issues



I WANT YOU



Recruiting ideas

- ▶ Posted flyers
- ▶ Craigslist ads
 - Volunteer opportunities
- ▶ Lab or department
- ▶ News stories
- ▶ Senior centers
- ▶ Class presentations
- ▶ E-mail to past participants

THE UNIVERSITY OF IOWA IS INVITING ADULTS TO PARTICIPATE IN A DRIVING RESEARCH STUDY

Who can be part of this study?

- Adults age 18 through 75
- Have valid US driver's license

You must be able to attend 1 study visit up to two hours in length at the Hawkeye Downs Speedway in Cedar Rapids, Iowa where you will drive a University vehicle in the parking areas.

If you meet the above criteria and are interested in participating, please visit:

Email: recruit@nads-sc.uiowa.edu

Call: 319-335-4719

You will be paid for your time and effort.

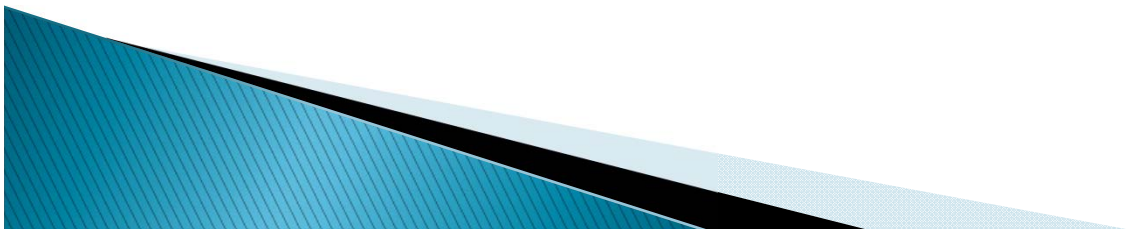
FOR MORE INFORMATION
WWW.DRIVINGSTUDIES.COM
RECRUIT@NADS-SC.UIOWA.EDU

319.335.4719

Coercion



- ▶ Friends, classmates need to be handled carefully
- ▶ Recruiting participants through parents and teachers
- ▶ Recruiting participants through study sponsors (e.g. state DOT)
 - Conflicts of interest for financial gain from contractors



The Experimental Session

- ▶ Intake
 - Greeting – introduce yourself, wear a nametag, dress nice
 - Consent
 - Demographics
 - Vision or other physical testing
- ▶ Instructions
- ▶ Drive
- ▶ Debrief
- ▶ Pay them on time !



Instructions

- ▶ Use simple language
- ▶ Use illustrations
- ▶ Provide off-line practice with any secondary tasks
- ▶ Provide warm-up or practice drive
- ▶ Be clear on relative importance of driving performance and secondary tasks



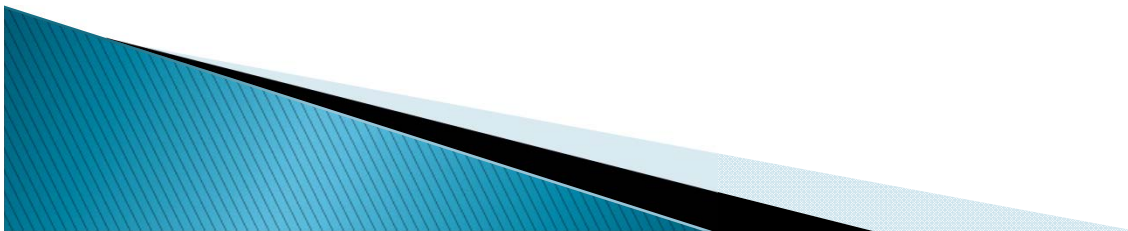
Drive

- ▶ Pay attention to room layout and lighting
- ▶ Maintain a consistent level of conversation
- ▶ Develop script of experimenter responses to likely questions or issues
- ▶ Monitor for simulator sickness



Identifying Benefits to Subjects

- ▶ Debriefing
 - Throughout course of longitudinal study
 - At completion of study
- ▶ Information Sheets
 - Opportunity to educate about traffic safety
 - Provide links for further information



Avoiding and Handling Simulator Sickness

- ▶ Procedural prevention
 - Use screening questions at enrollment
 - Provide good air flow in room
 - Provide rest period after practice drive
 - Assess sim sickness after practice drive
 - Total session should be less than 2 hours
 - Individual drives typically 20–30 minutes
 - Provide breaks and rest times
- ▶ Kennedy sim sickness questionnaire



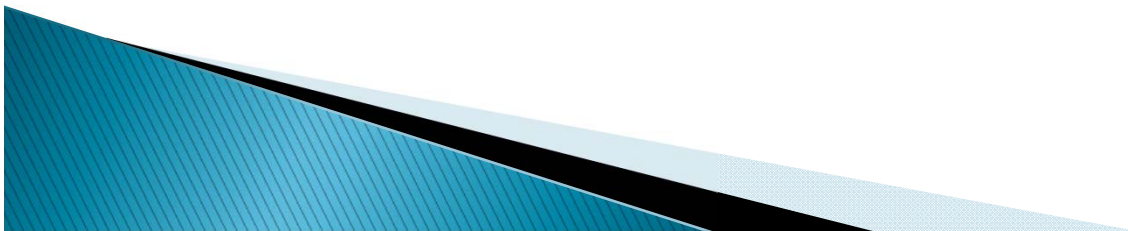
Reducing the Likelihood of Sim Sickness

▶ Scenario

- Avoid lots of turns and sudden stops
- Avoid lots of roadside objects
- Be careful about scale of objects

▶ Layout

- Check driver eye point
- Check display alignment
- Check for fixed objects in field of view
- Reduce field of view (some suggestion in literature)

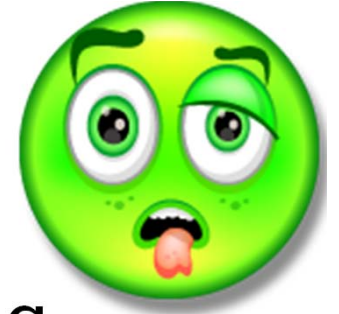


How to spot sickness



Visit [this webpage](#) to view the training slides used by the National Advanced Driving Simulator to train our staff to identify symptoms of simulator sickness.

What if they get sick ?



- ▶ Monitor for frequent swallowing, blinking, yawning
- ▶ Ask if they feel alright
- ▶ Stress that it will only get worse if they feel at all queasy
- ▶ STOP them immediately
- ▶ Offer cold water, lie down, fresh air, peppermint, 7-Up and soda crackers
- ▶ Offer a ride home
- ▶ Follow up later with a phone call



Discussion

- ▶ What problems have you had ?
- ▶ What tips can you share ?
- ▶ How do you recruit ?
- ▶ Do you use information sheets in your debriefing ?
- ▶ How do you respond to questions during a drive?

