INTRO PSYCH SCIENTIFIC REASONING MODULE: DISTRACTED DRIVING

INSTRUCTOR GUIDE FOR SMALL CLASSES

TOPIC: SENSATION AND PERCEPTION

Photo source: https://www.pexels.com/photo/person-holding-black-smartphone-and-vehicle-steering-wheel-1028742

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SUMMARY

In this module, students tackle a serious issue – car crashes due to cell phone use. Students read about and interpret data from an experimental study examining the effects of cell phone (vs in person) conversation on several driving measures from a driving simulator. The module includes opportunities to practice reading and interpreting a bar graph and a table. Instructors can use this example to link the carefully controlled studies in labs to real world policy and behavior change.

TOPIC Sensation and Perception

SOURCE ARTICLE

Drews, F., Pasupathi, M, & Strayer, D. (2008). Passenger and cell phone conversations insimulated driving. *Journal of Experimental Psychology: Applied, 14,* 392-400.

CONTENT SPECIFIC STUDENT LEARNING OBJECTIVES

1. Think critically about the potential effects of cell phone use on driving (human limitations in processing capacity; different forms of distracted driving).
2. Evaluate the strengths and weaknesses of an experimental design to assess the effects of cell phone conversations on driving performance.
3. Draw conclusions using data presented in graph and table form, including considering p-values.
4. Identify real-world implications of research findings.

APA LEARNING OBJECTIVES (2.0)

1.1 Describe key concepts, principles, and overarching themes in psychology.
1.3 Describe applications of psychology.
2.1 Use scientific reasoning to interpret psychological phenomena.
2.2 Demonstrate psychology information literacy.
2.4 Interpret, design, and conduct basic psychological research.

MCAT LEARNING OBJECTIVES (2015)

Psychological, Social, & Biological Foundations of Behavior: Foundational Concept 6B
Scientific Inquiry & Reasoning Skills
Skill 2: Scientific Reasoning and Problem-solving
Skill 3: Reasoning about the Design and Execution of Research
Skill 4: Scientific Statistical Reasoning

CLASS TIME 30 - 45 minutes

OTHER RESOURCES FOR THIS MODULE

Student Handout, PowerPoint slides

BEFORE CLASS

Copy Student Handouts – 1 per student.

Read through this guide, as well as the student handout, getting an estimate for much time to spend on each piece, depending on the time you have available.

Consider doing an online search to update the opening and closing of module with current issues:

- Search online to identify a recent car crash involving cell phones; use this in opening to set the stage

- Search online to identify local laws concerning cell phone use in vehicles or current patterns across the nation. During closing discussion, could extend discussion to cover implications of research for policy questions – e.g., Should laws prohibit talking on a cell phone while driving? Do "hands free" laws address the dangers of cell phones and driving?

DURING CLASS

SET THE STAGE

[Slide 1] - (title slide)

- Large group discussion: Setting the stage
    - Ask class how use of cell phones might impact driving
        - Students will likely come up with finding directions, texting, using the internet, playing games / watching videos, or talking on the phone
    - Ask students to talk with those around them about either personal anecdotes or stories of friends in car accidents involving cell phone use; students can also discuss their experience with any laws in their home state that limited different aspects of cell phone use
        - After a few minutes for individual discussion, have some individuals report out for whole-class discussion of the implications of research on this topic
        - If you have found any relevant current events, you could insert an extra slide to highlight an example of a recent car crash in which cell phones were implicated (news story or video, etc)
    - Note that one goal of psychology is to conduct controlled experiments that let us understand the effects of something on an outcome

ACTIVITY

[Slide 2] (types of evidence)

- Remind students that data can come from correlational studies (looking at associations between variables) or experimental studies (where the experimenter manipulates a variable of interest and randomly assigns participants to conditions)
- Correlational data:
    - Discuss the existence of *correlational data* showing that car accidents are more likely among individuals also using a cell phone at the same time
        - Limits of correlational studies: Impossible to show conclusively that something about cell phone use *causes* the accident
    - Experimental data:
        - Ask students how one could conduct an experimental study on the effects of cell phone use
            - Students will likely come up with the idea of randomly assigning people to drive while using a cell phone vs driving without using a cell phone
            - Could point out some challenges of doing this in the real world – it might be very dangerous, and it might be difficult to think of a good comparison condition
        - Benefit of experimental studies: Can isolate one aspect of cell phone use and use the experimental method to assess causal impact on driving
- Note that the experiment being discussed today focuses on the effects of *talking on a cell phone* on driver performance. Remind that a true experiment involves manipulating the variable of interest and randomly assigning participants to the different conditions
- Explain that you will be passing out a summary from a published research study examining whether talking on a cell phone while driving impairs performance. Students' job is to read the summary and discuss the questions at the end in their groups
- **Pass out student handout; encourage students to read silently, then form small groups as they finish to discuss the study questions**
- IF NEEDED:
    - Prior to passing out study, review the concepts "dependent variable" and "independent variable"

- While students work, circulate among groups to check for student errors in understanding and guide students to consider alternative possibilities
    - Q1:be sure students list ALL of the DVs – there are 4 in total (the three in Table 1, and also '% successfully completing the navigation task' shown in Fig 1)
    - Q2 & 3: only one IV, type of conversation (in-person passenger vs cell phone); this is experimentally manipulated with participants randomly assigned to condition
    - Q4: students may feel that using a driving simulator is a limitation. If so, encourage students to consider the benefits of driving simulators (control over variables; participant safety). Be sure students identify as a strength the use of the experimental method, as opposed to a simple correlational study, and the nice control condition. Students might also identify that the conversation was on a more intense topic than typical conversations, possibly limiting generalizability
    - Q5: the baseline condition acts as a control on incoming driving ability – we are able to see how driving changes with two different types of conversation
    - Q6: students might miss the direction of some effects (note the subtraction used – cell phone conversation leads to an INCREASE in following distance… this may impact traffic flow) as well as INCREASED lane deviations. Note the navigation task does not have a baseline success measure subtracted (i.e., it just tells us how many participants successfully completed the navigation task while holding a conversation). Students should identify as a limit that no baseline is provided for the navigation task, so it is possible that there were baseline differences between groups, though random assignment generally assuages that concern. Be sure students attend to the p-values in Table 1 in determining which changes to interpret as significant
    - Q7: encourage students to consider whether their design is correlational or experimental
- **While students work, instructor can copy the key figure and table from the handout onto the whiteboard for use during the whole-class discussion that follows**
- Once most groups are toward the end of handout, bring class back together for full class discussion

[Slide 3] (analyzing the study)

- Bring class back together for larger class-level discussion on key points
- DV & IV(s) – see above
- Strengths and Weaknesses?

    - Correlational vs. Experimental design? Primary advantages of using an experimental design?
    - What other control conditions might be useful? (e.g., does type of conversation matter?)
- Consider pattern of results, and what conclusions could be drawn in different scenarios
    - Refer to graphs / tables on board during discussion, including role of p-values in drawing conclusions
    - *Longer* following distance… a good thing? Or evidence for less attentive driving? Or effects on flow of traffic? How do you explain shorter following distance for in-person conversations?
    - **Consider possible ALTERNATE patterns of results on whiteboard -** For example, try redrawing the primary figure such that navigation performance is the same for both groups. Guide class through considering what conclusions would be drawn if different patterns of results were observed
- Alternate experiments
    - Have a few students share their alternate experiments
    - Identify DV/IV
    - Identify whether correlational / experimental
    - As a class, discuss the challenge of an appropriate control condition for different experiments

[Slide 4] (implications for laws)

- Discuss possible legal or personal implications of the research
- Students can share their personal experiences with laws in their state
    - Ask class to speculate on how *texting while driving* might be different than conversing on a cell phone while driving. As time allows, students can discuss either the different resource limitations taxed by texting (visual system, cognitive resources of texting) and whether / how an ideal experimental study could be designed to address this question

CONCLUDING THOUGHTS

- Remind students again of the importance of using research and psychological science to inform policy

- Ultimately no single study will address all questions – but policy can be informed by considering many studies together, and well-designed experimental research is especially valuable in drawing cause-effect conclusions