Psychological Methods Lightning Lessons

Interactive Session
Time: 45 minutes

Scholars who are new to the field of psychology may have a vague understanding of various types of research methodology but may lack the terminology to describe distinct empirical methods or articulate the implications of each type. The goal of the lightning lessons session is to succinctly present four commonly employed research designs in psychological science.

Trainees should be divided into four groups, and each group should be stationed at one of four places in the room. (It is helpful to have a map available to direct trainees to the appropriate table.) One psychologist will be assigned to represent each type of research method. The psychologist should aim to provide a basic overview of the method within seven minutes; the time will go quickly, and psychologists should use caution to not include too many details in their initial discussion of the method. By the end of their time with the psychologist, trainees should not feel like experts in the method, but should be able to explain the basic goals that can be accomplished by that method. Each psychologist should also have a handout with a basic overview of the method that trainees can retain for future reference. Materials are provided for the following four designs, but other designs may be selected if desired:

1. Correlational & survey
2. Experimental & quasi-experimental
3. Longitudinal & experience sampling
4. Qualitative & mixed-methods

Psychologists will spend seven minutes with one group, then will rotate to the next group until all groups have received a method from all psychologists.

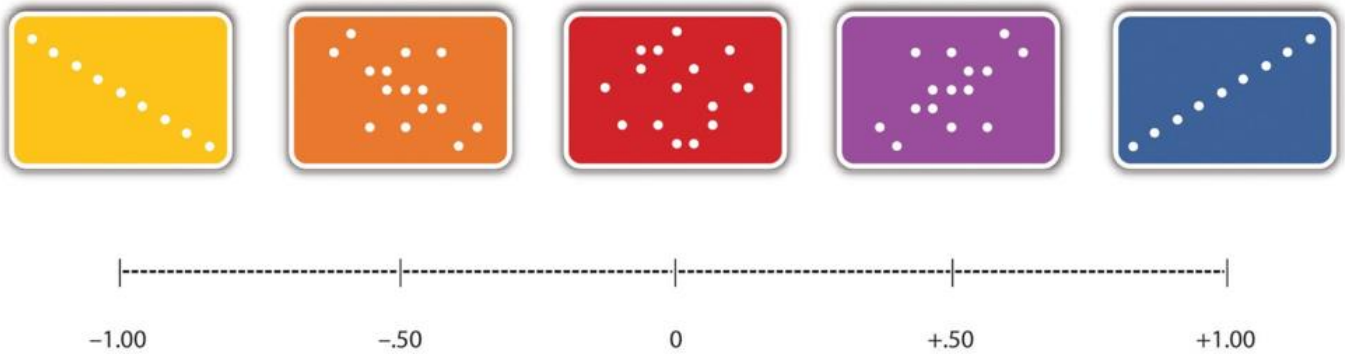
Extensions:
If time allows, facilitators may consider including more research methods, allowing each psychologist a longer time to discuss the method, or concluding with a discussion of how each method would address a single research question.

JOHN TEMPLETON FOUNDATION
Inspiring Awe & Wonder

Baylor University

Correlational & Survey Designs
Psychological Methods Lightning Lessons

Correlational designs measure two (or more) variables as they currently exist and examine the relationship between them. Many correlational studies examine two quantitative variables, variables that can be measured with numbers on a scale. These variables can both increase or decrease together, which is referred to as a positive correlation. It's also possible that one variable increases while the other decreases, which is referred to as a negative or inverse correlation. The more strongly two variables are related, the better able one variable is to predict another. When both variables are quantitative, the relationship between them can be displayed in a scatterplot, which can help to show the degree of relationship as well as the direction (positive or negative):



Correlational studies can also be conducted with variables that are comprised of categories (e.g., religious denomination). The main feature of a correlational design is that it investigates the relationship between the variables, without drawing causal conclusions. Correlational designs are not able to draw causal conclusions because they lack the experimental control over all other variables that may be related to the outcome variable. Even though correlation cannot determine causation, correlational studies can be used to describe relationships, investigate reliability and validity, or provide confirming evidence.

***When to use:** The research question is investigating the relationship between two (or more) variables, but it is impossible to manipulate the variable of interest.

Survey designs use self-report methods to gather information from samples with specific characteristics. Usually conducted with large samples, survey designs can efficiently gather large quantities of information from participants. Survey research frequently employs specific sampling procedures to increase the likelihood that the sample is representative of the population. If the sample is not representative of the population, the sample is biased and may lead to invalid conclusions.

Survey questions can be either open-ended (allowing the participant to respond in any way they like) or closed-ended (providing several options of responses from which the participants must choose). Questions must be worded in such a way that the respondents can understand what the question is asking but also that the question does not prompt the respondent to give a particular answer. Responses to close-ended questions are easier to categorize during data analysis, where responses to open-ended questions take more time to analyze.

***When to use:** The goal is to gather large quantities of information from participants, either to describe the prevalence of a variable or to examine relationships between variables.

References:
Price, P.C., Jhangiani, R.S., Chiang, I.A., Leighton, D.C., and Cuttler, C. (2017). *Research Methods in Psychology* (3rd ed.). PressBooks. https://opentext.wsu.edu/carriecuttler/.

Experimental & Quasi-Experimental Designs
Psychological Methods Lightning Lessons

Experimental designs are the only research designs that can allow researchers to make **causal** conclusions about the relationships between variables. There are four components to every experiment:

1. **Manipulate** an independent variable (the "cause" variable).
   a. The researchers must intervene to create these manipulations.
   b. Each independent variable should have at least two or more conditions.
   c. These conditions should be equivalent to each other in every way *except* for the particular quality we hypothesize is causing the change.
2. **Measure** a dependent variable (the "effect" variable).
3. **Compare** the measured dependent variable among the different conditions of the independent variable.
   a. If the independent variable had an effect on the dependent variable, we'll see different values of the dependent variable among the conditions of the independent variable.
4. **Control** (hold constant) all other possible extraneous variables.
   a. Some extraneous variables are impossible to avoid. However, some become **confounding variables**, which are those that change systematically along with the independent variable. Confounding variables are problematic because they provide an alternate explanation for the results.
   b. One way to address confounding variables is through **random assignment**, which means that each participant has an equal chance of being in any of the conditions.

By leaving participant assignment to chance, we increase the likelihood that any individual differences among the participants will be evenly spread out between the experimental conditions. This decreases the likelihood of confounding variables, especially those that are due to participant characteristics.

***When to use:** The research question is investigating a direct causal link between two variables, and it is possible to randomly assign participants to the experimental conditions.

Quasi-experimental designs have many of the features of an experimental design but is not truly experimental in nature. There are many cases when researchers cannot randomly assign participants to experimental conditions, whether that is because the independent variable is a characteristic of the individual (e.g., gender identity) or because the research is being conducted in an applied setting where it is not possible to interfere with participants' membership in a group (e.g., congregation membership).

Quasi-experimental designs are frequently used in applied settings where it is not possible to randomly assign participants to experimental conditions. However, they are vulnerable to potential confounding variables. Since random assignment is not used, it is possible that individual differences are not spread out across the experimental conditions, thus creating a possible alternative explanation for the results.

***When to use:** The research question aims to investigate a causal relationship, but random assignment to the experimental conditions or the use of control groups is not possible.

References:
Morling, B. (2021). *Research Methods in Psychology: Evaluating a World of Information* (4th ed.). W.W. Norton.
Price, P.C., Jhangiani, R.S., Chiang, I.A., Leighton, D.C., and Cuttler, C. (2017). *Research Methods in Psychology* (3rd ed.). PressBooks. https://opentext.wsu.edu/carriecuttler/. CC BY-NC-SA 4.0.

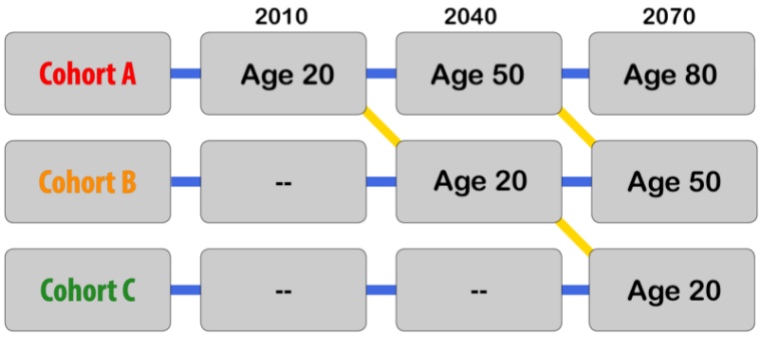
Longitudinal & Experience Sampling Methods
Psychological Methods Lightning Lessons

Longitudinal research tracks changes in variables across time. Participants are recruited, and the same individuals are followed up with over time. Longitudinal research is frequently concerned with developmental processes within a group of participants; how do the participants change across time? Most frequently, researchers collect longitudinal data by asking participants to complete a survey questionnaire and then follow-up with the participants and ask them to complete the survey questionnaire again after a set amount of time. Longitudinal studies can last for days, weeks, or even decades depending on the purpose of the research.

There are several logistical challenges to conducting longitudinal research. First, researchers should be careful to employ the same measurement at each assessment; having different measures does not allow for appropriate comparisons between time points. Second, participants are often lost to follow-up, a problem called attrition. If participants who are lost to follow-up are similar to each other in a particular way (e.g., low socioeconomic status), it's possible that the participants' absence will bias the sample (e.g., the sample will be more representative of participants from high socioeconomic status backgrounds).

Some researchers use cross-sectional cohort studies to examine changes across various stages of human development at a single time point. In a cross-sectional cohort study, researchers might recruit separate groups (cohort) of participants at various ages (e.g., one cohort of twenty-year-olds, one cohort of fifty-year-olds, and one cohort of eighty-year-olds) and survey them at the same time. While this is a time-efficient way of collecting data about changes over time, these designs are vulnerable to cohort effects, which is where one cohort has experienced an event in a way that makes them different from the other cohorts that has nothing to do with the developmental processes under study (e.g., the fifty-year-olds were age 18 when a draft was enacted, making them more likely to have engaged in military service relative to either of the other cohorts).

The gold standard research design is one that combines the cross-sectional cohort and longitudinal designs, referred to as a sequential design. In a sequential design, researchers recruit cohorts of participants at different ages and then continue to track them over time. This design allows for examination of changes in individuals over time, but also allows researchers to account for differences between cohorts.



***When to use:** The research question is focused on developmental processes or change in a variable over time, and researchers have the

Experience sampling methods (ESM) allow for researchers to gain information about participants while in their daily lives. In an ESM study, researchers prompt participants to complete a very short survey on the variables of interest (e.g., current mood state) at specific intervals or random times throughout the day with text messages or app notifications.

These very short daily surveys can occur over a period of days or weeks. Given that ESM studies often result in a lot of data points for each participant and thousands of data points in the study, they are referred to as *intensive longitudinal data*. This data collection strategy allows participants to gather information from participants as they experience it rather than relying on retrospective reporting, increasing the validity of the study.

References:

Lumen Learning (2022). "Developmental Research Designs" In *Lifespan Development*. Lumen Learning https://courses.lumenlearning.com/wm-lifespandevelopment/chapter/developmental-research-designs/.

Qualitative & Mixed-Methods Research
Psychological Methods Lightning Lessons

Qualitative research produces data that is non-numerical, or data that is descriptive of a unique individual. Rather than drawing conclusions about human behavior using quantifiable indicators of variables, the goal of qualitative research is to describe the participants' experience. Qualitative research can be useful in helping to generate new questions that can be studied with quantitative (i.e., representing variables using numbers) methods. Qualitative research may also be useful in providing context to an individuals' experience; for instance, qualitative research can provide a participant the opportunity to share personal details that shape their perspective that might be missed on a survey or experiment.

Types of Qualitative Data:

- Interviews: Researchers conduct interviews by asking participants or groups of participants (i.e., focus group) questions about their experience. Interviews can be structured, in which the researcher asks a particular set of questions and does not deviate, or unstructured, in which the researcher provides the participants with a few prompts but allows the participant to talk about whatever they wish. Researchers can also take a hybrid approach, called a semi-structured interview, in which they have a set of questions they ask participants, but can add additional questions depending on the participants' responses.
- Observations: Researchers observe an object, process, or other phenomenon for the purpose of collecting data about it or drawing conclusions. Observations can be of individuals and/or environments.
- Documents: Researchers analyze records (e.g., medical, educational), media (newspapers), social media, and other forms of print to draw conclusions.
- Audiovisual materials: Researchers may analyze recorded audio or video recordings, photography, or other forms of audiovisual materials to draw conclusions.

Qualitative data is typically analyzed by identifying repeated themes throughout the participants' comments and writing a narrative to interpret those themes.

***When to use:** The goal of the research is to describe participants' experience in their own words.

Mixed-methods research is a hybrid approach that considers qualitative and quantitative research to be complementary processes and includes aspects of both. In a mixed-methods approach, a researcher might use qualitative data collection procedures to identify hypotheses, and then use quantitative data analysis to test those hypotheses. Mixed-methods research can also aid in understanding the results of quantitative studies. A researcher may study the same general question using both quantitative and qualitative methods and then compare the results. If the results are congruent, the researcher is more confident in the conclusions drawn. However, if the results are incongruent between the two methods, looking at the qualitative results may help with interpreting the quantitative results.

***When to use:** The research would benefit from having some aspects of both qualitative and quantitative analysis.

References:
Price, P.C., Jhangiani, R.S., Chiang, I.A., Leighton, D.C., and Cuttler, C. (2017). *Research Methods in Psychology* (3rd ed.). PressBooks. https://opentext.wsu.edu/carriecuttler/. CC BY-NC-SA 4.0.