Amy Berning, Retired, NHTSA Research Psychologist

Research Psychologist at National Highway Traffic Safety Administration. Focused on alcohol / drug driving.

Designed studies on problem identification, impact of laws and sanctions, and development of tools for law enforcement. Led the National Roadside Surveys of Alcohol and Drugs, the Virginia Beach Crash Risk study, and the study examining Alcohol and Drug Prevalence Among Seriously or Fatally Injured Road Users.

Faculty with the Borkenstein Alcohol and Drug Courses.

Reviewed hundreds of proposals.

Reviewer for scientific journals.

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Critically Reviewing Research

Amy Berning, Retired, NHTSA Research Psychologist

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I have no disclosures

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Learning Objectives

Have more confidence understanding research studies.

Learn standard components of a research paper.

Identify results from different angles when determining the rigor of the study and the meaningfulness of results.

Identify research findings presented inaccurately or incompletely.

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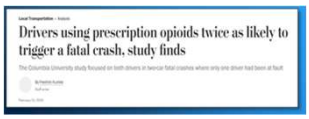
Imagine...

You are at a conference

Or

Reading a Journal Article


Drivers using prescription opioids twice as likely to trigger a fatal crash, study finds

?


FATALLY INJURED DRIVERS INCREASINGLY TEST POSITIVE FOR DRUGS, NUMBERS NEARLY TRIPLE FOR MARIJUANA IN TEN-YEAR PERIOD

The prevalence of non-alcohol drugs detected in fatally injured drivers in the U.S. has been steadily rising and tripled from 1999 to 2010 for drivers who tested positive for marijuana -- the most commonly detected non-alcohol drug -- suggesting that drugged driving may be playing an increasing role in fatal motor vehicle crashes.

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Who Sponsored the Study? How was it Funded?

Grant

Contract

More Oversight

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Components of a Research Paper

- ❑ Abstract
- ❑ Background / Introduction
  - ❖ Objectives
- ❑ Method
  - ❖ Data Collection
  - ❖ Equipment
  - ❖ Participants
- ❑ Results
- ❑ Discussion / Conclusion
- ❑ References

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Abstract

Summarize the study.

"Stand alone."

Why the study was conducted, the objectives, research design, results, and conclusions.

A concern is if information is cherry-picked, and only results that align with the authors' goals are presented.

Alcohol and Drug Prevalence Among Seriously or Fatally Injured Road Users Thomas… NHTSA, 2022

Over the last few decades, interest in how drugs other than alcohol may be affecting roadway safety has increased. Studies conducted by NHTSA and others have provided substantial insights on the topic of drugged driving, but a gap in knowledge exists regarding drug prevalence among drivers and other road users such as pedestrians and bicyclists who are seriously or fatally injured in crashes in the United States. The current study sought to fill this gap by examining drug prevalence among a large sample (N = 7,279) of seriously injured roadway users presenting to seven selected trauma centers and fatally injured crash victims presenting directly to four medical examiners at selected sites. Overall, 55.8% of the injured or killed roadway users tested positive for one or more drugs (including alcohol) on this study's toxicology panel. The most prevalent drug category detected was cannabinoids (active THC) with 25.1% positive, followed by alcohol (23.1%), stimulants (10.8%), and opioids (9.3%). Overall, 19.9% of the roadway users tested positive for two or more categories of drugs. For drivers specifically, the results showed associations of drug positivity with age, sex, time of crash, and day of crash (weekday versus weekend). The results in this report provide a first look at drug prevalence among a large sample of seriously or fatally injured roadway users. This study's results can only be used to describe drug prevalence among the specific populations sampled and with full awareness of the study's limitations. The study results should not be used to imply impairment or increased risk associated with drug presence. Future similar research at these sites or others across the country could be used for monitoring changes in drugged driving over time and could inform traffic safety stakeholders to better tailor impaired driving countermeasures for particular regions or types of road users.

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Introduction / Background

Sets the stage for the study, providing context.

Mention of past research on the area that has advanced knowledge. This should include breakthroughs in knowledge, or limitations of the studies.

NO cherry-picking to only highlight certain findings; nor should only studies supporting that belief work be included. This is a serious concern in studies, and occurs often in drug impairment studies.

By reading not only the about the study of interest but ALSO reading the studies referred to, you will start to be familiar with the literature and sometimes will realize, "wait, that is NOT what that study found, this author mischaracterized it."

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Citations and References

Citation within the body of the paper:

Berning, et al. (2022)

In the Reference Section (at end of document, or maybe in footnotes)

Berning, A., Smith, R. C., Drexler, M., & Wochinger, K. (2022, March). Drug testing and traffic safety: What you need to know (Report No. DOT HS 813 264). National Highway Traffic Safety Administration.

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Objectives

Specific enough that it can be addressed in the study (and ONLY this to be addressed). If a study starts to veer off into other objectives the focus on the actual objective will be lost.

Along with an objective, there may be individual research questions that fall underneath that topic, rather than around that topic.

The goal of this project was to conduct a comprehensive evaluation of the impacts of the change in Utah's per se law from .08 to .05. The specific objectives were to

- Document the legislative process that resulted in the per se law change; and
- Examine whether any changes occurred within Utah after the law revision in terms of
  - Crashes and fatalities,
  - Impaired driving arrests,
  - Driver knowledge, perceptions, and attitudes toward drinking and driving,
  - State education or prevention strategies, or
  - Alcohol sales and other economic indicators.

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Methods (or Methodology)

Refers to the study's research design.

It must fit the study's objectives and be able to address the research questions. If the types of methodologies available to the sponsor and researchers don't allow for that, the objectives may need to be pared down to be realistic. It may not be feasible to examine "the impact of a cannabis law on a state" but it may be possible to narrow the topic to "are drivers in a state aware of the new law?"

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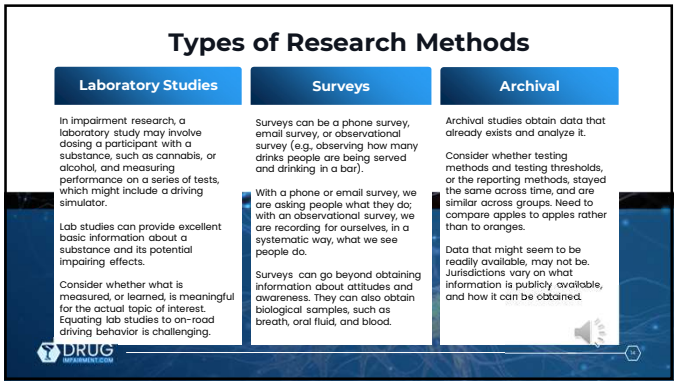
Types of Research Methods
Laboratory Studies
In impairment research, a laboratory study may involve dosing a participant with a substance, such as cannabis, or alcohol, and measuring performance on a series of tests, which might include a driving simulator.
Lab studies can provide excellent basic information about a substance and its potential impairing effects.
Consider whether what is measured, or learned, is meaningful for the actual topic of interest. Equating lab studies to on-road driving behavior is challenging.
Surveys
Surveys can be a phone survey, email survey, or observational survey (e.g., observing how many drinks people are being served and drinking in a bar).
With a phone or email survey, we are asking people what they do; with an observational survey, we are recording for ourselves, in a systematic way, what we see people do.
Surveys can go beyond obtaining information about attitudes and awareness. They can also obtain biological samples, such as breath, oral fluid, and blood.
Archival
Archival studies obtain data that already exists and analyze it.
Consider whether testing methods and testing thresholds, or the reporting methods, stayed the same across time, and are similar across groups. Need to compare apples to apples rather than to oranges.
Data that might seem to be readily available, may not be. Jurisdictions vary on what information is publicly available, and how it can be obtained.
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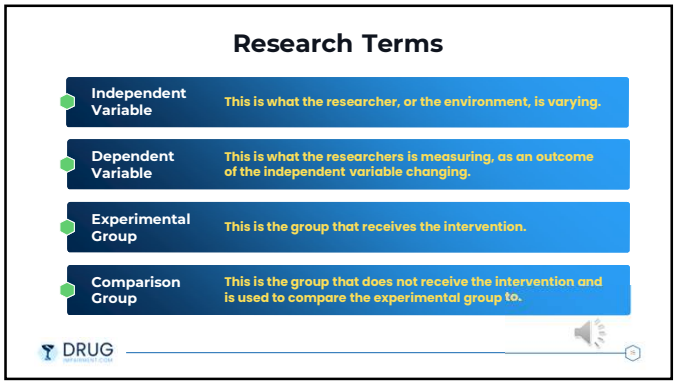
Research Terms
Independent Variable
This is what the researcher, or the environment, is varying.
Dependent Variable
This is what the researchers is measuring, as an outcome of the independent variable changing.
Experimental Group
This is the group that receives the intervention.
Comparison Group
This is the group that does not receive the intervention and is used to compare the experimental group to.
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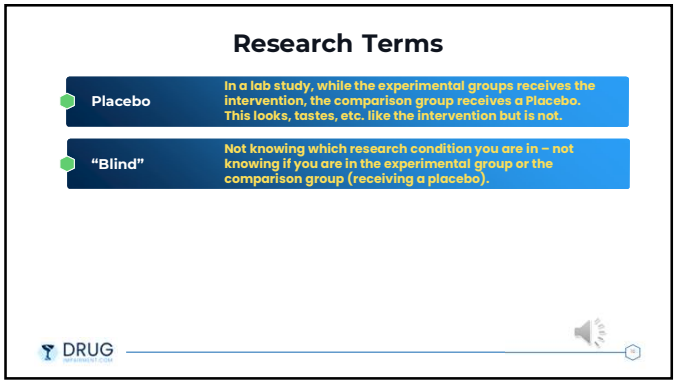
Research Terms
Placebo
In a lab study, while the experimental groups receives the intervention, the comparison group receives a Placebo. This looks, tastes, etc. like the intervention but is not.
"Blind"
Not knowing which research condition you are in – not knowing if you are in the experimental group or the comparison group (receiving a placebo).
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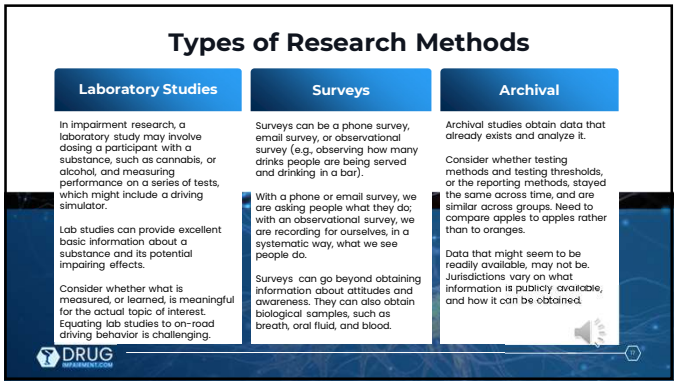
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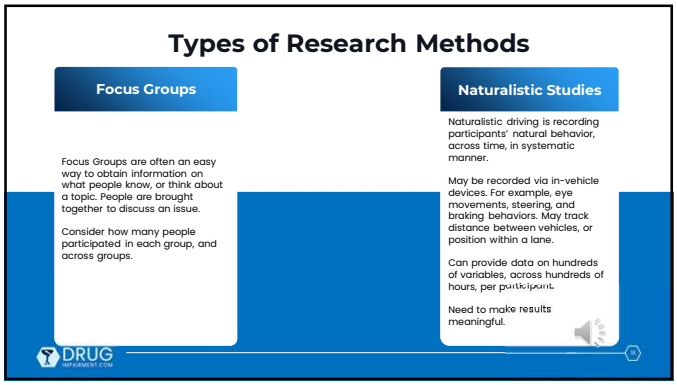
Types of Research Methods
Focus Groups
Focus Groups are often an easy way to obtain information on what people know, or think about a topic. People are brought together to discuss an issue.
Consider how many people participated in each group, and across groups.
Naturalistic Studies
Naturalistic driving is recording participants' natural behavior, across time, in systematic manner.
May be recorded via in-vehicle devices. For example, eye movements, steering, and braking behaviors. May track distance between vehicles, or position within a lane.
Can provide data on hundreds of variables, across hundreds of hours, per participant.
Need to make results meaningful.
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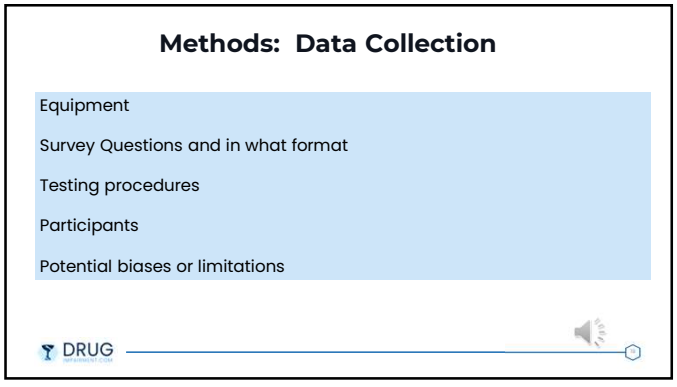
Methods: Data Collection
Equipment
Survey Questions and in what format
Testing procedures
Participants
Potential biases or limitations
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Research Terms

Reliability — Consistency. It is the likelihood the test or measure will yield the same result, when conditions and input are the same.

Validity — Accuracy. We want to assess what we think we are measuring - what the construct or test was designed to do.

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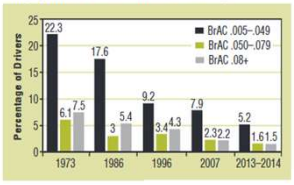
Results

Present the data, without interpretation.

Descriptive Statistics provide basic information about what was found. These are can be counts of things that occurred.

Percentage of Weekend Nighttime Drivers by BrAC Category in the Five National Roadside Surveys[3]



Berning, Compton, and Wochinger (2015) Research Note 2015.pdf

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Results

Find NHTSA datasets at NHTSA.gov and Welcome to ROSA P

Inferential statistics
When comparing things, such as a jurisdiction's number of crashes before and after an invention. Or, when comparing results across locations or conditions.

"Statistical Significance" refers to whether that result is likely to be true, or whether it likely occurred by chance. "p < .05" means the probability (the p) is less than 5% that it occurred by chance. Another way of saying this, the invention likely did have an impact.

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Thomas, F. D., Blomberg R., Darrah, J., Graham, L., Southcott, T., Dennert, R., Taylor, E., Treffers, R., Tippetts, S., McKnight, S., & Berning, A. (2022, February). *Evaluation of Utah's .05 BAC per se law* (Report No. DOT HS 813 233). National Highway Traffic Safety Administration.

Table ES-1. Estimated Average Monthly Changes for Selected Crash and Driver Measures

Measure	After .05 Law Passage (21 months before effective) $\Delta_{\%}$	After .05 Law In Effect (12 months) $\Delta_{\%}$
Crashes		
Total per VMT†	-11.5*	-9.6*
Injury per VMT	-10.9*	-10.8*
Single Vehicle Nighttime per VMT	-12.3*	-7.8
Single Vehicle Nighttime Injury per VMT	-18.1*	-13.7*
Alcohol Positive per VMT	-5.8	-8.9*
BAC ≥ .05 per VMT	-24.0*	-14.7
BAC ≥ .08 per VMT	-23.3*	-13.7
BAC ≥ .15 per VMT	-23.9*	-9.1
Drivers		
% Suspected Alcohol	-3.7	-12.5*
% Alcohol Positive	-6.8	-14.6*
% BAC ≥ .05	-22.7*	-22.5*
% BAC ≥ .08	-19.5*	-22.9*
% BAC ≥ .15	-24.1*	-22.5*

$\Delta_{\%}$ = estimated percentage change. *$p < .05$, two-tailed ARIMA model. †VMT is per 100 million vehicle miles traveled.

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Research Terms

Correlation Variables are related to each – there may be positive, negative, or no correlations.

Correlation does not Imply Causation

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Discussion

Brings all the information together.

The author reiterates the objectives of the research and any specific questions. The author makes sense of the results, especially statistical results, and should discuss whether they are meaningful, as well as statistically significant.

Results do not need to research statistical significance to be important, or to advance knowledge. Similarly, a discussion should consider whether results that ARE statistically significant are meaningful in real life.

May recommend next steps, or policy implications.

Overall, the study's findings indicate that passage of the *.05 per se* law had demonstrably positive impacts on highway safety in Utah. The crash analyses demonstrated reliable reductions in crash rates and alcohol involvement in crashes associated with the new law that were consistent with, or greater than, those observed or predicted by prior research (e.g., Fell & Scherer, 2017). While the concerns about hurting the State's economy and increasing arrests were understandable, the data reviewed by this study indicate that none of the potential negative effects of concern came to fruition. In fact, alcohol sales and per capita consumption appeared to continue their increasing trends under the new law as did tourism and tax revenues. Similarly, DUI arrests for alcohol did not increase markedly after the law came into effect.

Thomas, F. D., Blomberg R., Darrah, J., Graham, L., Southcott, T., Dennert, R., Taylor, E., Treffers, R., Tippetts, S., McKnight, S., & Berning, A. (2022, February). *Evaluation of Utah's .05 BAC per se law* (Report No. DOT HS 813 233). National Highway Traffic Safety Administration.

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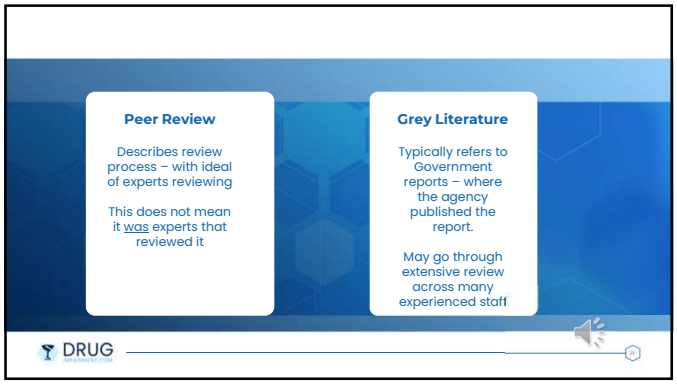
Peer Review
Describes review process – with ideal of experts reviewing
This does not mean it was experts that reviewed it
Grey Literature
Typically refers to Government reports – where the agency published the report.
May go through extensive review across many experienced staff
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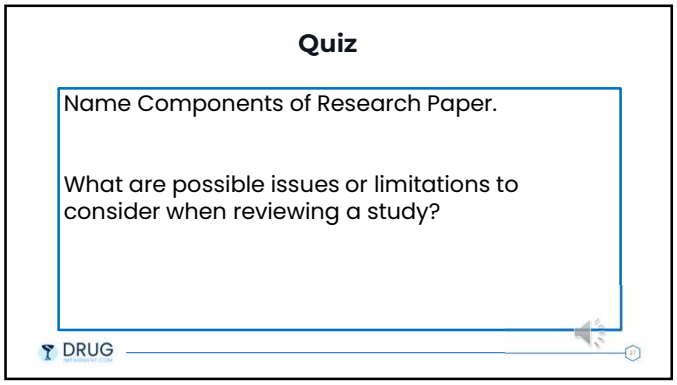
Quiz
Name Components of Research Paper.
What are possible issues or limitations to consider when reviewing a study?
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keepberning@gmail.com
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