

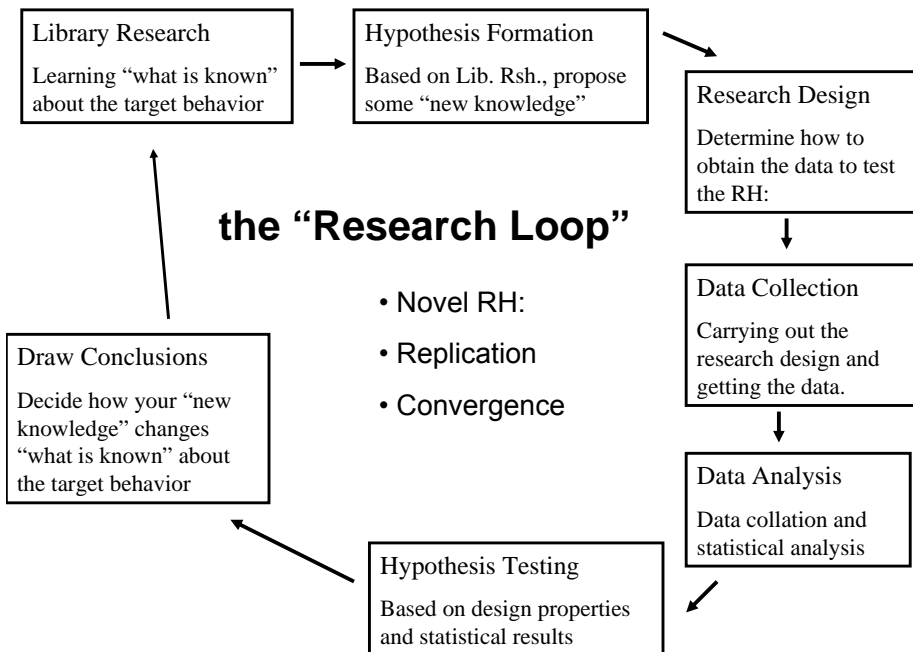
Research Process

- Choices & Combinations of research attributes
- Research Loop and its Applications
- Research Process and what portions of the process give us what aspects of validity
- Data Integrity
 - Experimenter expectancy effects
 - Participant Expectancy Effects
 - Single- and Double-blind designs
 - Effects of attrition on initial equivalence
- Study attributes that do and do not influence the causal interpretability of the results.

Now might be a good time to review the decisions made when conducting any research project.

- Research hypothesis (associative or causal)
- Research design (true vs. nonexp & BG vs. WG)
- Sampling procedure (complete vs. purposive, researcher vs. self selected & simple vs. stratified)
- Setting (laboratory vs. structured vs. field)
- Task (while there are thousands of possible tasks, they generally divide into “natural, familiar tasks” and “contrived, novel & artificial tasks”)
- Data collection (observational vs. self-report)

Considering these choices, any one study could be run 1536 different ways !!! ($2 \times 4 \times 8 \times 3 \times 2 \times 2 = 1536$)



Applying the Research Loop

The “research loop” is applied over and over, in three ways...

- Initial test of a RH:
 - The first test of a research hypothesis -- using the “best” design you can
- Replication Study
 - being sure your conclusions about a particular RH: are correct by repeating exactly the same research design
 - the main purpose of replication is to acquire confidence in our methods, data and resulting conclusions
- Convergence (Converging Operations) Study
 - testing “variations” of the RH: using “variations” of the research design (varying population, setting, task, measures and sometimes the data analyses)
 - the main purpose of convergence is to test the limits of the “generalizability” of our results
 - what design/analysis changes lead to different results?



Types of Validity

Measurement Validity

- do our variables/data accurately represent the characteristics & behaviors we intend to study ?

External Validity

- to what extent can our results can be accurately generalized to other participants, situations, activities, and times ?

Internal Validity

- is it correct to give a causal interpretation to the relationship we found between the variables/behaviors ?

Statistical Conclusion Validity

- have we reached the correct conclusion about whether or not there is a relationship between the variables/behaviors we are studying ?

Research process ...

Statement of RH: →

- tells associative vs. causal intent
- tells variables involved
- tells target population

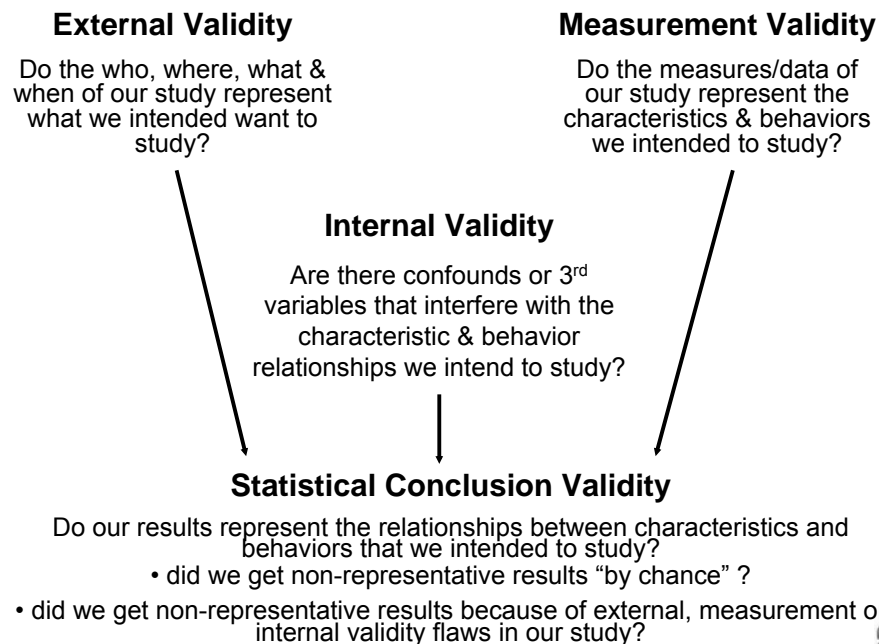
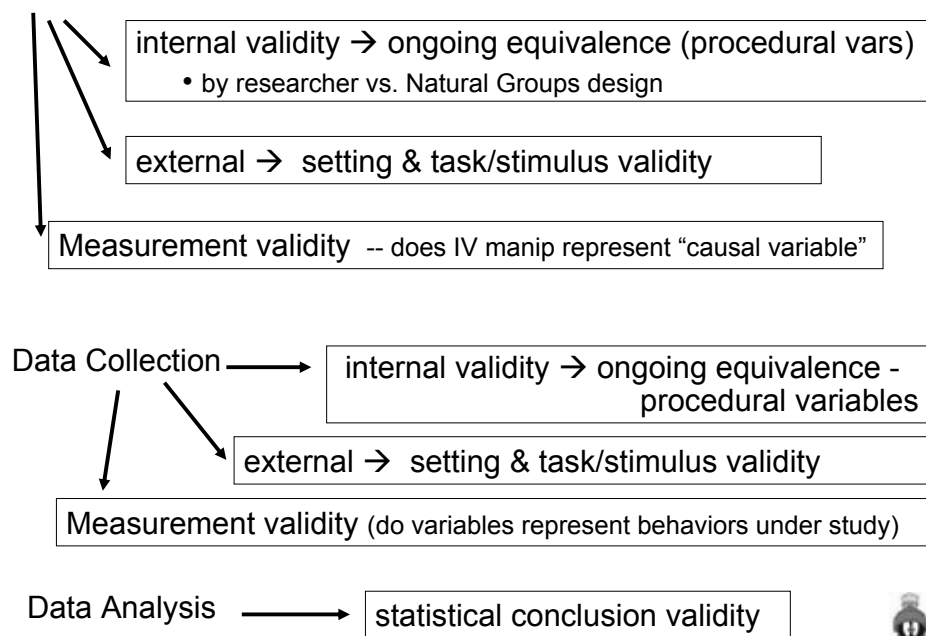
Participant Selection (Sampling) →

- external → population validity
 - Complete vs. Purposive
 - Researcher- vs. Self-selection
 - Simple vs. Stratified

*Participant Assignment (necessary only for Causal RH:) →

- internal validity → initial equivalence (subj vars)
 - random assignment of individuals by the researcher ☺
 - random assignment of groups ☺
 - random assignment – arbitrary conditions by researcher ☹
 - random assignment – arbitrary conditions by “administrator” ☹
 - self assignment ☹
 - non-assignment (e.g., natural or pre-existing groups) ☹

*Manipulation of IV (necessary only for Causal RH:)



Experimenter Expectancy Effects

A kind of “self-fulfilling prophecy” during which researchers unintentionally “produce the results they want”. Two kinds...

Modifying Participants' Behavior

- Subtle differences in treatment of participants in different conditions can change their behavior...
- Inadvertently conveying response expectancies/research hypotheses
- Difference in performance due to differential quality of instruction or friendliness of the interaction

Data Collection Bias (much like observer bias)

- Many types of observational and self-report data need to be “coded” or “interpreted” before they can be analyzed
- Subjectivity and error can creep into these interpretations – usually leading to data that are biased toward expectations

Data Collection Bias: Observer Bias & Interviewer Bias

Both of these are versions of “seeing what you want to see”

Observer Bias is the term commonly used when talking about observational data collection

- Both observational data collection and data coding need to be done objectively and accurately
- Automation & instrumentation help – so does using multiple observers/coders and looking for consistency

Interviewer Bias is the term commonly used when talking about self-report data collection

- How questions are asked by interviewers or the interviewers’ reactions to answers can drive response bias
- More of a challenge with face-to-face interviews
- Computerized and paper-based procedures help limit this

Participant Expectancy Effects

A kind of “demand characteristic” during which participants modify their behavior to respond/conform to “how they should act”.

Social Desirability

- When participants intentionally or unintentionally modify their behavior to match “how they are expected to behave”
- Well-known social psychological phenomenon that usually happens between individual’s and their “peer group”
- Can also happen between researcher and participants

Acquiescence/Rejection Response

- If participant thinks they know the research hypothesis or know the behavior that is expected of them they can “try to play along” (acquiescence) or “try to mess things up” (rejection response)
- Particularly important during within-groups designs – if participants think study is “trying to change their behavior”



Participant Expectancy Effects: Reactivity & Response Bias

Both of these refer to getting “less than accurate” data from the participants

Reactivity is the term commonly used when talking about observational data collection

- the participant may behave “not naturally” if they know they are being observed or are part of a study
- Naturalistic & disguised participant observation methods are intended to avoid this
- Habituation and desensitization help when using undisguised participant observation

Response Bias is the term commonly used when talking about self-report data collection and describes a situation in which the participant responds how they think they “should”

- The response might be a reaction to cues the researcher provides
- Social Desirability is when participants describe their character, opinions or behavior as they think they “should” or to present a certain impression of themselves
- Protecting participants’ anonymity and participant-researcher rapport are intended to increase the honesty of participant responses

Data collection biases & inaccuracies -- summary

		Type of Data Collection	
		Observational	Self-report
Researcher Expectancy		Observer Bias “inaccurate data recording/coding”	Interviewer Bias “coaching” or “inaccurate recording/coding”
		Reactivity “reacting” to being observed	Response Bias “dishonest” responding

Single & Double-blind Procedures

One way to limit or minimize the various biasing effects we’ve discussed is to limit the information everybody involved has

In **Single Blind Procedures** the participant doesn’t know the hypotheses, the other conditions in the study, and ideally, the particular condition they are in (i.e., we don’t tell how the task or manipulation is designed to change their behavior)

In **Double-blind Procedures** neither the participant nor the data collector/data coder knows the hypotheses or other information that could bias the interaction/reporting/coding of the researcher or the responses of the participants

Sometimes this simply can’t be done (especially the researcher-blind part) because of the nature of the variables or the hypotheses involved (e.g., hard to hide the gender of a participant from the researcher who is coding the video tape)

Attrition – also known as drop-out, data loss, response refusal, & experimental mortality

Attrition endangers initial equivalence of subject variables

- random assignment is intended to produce initial equivalence of subject variables – so that the groups (IV conditions) have equivalent means on all subject variables (e.g., age, gender, motivation, prior experience, intelligence, topical knowledge, etc.)
- attrition can disrupt the initial equivalence – producing inequalities
- “differential attrition” – related to IV condition differences – is particularly likely to produce inequalities
 - e.g., If one condition is “harder” and so more participants drop out of that condition, there is likely to be a “motivation” difference between the participants remaining in the two conditions (i.e., those remaining in the harder condition are more motivated).

So, “attrition” works much like “self assignment” to trash initial equivalence

Both involve a non-random determination of who provides data for what condition of the study!

Imagine a study that involves a “standard treatment” and an “experimental treatment”...

- random assignment would be used to ensure that the participants in the two groups are equivalent
- self-assignment is likely to produce non-equivalence (different “kinds” of folks likely to elect the different treatments)
- attrition (i.e., rejecting the randomly assigned condition) is similarly likely to produce non-equivalence (different “kinds” of folks likely to remain in the different treatments)

Study attributes that do and don’t directly influence the causal interpretability of the results & a couple that make it harder

Attributes that DON’T directly influence causal interpretability...

- Participant Selection (population part of external validity)
- Setting (setting part of external validity)
- Data collection (measurement validity)
- Statistical model (statistical conclusion validity)

Attributes that DO directly influence causal interpretability...

- Participant Assignment (initial eq. part of internal validity)
- Manipulation of the IV (ongoing eq. part of internal validity)

Attributes that make it harder to causally interpret the results ...

- Field experiments (harder to maintain ongoing equivalence)
- Longer studies (harder to maintain ongoing equivalence)



Something else to remember...

There are certain combinations of data collection, design, setting and/or statistics that co-occur often enough that they have been given names.

- But, the names don’t always accurately convey the causal interpretability of the resulting data.
- Remember, the causal interpretability of the results is determined by the design & the presence/absence of confounds
- You have to check the type of design that was used (experimental or non-experimental) and whether or not you can identify any confounds !!!

Some of those combinations ...

Research “Types” named for the data collection used

- “Survey research”
- “Observational research” **Usually implies a non-experiment conducted in the field**
- “Trace research”

Remember: Any data collection method can be used to obtain causally interpretable data it is part of a properly conducted true experiment.

Research “Types” named for the research setting used

- “Field research” **usually implies a non-experiment**
- “Laboratory research” **usually implies an experiment**
- “Trace research”













Remember: Any research setting can be used to obtain causally interpretable data it is part of a properly conducted true experiment.

Research “Type” seemingly named for the statistical analysis used

- “Correlational research” **usually implied a non-experiment**

Remember: Any data collection method can be used to obtain causally interpretable data it is part of a properly conducted true experiment.

So there’s lot of possible combinations of data collection, setting and design (even if we simplify things as below)...

Data collection	Experimental Design w/o confounds Setting		Non-experimental Design & Exp Design w/ confounds Setting	
	Laboratory	Field	Laboratory	Field
Observation				
Self-report				
Trace				

All three attributes are important when describing the study!

But only the design type and confound control actually determine the causal interpretability of the results!!!!

