

If All You Have is a Hammer.....

A Brief Look Inside a Researcher's Toolbox

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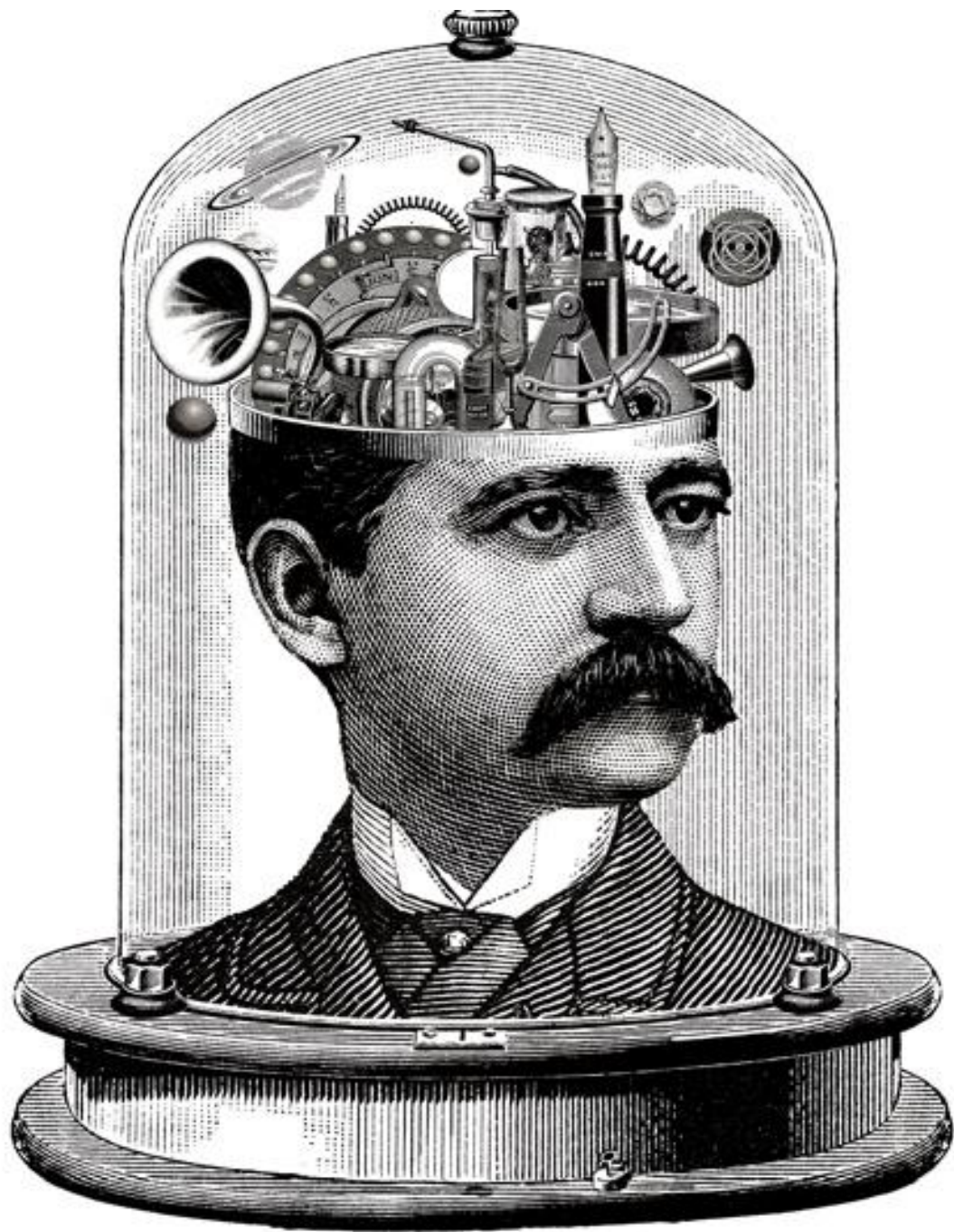


ORPRN
*Oregon Rural Practice-Based
Research Network*



“What we have here is a failure to communicate.”





Disclaimer

WARNING:

The following presentation will *not* make you into a professional researcher.

What I hope it *will* do:

- Give you a glimpse of how academic researchers might think of problems and questions of interest
- Give you a taste of some of the research methods (tools) often used by researchers who work with communities
- Provide a foundation, on which you can build, that may make it easier to work in partnership with academic researchers

If the only tool you have is a hammer,
you tend to see every problem as a nail.

-- Abraham Maslow

Which tool ?



?

Which tool ?



Which tool ?



?

Which tool ?



Which tool ?



?

Which tool ?



Which tool ?





Some Items in a Researcher's Toolbox

Basic Terms and Concepts

- Association
- Exposure and Outcome

Quantitative Methods

- Descriptive study
- Cross-sectional study
- Case-Control study
- Cohort study
- Randomized Trial

Qualitative Methods

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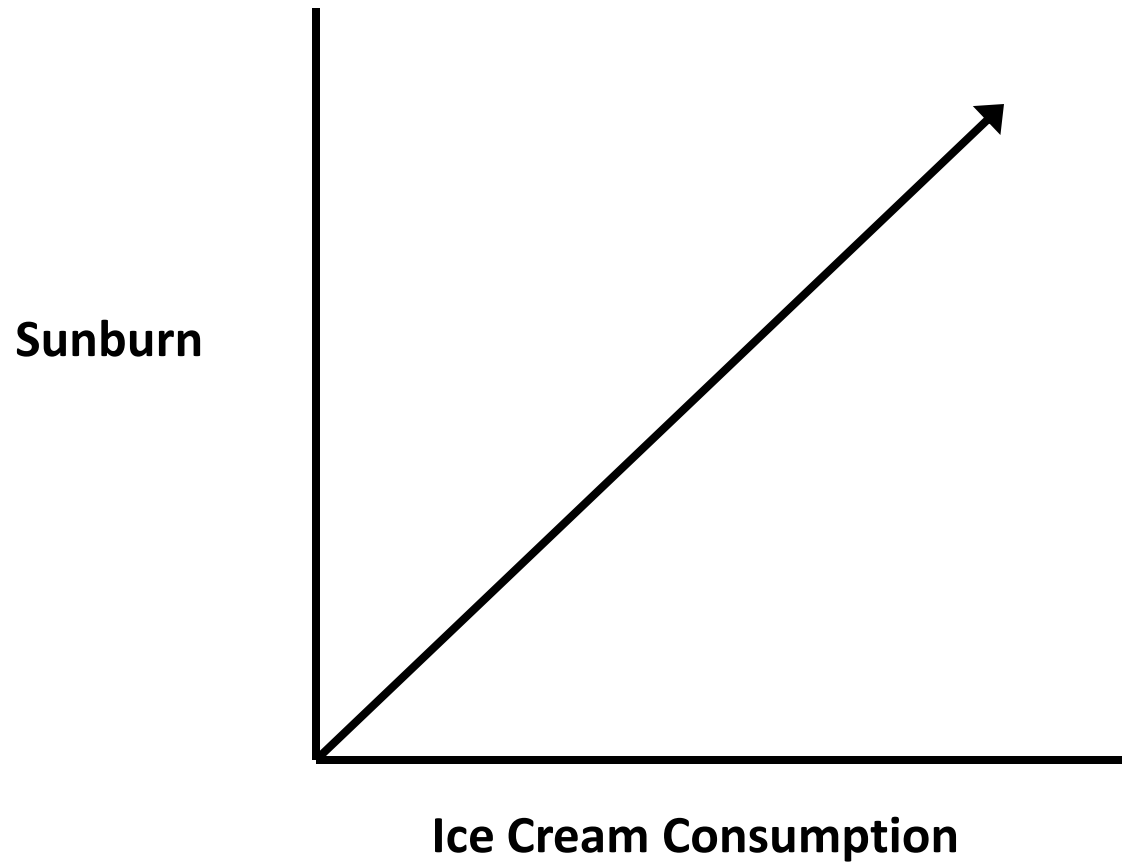
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Qualitative Methods

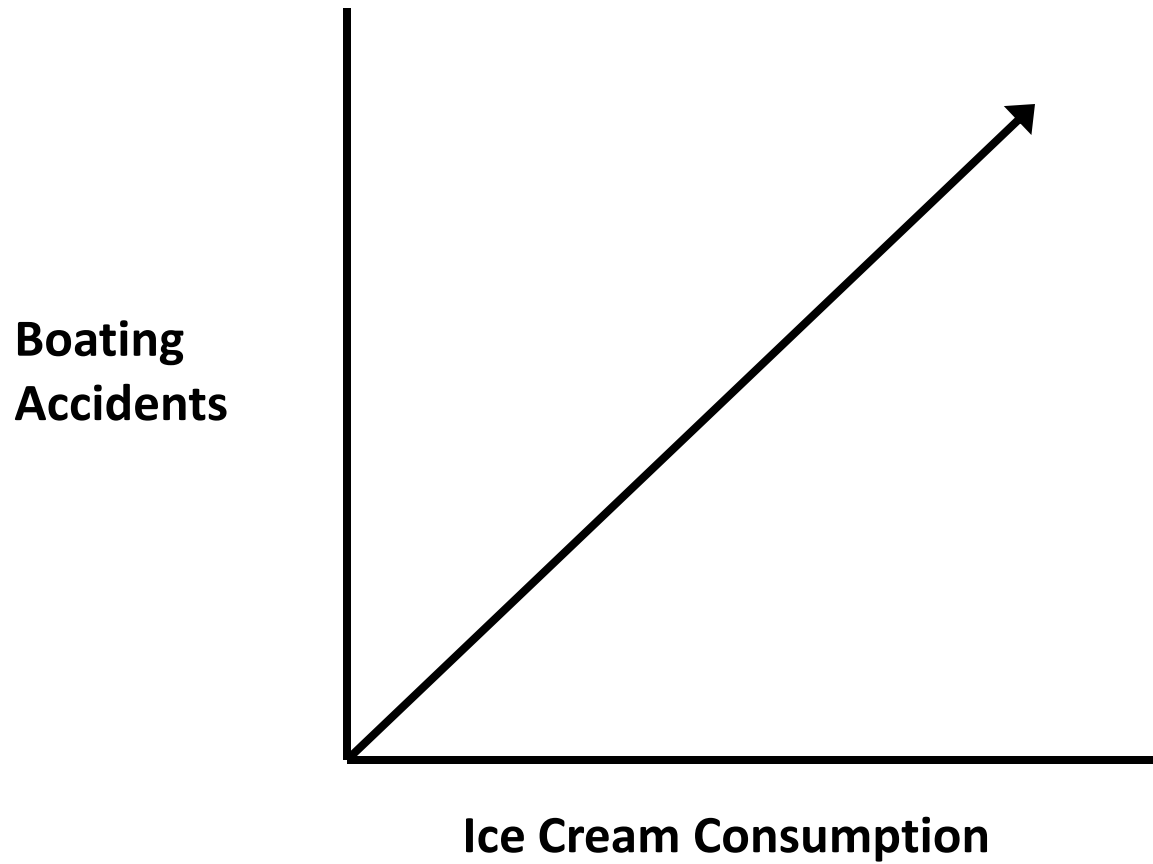
Association



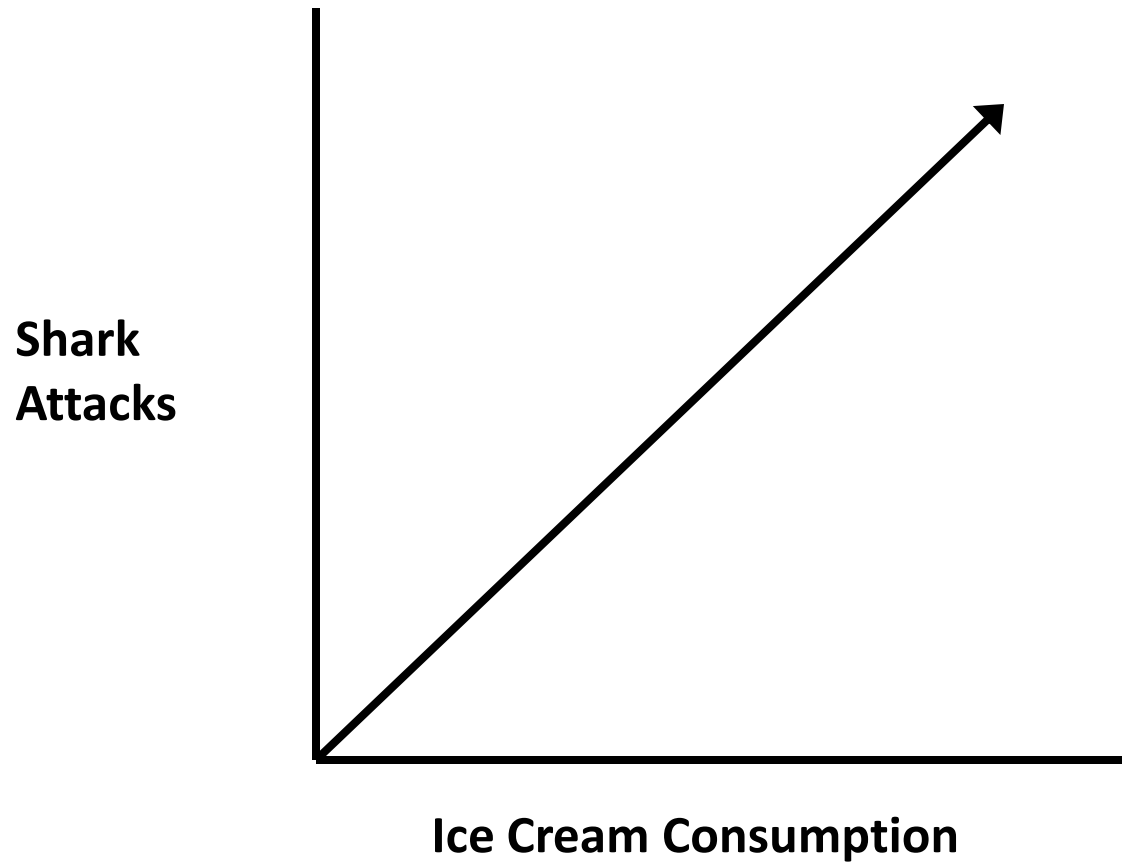
Association



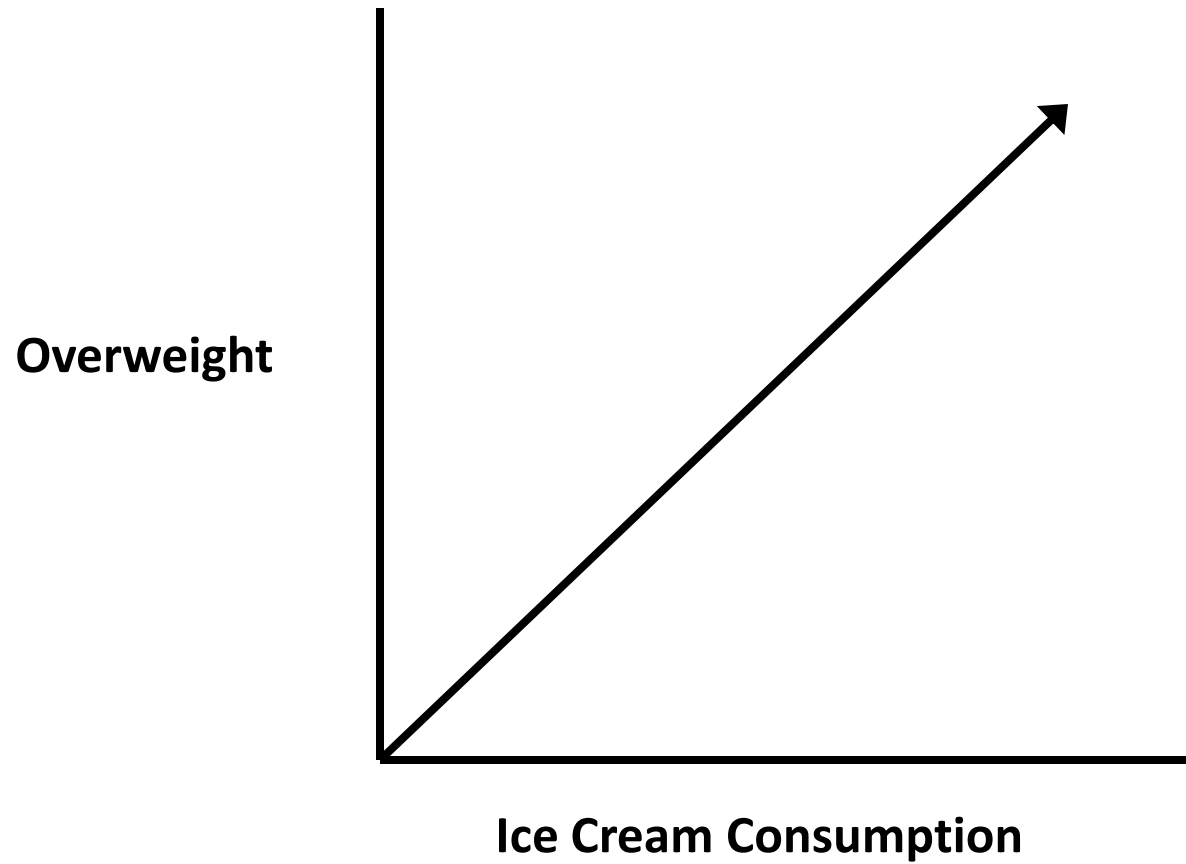
Association



Association



Association



Basic Terms

Exposure:

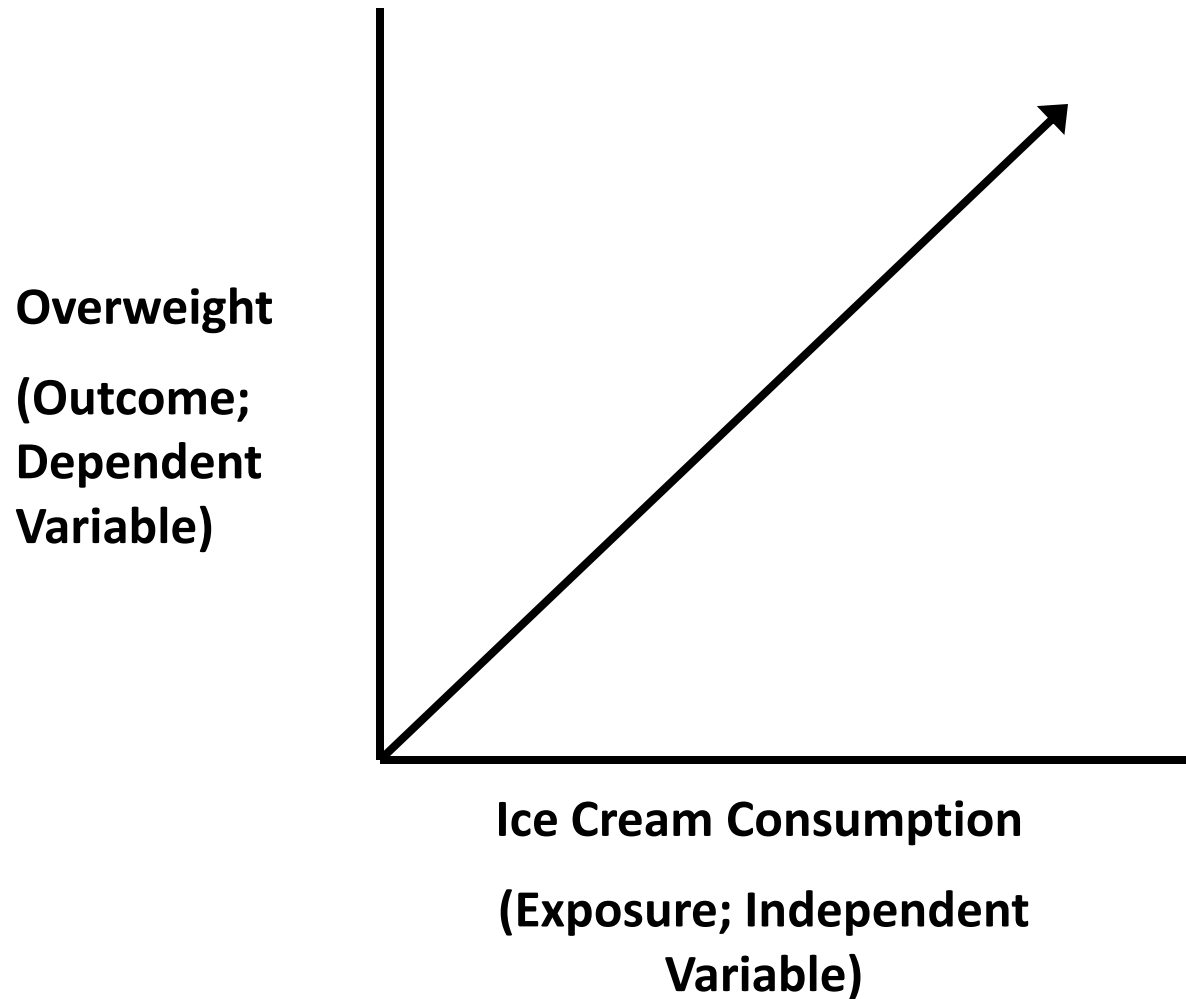
- Traditional medical: A state of contact with something, such as an infectious agent (germs), radiation, or chemicals that may have a harmful effect
- Could be any relevant characteristic, habit, or practice that may increase or decrease the likelihood of an outcome
- *Independent variable*

Basic Terms

Outcome:

- Traditional medical: A disease that results from an exposure.
- Could be a condition other than a disease (for example, social or economic events or circumstances)
- *Dependent variable*

Association



Exposure & Outcome

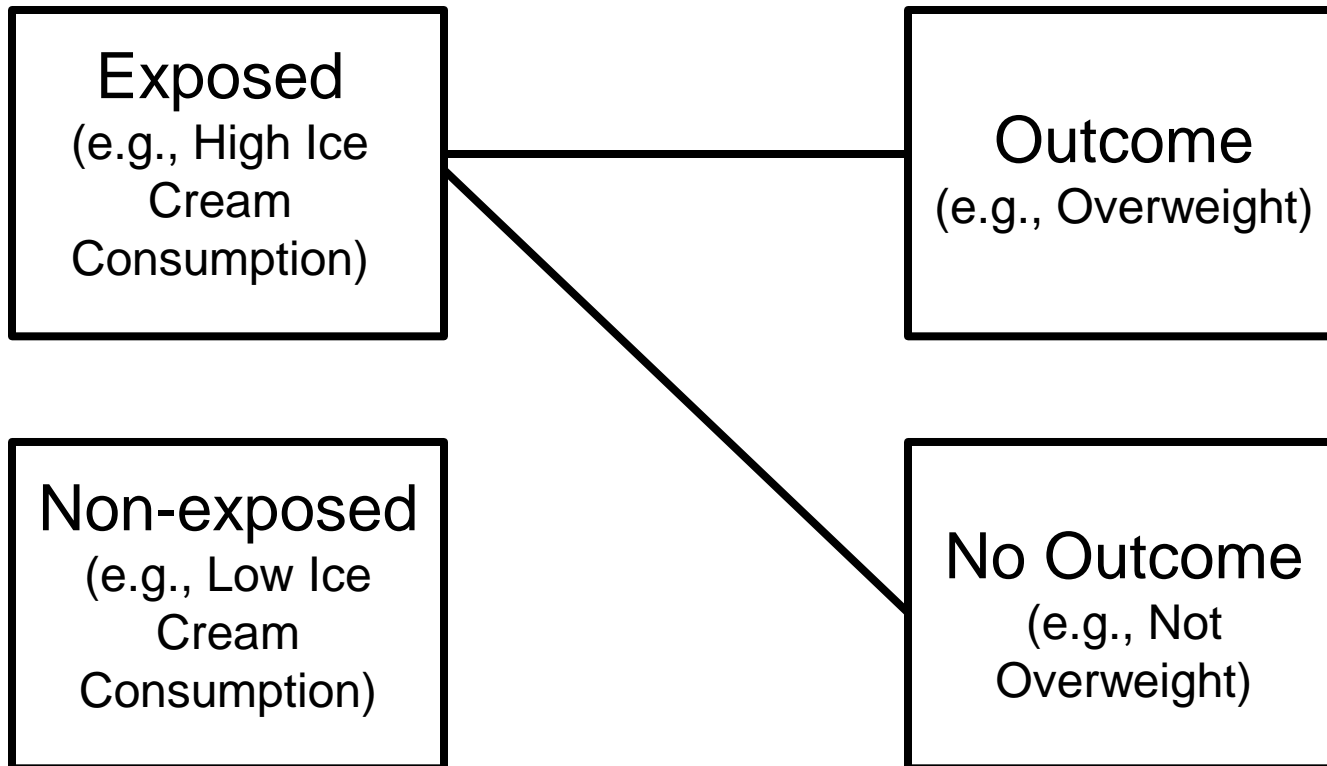
Exposed
(e.g., High Ice
Cream
Consumption)

Outcome
(e.g., Overweight)

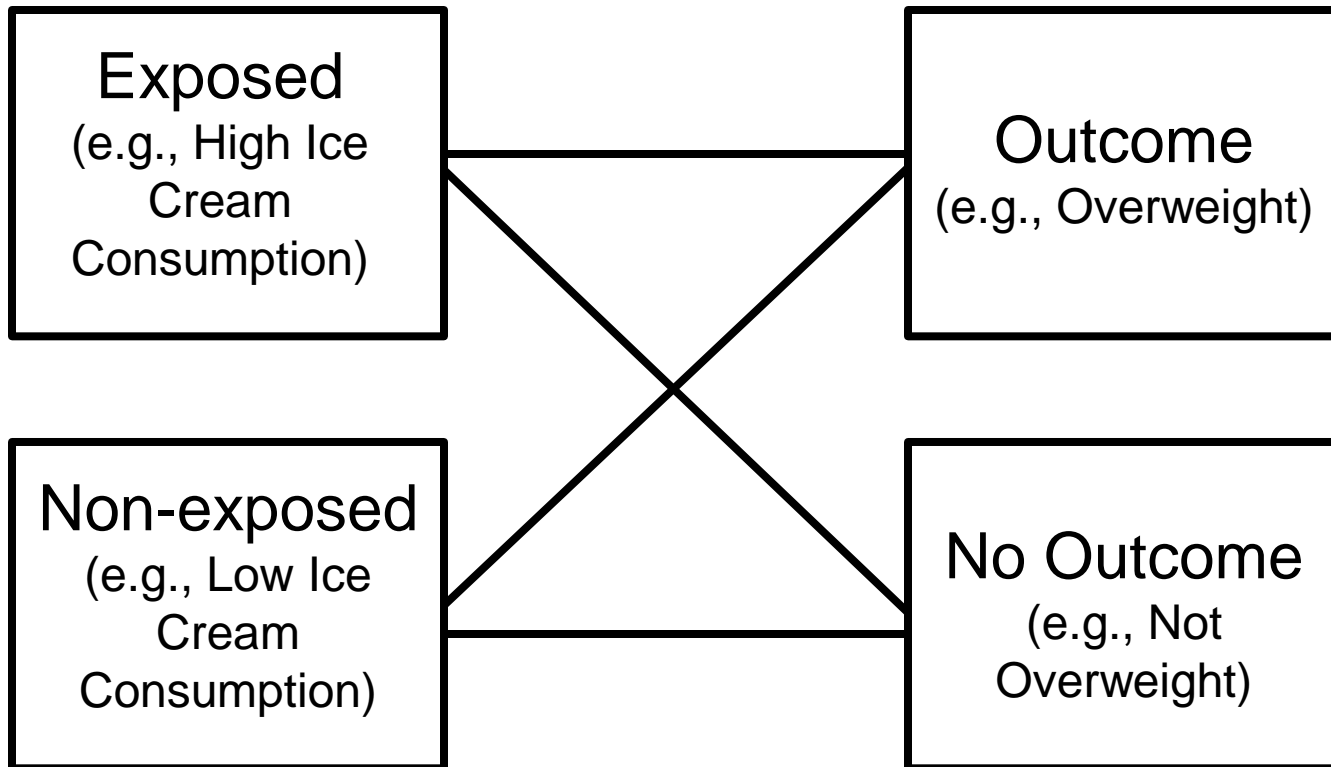
Non-exposed
(e.g., Low Ice
Cream
Consumption)

No Outcome
(e.g., Not
Overweight)

Exposure & Outcome



Exposure & Outcome



Problem:

Too many of
our kids are
overweight



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Qualitative Methods

Descriptive study

Question:

How many kids are overweight?

- Population of Interest: Which kids?
- Study design:
 - 1) Measure BMI of all 10-year old children in the county
 - 2) Calculate the percentage overweight

Exposure & Outcome

Exposed
(e.g., High Ice
Cream
Consumption)

Overweight

Non-exposed
(e.g., Low Ice
Cream
Consumption)

Not
Overweight

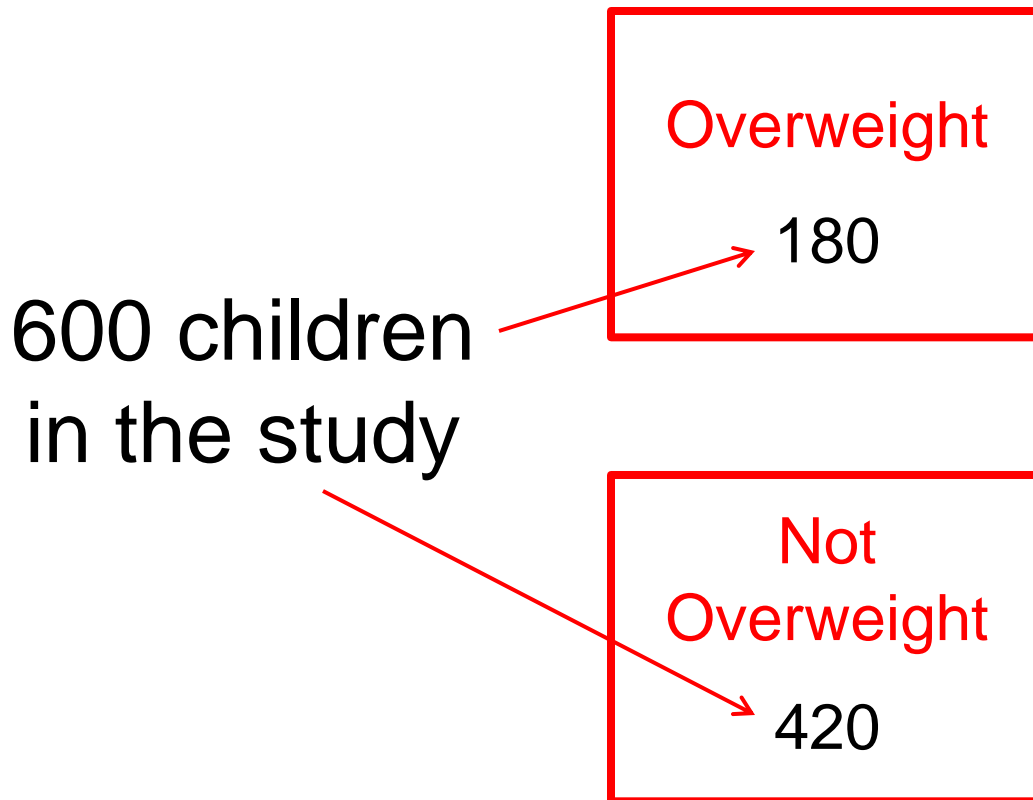
Descriptive Study

600 children
in the study

Overweight

Not
Overweight

Descriptive Study



Descriptive Study

600 children
in the study

Overweight

180

Not
Overweight

420

$$180/600 = 30\%$$

Cross-sectional Study

Question:

Do overweight kids exercise less?

- Get information about the *exposure* (exercise) and the *outcome* (overweight) **at the same point in time**
- Study design:
 - 1) Measure BMI
 - 2) Survey about current exercise

Exposure & Outcome

Exercise
less than 1
hour/day

Overweight

Exercise 1
hour or
more/day

Not
Overweight

Exercise
less than 1
hour/day

Exercise 1
hour or
more/day

Overweight

Not
Overweight

Overweight

Not
Overweight

Exercise
less than 1
hour/day

Exercise 1
hour or
more/day

Cross-sectional study

	Overweight	Not Overweight
Less than 1 hour/day		
1 hour/day or more		

Cross-sectional study

	Overweight	Not Overweight	
Less than 1 hour/day			100
1 hour/day or more			
	30	70	

Cross-sectional study

	Overweight	Not Overweight	
Less than 1 hour/day	20		
1 hour/day or more	10		
	30	70	100

Cross-sectional study

	Overweight	Not Overweight	
Less than 1 hour/day	20	35	
1 hour/day or more	10	35	
	30	70	100

Cross-sectional study

	Overweight	Not Overweight	
Less than 1 hour/day	20	35	55
1 hour/day or more	10	35	45
	30	70	100

Cross-sectional study

	Overweight	Not Overweight	
Less than 1 hour/day	20	35	55
1 hour/day or more	10	35	45
	30	70	100
	$20/30 = 66\%$	$35/70 = 50\%$	

Cross-sectional studies

Advantages:

- Feasible
- Inexpensive
- Quick

Disadvantages:

- Cannot observe the temporal (“before & after”) relationship between exposure and outcome

Case-control Study

Question:

Is playing video games associated with obesity in children?

Compare study participants according to their *outcome* status (case or control)

- Identify kids who are obese (cases)
- Identify kids who are just like the cases in all ways except for obesity (controls)
- Get information about prior video game use (exposure) for the past 2 years

Case-control study design

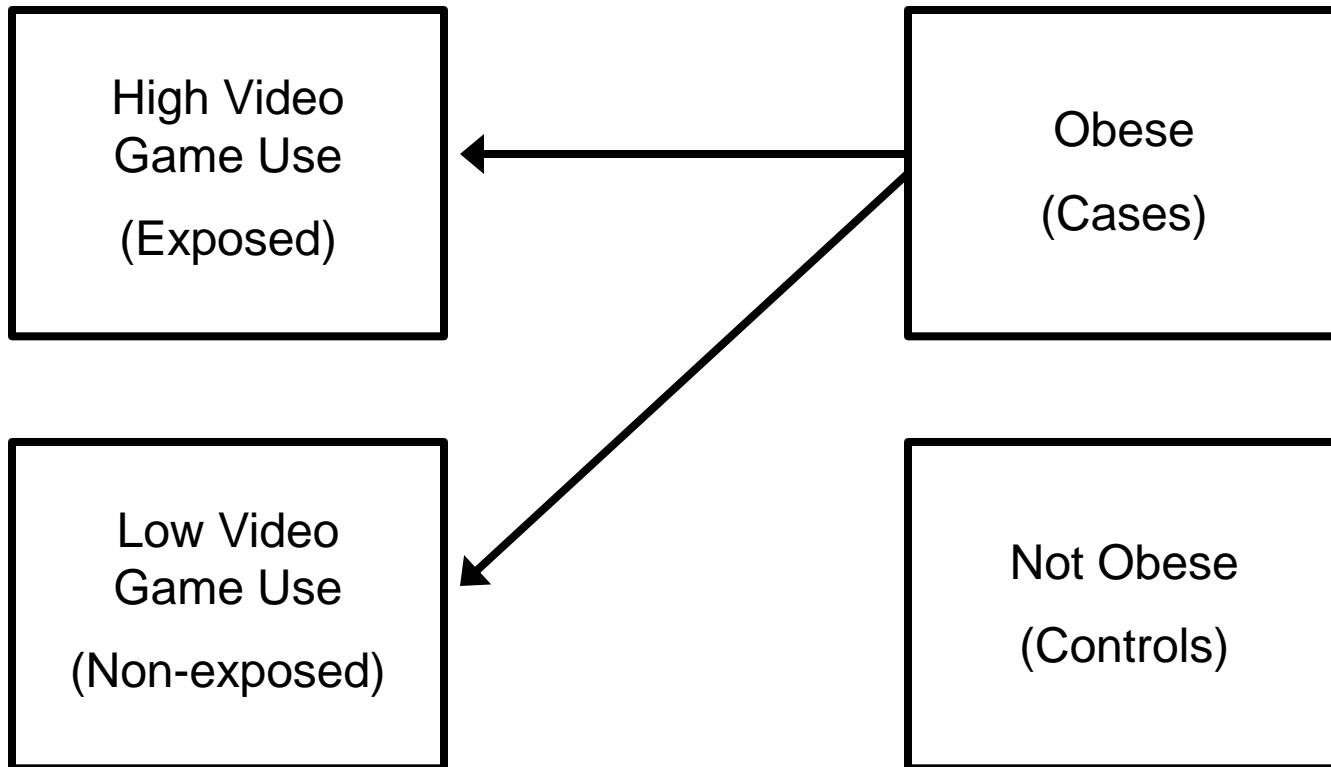
High Video
Game Use
(Exposed)

Obese
(Cases)

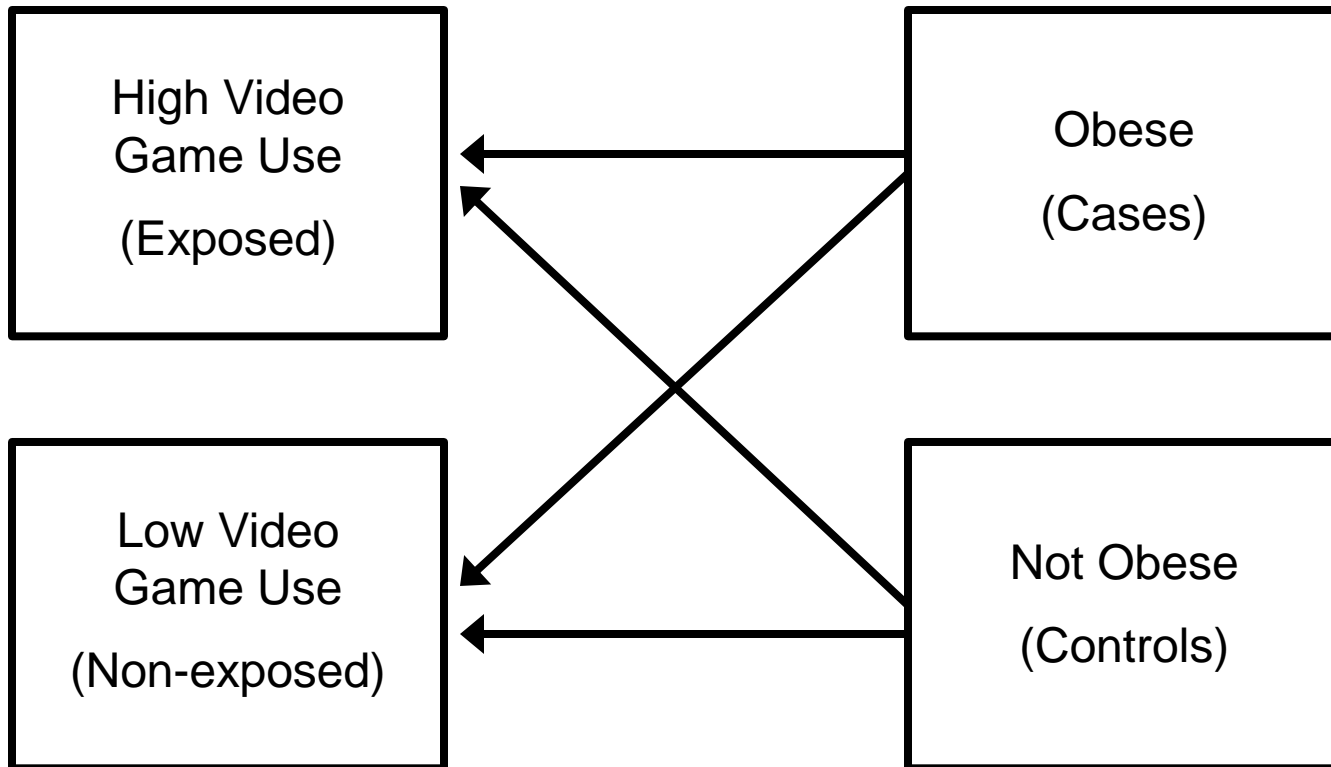
Low Video
Game Use
(Non-exposed)

Not Obese
(Controls)

Case-control study design



Case-control study design



Case-control studies

Advantages:

- Quick
- Low cost

Disadvantages:

- Biases from case or control selection
- Information bias (recall)

Cohort Study

Compare study participants according to their *exposure* status (exposed/not exposed)

- Identify kids with high use (exposed)
- Identify kids with low use (non-exposed)
- Survey about video game use and other relevant factors at intervals for 3 years
- Measure obesity (outcome)

Cohort study design

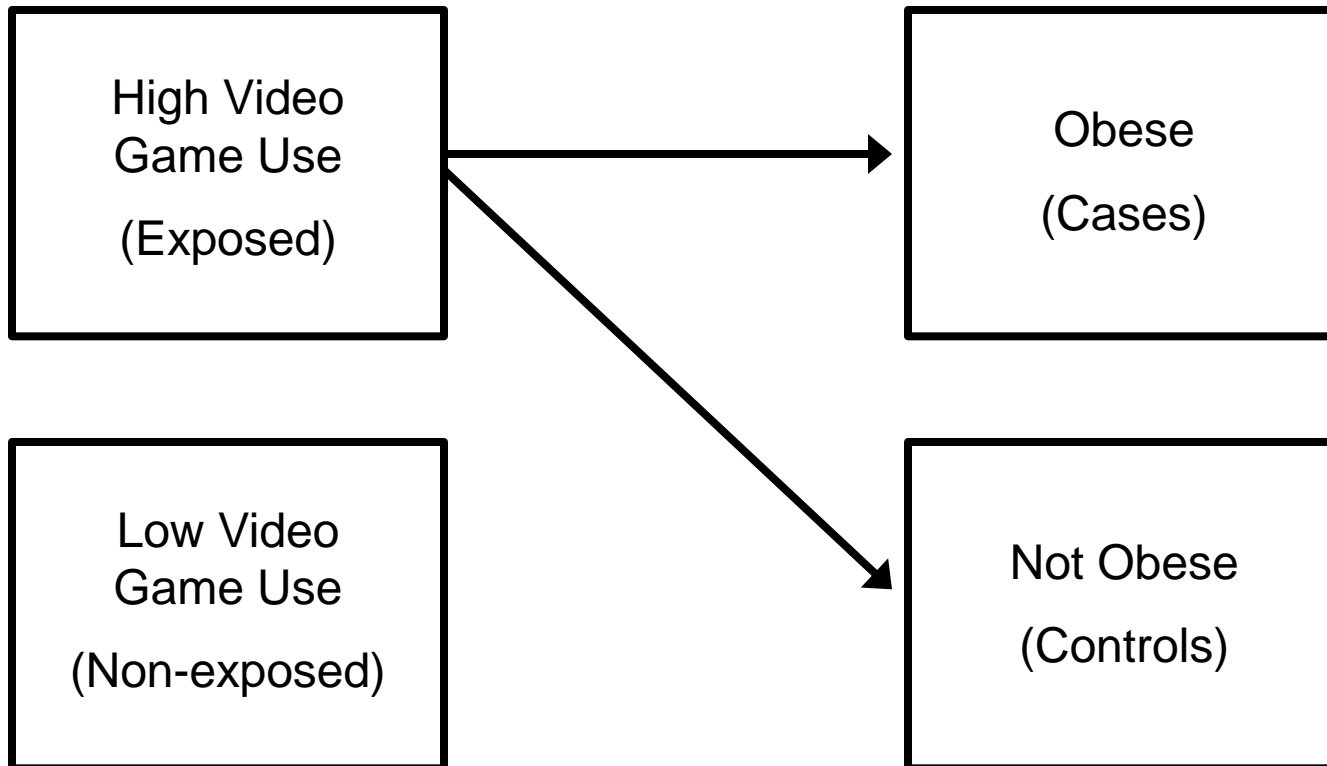
High Video
Game Use
(Exposed)

Obese
(Cases)

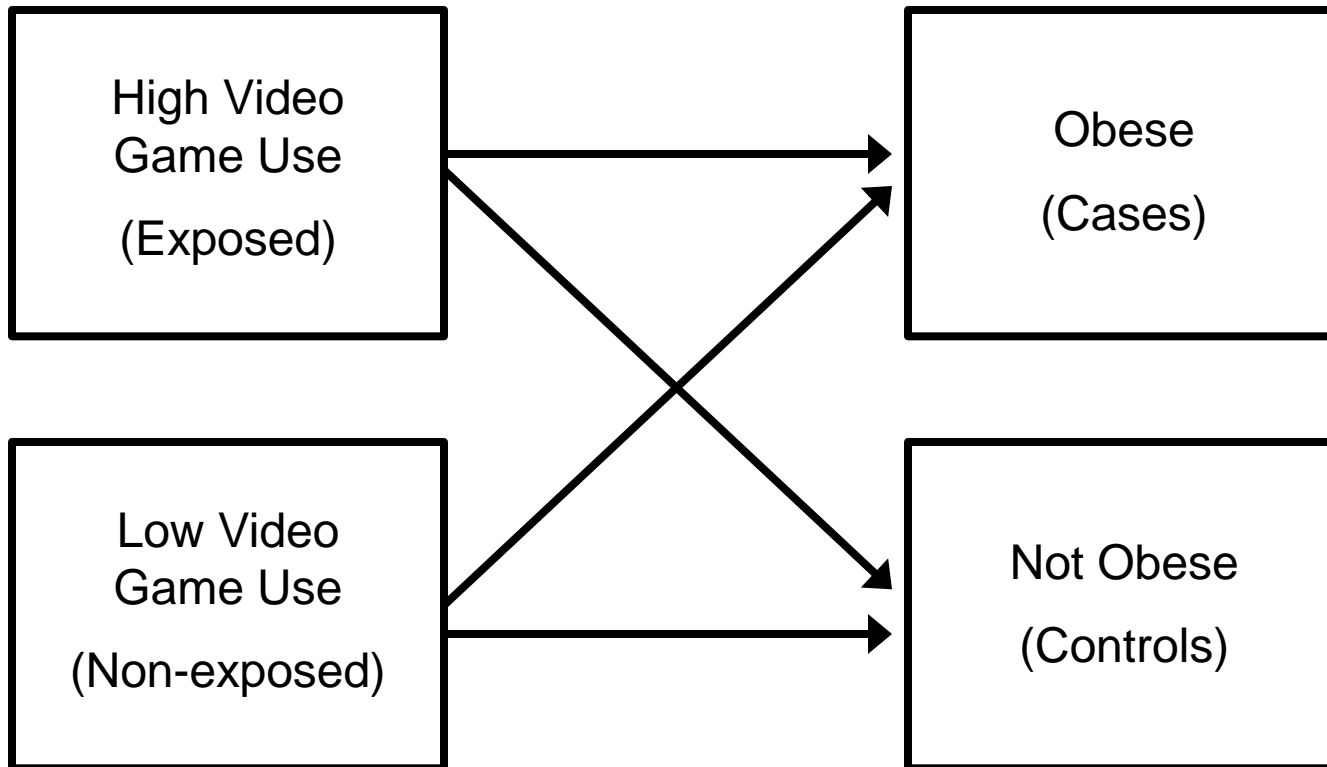
Low Video
Game Use
(Non-exposed)

Not Obese
(Controls)

Cohort study design



Cohort study design



Cohort studies

Advantages:

- Measurement of exposure not biased
- Temporality is known
- Can measure multiple outcomes

Disadvantages:

- Time
- Cost
- Loss to follow-up

Randomized Trial

Question: Does teaching parents how to motivate their children to exercise work?

- Define the study population
- Randomly assign participants to “treatment” or comparison group
- Handle the “treatment” and comparison groups the same except for the “treatment”
- Measure changes in amount of exercise

Randomized trial design

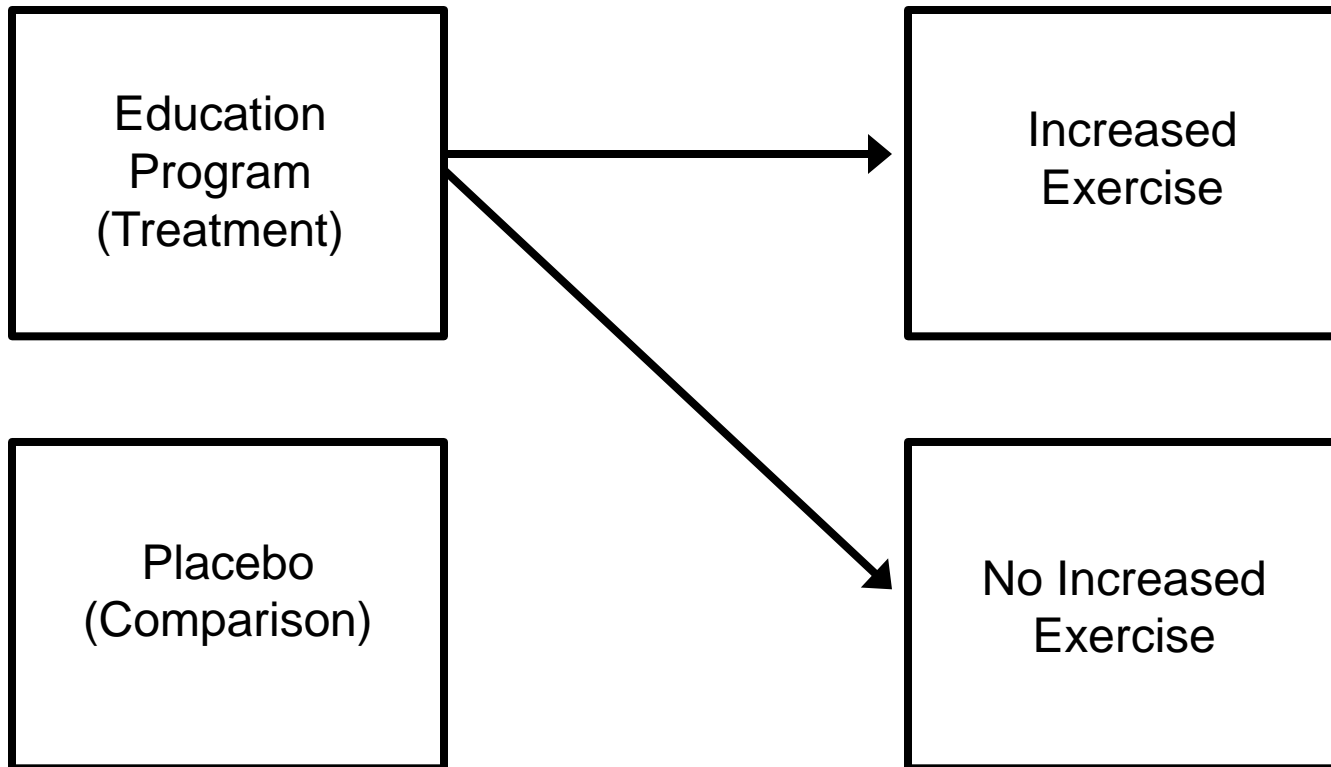
Education
Program
(Treatment)

Increased
Exercise

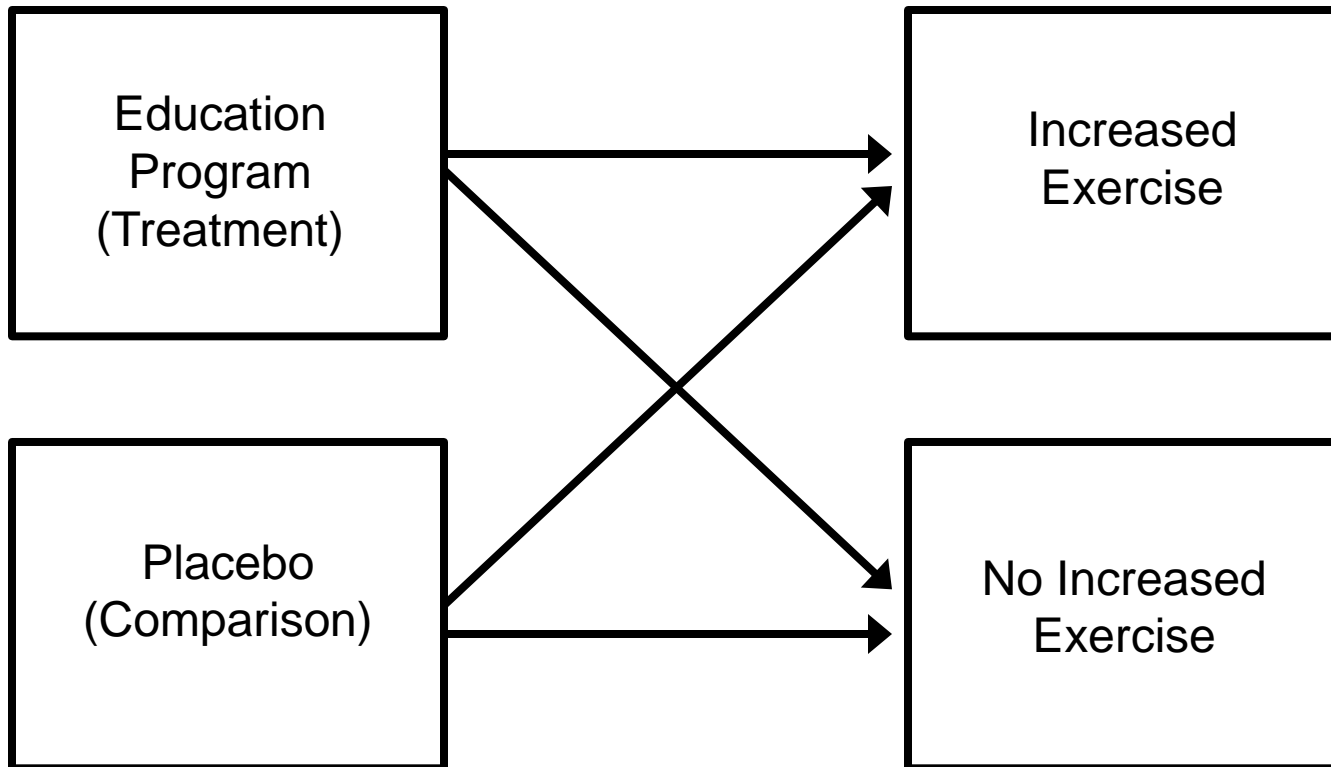
Placebo
(Comparison)

No Increased
Exercise

Randomized trial design



Randomized trial design



Randomized Trials

Advantages:

- Randomization makes the groups comparable with respect to all factors - known and unknown, measurable and unmeasurable - except for the one factor being studied

Disadvantages:

- Time and Cost
- Complex

Qualitative Research

Quantitative research uses data based on numeric measurements and mathematical methods

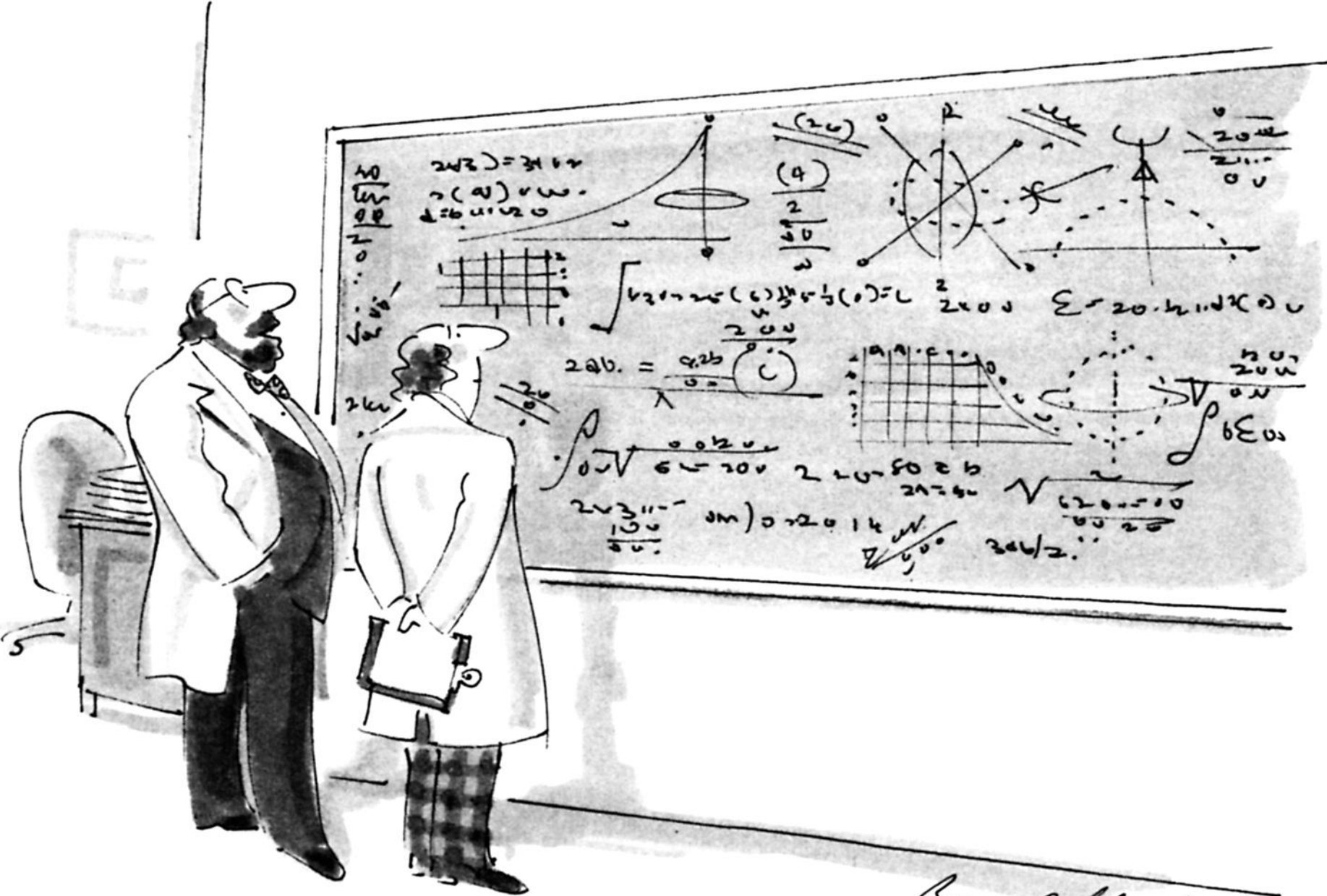
Qualitative research uses data based on focus group discussions, interviews, and/or the observations of the researcher(s)

Problem

- We added healthful options at the school cafeteria.
- We did a quantitative study and found that a minority of children were choosing these items more than twice a week:
 - 6 to 8 year olds: 32%
 - 9 to 11 year olds: 24%
 - 12 to 14 year olds: 13%

What helps kids choose healthful alternatives in the cafeteria?

- Observe the cafeteria; field notes
- Interviews:
 - Students
 - Cafeteria staff
 - Parents
- Record interviews and transcribe
- Multiple researchers “code” the transcripts and come to agreement about themes



Bernard Schönbauer.

“Oh, if only it were so simple.”