When Real Life Happens: A Practical Approach to Interpreting & Conducting Rigorous Research

Session #: 1059
Day/Time: Thursday, November 17, 2016 at 1:30pm
Location: CC/201B
Authors: Lisa Fitton, Autumn McIlraith, Carla Wood, Emily Diehm, Jennifer Brown, & Suzanne Adlof

Additional Recommended Resources

TEXTBOOKS

- Kazdin, A. E. (2011). *Single-case research designs: Methods for clinical and applied settings* (2nd ed.). New York, NY: Oxford University Press.
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin
- Kline, R. B. (2015). *Principles and practice of structural equation modeling* (4th ed.) New York, NY: Guilford Press.
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Thompson, B. (2004). *Exploratory and confirmatory factor analysis: Understanding concepts and applications*. Washington, DC: American Psychological Association.

ONLINE RESOURCES

- Logan, J. (2016). I am statistics, and so can you [Web blog]. Retrieved from http://statsineducation.tumblr.com/
- What Works Clearinghouse (2014). *Procedures and standards handbook version 3.0*. Retrieved from ies.ed.gov/ncee/wwc/Docs/referenceresources/wwc_procedures _v3_0_standards_handbook.pdf
- Magnusson, K. Interpreting correlations: An interactive visualization. [Web page]. Retrieved from http://rpsychologist.com/d3/correlation/
- Garbin, C. Cal's resource archive. [Web page]. Retrieved from http://psych.unl.edu/psycrs/Resource.html

PAPERS (more technical)

- Wood, C., McIlraith, A., & Fitton, L. (2016). State of practice for language and literacy research: A review of methods in ten relevant journals. *Contemporary Issues in Communication Science and Disorders, 43*, 195-207. doi: 1092-5171/16/4302-0195
- Ioannidis, J. (2005). Why most published research findings are false. *PLoS Medicine, 2*(8), 0696-0701. doi: 10.1371/journal.pmed.0020124
- O'Dwyer, L. M., & Parker, C. E. (2014). A primer for analyzing nested data: Multilevel modeling in SPSS using an example from a REL study (REL 2015-046). Washington, DC: U.S. Dept of Education, Inst of Edu Sci, National Center for Edu Eval and Regional Assist, Regional Edu Lab Northeast & Islands. Retrieved from http://ies.ed.gov/ncee/edlabs
- Petscher, Y. (2016). Do our means of inquiry match our intentions? *Frontiers in Psychology*, 7:1048. doi:10.3389/fpsyg.2016.01048
- Sharpe, D. (2013). Why the resistance to statistical innovations? Bridging the communication gap. *Psychological Methods, 18*(4), 572-582. doi: 10.1037/a0034177

Cheat Sheet: Evaluating Research Designs and Statistical Analyses

	When it's helpful	*When it's not as helpful*	*Things to watch out for*
Randomized Controlled Trial	• To test an intervention that's shown promise in smaller studies • To generalize your results to a large, diverse population • As the "gold standard" for causal claims about an intervention's effectiveness	• When resources are limited (time, money, personnel, participants) • When intervention cannot be ethically withheld from any participants • To isolate individual responses to intervention • To study the influence of factors you cannot change	• Was true random assignment used? • Are there issues with the control group not remaining a true control? • Were there enough participants for randomization to be effective?
Single-Case Design	• To test new intervention ideas • With low-incidence populations • When resources are limited	• To generalize your results to a large, diverse population • To evaluate more established interventions	• Is there a reasonable baseline period? (e.g., ~ 5 time points) • Did the baseline period convince you the participant(s) exhibited stable performance prior to intervention? • Is there replication of the observed effect? (3 or more instances)
Quasi-Experimental Design	• To study the influence of factors you cannot change (e.g., gender, SES, (dis)ability status • When it would be unethical to withhold treatment from a control group	• To make strong causal claims • To generalize your results to a large, diverse population	• How strong is the counterfactual (if there is one)? • Are there any signs of experimenter bias? • Was a pretest used to examine pre-existing differences between groups? • Over-reaching on the conclusions?

	When it's helpful	*When it's not as helpful*	*Things to watch out for*
Structural Equation Modeling	• To study many interrelated factors at the same time • To determine the "most important" predictors • To get a better view of the big picture	• With smaller sample sizes • When few variables are available	• Be wary of claims about directionality of relationships: not a sure thing • How is the model fit? • Are there individual sampling issues? • Is there possible masking of real effects?
Hierarchical Linear Modeling	• When data have a nested structure (e.g., students nested within schools; or many time points nested within person) • With larger sample sizes	• With smaller sample sizes • With fewer than 10 higher-level units (e.g., schools)	• Does the unit of assignment match the unit of analysis? • Are the assumptions met? • Has missing data been handled properly, and reported?