Lecture Notes

# Chapter 11: Validity of Research Results in Quantitative, Qualitative, and Mixed Research

## Learning Objectives

* 1. Explain the meaning of confounding variables.
  2. Explain the meaning of statistical conclusion validity, construct validity, internal validity, and external validity and their importance in the research process.
  3. Identify and explain the types of evidence that are needed to reach a causal conclusion.
  4. Explain the threats to internal validity and be able to identify when they might exist in a research study.
  5. Explain the threats to external validity and when they might exist in a research study.
  6. Explain the role of operationalization of constructs in research.
  7. Identify and explain the types of validity or trustworthiness used in qualitative research.
  8. Identify and explain the types of validity or legitimation used in mixed research.

## Chapter Summary

## In this chapter, validity issues for quantitative research, qualitative, and mixed research are discussed. Internal, external, construct, statistical conclusion, trustworthiness and legitimation are explained and discussed.

## Annotated Chapter Outline

1. Introduction
   1. Validity is the accuracy of the inferences or interpretations researchers make.
   2. This chapter discusses six different types of validity in the different research methodologies.
2. Validity Issues in the Design of Quantitative Research Key Point
   1. Goal of quantitative research is for the result to be reliable and the inferences made from the results to be valid.
      1. **Research** **Reliability**: the consistency, stability, or repeatability of the results of the study.
         1. Would the results be the same if the study was conducted again or replicated?
      2. **Research Validity:** The correctness or truthfulness of an inference that is made from the results of a study.
         1. Possibility of a variable other than the independent variable impacted the dependent variable or limited the ability to generalize results.
         2. **Extraneous variable:** any variable other than the independent variable that might influence the dependent variable.
         3. **Confounding variable:** an extraneous variable that systematically varies with the independent variable and also influences the dependent variable.
         4. When you design a research study in which you want to make a statement about cause and effect, you must think about what extraneous variables are probably confounding variables and do something about it
         5. Discussion Question: compare and contrast extraneous and confounding variables.
   2. Four major types of validity for quantitative research that are used to evaluate the validity of the inferences that can be made from the results of a study.
      1. The four types of validity are
         1. Internal
         2. External
         3. Construct
         4. Statistical conclusion
      2. These types of validity and threats are discussed in this chapter.
         1. Researchers must consider the possibility of these threats so you can plan your research to control the threat or measure it to see if it impacted results.
      3. Discussion Question: Why should researchers concern themselves with threats to validity in quantitative studies?
3. Internal Validity (i.e., Causal Validity): **Internal validity** is the ability to infer that a causal relationship exists between two variables.
   1. Two Major Types of Causal Relationships
      1. **Causal description:** describing the consequences of manipulating an independent variable
      2. **Causal explanation:** explaining the mechanisms through which and the conditions under which a causal relationship holds.
         1. Once causal description is shown, subsequent research typically is focused on explaining how and why the descriptive relationship exists.
         2. Identifying how and why a causal relationship exists is more difficult than describing the relationship.
      3. Discussion Question: Why is it more difficult to find causal explanations than causal descriptions?
   2. Criteria for Inferring Causation
      1. Three types of evidence are needed to conclude that the independent variable produced changes in the dependent variable (“causation”)
      2. Condition 1: the relationship condition
         1. Need evidence that the independent and dependent variables are associated, correlated, or related.
         2. However, evidence of association or covariation or correlation is not sufficient evidence of causation.
         3. Evidence of association is necessary but not sufficient to infer causation.
      3. Condition 2: temporal antecedence condition
         1. Correct temporal ordering of variables
         2. A cause must precede an effect
         3. **Ambiguous temporal precedence:** the inability to specify which variable is the cause and which is the effect.
      4. Condition 3: lack of alternative explanation condition
         1. The relationship between the variables must not be due to some confounding extraneous or “third” variable.
         2. **Third variable:** a confounding extraneous variable.
      5. Strong experimental designed help all three conditions to be met by manipulating the independent variable and observing its effect on the dependent variable as well as randomly assigning participants to the treatment and control groups so that the groups are equated on all extraneous variables.
      6. In nonexperimental research, it is difficult to establish Condition 2 (problems in showing temporal sequencing) and ruling out confounding variables.
      7. Discussion Question: Describe the conditions that are necessary to infer causation in research.
   3. Threats to Internal Validity in Single-Group Designs
      1. Other possible causes for the effect observed between the independent and dependent variable are *threats to internal validity.*
      2. **Use one-group pretest–posttest design** (administering a posttest to a single group of participants after they have been pretested and given an experimental treatment condition) as an example.
      3. **History:** any event, other than a planned treatment event, that occurs between the pretest and posttest measurements of the depended variable and influences the post measurement of the dependent variable.
         1. Especially problematic when something in addition to the treatment occurs between pretest and posttest and time interval between pretest and posttest is lengthy.
      4. **Maturation:** Any physical or mental change that occurs over time that affects performance on the dependent variable.
      5. **Testing:** Any change in scores obtained on the second administration of a test as a result of having previously taken the test.
         1. When the same test is used for pretest and posttest, control needs to be implemented to rule out the effect of testing as the rival hypothesis.
      6. **Instrumentation:** Any change that occurs in the way the dependent variable is measured.
         1. Measurement instrument is different at pretest and posttest.
         2. When using observers, their skills may change from pretest to posttest. Use of different observers, observer training, and inter-rater reliability checks can help with this threat.
      7. **Regression artifacts:** the tendency of very high pretest scores to become lower and very low pretest scores to become higher at posttesting.
      8. Discussion Question: Discuss the different threats to internal validity in single-group designs.
   4. Threats to Internal Validity in Multigroup Design
      1. The addition of a control group eliminates the threats to internal validity that were identified for single-group designs.
      2. **Multigroup research design**: A research design that includes more than one group of participants.
         1. None of the difference between the two groups can be due to the basic threat as long as the basic threat affects both groups equally.
      3. **Differential Selection**: selecting participants who have different characteristics for the various treatment groups.
         1. See Table 11.1
         2. It is a serious problem when the groups differ on variables other than the independent variable.
         3. Solution: random assignment of participants to groups
         4. Discussion Question: How does random assignment to groups address differential selection?
      4. **Additive and Interactive Effects:** occur when two or more basic threats to internal validity combine to produce a more complex bias.
         1. **Selection history effect:** occurs when an event taking place between the pretest and posttest differentially affects comparison groups and obscures the treatment effect.
         2. **Selection maturation effect:** occurs when comparison groups mature at different rates, obscuring the treatment effect.
         3. **Attrition:** loss of people who do not complete the experiment
         4. **Differential attrition:** a differential loss of participants from the various comparison groups that obscures the treatment effect.
         5. **Selection-testing effect:** occurs when groups react to the pretest differently, obscuring the treatment effect.
         6. **Selection-instrumentation effect:** occurs when groups react differently to changes in instrumentation, obscuring the treatment effect.
         7. **Selection-regression effect:** occurs when groups regress to the mean, obscuring the treatment effect.
         8. Random assignment to groups is used to counteract these additive and interactive effects.
         9. Discussion Question: Compare and contrast the threats to internal validity in multigroup designs and describe how random assignment addresses these threats.
4. **External Validity (i.e., Generalizing Validity):** the extent to which the study results can be generalized to and across populations of persons, settings, times, outcomes, and treatment variations.
   1. **Population Validity**: the ability to generalize the study results to individuals who were not included in the study.
      1. **Target population:** the larger population to whom the study results are to be generalized.
      2. **Generalizing to a population:** applying a finding based on a research study to the target population.
      3. **Generalizing across subpopulations**: applying a finding based on a research study sample to all subgroups in the target population.
      4. Both of these kinds of population validity are important; however, some methodologists (such as Cook and Campbell) are more concerned about generalizing across populations. That is, they want to know how widely a finding applies.
   2. **Ecological Validity:** the ability to generalize the study results across settings.
      1. For example, research finds that a new teaching technique works in urban schools. Researchers might also want to know whether the same technique works in rural schools and suburban schools. That is, the researcher would want to know whether the technique works across different settings.
      2. Reactivity is a threat to ecological validity. **Reactivity** is an alteration in performance that occurs as a result of being aware of participating in a study.
      3. Reactivity is a problem of ecological validity because the results might only generalize to other people who are also being observed.
   3. **Temporal Validity:** the extent to which the study results can be generalized across time.
      1. For example, a researcher finds that a certain discipline technique works well with many different kinds of children and in many different settings. After many years, however, teachers note that it is not working any more. There is a need to conduct additional research to make sure that the technique is robust over time, and if not to figure out why and to find out what works better. Likewise, findings from far in the past often need to be replicated to make sure that they still work.
   4. **Treatment Variation Validity**: the ability to generalize across variations of the treatment.
      1. For example, if the treatment is varied a little, will the results be similar?
      2. One reason this is important is because when an intervention is administered by practitioners in the field, it is unlikely that the intervention will be administered exactly as it was by the original researchers.
      3. This is, by the way, one reason that interventions that have been shown to work end up failing when they are broadly applied in the field.
   5. **Outcome Validity:** the ability to generalize across different but related dependent variables.
      1. For example, if a study shows a positive effect on self-esteem, will it also show a positive effect on the related construct of self-efficacy?
      2. A good way to understand the outcome validity of a research study is to include several outcome measures to get a more complete picture of the overall effect of the treatment or intervention.
   6. Discussion Question: Considering each type of external validity discuss why each type is important in light of our ability to generalize research findings.
5. **Construct Validity**: the extent to which a higher order construct is accurately operationalized and measured in a particular study.
   1. **Operationalizing a construct:** identifying a specific instrument to empirically measure the construct.
      1. Good definition and explanation of the meaning of the construct and effective ways to measure it.
      2. If an existing tool is available and it is reliable and valid, then use that measure, if it likely to work with the participants.
   2. **Treatment Diffusion:** the participants in one treatment condition are exposed to all or some of the other treatment.
      1. Participants in treatment group interact and/or share resources with people in the control group.
   3. Discussion Question: Explain how treatment confusion can occur and how it can influence construct validity.
6. **Statistical Conclusion Validity**: the ability to infer that the independent and dependent variables are related in the larger population of interest and the strength of that relationship.
   1. In future chapters, statistics and statistical reasoning will be explained. What is important to know now is that researchers use statistics to make inferences about populations based on statistical tests based on sample data but the inferences may or may not be valid.
   2. Discussion Question: Describe how statistical conclusion validity could impact a research study.
7. Research Validity (or “Trustworthiness”) in Qualitative Research: qualitative researchers argue that qualitative research varies in quality which is referred to as validity or trustworthiness. Is the research plausible, credible, trustworthy, and therefore defensible.
   1. Table 11.2: Strategies Used to Promote Qualitative Research Validity
      1. Are also effective with quantitative research.
      2. **Triangulation:** a validation approach using multiple investigators, methods, data sources, and/or theoretical perspectives in the search for convergence of results.
      3. **Reflexivity:** self-reflection by the researcher on his or her assumptions, biases, predispositions and actions, and their impact on the research situation and evolving interpretations.
         1. Deals with **researcher bias:** obtaining results consistent with what the researcher wants to find. Also use **negative-case sampling** (attempting to identify cases that are expected to disconfirm the researcher’s expectations and generalizations) to counteract researcher bias.
      4. Discussion Question: Using the strategies in Table 11.2, discuss how qualitative researchers can use them to improve the research validity of their studies.
   2. **Descriptive Validity:** the factual accuracy of an account as reported by the researcher.
      1. Use of multiple investigators/observers to record and describe participants’ behavior and context and then cross-checking of information for corroboration or agreement across observers.
      2. Discussion Question: Describe how descriptive validity is established and how it establishes research validity or trustworthiness.
   3. **Interpretive or Emic Validity**: accurately portraying the study participants’ own perspectives and meanings, providing the insider’s viewpoint.
      1. Goal is to “get into the heads” of participants and accurately document their viewpoints and meanings.
      2. Obtain **participant feedback** or **member checking** (discussion of researcher’s conclusions with study participants
      3. Another useful strategy is to use of **low-inference descriptors** (a description that is phrased very similarly to the participants’ accounts and the researcher’s field notes) in the research report
      4. Discussion Question: Define interpretive validity and describe how it can be established.
   4. **Theoretical Validity:** the degree to which a theoretical explanation fits the data.
      1. There are multiple strategies for that can assist with this type of validity.
         1. Extended fieldwork: collecting data in the field over an extended period of time leads to confidence in the stability of patterns of relationships so that their cause can be understood by the researcher.
         2. The use of **multiple theoretical perspectives** (the use of multiple theories, disciplines, and perspectives to interpret and explain the data) provides the researcher with insights and help develop a more useful explanation.
         3. **Pattern matching** or predicting a pattern of results and determining whether the actual results fit the predicted fingerprint or signature pattern assists the researcher in developing evidence that supports the researcher’s explanation.
         4. **Peer review** (discussing one’s interpretations and conclusions with peers or colleagues) and **critical friend** (a type of peer review in which one trusted friend provides honest and open feedback about your actions throughout the study) assist the researcher in identifying any problems in actions or explanations.
      2. Discussion Question: Describe theoretical validity and how each of the strategies discussed address the study’s theoretical validity.
   5. Internal Validity (or causal validity)
      1. **Researcher-as-detective:** the researcher who is searching for information about cause and effect and examining each possible “clue” and then drawing a conclusion.
      2. It is important for researchers to **rule out alternative explanations** for their data by making sure that other explanations of the researcher’s conclusions are not better than the explanations the researcher is using.
      3. Using **multiple methods** of research and data collection, such as interviews, questionnaires, and observations, in investigating an issue. You do not want to limit yourself to a single data source.
      4. Discussion Question: Discuss how establishing internal validity for quantitative and qualitative research is similar and how it differs.
   6. External Validity
      1. Note that the standard view of science and the causation among variables at a general level of understanding and analysis (**nomothetic causation)** has traditionally not a priority of qualitative researchers. Rather, they were concerned with **idiographic or local causation** (local, singular, particularistic causes, including intentions, specific or local attitudes, conditions, contexts, and events). However, in many research areas today, it is becoming an important goal.
      2. One form of generalizing in qualitative research is called **naturalistic generalization** (generalizing based on similarity).
         1. When you make a naturalistic generalization, you look at your students or clients and generalize to the degree that they are similar to the students or clients in the qualitative research study you are reading. In other words, the reader of the report is making the generalizations rather than the researchers who produced the report.
         2. Qualitative researchers should provide the details necessary so that readers will be in the position to make naturalistic generalizations.
      3. Another way to generalize qualitative research findings is through **replication logic**. This is the idea that the more times a research finding is shown to be true with different sets of people the more confidence we can place in the finding and in generalizing beyond the original participants.
      4. Discussion Question: Discuss how establishing external validity for quantitative and qualitative research is similar and how it differs.
8. Research Validity (or “Legitimation”) in Mixed Research: all of the types of validity discussed for quantitative and qualitative research are relevant for mixed research. This is the idea of what is called multiple validities. Note that this is a pretty tall task to achieve, but it is an important goal of good mixed research.
   1. **Meta-inference**: an inference or conclusion that build on or integrates quantitative and qualitative findings
   2. There are 11 types of validity in mixed research.
      1. **Inside–outside legitimation:** the extent to which the researcher accurately understands, uses, and presents the participants’ subjective insider or “native” views (also called the “emic” viewpoint) and the researcher’s “objective outsider” view (also called the “etic” viewpoint).
      2. **Paradigmatic/philosophical legitimation:** the degree to which the mixed researcher clearly explains his or her philosophical beliefs about research.
      3. **Commensurability approximation legitimation:** the degree to which a mixed researcher can make Gestalt switches between the lenses of a qualitative researcher and a quantitative researcher and integrate these two views into an integrated or broader viewpoint.
      4. **Weakness minimization legitimation:** the degree to which a mixed researcher combines qualitative and quantitative approaches to have nonoverlapping weaknesses.
      5. **Sequential legitimation:** the degree to which a mixed researcher appropriately addresses and/or builds on effects or findings from earlier qualitative and quantitative phases.
      6. **Conversion legitimation:** the degree to which quantitizing or qualitizing yields high-quality meta-inferences.
      7. **Sample integration legitimation:** the degree to which a mixed researcher makes appropriate conclusions, generalizations, and meta-inferences from mixed samples.
      8. **Pragmatic legitimation:** the extent to which the research purpose was met, research problem “solved,” research questions sufficiently answered, and actionable results provided.
      9. **Integration legitimation:** the degree to which the researcher achieved integration of quantitative and qualitative data, analysis, and conclusions.
      10. **Sociopolitical legitimation:** the degree to which a mixed researcher addresses the interests, values, and viewpoints of multiple stakeholders in the research process.
      11. **Multiple validities legitimation:** the extent to which all of the pertinent validities (quantitative, qualitative, and mixed) are addressed and resolved successfully.
   3. Discussion Question: Compare and contrast the many types of validity in mixed research. In addition, contrast them with similar validities in quantitative and qualitative research.