Research Methods in Suicidology

2020 Workshop Series
for Early Career Researchers
900,000 suicides a year worldwide

Globally: 10.7 per 100K (2019)
‘Spike in self-harm, suicide ideation amid Covid pandemic’
International Academy for Suicide Research

who are we?

Prof. Gil Zalsman MD, MHA
President of IASR
IASR Vision:

Promotion of high standards of research and scholarship in the field of suicidal behavior
IASR Future Directions

• In-between meetings educational activity
• Senior researchers workshop on metanalysis
• Investing in early career scientists (+CDE)
• Fall school: research methods in suicidology
• Using web-based teaching and training
• Strengthening international ties and influence
• “Love your brain”- In next congress: running with the president, mindfulness meditation
What else have we done in 2020?

- Newsletter
- SPOC- short private online course on introduction to suicidology- planned to be an online series of excellent lectures
- ASR position paper on suicide research on times of COVID-19 pandemic to be published soon research.
- Join us, apply for membership: [https://suicide-research.org](https://suicide-research.org)
International Summit

2021 IASR/AFSP International Summit on Suicide Research

October 24-27, 2021

World Trade Center Barcelona, Spain
Research Methods in Suicidology

2020 Workshop Series
for Early Career Investigators
AIM

To promote research skills for the study of suicide among early career researchers. This workshop series, which includes three 2.5-hour sessions, will give specific tools for early career researchers who want to engage in high-level suicide research.
Session 1: Thursday, October 15, 2020: 11:30am – 2:00pm EDT (US)

1. IASR and Introduction to Suicidology - Gil Zalsman, IASR & Tel Aviv U

2. AFSP and Introduction to Suicide Research Methods - Jill Harkavy-Friedman, AFSP

3. Suicide Research Basics: Recruitment, Sample Selection, Bias, Confounding, and Outcomes - Jill Harkavy-Friedman, AFSP & Diana Clarke, APA

What have we learnt

Q&A
Why should we talk about “how to”? 
Challenges:

quality of current research complex behavior multifactorial heterogenic phenotype fatal outcome IRBs are phobic....
Some tips on how to publish a good paper....
Types of publications

• Original research (focus of this workshop)
• Reviews (invited vs. not invited)
• Case reports/series
• Letter to the editor
• Meta analysis
The middle is your original contribution

Start with the biggest questions and get progressively more specific

Focus now on conclusions
Recommended Sequence

• Results, figures, tables-first step
• Discussion
• Methods
• Introduction- only when all of the above is finished
• Last: abstract and title
The power of figures
Importance of the abstract

- Abstract is your visiting card
- In most cases makes the editor to send the Ms to reviewers or reject it.
- Determines if paper will be read
• Max information in least words
• Depended & independent variables
• Relationship between them
• Use catchy titles
Editors’ tips

- Cite the Journal you are submitting the paper to
- Reviewers may be selected from your references
- Use editing programs (e.g. Endnote)
- Relevant and recent
Two possible articles you can write:
1. The article you planned to write when you designed your study
   OR.....
2. The article that makes the most sense now that you have seen the results
-0.73 correlation between clarity of results and length of discussion (Bem DJ, 1987)

BE BRIEF!!!!!
If you do not have time to check the spelling you may have not had time to check the quality of your experiments......
Authors write

Reviewers comment (2-3)

Editors decide

Readers read (average = 7)
Rejection

Reject (up to 90-95% in good journals, do not give up!)

Major revisions required (it will be reviewed again, may be rejected)

Minor revisions needed (usually accepted)

Accepted (congratulations! Enjoy and celebrate!)
“Scientists are rated by what they finish, not by what they attempt”
Thank You!

Q&A
Our Speakers

Diana E. Clarke, PhD
Deputy Director of Research &
Senior Epidemiologist/Research Statistician
American Psychiatric Association
IASR Board memebr

Jill Harkavy-Friedman, PhD
Vice President of Research
American Foundation for Suicide Prevention
AFSP
American Foundation for Suicide Prevention
Disclosures

Jill Harkavy-Friedman, PhD, has no financial relationships to disclose relating to the subject matter of this presentation.
AFSP Mission

Save Lives and Bring Hope to those affected by suicide
Five Core Strategies

Research ➔ Education ➔ Public Awareness ➔ Advocacy ➔ Outreach & Support
A Bit about AFSP

- Research
- Prevention Education
- Loss and Healing Programs
- Advocacy and public policy presence in Washington, volunteer advocates in all 50 states, MH Days at State Capitals
- 73 chapters, in all 50 States
- Community Out of the Darkness Community Walks
- The Overnight Out of the Darkness Walk
Research is at the core of AFSP

Founded by researchers, families that lost love ones

Goal was to create a sustainable private source of support for research into suicide

AFSP is now the leading private funder of suicide research, amount for research growing every year

Scientific Advisory Council includes over 200 leading suicide researchers provide expertise
AFSP Research Program

The only research organization that specifically funds research related to suicide

• Requiring a suicide related outcome in all studies

Funds innovative research

• Most of AFSP grantees go on to receive larger grants based on data obtained from their AFSP study
Action Alliance Prioritized Research Agenda

1. Why do people become suicidal?
2. How can we better detect/predict risk?
3. What interventions are effective, what prevents someone from engaging in suicidal behavior?
4. What services are most effective for treating the suicidal person and preventing suicidal behavior?
5. What other types of interventions (outside health care settings) reduce suicide risk?
6. What research infrastructure is needed?

http://www.suicide-research-agenda.org/
Types of Research Supported by AFSP

- Neurobiological studies
- Genetic studies
- Psychosocial studies
- Clinical treatment studies
- Community intervention studies
- Survivors of suicide loss studies
Our researchers

AFSP Funds:
• Young Investigators to build a scientific community
• Senior Investigators to engage seasoned researchers in suicide prevention
• Suicide researchers at all levels for new ideas
Ideal Study

Innovative
Includes suicide outcome
Ultimately has potential **impact** on suicide

Sound **methodology**
Investigator(s) with relevant expertise
Evidence of feasibility
Investigator(s) with ongoing interest in suicide research

Adheres to Grant Procedure Manual
Application process

Everything you need to know can be found at:

https://afsp.org/research-grant-information
Introduction to suicide research methods

By: Jill Harkavy-Friedman, PhD
Things aren’t always as they appear
Goals

1. Rationale for special considerations for suicide research
2. Importance of a theoretical/conceptual framework
3. Developing Hypotheses
Special Considerations for Suicide Research
Unique factors of Suicide Research

- Suicide is an infrequent event
  - Often need proxy measures
  - Not normally distributed
- Definitional ambiguity
- Complex models
- Multiple pathways to behavior
- Transdiagnostic
Unique features of Suicide (con’t)

• Lifetime risk as well as short-term risk
• Intermittent risk (moving outcome)
• Occurs across groups yet some groups at higher risk than others
• Non one pathway to suicide
• Safety concerns
• Discomfort with the topic
Conceptual Framework
Importance of Conceptual Model

Guides all decisions

- Significance of your study
- Hypotheses
- Methods: Sample, measure, procedures, data analysis
- Interpretation and discussion
- Next study
There is never one single cause of suicide
Interacting Risk and Protective Factors

Current Life Events

SUICIDE

Moutier C, Harkavy-Friedman, JM. Model for understanding suicide. afsp.org
Interacting Risk and Protective Factors

- **Biological**
- **Psychological**
- **Social & Environmental Factors**

Current Life Events

Lethal Means

SUICIDE

Moutier C, Harkavy-Friedman, JM. Model for understanding suicide. afsp.org
Model Basic Assumptions

1. Suicide is complex and multi-factored
2. Single variable studies is not enough
   a. Mediators, moderators, confounders
   b. Multiple systems assessed (biopsychosocial)
3. Intraindividual, interpersonal, systemic
4. Timing matters (cross-section & longitudinal)
5. Environmental contribution

Moutier C, Harkavy-Friedman, JM. Model for understanding suicide. afsp.org
Study essentials given theory

- Prospective or Retrospective Design
- Outcome is suicide (not SI or SA)
- Assess potential contributors, stressors and means
- Source of information (self, family, police, records)
- Hypotheses multi-factorial and many pathways
- Data analyses will be multivariate
Design and Hypotheses
Design considerations

Type of design

Questions that can be answered
Questions that cannot be answered

Multi-method multi-trait approach

Strengths and Limitations
Types of Research Designs

**Cross-sectional:** One time assessment (surveys)

**Experimental:** Intervention effect
  - Control/Comparison Group (compare treatments)

**Longitudinal:** Study over time
  - Prospective cohort design (reassess 6 mos after hospital)

**Epidemiological:** large systematic data sets
  - Cohort (registry)
  - Case Control (SA/No SA)
Hypotheses

The goal of every research study is to answer testable question(s)

Is there a difference?
Is there a relationship?
What do variables contribute?
Can we discover something new?
Considerations for hypotheses

Based on current knowledge
Logical
Achievable
Testable
Interesting and Important

Design, hypotheses, measures, data analysis related
<table>
<thead>
<tr>
<th>Type of Study</th>
<th>Cross-Sectional</th>
<th>Longitudinal</th>
<th>Experimental/Quasi</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Q</strong>: Is there a relationship?</td>
<td><strong>Q</strong>: Is there Change over time?</td>
<td><strong>Q</strong>: Is there a difference between groups</td>
</tr>
<tr>
<td></td>
<td><strong>A</strong>: Correlation, chi-square, OR, RR</td>
<td><strong>A</strong>: Repeated Measure, Correlation</td>
<td><strong>A</strong>: ANOVA/ANCOVA, Regression, X^2</td>
</tr>
<tr>
<td>Clinical Trial</td>
<td>Give everyone meds and correlate with side-effects</td>
<td>Follow-up study of suicide in patients previously in hospital.</td>
<td>Randomly assign to 3 doses of meds and compare symptoms</td>
</tr>
<tr>
<td>Psychobiological</td>
<td>Assess cortisol and stress levels</td>
<td>Assess number of suicide attempts over first year of MDD</td>
<td>Administer ketamine to people with SI and midazolam</td>
</tr>
<tr>
<td>Epidemiological</td>
<td>Assess exposure to stress and suicide rate</td>
<td>ACES and suicidal behavior 10 years later</td>
<td>The effect of duration of hospitalization on outcome in SA</td>
</tr>
<tr>
<td>Imaging</td>
<td>MRI VLPRC and decision making</td>
<td>MRI of teens and follow-up 10 years later for SA</td>
<td>PET study of effects of ligand in people with SA and no attempt</td>
</tr>
<tr>
<td>Genetic Family Study</td>
<td>Assess families for specific genes for suicidal behavior</td>
<td>High risk study of children of individuals with who died by suicide</td>
<td>Compare families of those with SA to those with without SA on mRNA</td>
</tr>
<tr>
<td>Genetic Animal Study</td>
<td>Assess impulsivity of knockout mice</td>
<td>Assess impulsivity in mice at 2-weeks, 3-months and 1-year to determine effects of age</td>
<td>Compare Trk and HT2 knockout mice on</td>
</tr>
</tbody>
</table>
Sample and Sampling
What is a sample?

A finite part of a statistical population whose properties are studied to gain information about the whole (Webster, 1985)
What is sampling

The act, process or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population

- Representativeness
- Generalizability
Why do we sample

Most times it is impossible to study the whole population
Requires fewer resources: time, labor and money
Some populations are inaccessible
Process of observation can interfere with results
How is the sample selected?

Type of Recruitment of Sample:
  • Convenience vs. Random

Criteria for inclusion and exclusion:
  • Recruitment and Screening criteria

Demographic considerations:
  • Age, sex, educational level...

Determination of Control or Comparison Group
Who/What is the unit of the interest?

- People who died by suicide
- People who are alive
  - All patients (Inpatient, outpatient, ED, medical unit)
  - At-risk- People with SI, SA, MH condition, Substance
- General population
  - All people
  - People with risk (genetic, disparity)
- Mice
- Articles (meta-analysis)
Sampling

Convenience: available

Purposive: Selects information rich cases for in depth study

Random Sampling: Allows a known probability that each elementary unit will be chosen
Convenience Sampling

Uses the most readily available subjects

College students

Easy to obtain subjects

Limit: Not necessarily representative or generalizable
Purposeful Sampling

Types: Extreme/Deviant case; Intensity; Maximum variation; Homogeneous; Typical case; Stratified purposeful; Critical case; Snowball or chain; Criterion; Theory based; Confirming/Disconfirming; Opportunistic
Uses of Purposive Sampling

• Validation of a test or instrument with a known population (suicide risk measure)

• Collection of exploratory data from an unusual population (suicide among Amish families)

• Use in qualitative studies to study the lived experience of a specific population (interview people positive on Q9 of PHQ9)
Types of Random Sampling

Simple
Systematic random sample
Stratified
Cluster Sample
Matched Sample
Simple

Randomly select sample for Harris Poll to survey

Advantages

• Avoids researcher bias
• Decreases likelihood of nonrepresentative sample

Disadvantages

Time consuming
May not be possible to obtain a list of all eligible units
Stratified Random Sampling

Independently selecting a separate simple randomized sample from each population stratum

Randomly select classrooms for suicide prevention education vs. no educ

Need to consider:

• Logical basis for selecting subsets
• Do you have enough information to divide population
• Are there enough subjects to get meaningful groups into each subset
• Have random procedures been used for each subset
Cluster Sampling
Select clusters from the population on the basis of simple random sampling. Sample clusters comprises a census of each random cluster selected
Randomly sample 30 people who made a SA in each season
Advantage: More economical
Disadvantage: Subject to sampling bias since likely to get similar responses from members of a cluster and must assess everyone in that cluster
Systematic Random Sample
Select every nth subject from a list of all possible subjects. Population listing must be random and sampling must start at a random point.

every 6\textsuperscript{th} person from Qualtrics

Advantage:
• Economical

Disadvantage:
• May be geographic or cyclic events
Matched Sampling

Match samples on characteristics to obtain equivalent comparison groups

Match those with and without SA by age

Advantage:
- Equates on potentially confounding variables

Disadvantage:
- Need to determine what variables to match
- Open to sampling and researcher bias
Groups to sample

Cases

Controls

Comparison group
Cases/Patients/Animals

Caseness: Target group

Inclusion/Exclusion and Assessment

Recruitment: Location, method

Demographics and Genes

Cultural/Environmental Issues

Phase: Age, Duration of illness, treatment phase, generation, litter
Controls

Usually in experimental designs
Normally distributed
Within Subject
Within Cohort
Determining Matching Criteria
Comparison Groups

When you have no control

Nature of Group

• People with MDD and no suicide attempt, mouse strain
Sampling Bias

When an individual or group is more likely to be selected for participation

Types: self-selection, non-response, undercoverage, survivorship, pre-screening or advertising, healthy user

Representativeness and Generalizability affected
Procedural Considerations
Procedural Considerations

Intervention/Tasks

• Definition and manualization
  - Timing. # sessions, length, medication dose
• Training & ongoing supervision
• Maintenance of blind assessors
• Implementation of intervention and fidelity
• Adherence and attrition

Interval of Measurement

• One-shot, short-term, long-term
Procedural Considerations (Cont’d)

Recruitment Methods
• Systematic, documented
• Keeping people in the program

Investigator’s Role
• Avoid potential biases
• Appropriate level of supervision

Ethical Considerations
• Confidentiality, identification of risk, intervention

Feasibility
Thank You!
Exposure, Outcomes, & Other Variables in Suicide Research – Things to Consider

Diana E. Clarke, Ph.D., M.Sc.
Deputy Director of Research &
Senior Research Statistician/Epidemiologist,
American Psychiatric Association &
American Psychiatric Association Foundation
OBJECTIVES:

• Continue the conversation on methodological issues that you need to consider in suicide prevention research

• To help you understand:
  
  • The importance of having clear definition and operationalization of your variables of interest – exposure and outcome
  
  • The importance of thinking about other variables that may distort, modify or illuminate the relationship between your variables of interest
  
  • How and when to address these “other” variables
  
  • How operationalization of your outcome will inform your analytic strategy
WHAT IS THE OUTCOME OF INTEREST?

• Be clear about your outcome of interest
  • Suicidal ideation/thought
  • Suicide attempt/behavior
  • Suicide

• Clear operationalization
  • Dichotomous - Y/N
  • Count - Number of event
  • Level/severity
What is your main independent variable/exposure:

• Exposure: The main factor to which a group of individual is exposed

• An Intervention:
  • e.g., gatekeeper training, suicide safety planning,
  • How are people identified and enrolled in the intervention?

• Other exposure:
  • e.g., exposure to a traumatic event, having a psychiatric disorder
  • How operationalized?

• Implications for sample size and how the outcome is assessed
THINGS TO THINK ABOUT – ALL VARIABLES:

- How will the information be collected?
- How clinically useful are the assessment tools being used?
- How frequent will the outcome & factors be assessed?
- How will completion of the assessments fit into clinical/research workflows?
- Measures needs to be reliable, valid, and sensitive to change!
ASSESSMENT TOOLS NEED TO BE:

What do we mean when we say a measure is **reliable**?

- The degree to which the results obtained by a measurement procedure can be replicated

What do we mean when we say a measure is **valid**?

- Relative absence of bias or systematic error
- Measuring what it purports to measure
ASSESSMENT TOOLS NEED TO BE:

- Reliable? Valid? Reliable and Valid?

**Figure 1**
Reliable (Consistent) but not Valid

**Figure 2**
Not Reliable (Consistent) and therefore it cannot be Valid

**Figure 3**
Reliable and Valid
OTHER VARIABLES OF INTEREST:

• Think about the way in which your exposure and outcome variables are related and ways in which other factors may be related to, illuminate bias, or be confounding of this relationship!

  • Confounders, mediators & moderators

• Use of a conceptual framework
**FIGURE 1: The Integrated Stress Process Model Can Help Identify Confounders, Mediators, Moderators**

<table>
<thead>
<tr>
<th>Circumstances in the Environment:</th>
<th>Ongoing Situations:</th>
<th>Psychosocial Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantages and disadvantage related to AGE, SEX, RACE/ETHNICITY, RURALITY</td>
<td>Advantages and disadvantage related to SOCIAL SUPPORT, CHARACTERISTIC OF THE NEIGHBOURHOOD, CHRONIC STRAIN</td>
<td></td>
</tr>
</tbody>
</table>

**Proximal/Recent Life Event(s):**  
Ranging from extreme events (e.g., natural disasters) to more usual life events (RECENT EXPERIENCE OF BEREAVEMENT, HEALTH PROBLEMS etc.)

**Biological Background:**  
especially genetic inheritance.

**Personal Dispositions/Characteristics:**  
Genetic vulnerability, prior disorder (past suicide attempt), ability (functional) & I.Q; personality characteristics related to coping, history of past experiences with major positive and negative events that may be reflected in personality, beliefs and values (e.g., Holocaust, childhood physical/sexual abuse)

<table>
<thead>
<tr>
<th>Adaptive/ Maladaptive Response</th>
<th>Cognitive Appraisal and Coping Response</th>
<th>Adverse Change in Health or functioning (e.g. SUICIDE, SUICIDE ATTEMPT, SUICIDAL IDEATION)</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Of Stress</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**No substantial Change in Health or Functioning**
CONFOUNDER, MODERATOR, MEDIATOR?

- **Confounder** = A factor that is independently associated with the exposure (independent variable) and the outcome (dependent variable) but **NOT in the causal pathway** that **distorts** the relationship between E and D.

- Does E cause D, D cause E, or does E and D share a common antecedent, C?

- **Bias** you hope to prevent or control and best dealt with at the study design stage
CONFOUNDERS IN SUICIDE PREVENTION RESEARCH?

• Examples of potential confounders:
  • Sociodemographic factors e.g., age, gender, race, SES
  • Past suicide attempt
  • History of psychiatric disorders (e.g., major depressive disorder, bipolar disorder, etc.)
  • Alcohol and illicit drug misuse or disorder
  • History of physical/sexual abuse/neglect (adverse life events)
Techniques for dealing with confounders & why:

- **Design Stage**
  - Randomization in RCT
  - Matching

- **Analytic Stage**
  - Stratified analysis
  - Multivariable analytic technique (e.g., logistic regression)

- Greater examination of data for potential confounders can lead to more accurate interpretations about the causal effects of interventions.
### HYPOTHETICAL EXAMPLE OF CONFOUNDING:

<table>
<thead>
<tr>
<th>GROUP</th>
<th>EXPOSURE</th>
<th>Suicidal Ideation (SI)</th>
<th>Association</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>Intervention</td>
<td>400(a)</td>
<td>514(b)</td>
<td>OR = a/b÷c/d</td>
</tr>
<tr>
<td></td>
<td>Treatment As Usual</td>
<td>600(c)</td>
<td>486(d)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>Intervention</td>
<td>200(a)</td>
<td>114(b)</td>
<td>OR = a/b÷c/d</td>
</tr>
<tr>
<td></td>
<td>Treatment As Usual</td>
<td>500(c)</td>
<td>286(d)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>Intervention</td>
<td>200(a)</td>
<td>400(b)</td>
<td>OR = a/b÷c/d</td>
</tr>
<tr>
<td></td>
<td>Treatment As Usual</td>
<td>100(c)</td>
<td>200(d)</td>
<td></td>
</tr>
</tbody>
</table>

Hypothetical numbers taken from Bauman et al, 2002, AJPM
CONFOUNDERS, MODERATORS, MEDIATORS?

- **Modifier/effect modifier**: A third factor, that at different levels, has different effect on the relationship between exposure and outcome.

![Diagram showing relationship between exposure, effect modifier, and disease]
Techniques for dealing with moderators & why:

- **Design Stage**
  - Study the 2 groups separately
  - Implications for sample size

- **Analytic Stage**
  - Stratified analysis by the effect modifier
  - Interaction term in multivariable analytic technique

- Better understanding of **moderators** can inform tailoring of interventions to the needs of specific subgroups of people at risk for suicide.
## HYPOTHETICAL EXAMPLE OF MODERATOR:

<table>
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<th>Association</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
<td>OR = a/b÷c/d</td>
</tr>
<tr>
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<td>Intervention</td>
<td>150(a)</td>
<td>164(b)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Treatment As Usual</td>
<td>550(c)</td>
<td>236(d)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>Intervention</td>
<td>200(a)</td>
<td>400(b)</td>
<td></td>
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<td>100(c)</td>
<td>200(d)</td>
<td></td>
</tr>
</tbody>
</table>

Hypothetical numbers taken from Bauman et al, 2002, AJPM
EXAMPLE OF A MODERATOR:

Figure 1. Hope as a moderator of perceived burdensomeness and suicidal ideation.
CONFOUNDER, MODERATOR, MEDIATOR?

- A **mediator** is a factor that is also associated with both the exposure and outcome, but **is part of the causal pathway** between the exposure and outcome.

- Mediators clarify the causal pathway.
Techniques for dealing with moderators & why:

• Must distinguish between a confounder and a mediator based on knowledge of the disease process – Conceptual Model

• Temporal relationship

• Analytic Methods
  • Path analytic technique
  • Sequential regression technique

• Better understanding of mediators of suicide prevention interventions can inform systematic improvements in intervention efficacy

• Help to identify modifiable pathways
EXAMPLE OF MEDIATORS:

Physical Abuse → Antagonism

Antagonism → SR-Suicide Attempt

Antagonism → Disinhibition

Disinhibition → CR-Current Suicide Risk

Physical Abuse → CR-Current Suicide Risk

SR-Suicide Attempt → CR-Current Suicide Risk
EXAMPLE OF MEDIATORS:

- Sexual Abuse
- Detachment
- Psychoticism
- SR-Suicide Attempt
- CR-Current Suicide Risk

Relationships:
- Sexual Abuse → Detachment: 2.65*
- Sexual Abuse → Psychoticism: 3.53*
- Detachment → SR-Suicide Attempt: 0.57*
- Psychoticism → CR-Current Suicide Risk: 0.91*
- SR-Suicide Attempt → CR-Current Suicide Risk: 0.06*
- Psychoticism → CR-Current Suicide Risk: 0.07*
CONFOUNDER, MODERATOR, MEDIATOR?

- Due to the complex bi-directional relationships among psychosocial variables, environmental variables, and suicide outcomes, the “other variables” can operate in different ways in different situations – e.g., social support (SS)
  - **Social support as a mediator**
    - Participating in the intervention may lead to more SS from friends and family (or the individual feeling they have more SS) and lead to reduced suicidal ideation/behavior
  - **Social support as a moderator**
    - Individuals with high positive SS are encouraged and supported as they participate in the intervention leading to reduced suicidal ideation/behavior
    - Individuals with high negative SS have no encouragement or support as they participate in the intervention leading little or no reduction in suicidal ideation/behavior
**VARIABLES & LEVELS OF MEASUREMENT:**

- Variables & their levels of measurement determine the analytic methods

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type of variable</th>
<th>Levels of Measurement</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cause of death</td>
<td>Categorical</td>
<td>Nominal</td>
<td>1=Accident; 2= homicide; 3=suicide; 4=other</td>
</tr>
<tr>
<td>History of suicide attempt</td>
<td>Categorical</td>
<td>Ordinal</td>
<td>0-No; 1=Yes</td>
</tr>
<tr>
<td>Severity of suicide ideation</td>
<td>Ordinal</td>
<td>Ordinal</td>
<td>0=none; 1=Mild; 2=Moderate; 3=Severe 4=Extreme</td>
</tr>
<tr>
<td>Number of suicide attempts</td>
<td>Quantitative</td>
<td>Interval</td>
<td>Count – 0 to ?</td>
</tr>
</tbody>
</table>
## DESCRIPTIVE STATISTICS – GENERAL:

<table>
<thead>
<tr>
<th>Level of measurement</th>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal or ordinal</td>
<td>Proportion</td>
<td>Fraction of the population that is affected (i.e., those affected/the entire population); measure of the frequency with which an event occurs</td>
</tr>
<tr>
<td>Interval</td>
<td>Mean, median, mode</td>
<td>Measures of central tendency</td>
</tr>
<tr>
<td></td>
<td>Standard deviation</td>
<td>Summary of the variation of the values around the mean (i.e., how widely dispersed the values are)</td>
</tr>
</tbody>
</table>
DIFFERENCES BETWEEN GROUPS:

- What type of dependent/outcome variable used?
  - Continuous
    - How many groups?
      - 2 Groups: Student’s T-Test
      - More than 2 groups: ANOVA
  - Categorical
    - Chi-square tests
Some examples of INFERENTIAL STATISTICS:

<table>
<thead>
<tr>
<th>Dependent/Outcome Variable</th>
<th>Regression Model Used</th>
<th>Measures of Association</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Categorical (Ordinal or nominal)</td>
<td>- Binary (2 responses, Y/N)</td>
<td>- Logistic</td>
</tr>
<tr>
<td>- Time to event</td>
<td>- Survival</td>
<td>- Hazard ratio</td>
</tr>
<tr>
<td>- Categorical (Ordinal or nominal)</td>
<td>- Categorical (3+ responses)</td>
<td>- Multinominal Logistic (ordinal or nominal)</td>
</tr>
<tr>
<td>- Interval</td>
<td>- Count</td>
<td>- Poisson, Negative Binomial</td>
</tr>
<tr>
<td>- Interval</td>
<td>- Continuous</td>
<td>- Linear</td>
</tr>
</tbody>
</table>

- Categorical (Ordinal or nominal)
- Binary (2 responses, Y/N)
- Logistic
- Odds Ratio (OR)
- Relative Risk Ratio (RRR)
- Time to event
- Survival
- Hazard ratio
- Categorical (3+ responses)
- Multinominal Logistic (ordinal or nominal)
- Odds Ratio (OR)
- Relative Risk Ratio (RRR)
- Interval
- Count
- Poisson, Negative Binomial
- Incidence Rate Ratio (IRR)
- Continuous
- Linear
- Risk Difference
SUMMARY:

• How you define and operationalize your study variables is important
  • From design to analysis and dissemination of results
• Identifying & addressing confounders, moderators & mediators is important in:
  • Preventing distortions;
  • Informing the need to study certain groups separately; and
  • Helping to explain the causal relationships in suicide prevention research
• Use of a conceptual framework can guide the process and help in explaining
  the relationships/associations observed.
Thank You!