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Exploring Experimental Research Design in Social Sciences

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What is Research?

A systematic means of problem solving (Tuckman, 1978).

Systematic

01

Research process

Logical

02

Induction / Deduction

Empirical

03

Evidence based

Reductive

04

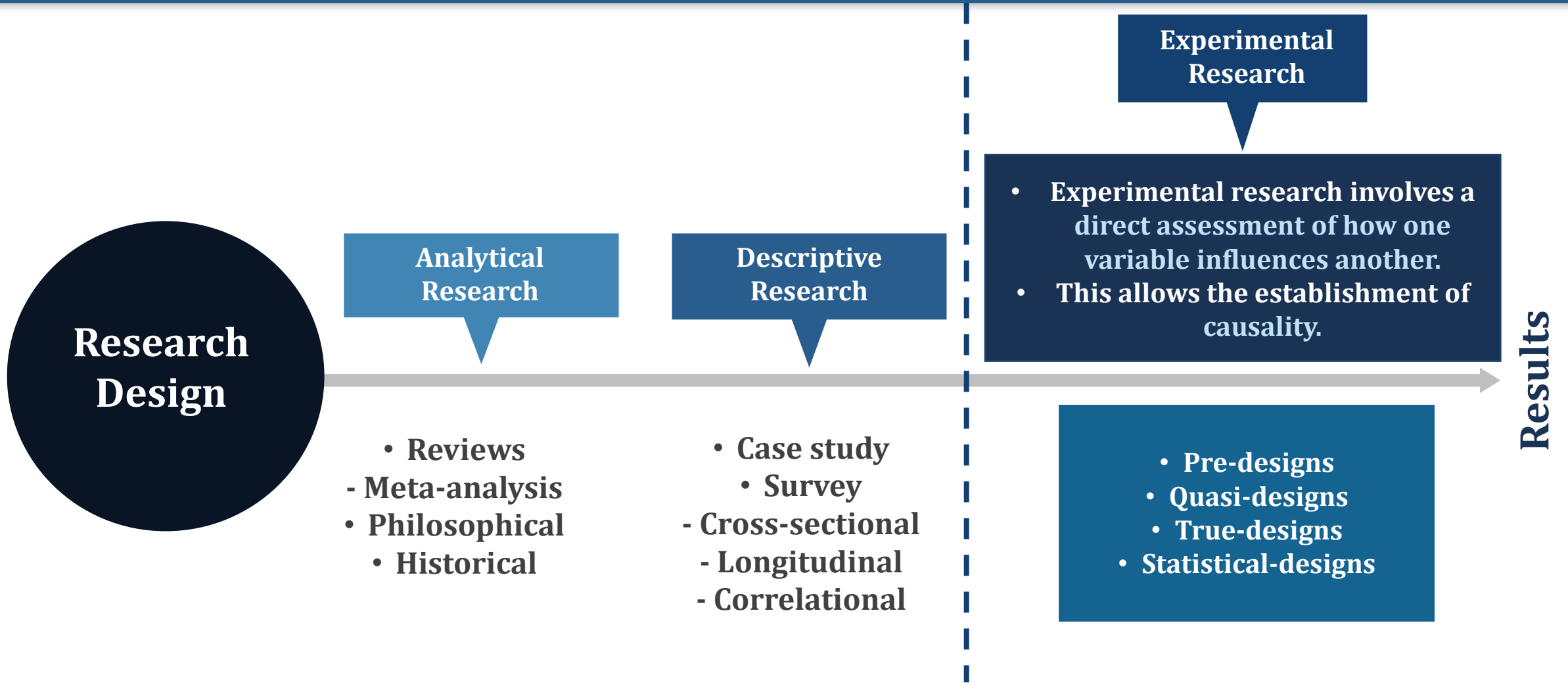
Generalization

05

Replicable

Methodology

Research Design Continuum

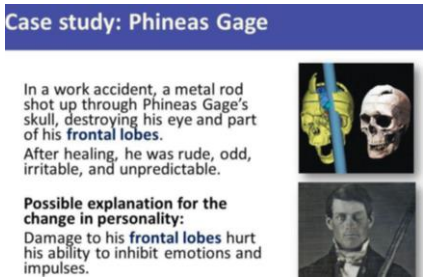


Research Design Continuum

Research Design

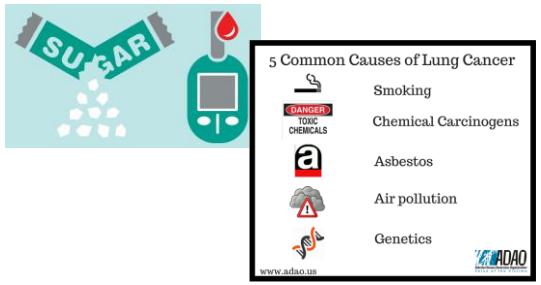
Descriptive Research

- **Case study**



- **Survey**

- Correlational



Empathy – Prosocial Behavior

- Cross-sectional

Cross-Sectional Studies

- Participants of different ages studied at the same time.

- Longitudinal

Longitudinal Studies

- One group of people studied over a period of time.

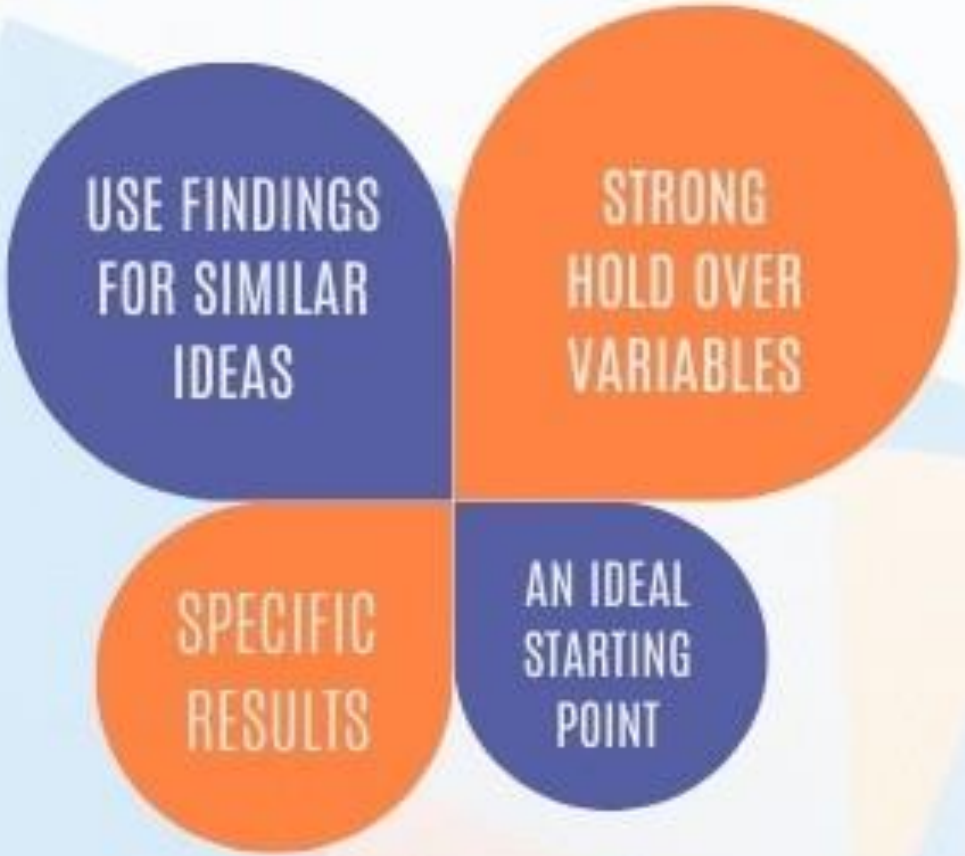
Experimental Research

- Experimental research involves a **direct assessment of how one variable influences another.**
- This allows the establishment of **causality.**

- **True-designs**
- **Quasi-designs**
- **Pre-designs**

Results

ADVANTAGES OF EXPERIMENTAL RESEARCH



- Researchers have a stronger hold over variables to obtain results.
- Subject does not impact the effectiveness of experimental research.
- The results are specific.
- Research findings from same dataset can be repurposed for similar research ideas.
- Experimental research makes an ideal starting point.
- The collected data could be used as a foundation to build new research ideas for further studies.

Variables

Independent Variable

- This variable is the 'cause' / as the predictor variable

Dependent Variable

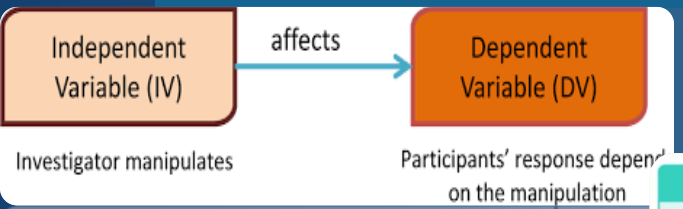
- This variable is the 'effect' / should only vary in response to the IV / also known as the criterion variable

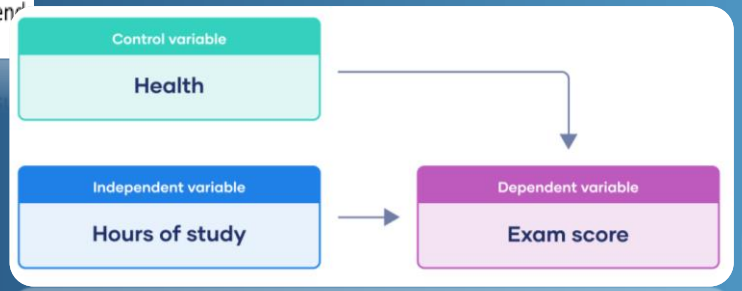
Extraneous Variables

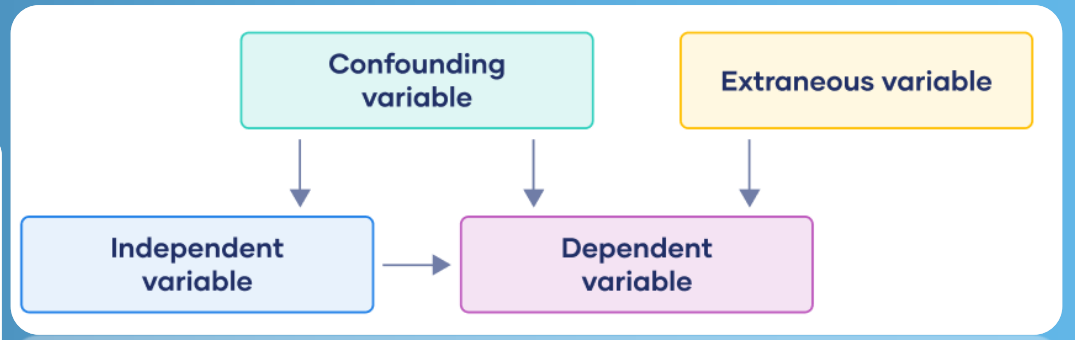
- Must be controlled to isolate the effect of the IV on the DV

Confounding Variables

- **Extraneous variables which have co-varied with**







Experimental Method

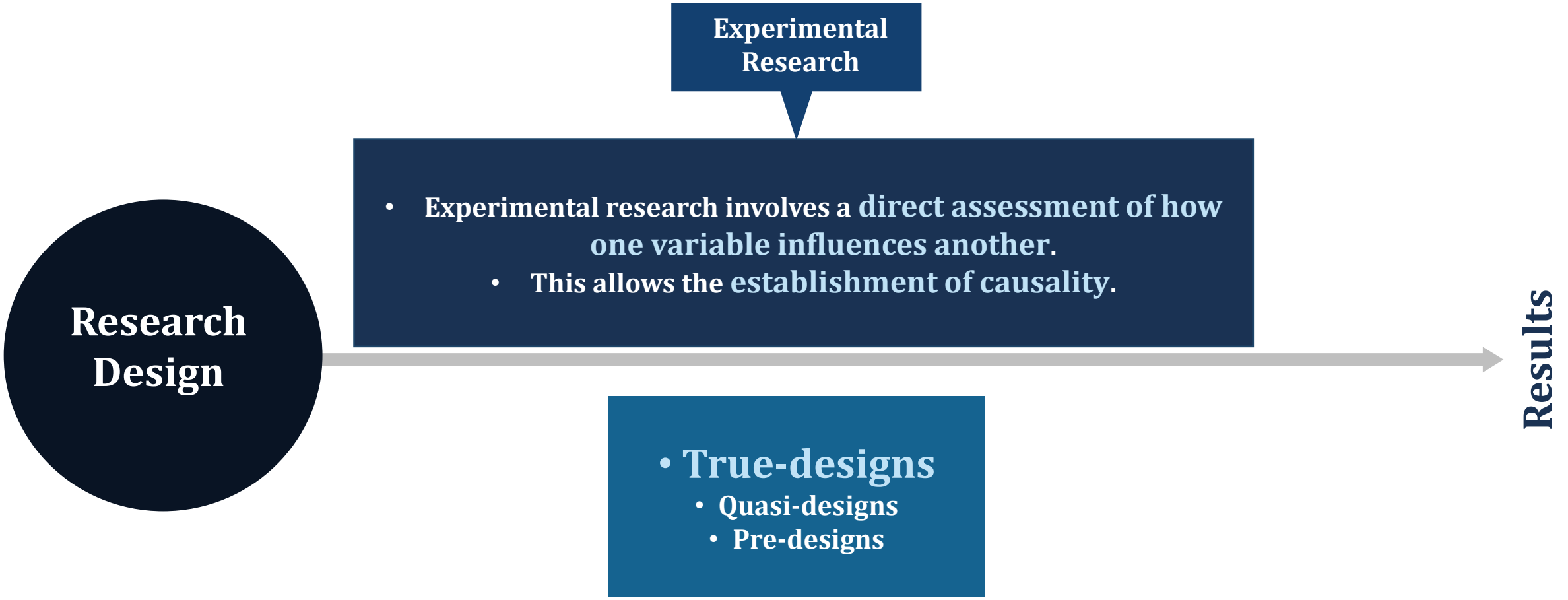
- **The most scientifically sophisticated research method.**
- **Defined as 'observation under controlled conditions'.**

Experimental / Treatment Variable

Criterion / Outcome Variable

Best research methodology to establish **cause-and-effect relationships** among variables

Experimental Research



True Experimental Design

- researchers **have complete control over the extraneous variables**
- can predict confidently that the observed **effect on the dependable variable is only due to the manipulation of the independent variable**

Essential characteristics:

i. Manipulation
ii. Control
iii.Randomization

Manipulation

Conscious control of the independent variable by the researcher through treatment or intervention(s) to observe its effect on the DV.

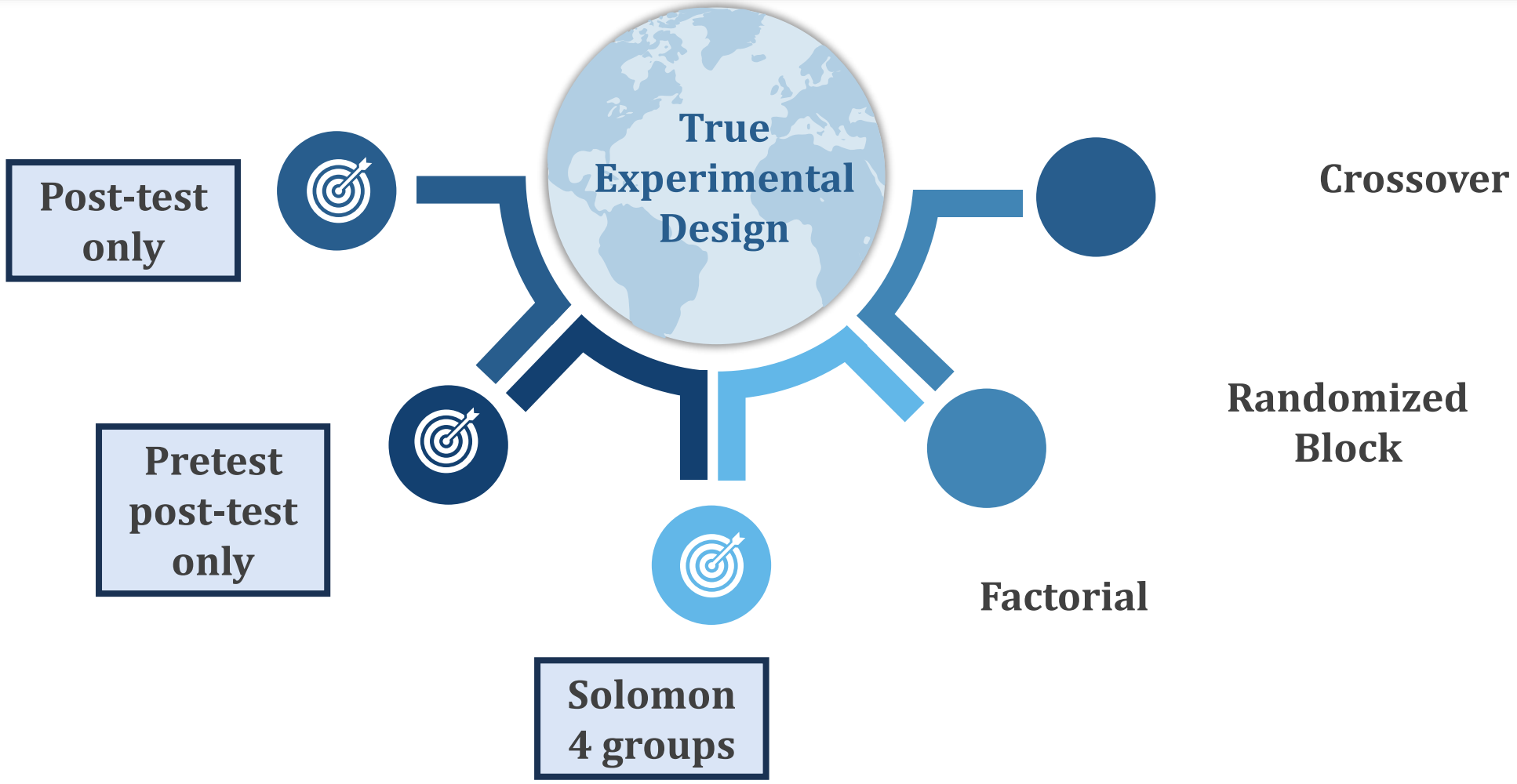
Control

- Use of **control group and controlling the effects of extraneous variables on the DV**.
- Control group receive no experimental treatment or any intervention at all.

Randomization

- Every subject has an **equal chance of being assigned** to experimental.
- To minimize the threat of internal validity of the study.
- Eliminate the EV effect on DV.

Types of True Experimental Design

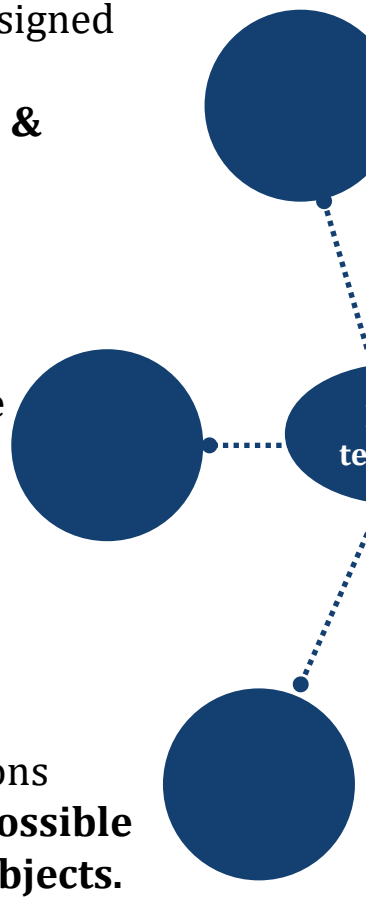


True Experimental Design: Post-test Only

2 randomly assigned group, i.e., **experimental & control.**

Neither of which is pretested before the implementation of treatment on the experimental group.

Helpful in situations **where it is not possible to pretest the subjects.**



Post-test only

Random assignment

Exp. group → Treatment/ Intervention → Post-test

Control group → → → Post-test

100 randomly selected university UG students

R
50 UG students → X
Imagining positive contact with a drug addict → O
Post-test
Intergroup prejudice questionnaire

R
50 UG students → X
No intervention → O
Post-test
Intergroup prejudice questionnaire

Example: Post-test Only

Research Question: Does a brief mindfulness meditation intervention reduce anxiety levels in college students during exam periods?

Researchers recruit college students who are interested in participating in the study during the exam period. Participants are randomly assigned to either the experimental group or the control group.

50 randomly selected university UG students

A
25 UG students

X
Brief mindfulness meditation session (15 min)

O
Post-test
State-Trait Anxiety Inventory (Anxiety level)

B
25 UG students

X
Asked to sit quietly and relax for the same duration of time (15 minutes) but does any guidance on mindfulness meditation

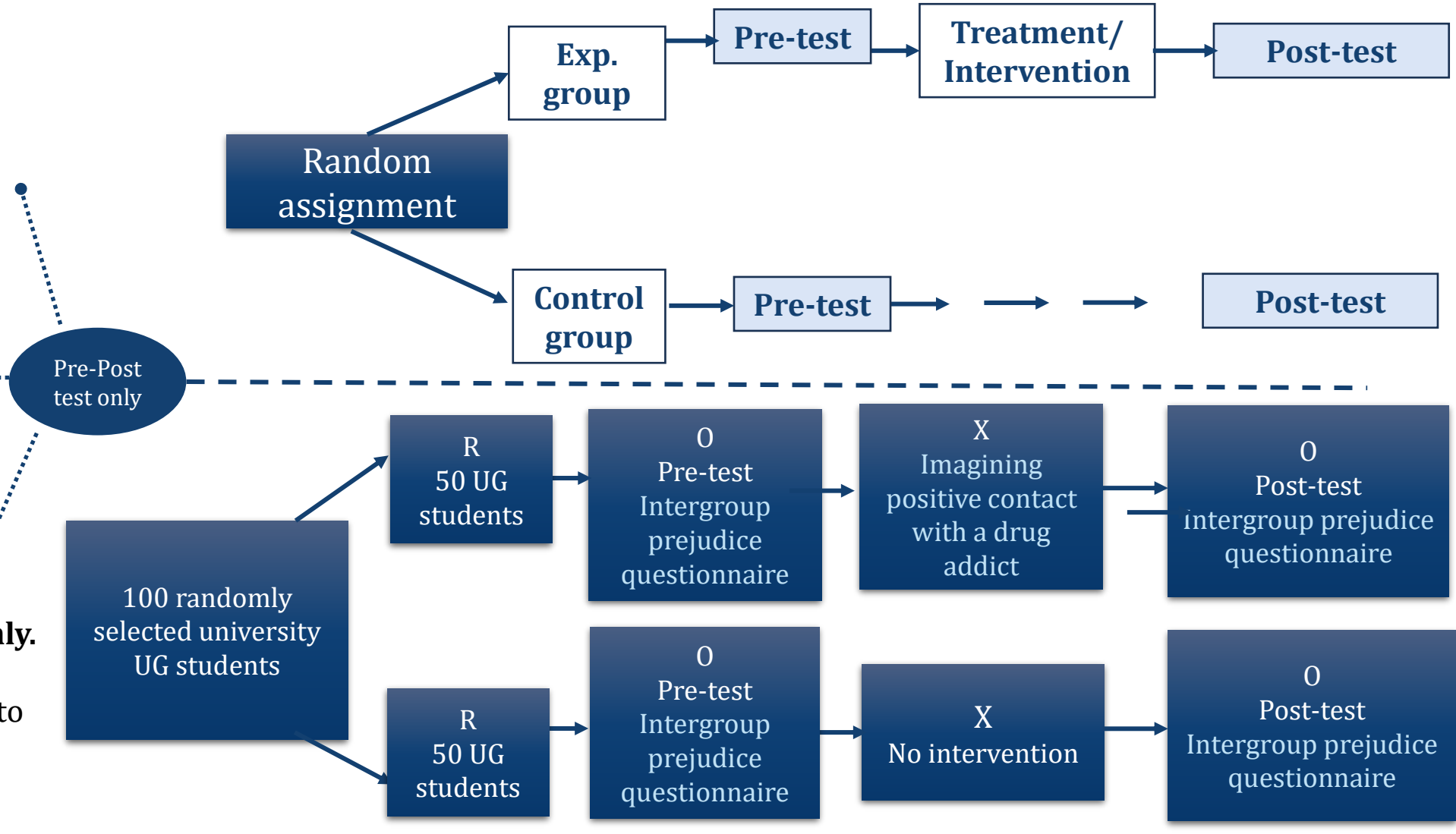
O
Post-test
State-Trait Anxiety Inventory (Anxiety level)

True Experimental Design: Pre-Post Test Only

2 randomly assigned group, i.e., **experimental & control.**

The **effect of the DV on both groups is seen before the treatment/ intervention (pretest)**

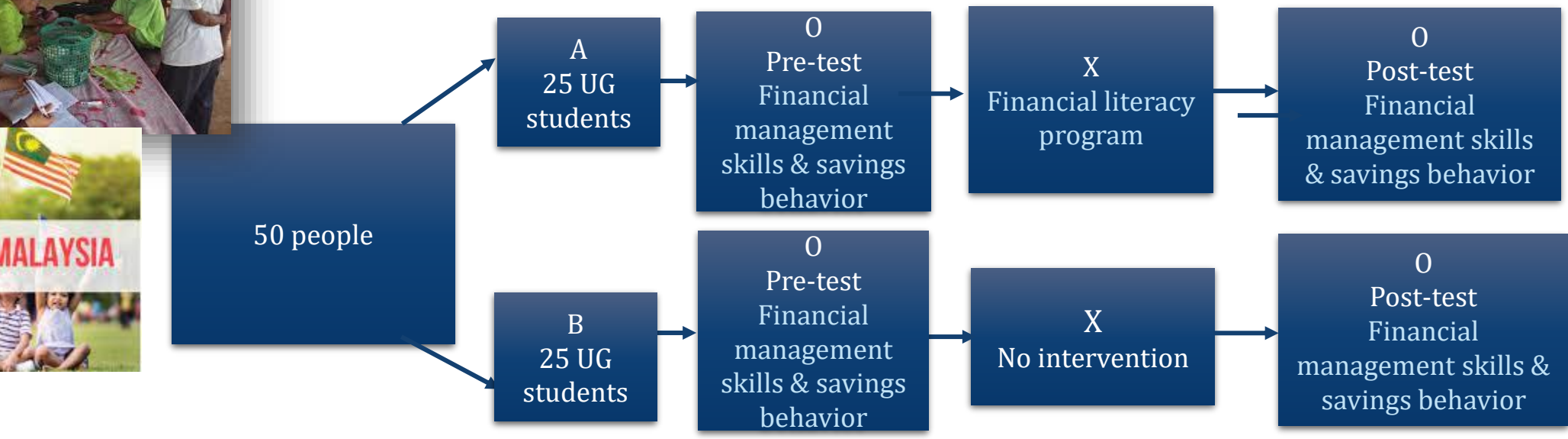
- Later, the **treatment** is carried out **on experimental group only.**
- After-treatment observation of DV is made on both the groups to examine the effect of the manipulation of IV on DV.



Example: Pre-Post Test Only

Research Question: Does a financial literacy training program improve financial management skills and savings behavior among low-income individuals?

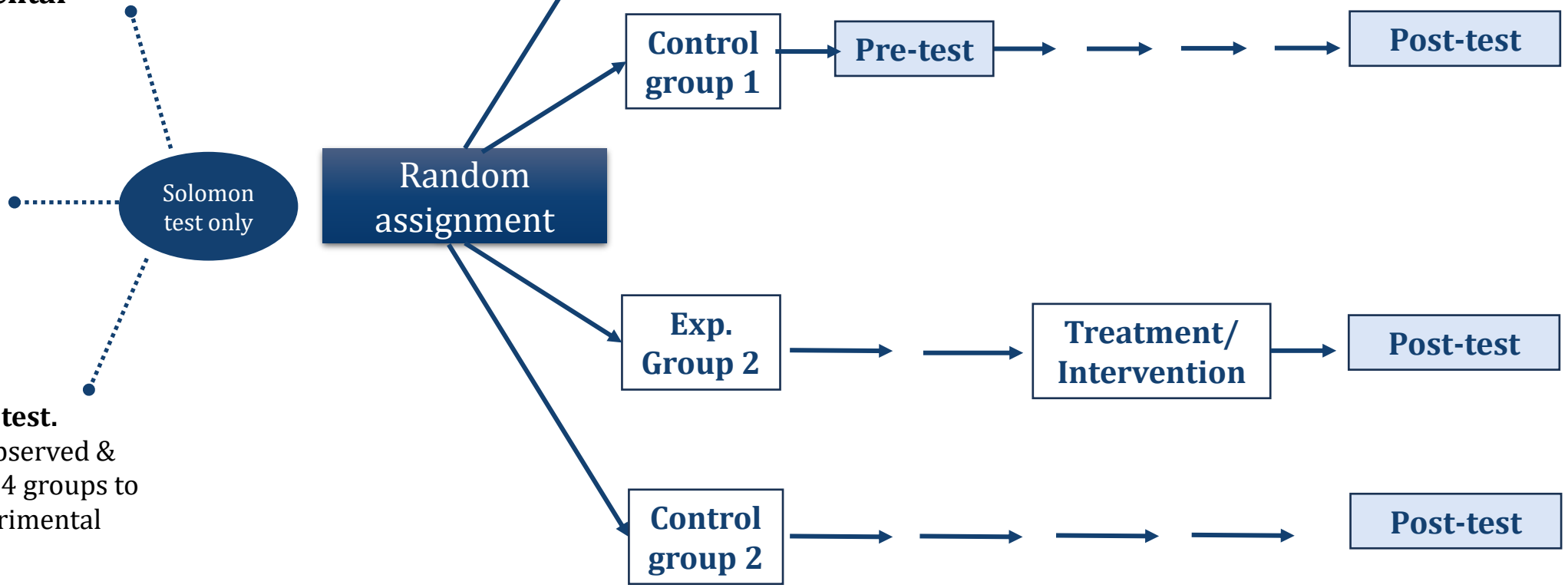
Researchers recruit low-income individuals from a community who are interested in participating in a financial literacy training program. Participants are randomly assigned to either the experimental group or the control group.



True Experimental Design: Solomon four-group design

- **2 experimental groups** (Exp group 1& 2) & **2 control groups** (Cont group 1 & 2)
- Considered as **1 of the strongest experimental design.**

Only **Expt. Group 1 & control group 1 receive pre-test,** followed by the **treatment to the Expt. Group 1 & 2.**



- All **4 groups receive post-test.**
- The effects of the DV are observed & comparison is made of the 4 groups to asses the effect of IV (experimental treatment on the DV).

True Experimental Design: Solomon four-group design

Research Question: Does an occupational safety training program reduce the incidence of workplace accidents in a manufacturing plant?

100 randomly selected workers

A
25 workers
(Cont. 1)

O
Pre-test
occupational safety and awareness of potential hazards in the workplace.

X
Occupational safety training program

O
Post-test
assessing their knowledge about occupational safety and hazard awareness

B
25 workers
(Expt. 1)

O
Pre-test
occupational safety and awareness of potential hazards in the workplace.

C
No intervention

O
Post-test
assessing their knowledge about occupational safety and hazard awareness

C
25 workers
(Cont. 2)

X
Occupational training program

O
Post-test
assessing their knowledge about occupational safety and hazard awareness

D
25 Workers
(Expt. 2)

C
No intervention

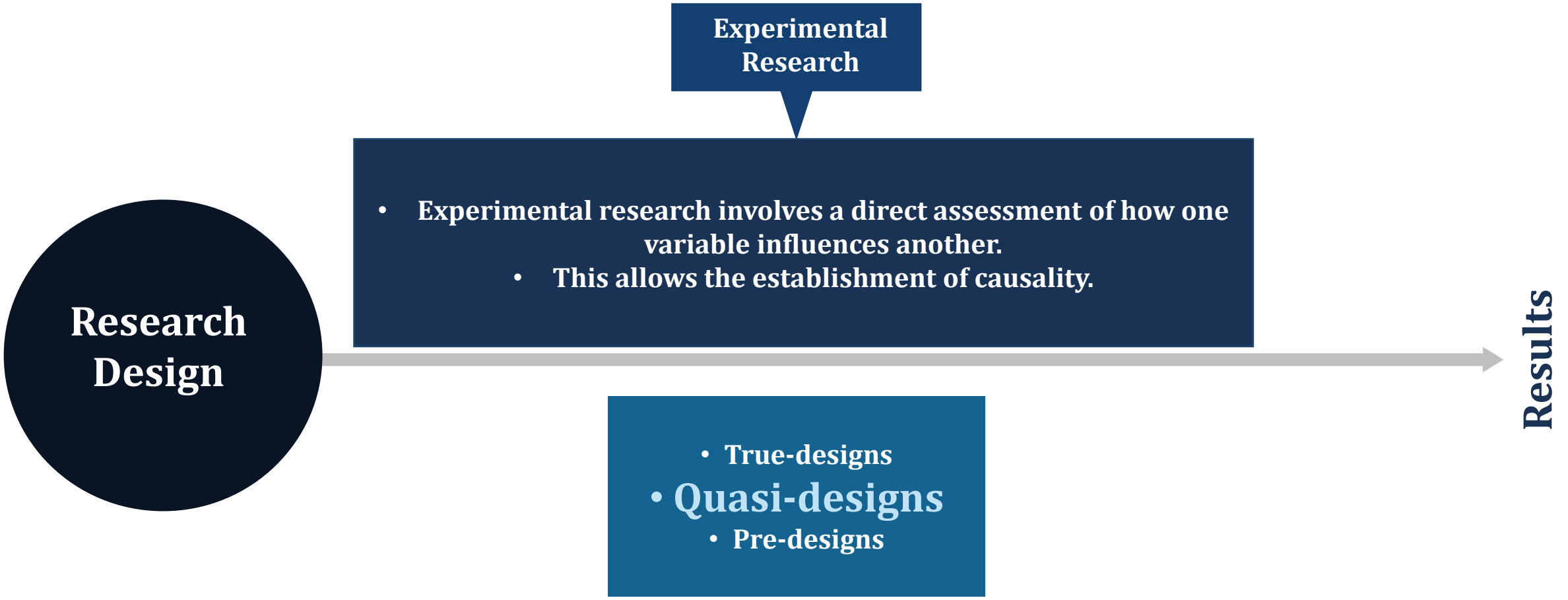
O
Post-test
assessing their knowledge about occupational safety and hazard awareness

True Experimental Design: Advantages

"Obviously somebody contaminated the sample, Kevin."

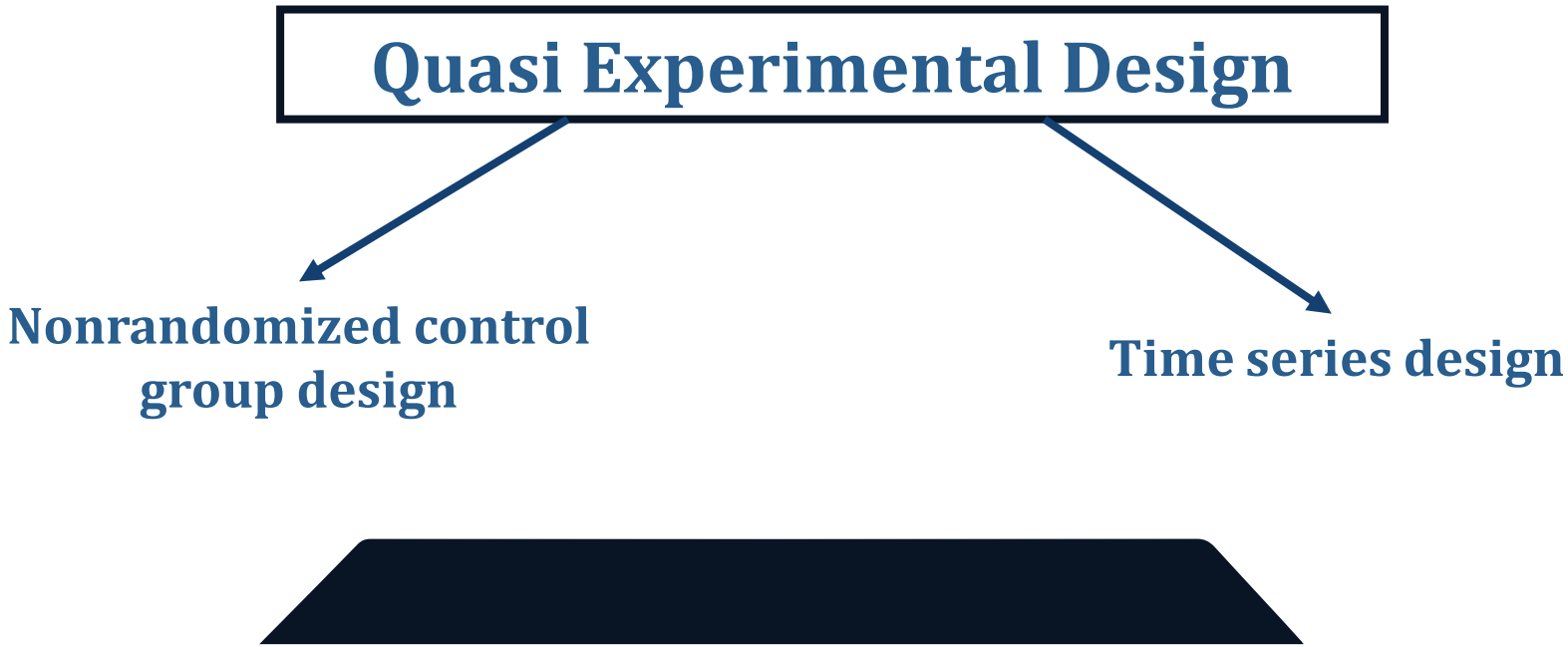
1. The most powerful designs to establish the causal relationship between independent & dependent variables.
2. The purpose of research is explanation; the causal relationship may be established among the variables by experimentation.
3. The controlled environment can yield a greater degree of purity in observation.

Experimental Research



Quasi Experimental Design

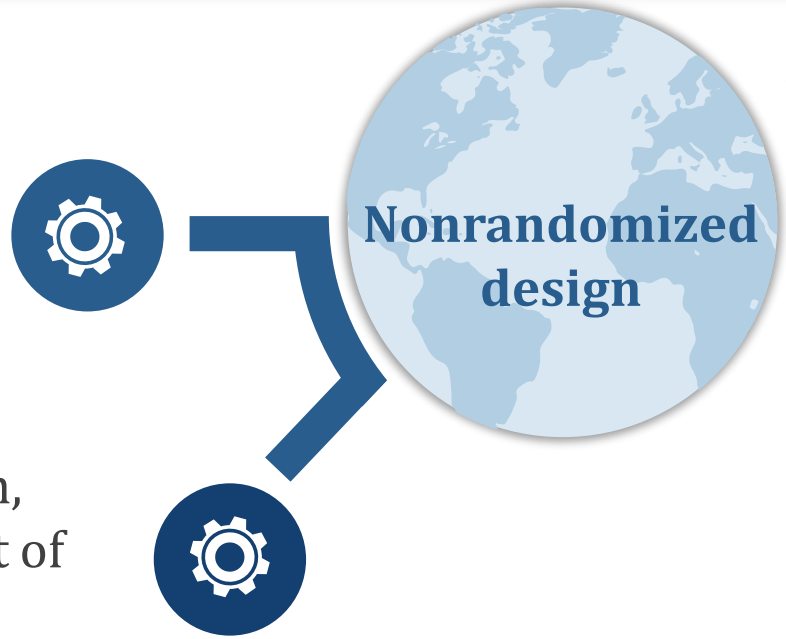
- **Manipulation of IV to observe effect on DV**
- **Lacks** at least 1 of the 2 characteristics of the true expt. Design; **randomization / control group.**
- This type of research design is used in field settings where random assignment is either irrelevant or not required.
- The IV is not manipulates in complete controller situations.



Nonrandomized Design

'non-equivalent control group design

Similar to pre-post test design, except no random assignment of subjects in experimental & control groups.

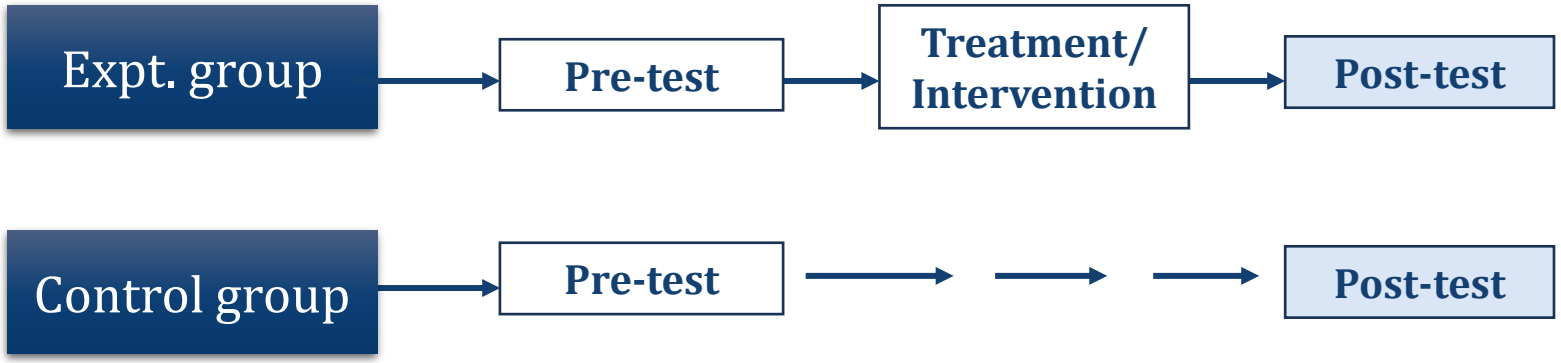


Research Question: Does participating in an after-school program focused on social skills and emotional intelligence improve adolescents' self-esteem?

School A

School B

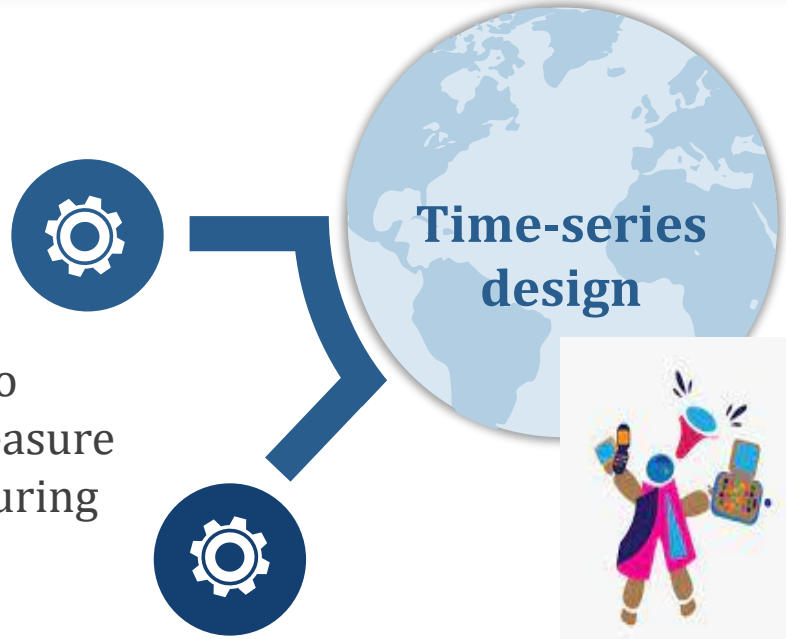
School A has recently implemented an after-school program focused on social skills and emotional intelligence, while School B has no such program.



Time-series Design

useful when the experimenter wants to measure the effects of a treatment over a long period of time.

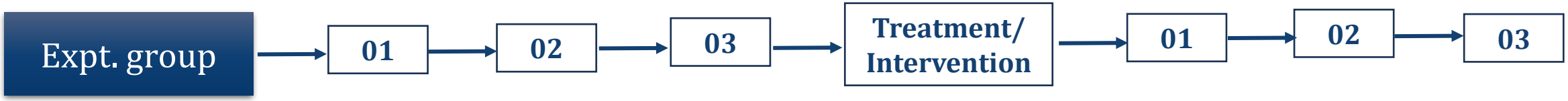
experimenter would continue to administer the treatment & measure the effects a number of times during the course of the experiment.



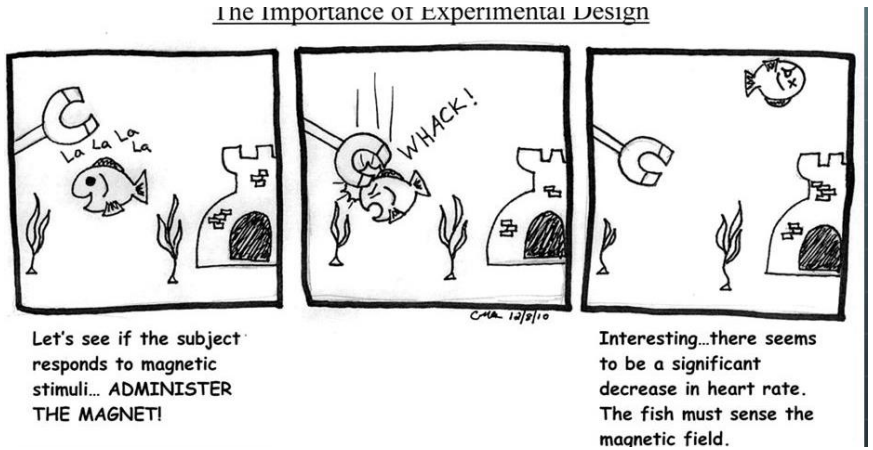
Research Question: Does a public awareness campaign about the importance of social connectedness lead to a decrease in reported feelings of loneliness in a community over time?

Researchers identify a community that is about to launch a public awareness campaign aimed at promoting social connectedness, emphasizing the importance of interpersonal relationships and providing resources to help people engage with others.

Generally it is a single-subject research



Quasi Experimental Design: Advantages



1

More frequently used because they are more practical & feasible to conduct research studies in different field, where in the absence of a large sample size, randomization &/ or availability of control groups are not always possible.

2

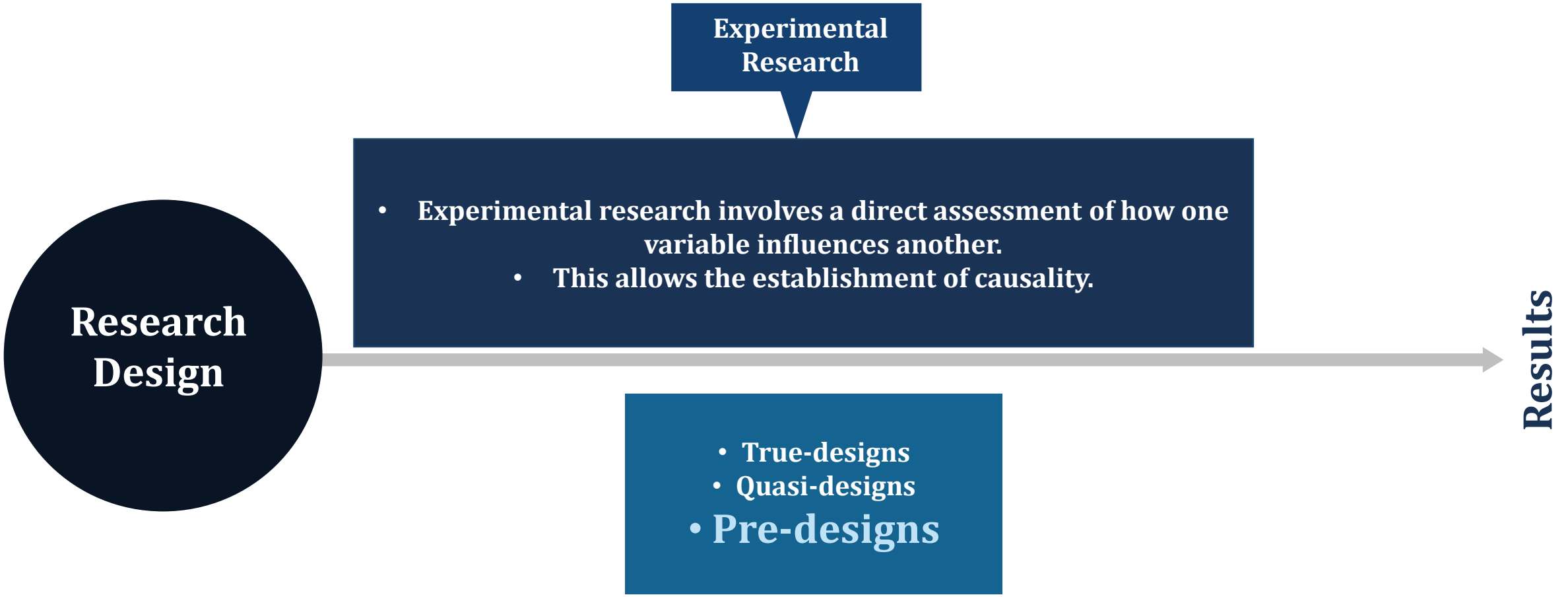
More suitable for real-world natural setting than true experimental research designs.

It may be able to establishing casual relationship

3

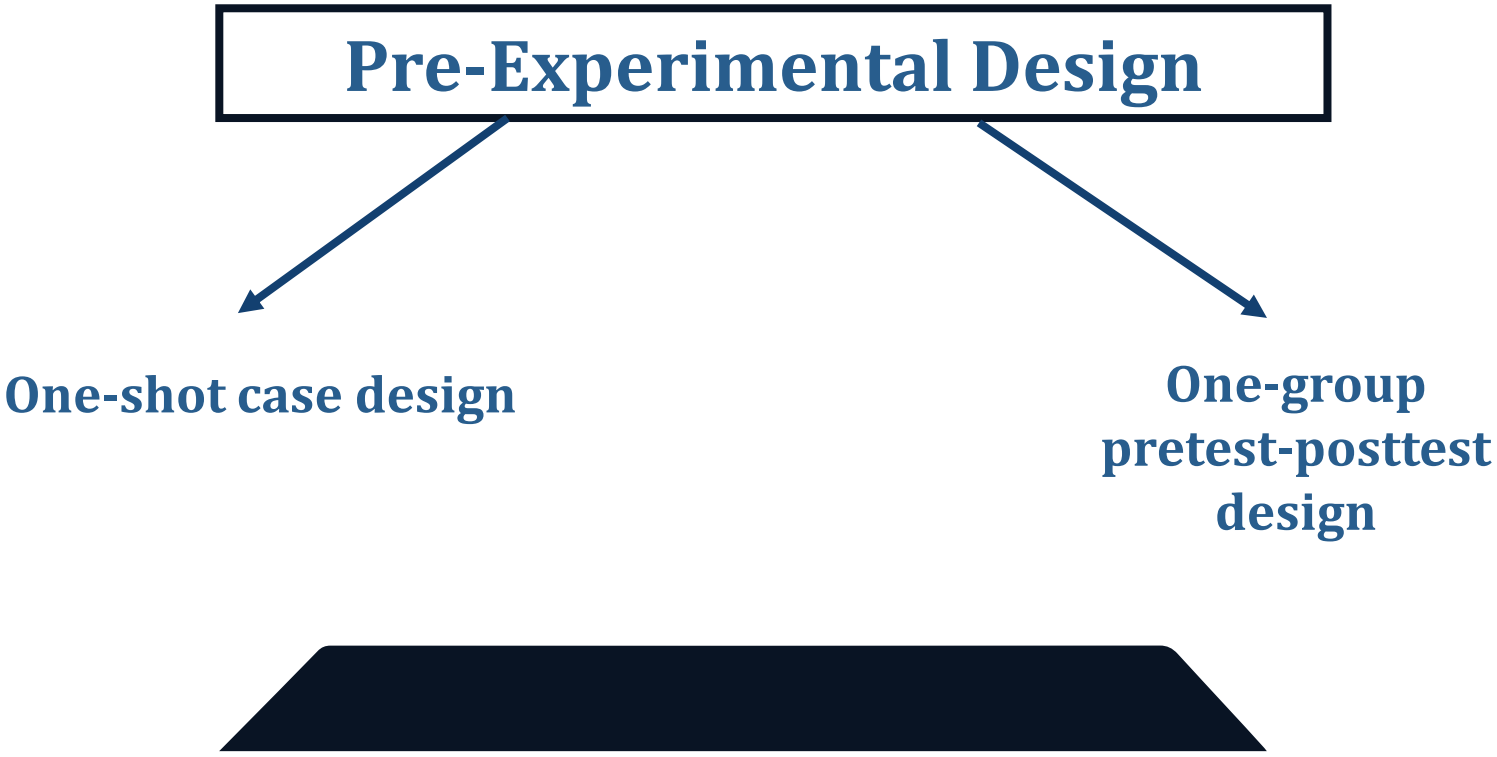
Allows researchers to evaluate the impact of quasi-independent variables under naturally occurring conditions.

Experimental Research



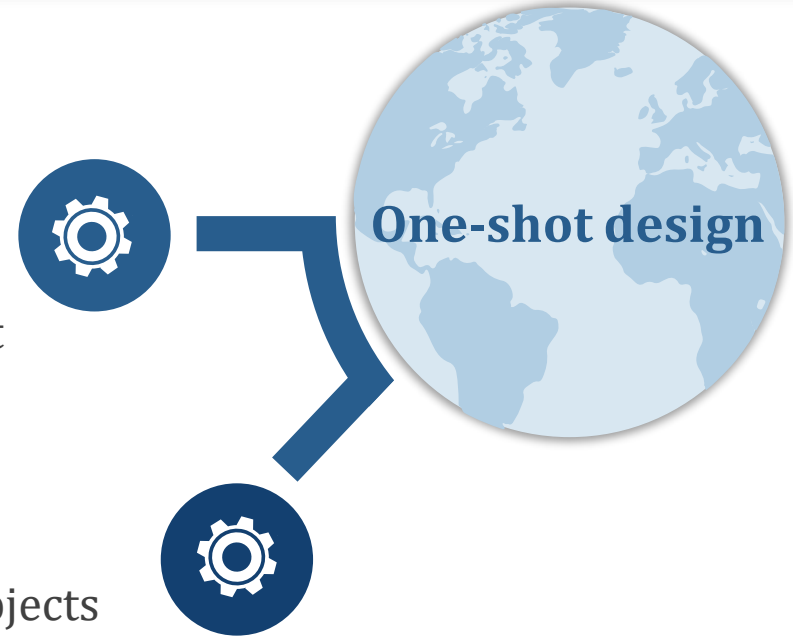
Pre-Experimental Design

- A research study could **conduct pre-experimental research design when a group or many groups are under observation** after implementing factors of cause and effect of the research.
- The pre-experimental design will help researchers understand **whether further investigation is necessary for the groups under observation**.



One-shot Design

A single experimental group is exposed to a treatment & observations are made after the implementation of that treatment



no random assignment of subjects to the experimental group & no control group at all

Research Question: Does a one-day workshop on effective study skills improve students' self-reported confidence in their ability to study?

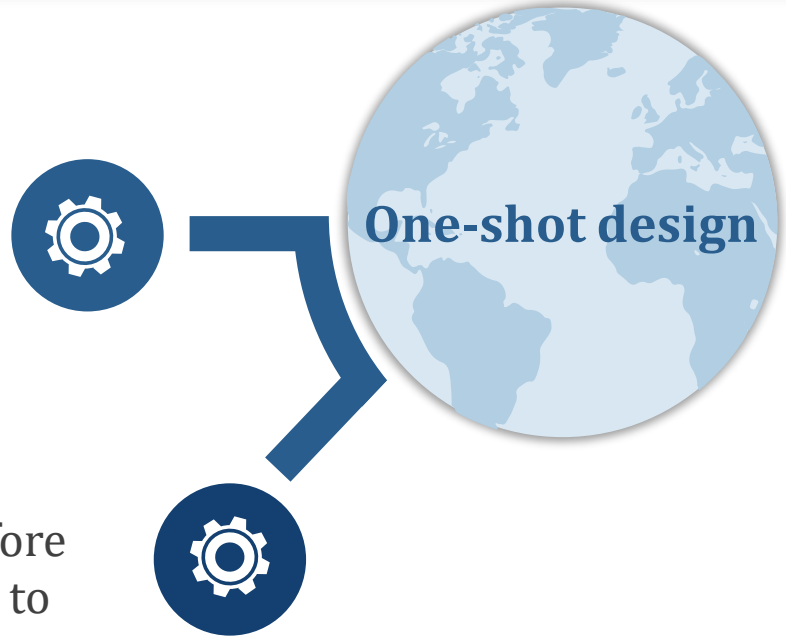
Researchers identify a group of high school students who have voluntarily signed up for a one-day workshop on effective study skills. The workshop covers various study techniques, time management, and strategies for dealing with test anxiety.

Expt. group → **Treatment/ Intervention** → **Post-test**

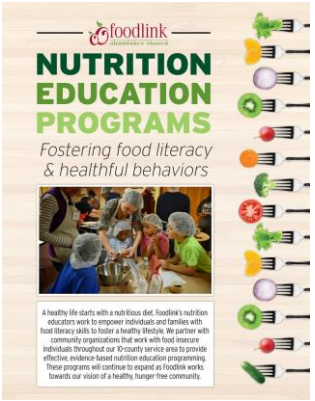
Example: suppose you wish to see if a new textbook increases student interest in your course (history, science, statistics, etc.)

One-group pre-post test Design

Simplest type of pre-experimental design, **where only the experimental group is selected as the study subjects**.

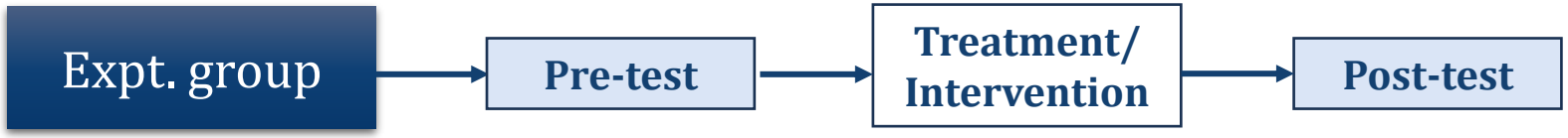


Research Question: Does a four-week nutrition education program lead to improved knowledge about healthy eating habits among adults?



Researchers recruit a group of adult volunteers interested in participating in a four-week nutrition education program. The program covers topics such as the importance of a balanced diet, portion control, understanding food labels, and meal planning.

A pretest observation of the dependent variables is made before implementation of the treatment to the selected group, the treatment is administered, & finally a posttest observation of dependent variables is carried out to assess the effect of treatment on the group.

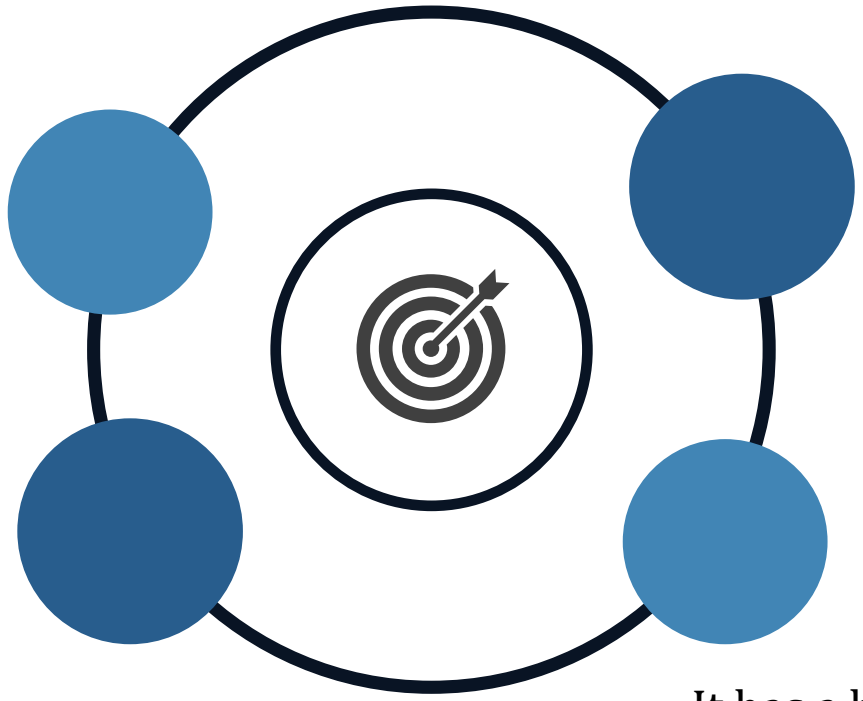


Example: suppose you want to assess the effects of weekly counselling sessions on the attitudes of identified bullies in school

Advantages – Disadvantages of Pre-experimental Design

Very simple & convenient to conduct these studies in natural settings, especially in nursing.

Most suitable design for the beginners in the field of experimental research.



Considered a very weak experimental design to establish casual relationship between independent & dependent variables, because it controls no threat to internal validity. It has very little control over the research.

It has a higher threat to internal validity of research

Questions in Experimental Design

01

When to test groups?

- Certainly you will want to test after the treatment/ intervention, but you may also choose to do a pre-test (this can help confirm that groups changed)

How much information to share?

- Try not to bias the experiment.. Limit information available to individuals about what is going on in the experiment.
- Don't reveal how others have responded, who is receiving a treatment (or placebo), what you expect to find etc2.
- Go double-blind and keep researchers as well as subjects in the dark.

02

Experiments and Validity

01

Experiments are strong on Internal Validity

- We know that the observed patterns are real
- Comparative and Statistical studies are weaker here, because we often lack proper control to rule out spurious relationships.

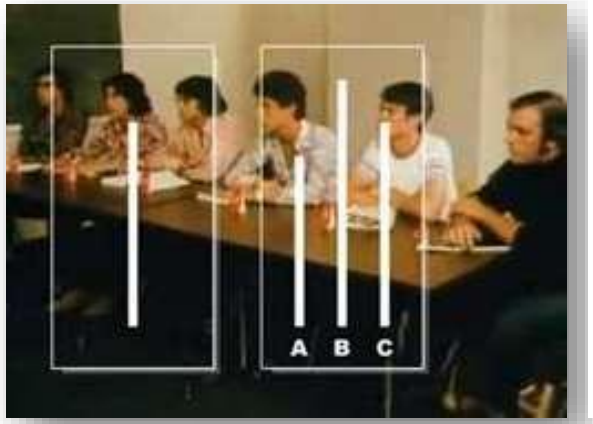
Experiments are weak on External Validity

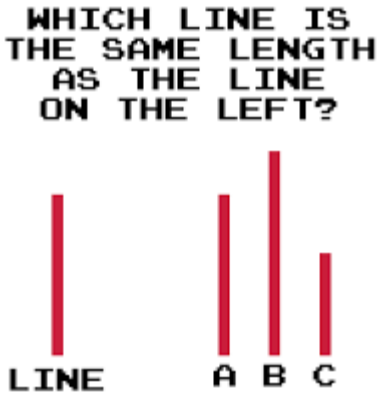
- We don't know (unless we do a field test) if the pattern will work the same in the "real world".
- Comparative and Statistical studies do much better here, because we are observing the real world.

02

Social Experiment

A social experiment is **a research method or project that aims to investigate and understand human behavior, social dynamics**, or the **effects of certain interventions in a social context**.



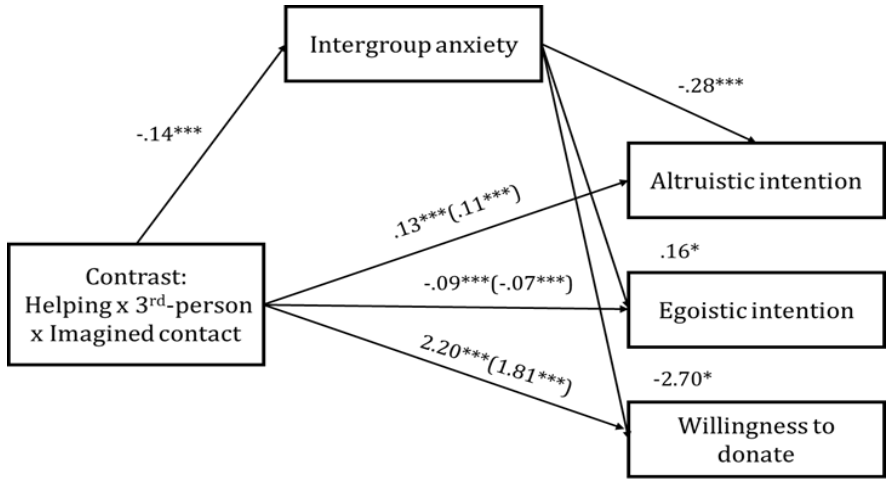


One classic example of a social experiment in social psychology is the Asch Conformity Experiments, conducted by Solomon Asch in the 1950s. The experiments were designed to investigate the extent to which individuals would conform to a group consensus, even when that consensus was clearly incorrect.

My PhD research:
IMAGINED INTERGROUP CONTACT EFFECTS ON PROSOCIAL ATTITUDES AND BEHAVIOUR

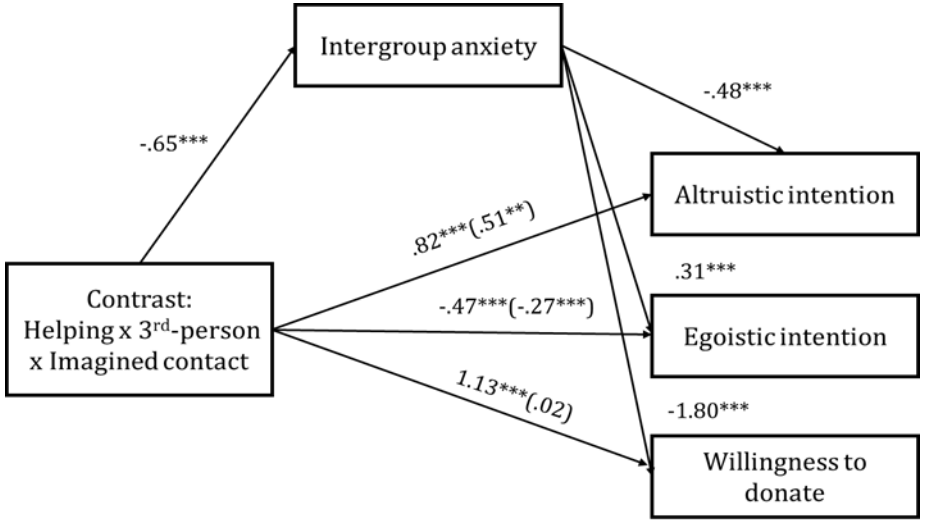
Table 1 Primary contrast

	Imagined contact conditions			
	IC	IC (prosocial)	IC (prosocial/first-person)	IC (prosocial/third-person)
Contrast	-1	-1	-1	+3

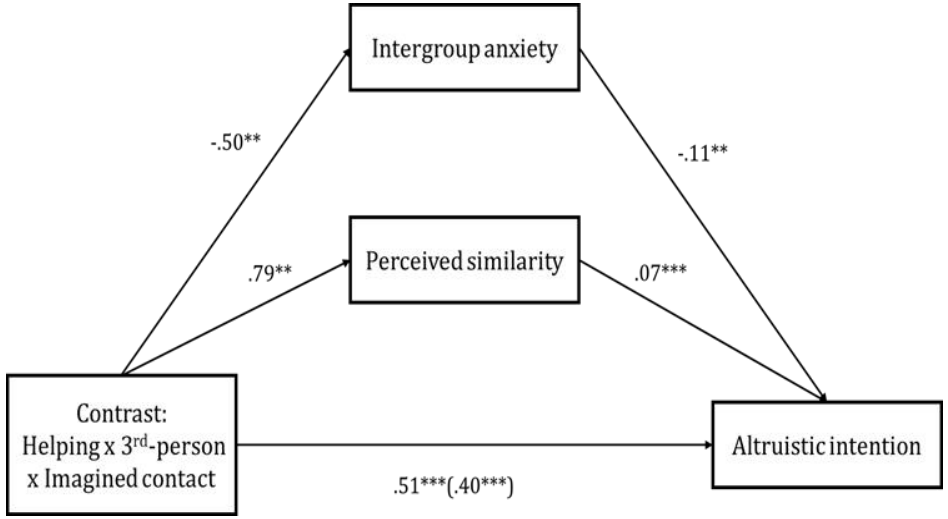


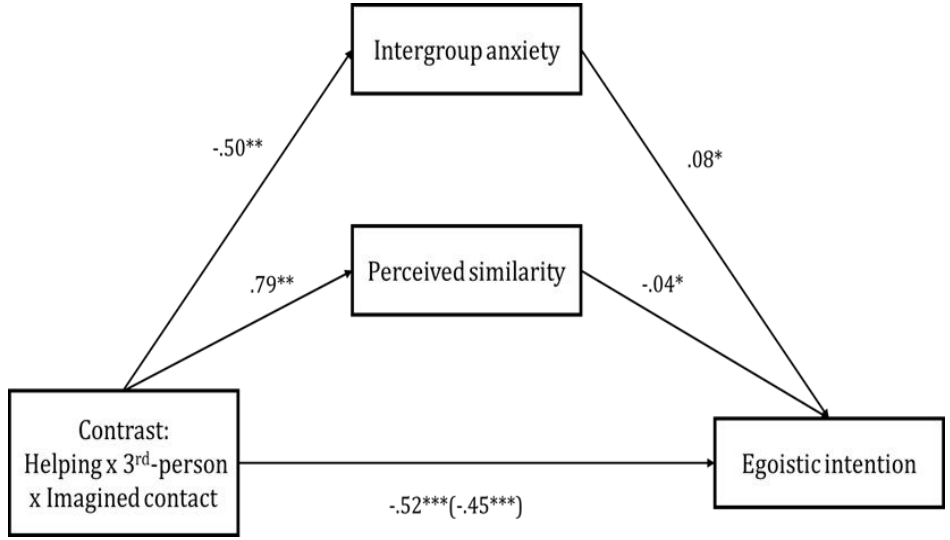
Study 1 & 2

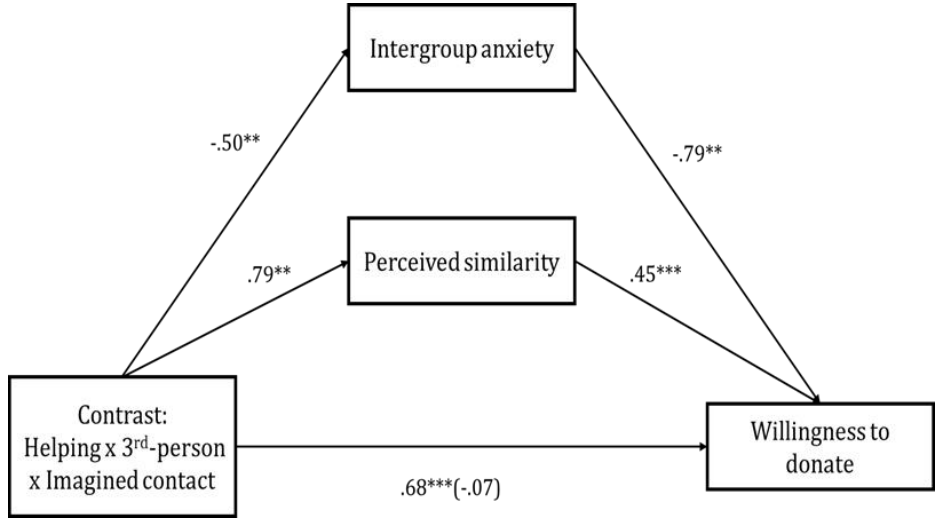
	Imagined contact conditions			
	IC (first-person)	IC (third-person; outdoor scene)	IC (third-person; Arab Muslim)	IC (third-person; Stranger)
Contrast	-1	-1	-1	+3



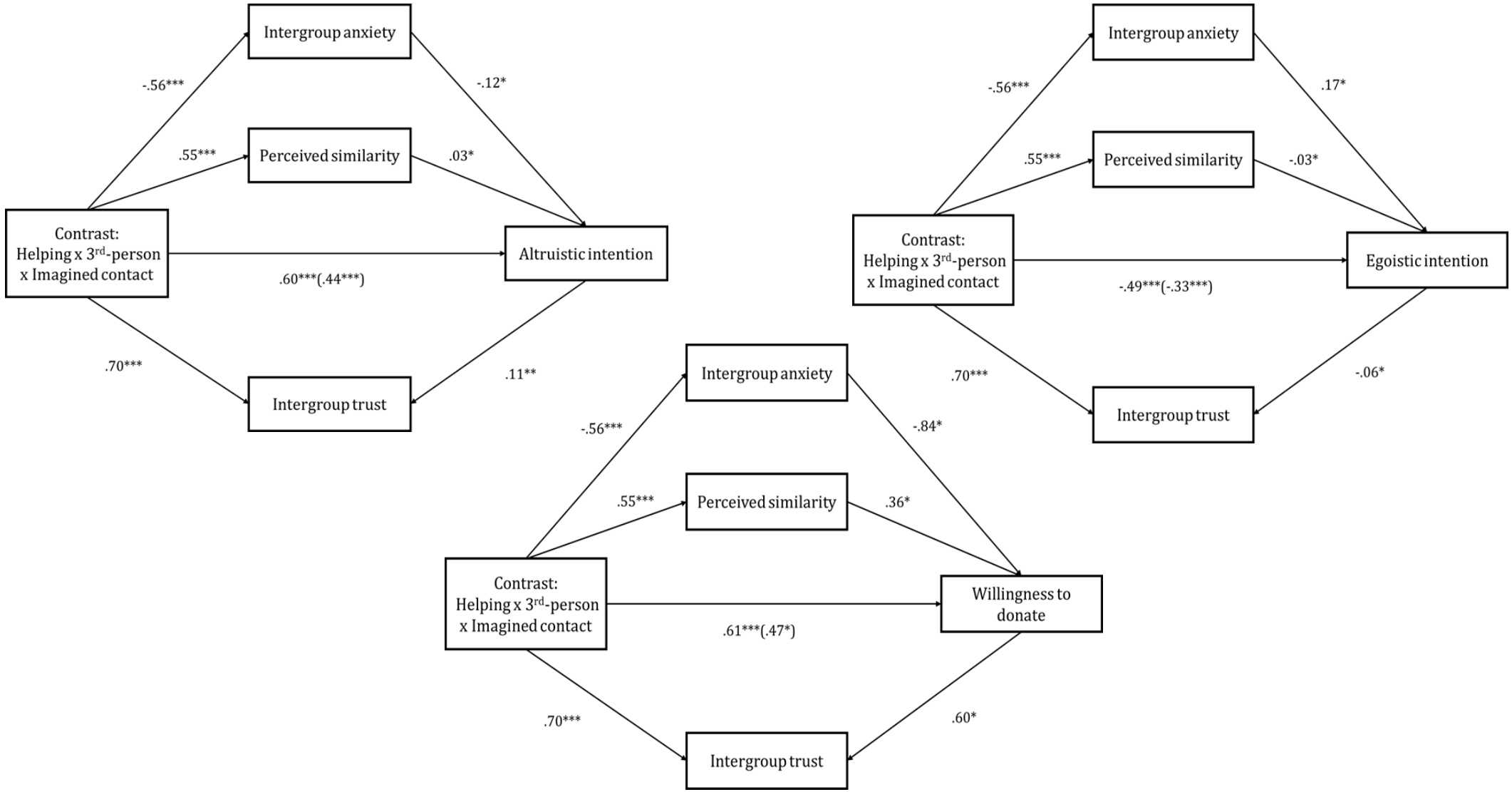
Study 3



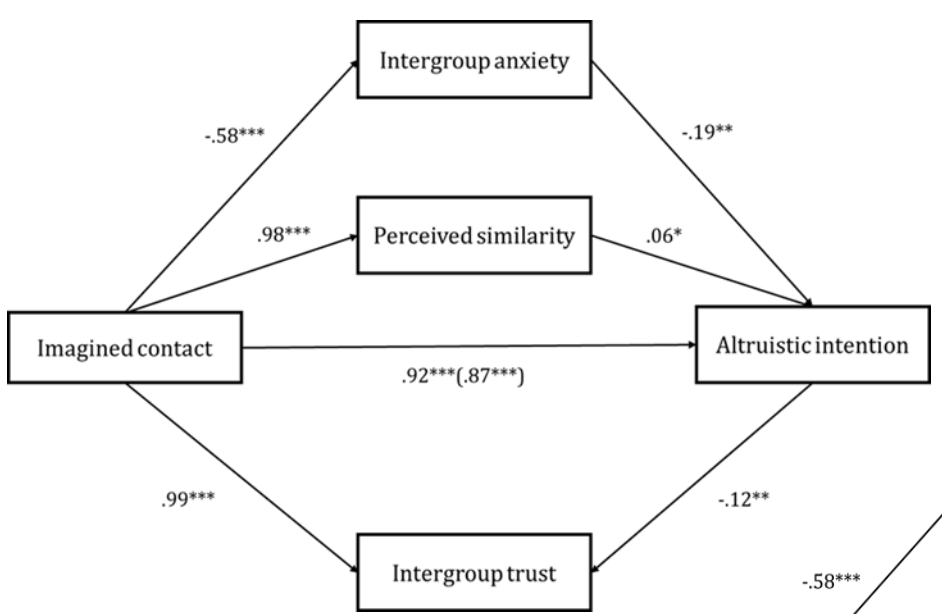


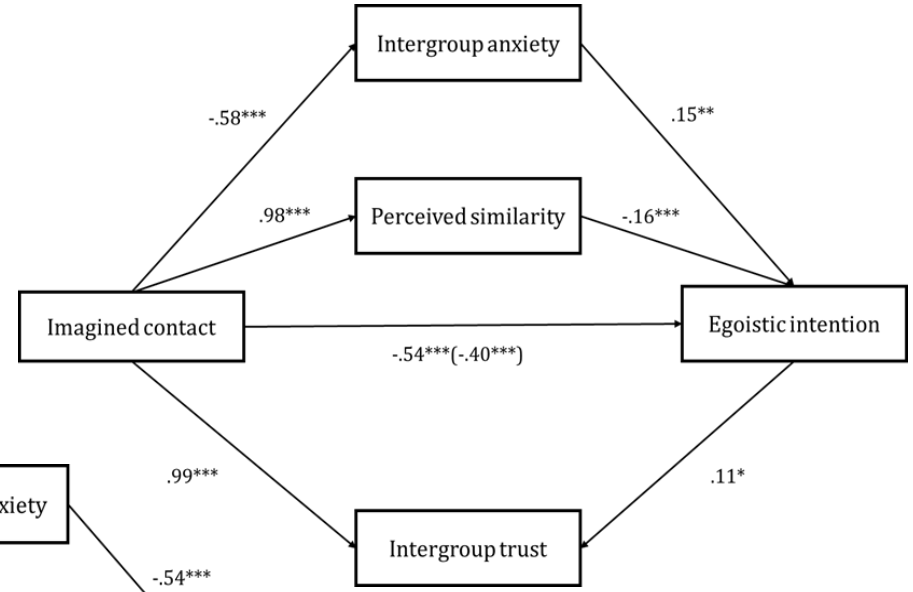


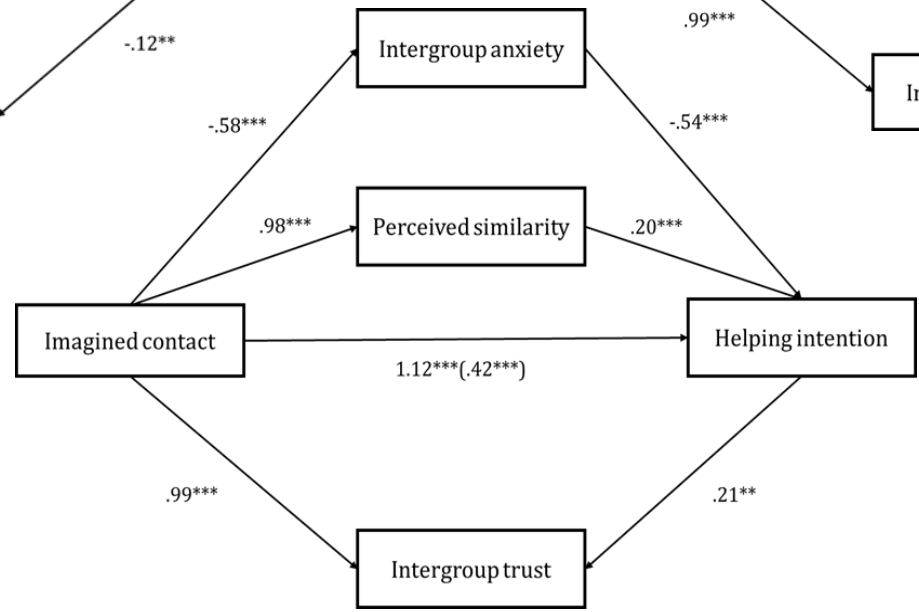
Study 4 & 5 (Prosocial intention)



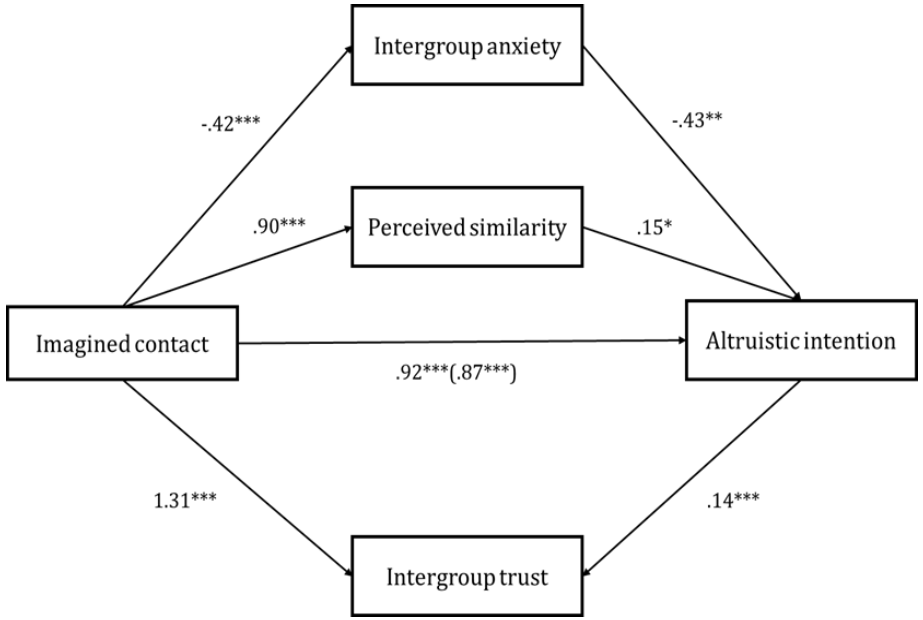
Study 6 (prosocial intention)

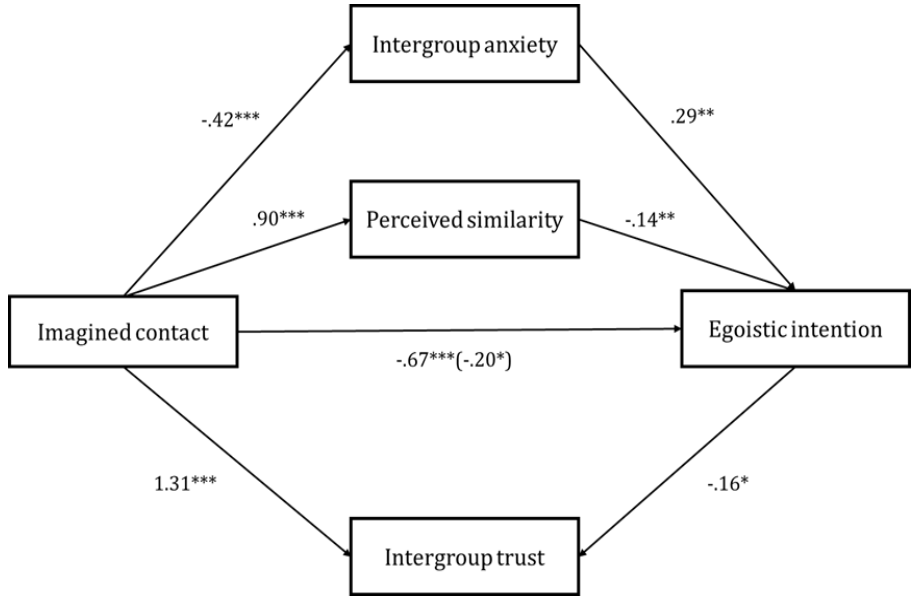


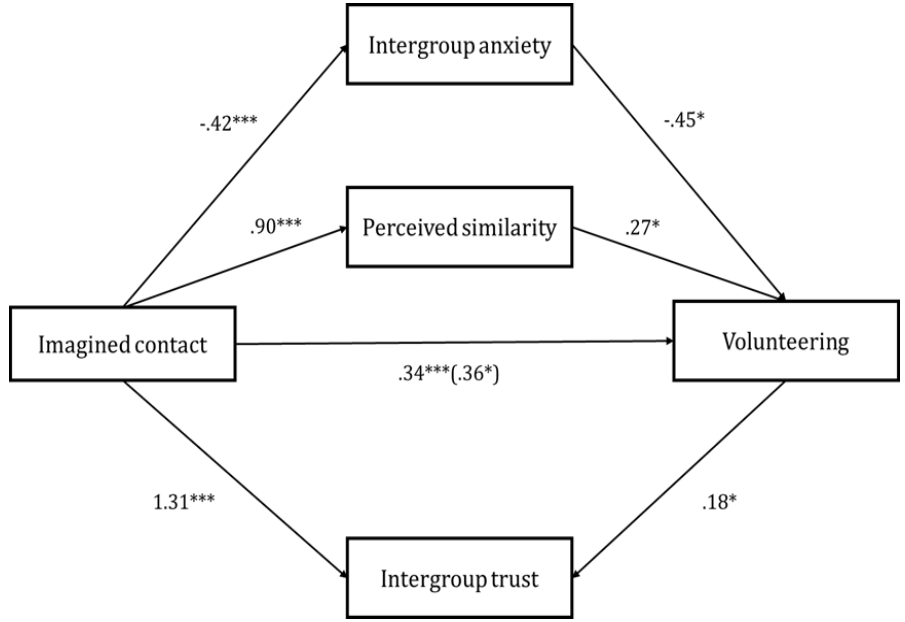




Study 7 (prosocial intention)







Study 8 (Examine the actual prosocial behavior in a real life settings.)

Thank You

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