Research Methods in Suicidology

2020 Workshop Series

for Early Career Researchers

RESEARCH METHODS

IASR
International Academy
of Suicide Research

American
Foundation
for Suicide
Prevention

900,000 suicides a year worldwide

Age-standardized suicide rates (per 100 000 population), both sexes, 2015

Suicide rate (per 100 000 population)

- <5.0
- 5.0–9.9
- 10.0–14.9
- ≥15.0
- Data not available
- Not applicable
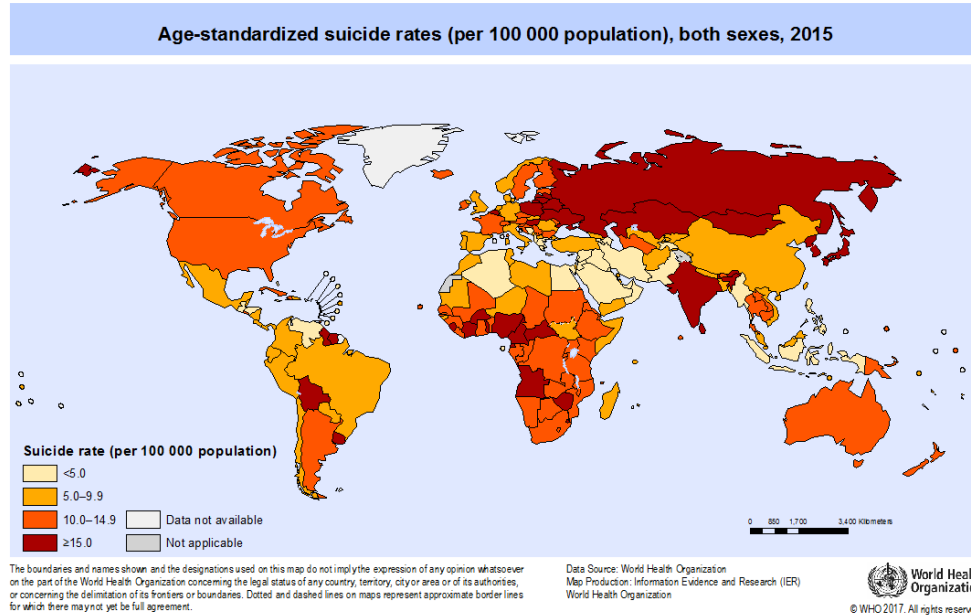
Globally: 10.7 per 100K (2019)

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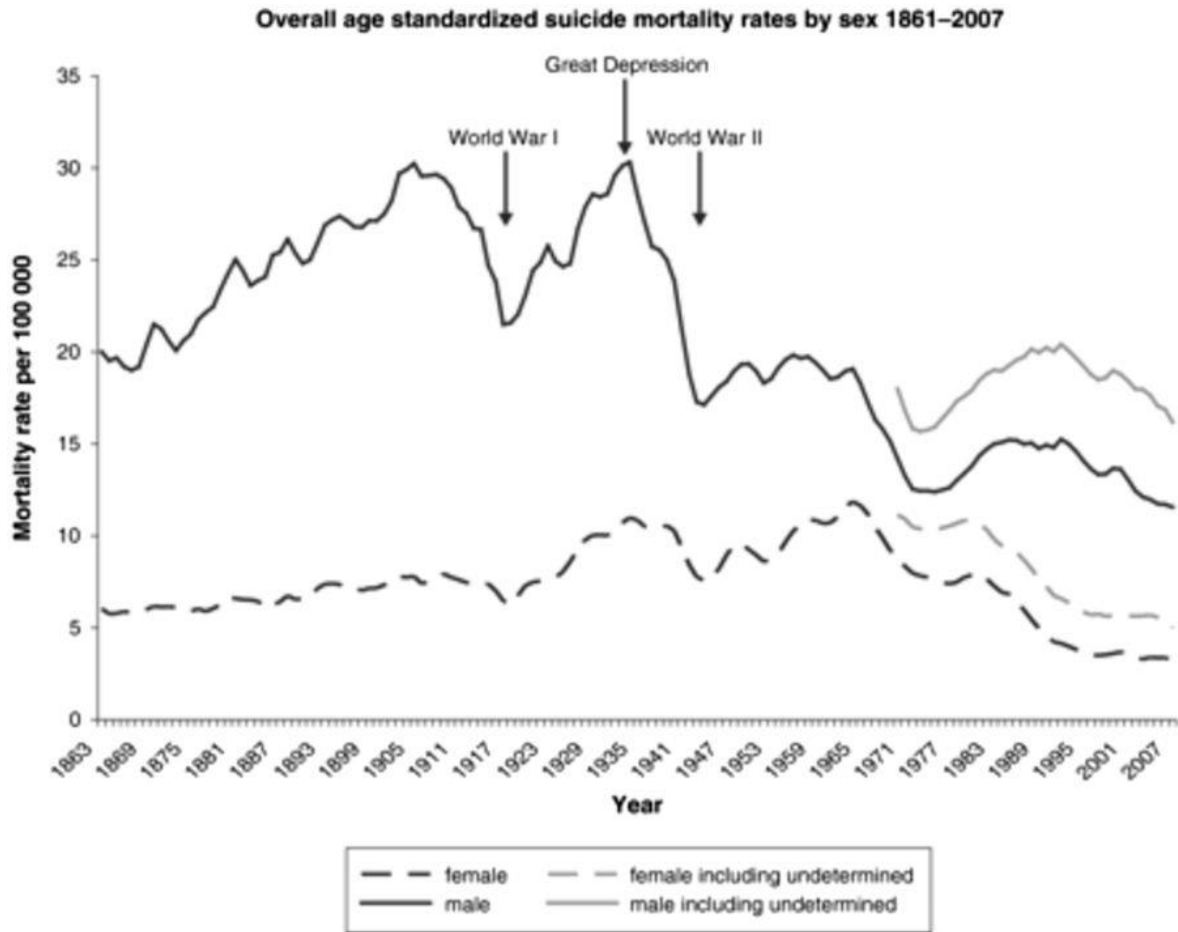'Spike in self-harm, suicide ideation amid Covid pandemic'

LOCKDOWN
COVID-19
COVID-19
LOCKDOWN

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Overall age standardized suicide mortality rates by sex 1861–2007

Batty et al., Translational Psychiatry 2018

International Academy for Suicide Research

who are we?

Prof. Gil Zalsman MD, MHA
President of IASR

IASR International Academy of Suicide Research

American Foundation for Suicide Prevention

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

International Summit

2021 IASR/AFSP International Summit on Suicide Research

October 24-27, 2021

World Trade Center Barcelona, Spain

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American Foundation for Suicide Prevention

AIM

To promote research skills for the study of suicide among early career researchers. This workshop series, which includes <u>three 2.5-hour sessions</u>, will give <u>specific</u> tools for early career researchers who want to engage in high-level suicide research.

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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

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Why should we talk about "how to"?

Challenges:

quality of current research
complex behavior
multifactorial
heterogenic phenotype
fatal outcome
IRBs are phobic….

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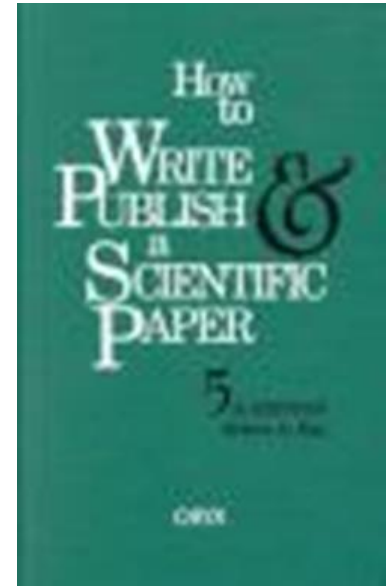
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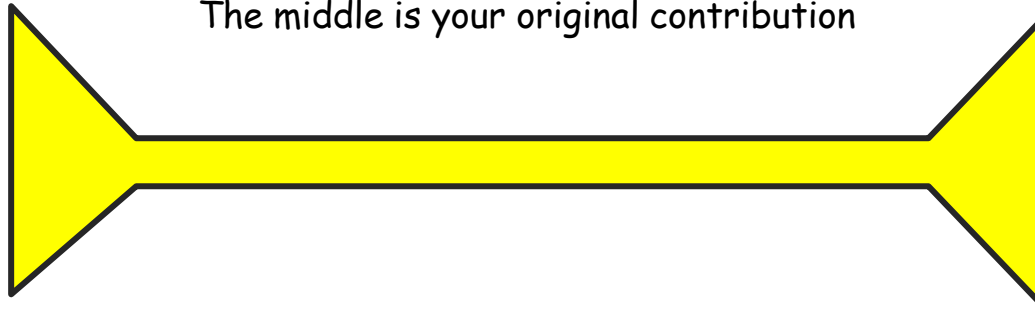# Some tips on how to publish a good paper….

Types of publications

- **Original research (focus of this workshop)**

- **Reviews (invited vs. not invited)**

- **Case reports/series**

- **Letter to the editor**

- **Meta analysis**

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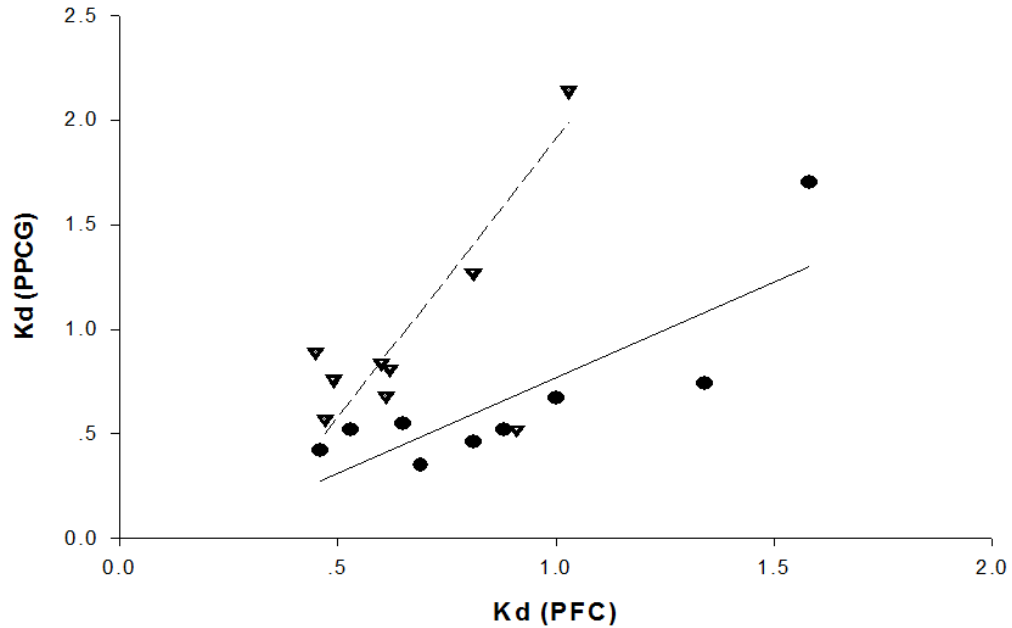The middle is your original contribution

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**

Title

- **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

Click to edit Master title style

- **-0.73 correlation between clarity of results and length of discussion (Bem DJ, 1987)**

- **BE BRIEF!!!!!**

Click to edit Master title style

- **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

Click to edit Master title style

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"

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

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Disclosures

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

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AFSP Mission

Save Lives and Bring Hope to those affected by suicide

Five Core Strategies

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

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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

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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

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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/

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Types of Research Supported by AFSP

Neurobiological studies

Genetic studies

Psychosocial studies

Clinical treatment studies

Community intervention studies

Survivors of suicide loss studies

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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

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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
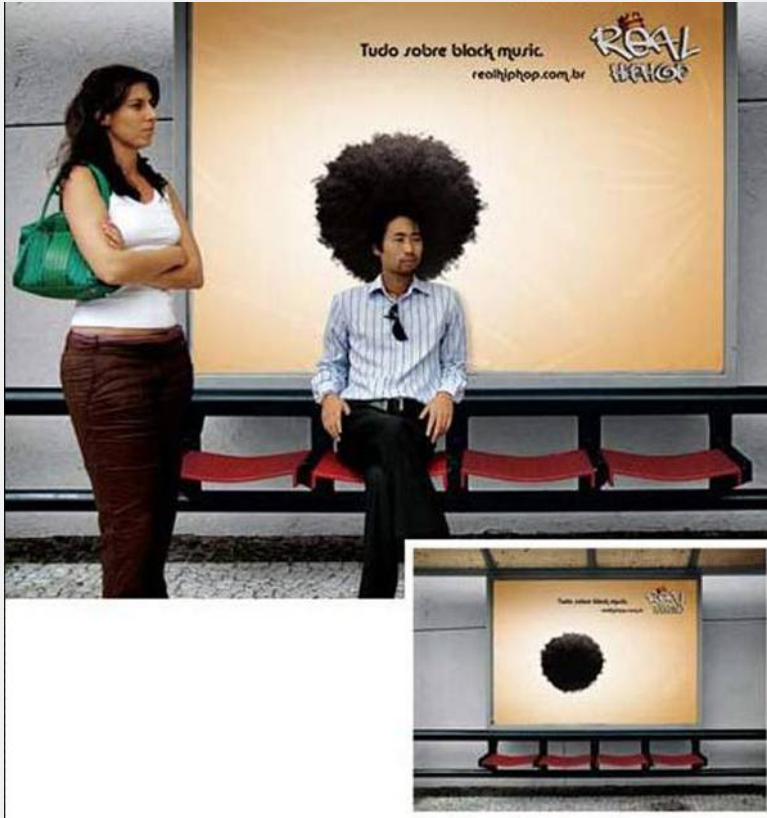
Goals

1. Rationale for special considerations for suicide research

2. Importance of a theoretical/conceptual framework

3. Developing Hypotheses

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

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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

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Interacting Risk and Protective Factors

Current Life Events

SUICIDE

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

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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

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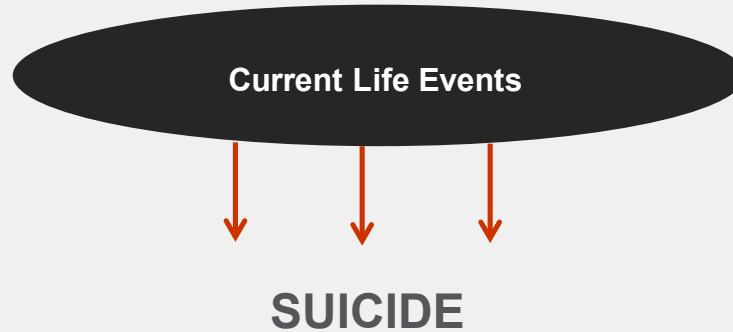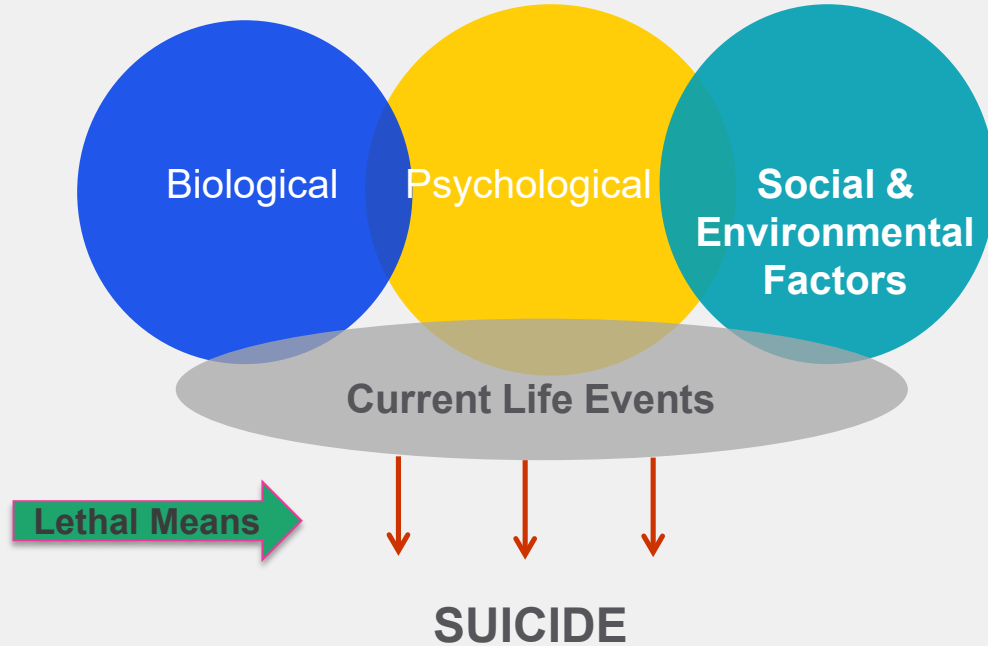
Model Basic Assumptions

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

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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

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

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

<u>Types</u>: 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 6th 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

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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!

@afspnational

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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**

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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 <u>reliable</u>?

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

What do we mean when we say a measure is <u>valid</u>?

- 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
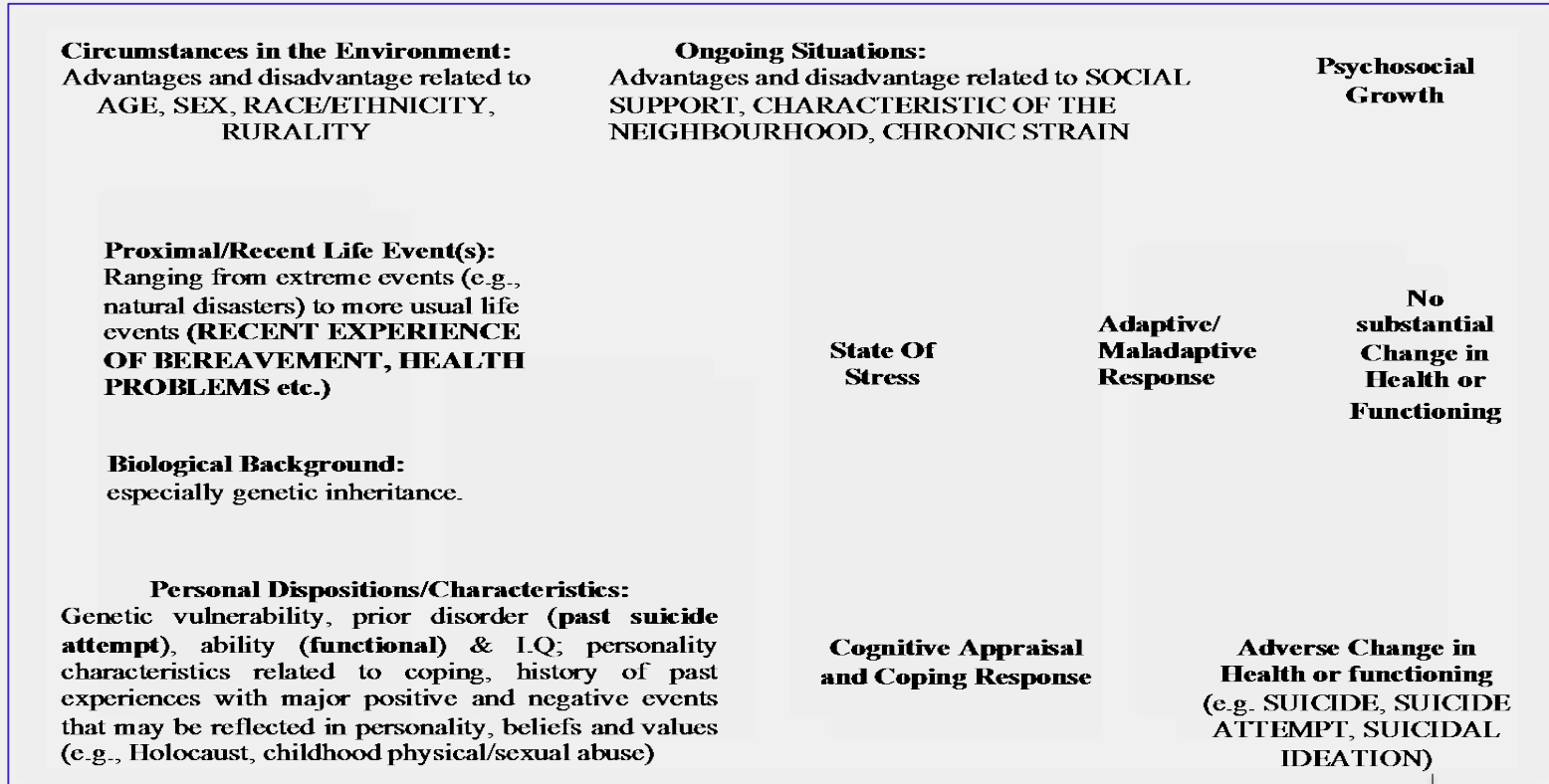
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OTHER VARIABLES OF INTEREST:

- 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

Circumstances in the Environment:
Advantages and disadvantage related to AGE, SEX, RACE/ETHNICITY, RURALITY

Ongoing Situations:
Advantages and disadvantage related to SOCIAL SUPPORT, CHARACTERISTIC OF THE NEIGHBOURHOOD, CHRONIC STRAIN

Psychosocial Growth

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.)

State Of Stress

Adaptive/ Maladaptive Response

No substantial Change in Health or Functioning

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)

Cognitive Appraisal and Coping Response

Adverse Change in Health or functioning (e.g. SUICIDE, SUICIDE ATTEMPT, SUICIDAL IDEATION)

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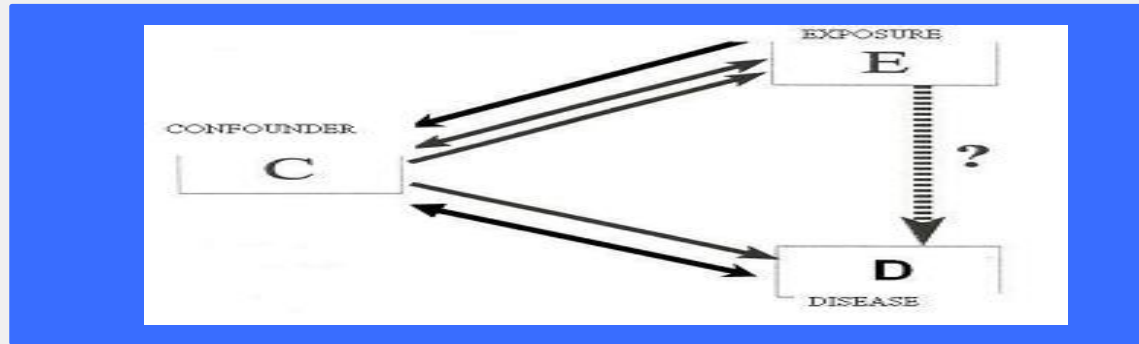
- Does E cause D, D cause E, or does E and D share a common antecedent, C?

- **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:

GROUP	EXPOSURE	Suicidal Ideation (SI)		Association	OR (95% CI)
		Yes	No	Odds Ratio (OR)	
All	Intervention	400(a)	514(b)	OR = a/b÷c/d	0.63 (0.53 -0.77)
	Treatment As Usual	600(c)	486(d)		
Female	Intervention	200(a)	114(b)	OR = a/b÷c/d	1.00 (0.77 – 1.30)
	Treatment As Usual	500(c)	286(d)		
Male	Intervention	200(a)	400(b)	OR = a/b÷c/d	1.00 (0.71 – 1.31)
	Treatment As Usual	100(c)	200(d)		

Hypothetical numbers taken from Bauman et al, 2002, AJPM

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CONFOUNDER, **MODERATOR**, MEDIATOR?

- **Modifier/effect modifier**: A third factor, that at different levels, has different effect on the relationship between exposure and outcome.
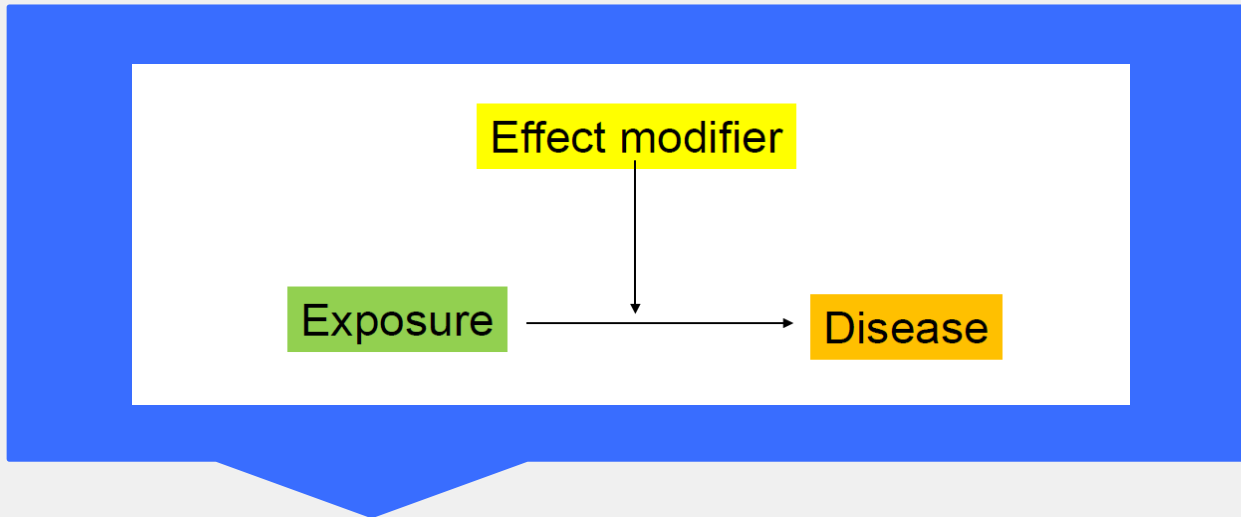
Techniques for dealing with moderators & why:

- 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 <u>moderators</u> can inform tailoring of interventions to the needs of specific subgroups of people at risk for suicide.**

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HYPOTHETICAL EXAMPLE OF MODERATOR:

GROUP	EXPOSURE	Suicidal Ideation (SI)		Association	OR (95% CI)
		Yes	No	Odds Ratio (OR)	
All	Intervention	400(a)	514(b)	OR = a/b÷c/d	0.63 (0.53 -0.77)
	Treatment As Usual	600(c)	486(d)		
Male	Intervention	150(a)	164(b)	OR = a/b÷c/d	0.39 (0.30 – 0.51)
	Treatment As Usual	550(c)	236(d)		
Female	Intervention	200(a)	400(b)	OR = a/b÷c/d	1.00 (0.71 – 1.31)
	Treatment As Usual	100(c)	200(d)		

Hypothetical numbers taken from Bauman et al, 2002, AJPM

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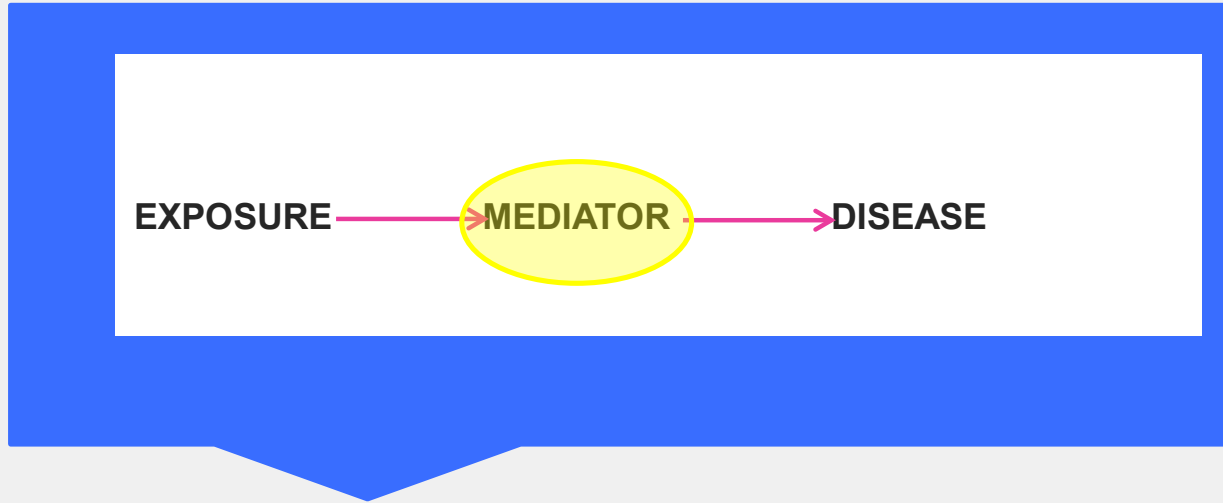
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EXAMPLE OF A <u>MODERATOR:</u>

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

EXPOSURE → **MEDIATOR** → **DISEASE**

- Mediators clarify the causal pathway

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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 <u>mediators</u> of suicide prevention interventions can inform systematic improvements in intervention efficacy**

- **Help to identify modifiable pathways**

EXAMPLE OF <u>MEDIATORS:</u>
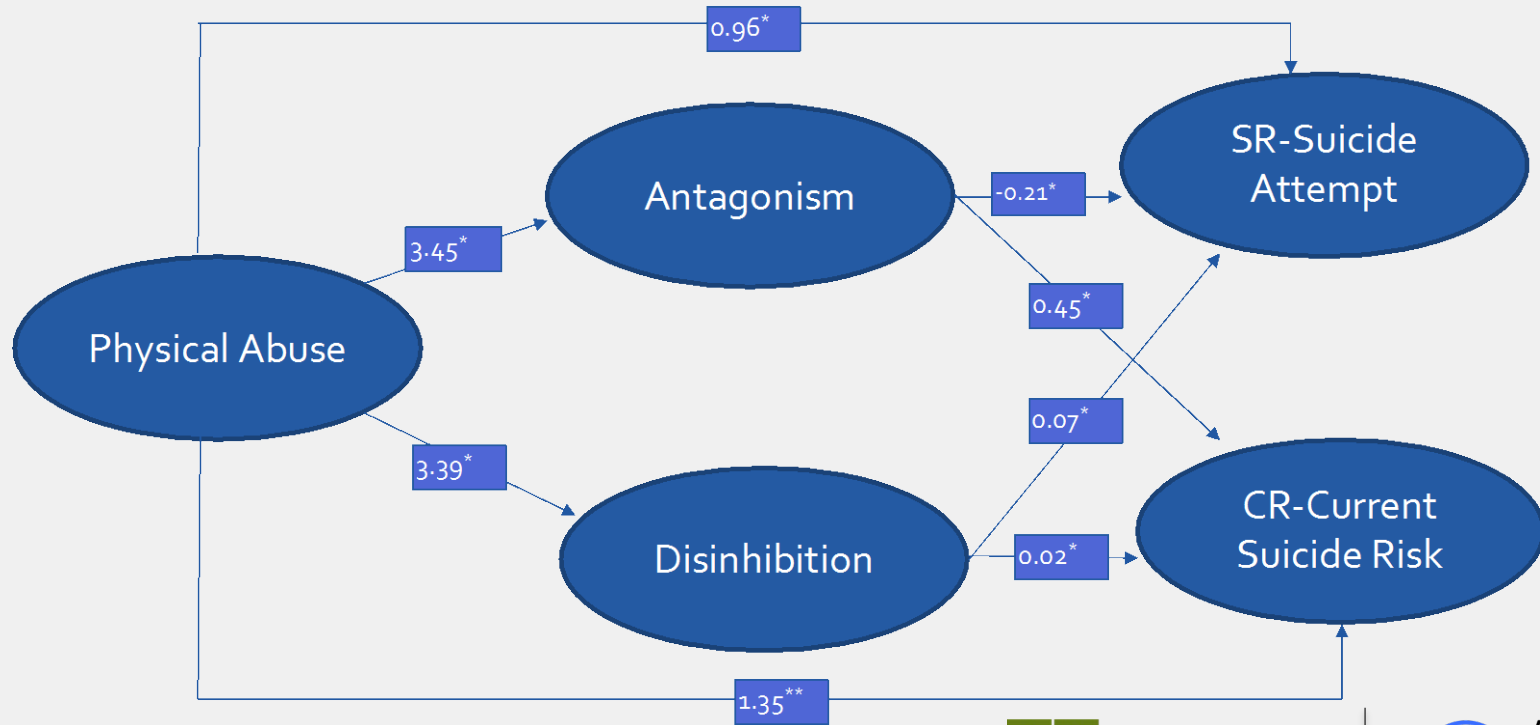
EXAMPLE OF <u>MEDIATORS:</u>
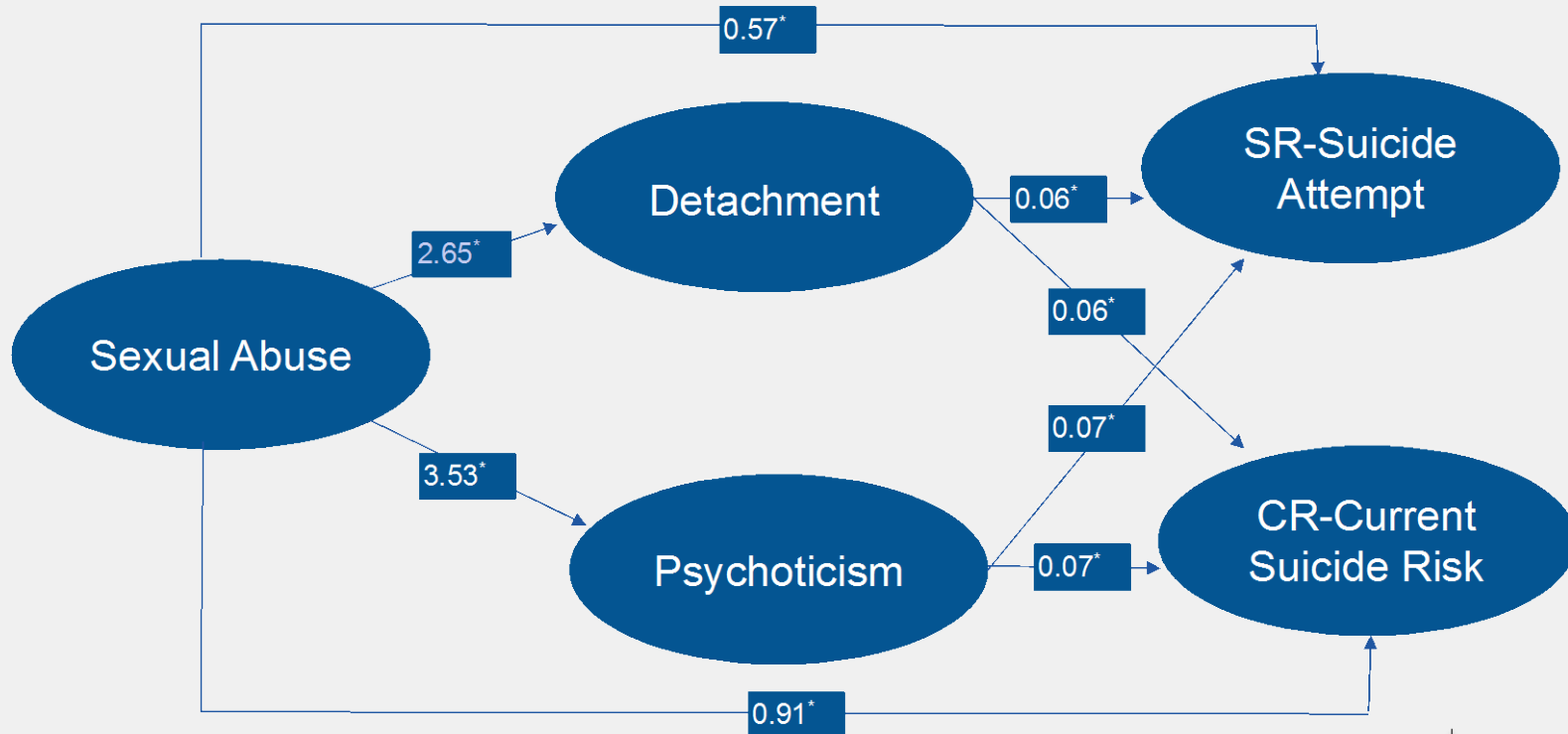
CONFOUNDER, MODERATOR, MEDIATOR?

- 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

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VARIABLES & LEVELS OF MEASUREMENT:

- Variables & their levels of measurement determine the analytic methods

Variable	Type of variable	Levels of Measurement	Values
Cause of death	Categorical	Nominal	1=Accident; 2= homicide; 3=suicide; 4=other
History of suicide attempt		Ordinal	0-No; 1=Yes
Severity of suicide ideation		Ordinal	0=none; 1=Mild; 2=Moderate; 3=Severe 4=Extreme
Number of suicide attempts	Quantitative	Interval	Count – 0 to ?

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DESCRIPTIVE STATISTICS – GENERAL:

Level of measurement	Term	Definition
Nominal or ordinal	Proportion	Fraction of the population that is affected (i.e., those affected/the entire population); measure of the frequency with which an event occurs
Interval	Mean, median, mode	Measures of central tendency
	Standard deviation	Summary of the variation of the values around the mean (i.e., how widely dispersed the values are)
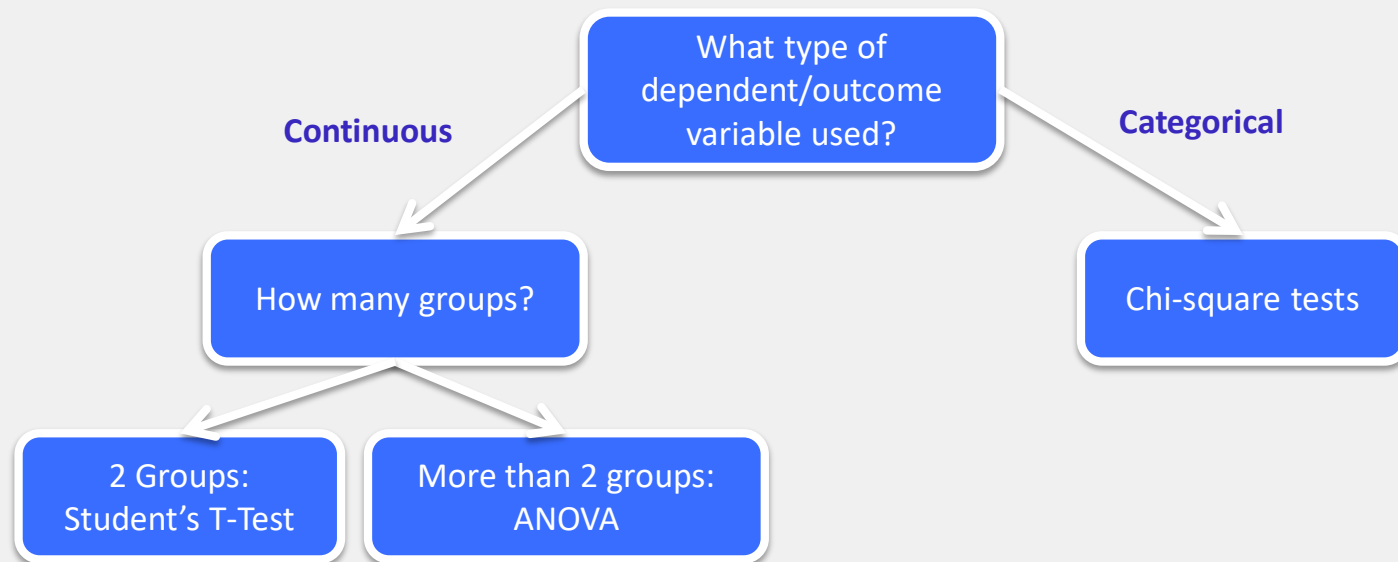
Some examples of INFERENTIAL STATISTICS:

	Dependent/ Outcome Variable	Regression Model Used	Measures of Association
- Categorical (Ordinal or nominal)	- Binary (2 responses, Y/N)	- Logistic	- Odds Ratio (OR) - Relative Risk Ratio (RRR)
	- Time to event	- Survival	- Hazard ratio
- Categorical (Ordinal or nominal)	- Categorical (3+ responses)	- Multinomial Logistic (ordinal or nominal)	- Odds Ratio (OR) - Relative Risk Ratio (RRR)
- Interval	- Count	- Poisson, - Negative Binomial	- Incidence Rate Ratio (IRR)
- Interval	- 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.