



**Applied Research Methods 05-816
Fall 2015**

Human-Computer Interaction Institute, Carnegie Mellon University

Sara Kiesler <kiesler@cs.cmu.edu>

Office - NSH 3513

Cell phone – 412 414 3336

Class meetings:

Monday, 3 p.m. – 6 p.m.

SCRG 104, 407 S. Craig St.

Office hours: Generally, Tuesdays by email appointment

Support: Ja’Ron Pitts <jpitts@andrew.cmu.edu>, 412-268-8416

This course is for Ph.D. level graduate students who are conducting empirical research. The course is especially but not exclusively designed for those interested in any aspect of technology in groups and organizations (social aspects, design, impact, etc.). In the past, student projects included such topics as how people use social media, how organizations use interactive robots and agents, and designing sensors for coaching physical therapy routines. The course will be run as a lab and seminar involving discussion and hands-on practice of research skills including ethnographic fieldwork, qualitative analysis, research design, experimentation, content coding and analysis, and statistical analysis. Students will design a research project in the course, typically but not necessarily with their advisor.

This course does not cover professional methods such as contextual design or usability testing that are already covered in other courses offered by the HCII. This course also will not offer advanced statistical and computational analyses. The statistical topics covered are practical for applying in research papers: understanding data types, organizing data for statistical analysis, assessing data properties and correcting for anomalies, selecting appropriate analytical techniques, applying techniques most often used in empirical work such as ANOVA and regression, using the JMP statistical package, and learning how to describe statistical tests for publication.

Each week, we discuss one important method. You’ll do reading to prepare for the class session. In the class itself, there will be reviews of readings, lectures, guest speakers, demonstrations, and

discussions and critiqued presentations by students. Please bring a laptop to every class except where noted.

This is a twelve-hour credit course (12 hours of work are expected outside of class).

Class attendance

I take this class seriously and I expect you to do the same. If you want credit for the class, you must prepare for class and attend. We will try to reschedule meetings that conflict with major conferences and holidays. If you have a conference or other obligation that conflicts with a scheduled class meeting, please let me know at the beginning of the semester.

Split attention via texting, emailing, tweeting, etc. is not allowed during class. Also, please do not take notes by typing into your computer. This method tends to bypass the brain and there is good evidence that taking notes with a pencil is superior to taking notes on a laptop. (Paper by Mueller and Oppenheimer available on Blackboard.)

Assignments

The work in this class consists of individual work: (a) readings before class (b) homework “modules,” and (c) a semester project. We will discuss the readings each week, and you will be graded on your contribution to this discussion. Minimal credit will be given for showing up for class; more credit will be given for active class participation (see **Grading**).

Please hand in homework assignments on time and in hard copy at the beginning of class when the assignments are due, with your name at the top. Please use the homework template so that the questions are retained. Type your answers in the spaces provided for answers and double space your text so I can insert comments. Tables and figures should be single-spaced. Format using APA guidelines when possible.

It is admirable to communicate with others, but when you get information from others (web, people, publications), you must cite your sources in a reference list. Research ethics require attribution.

Semester project

You will choose your project; I will not assign a project. Please consult with me so I know what to expect and can cover relevant methods in the course. The project can be part of your research with your advisor, or research you are doing for another class. I will set some milestones to be sure that you aren't caught at the end of the semester with an incomplete project. A “complete” project by my definition consists of a proposal and research design, work materials (such as questionnaires, coding forms, etc.), pretest or pilot data analyses, and a draft write-up and presentation of preliminary results from pretests or pilot data. Ideally, this project will be the basis for a conference paper or journal publication. In the past, some papers in the course were accepted for conferences and led to journal publication and thesis work.

Grading

Activity	Percent
Modules	50%
Class participation including reports and critiques	25%
Semester Project	25%

Required resources – texts, Blackboard, software

Textbooks (Ok to rent or purchase used. See this site for comparison pricing.

<http://www.addall.com/>)

1. Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches*, Sage. (Older version is ok.)
2. Martin, D. W. (2004). *Doing psychology experiments. 7th Ed.* Pacific Grove, CA: Brooks/Cole. (If you get a used version, please be sure to get the 7th edition.)
3. Dillman, D. A., Smyth, J. D., Christian, L. M. (2014). *Internet, mail, and mixed-mode surveys: The tailored design method, fourth edition.* NY: Wiley. (Older versions are obsolete.)
4. Strunk, Jr. W. & White, E. B. (1999 or 2015, by Strunk) *The elements of style. 4th Ed* NY: Allyn & Bacon.

Blackboard. All course materials including homework and readings (except books) are there.

Statistical Software

Purchase a six or 12 month license of JMP at

<http://www.onthehub.com/jmp/>

Your advisor can contact the departmental representative (e.g., Robert Kraut in the HCII) about your using one of the school licenses.

Class Schedule – Class begins at 3pm (set up room); ends at 6pm.

<i>Class Date</i>	<i>Assignments Due For Class</i>	<i>Class Discussion and Exercises</i>
Mon 8/31	<p>Obtain texts for the course.</p> <p>Download and install JMP. Try a tutorial to be sure it works.</p> <p>Get IRB training and certification. (This will take awhile.) www.cmu.edu/research-compliance/human-subject-research/training.html.</p> <p>Register on Blackboard, Applied Research Methods course. Most readings will be available on Blackboard.</p>	<p>Types of empirical research How to choose a method, goals and timetables, research design, levels of analysis.</p> <p>Introduction to qualitative fieldwork <i>Topics</i> Fly on the wall techniques Participant observation techniques Online techniques</p> <p><i>Statistics</i> Introduction to JMP When “statistics” in qualitative work?</p> <p><i>Handouts</i> Syllabus, term paper assignment Interview module homework (due 9/21)</p>
	Labor Day break	
Mon 9/14	<p>Read for class: Edmonson, A. C. & McManus, S. E. (2007) Methodological fit in management field research. <i>Academy of Management Review</i>, 32, 1155 – 1179.</p> <p>Schwarz, N. (1999). Self-reports: How the questions shape the answers. <i>American Psychologist</i>, 54, 94-105</p>	<p>Asking questions: qualitative interviews <i>Topics</i> Types of interviews, designing interviews</p> <p>Recording and working with interview data</p> <p><i>Handouts</i> Interview techniques</p> <p><i>Statistics</i> Categorical analyses used in mixed methods research, e.g., chi square</p>
Mon 9/21	<p>Turn in interview homework.</p> <p>Read Creswell, J. W. (2013). <i>Qualitative inquiry and research design: Choosing among five approaches</i>. Sage. Be prepared to discuss how grounded theory differs from other</p>	<p>Grounded theory <i>Topics</i> How to do it Comparison of grounded theory method with other qualitative methods.</p>

	qualitative methods.	<p><i>Handout</i> Grounded theory module homework due in two weeks (10/5).</p> <p><i>Statistics</i> Correlation</p>
Mon 9/28	<p>Read <i>one</i> of the following qualitative papers and post your review on Blackboard. (Read more if you want, of course, but choose just one to review.)</p> <p>Van Maanan, J. The smile factory. In P. Frost, et al (eds.) (1991). <i>Reframing Organizational Culture</i>. Newbury Park, CA: Sage Publications. 58-76. (Download from Blackboard)</p> <p>Gabbay, J. & le May, A. (2004). Evidence-based guidelines or collectively constructed “mindlines?” Ethnographic study of knowledge management in primary care. <i>BMJ</i>, 329, 1013. (Download from Blackboard)</p> <p>Mutlu, B. and Forlizzi, J. (2008). Robots in organizations: The role of workflow, social, and environmental factors in human-robot interaction. <i>Proceedings of HRI08</i>, NY: ACM Press, 239-248. (Download from Blackboard)</p> <p>Or your choice of any other peer reviewed “ethnographic study” or “grounded theory study” you find on Google Scholar with at least 150 citations.</p> <p>Or read a popular ethnography book: www.goodreads.com/shelf/show/ethnography</p>	<p>Coding qualitative data</p> <p><i>Topics</i> Grounded theory coding from interview transcripts</p> <p>Iterative vs. theory-oriented method</p> <p>Using coding software</p> <ul style="list-style-type: none"> • to keep track of data sources, • to identify themes, • to connect different data sources such as photos and transcripts, • to connect qualitative and quantitative data • to visualize patterns in your data <p><i>Statistics</i> Inter-rater reliability for categories of behavior (Kappa).</p>
Mon 10/5	<p>Turn in grounded theory homework.</p> <p>Turn in one paragraph (or more) description of your research proposal/term paper.</p>	<p>Analysis of qualitative data</p> <p><i>Topics</i> Author roles in analysis</p> <p>Using affinity diagrams, matrices, and models</p>

		<p><i>Statistics</i> Examine distributions, identify “outliers” and interesting cases, missing data</p> <p>Partitioning: explore themes and hypotheses</p> <p>Can you generalize? (Using participant data to understand generalizability of your “sample.”)</p>
10/12	<p>Read for class: Dillman, D. et al. text. Chapters 4 - 7</p> <p>Tourangeau, R. (2000). Remembering what happened: Memory errors and survey reports. In A. A. Stone, J. S. Turkkan, C. A. Bachrach, J. B. Jobe, H. S. Kurtzman & V. S. Cain (Eds.), <i>The science of self-report: Implications for research and practice</i> (pp. 29-48). Mahweh, New Jersey: Lawrence Erlbaum Associates.</p> <p>Tourangeau, R., & Yan, T. (2007). Sensitive questions in surveys. <i>Psychological Bulletin</i>, 133, 859-883.</p>	<p>Questionnaires (self report data)</p> <p><i>Topics</i></p> <p>Role of questionnaires in research. How to ask questions people can answer. Subjective vs. factual questions. Item wording and item order.</p> <p>What is a “scale?” (Two meanings)</p> <p><i>Statistics</i> Factor analysis Creating scales</p> <p><i>Handouts</i> Big five and other scales</p> <p>Questionnaire module homework due next week, 10/19</p>
Mon 10/19	<p>Turn in questionnaire homework</p> <p>Read for class: Martin, DW. <i>Doing Psychology Experiments</i> (7th Ed). Pacific Grove, CA: Brooks Cole. Chapters 1- 7.</p> <p>Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. <i>Journal of Personality and Social Psychology</i>, 58, 1015-1026.</p>	<p>Designing experiments - I</p> <p>Why experiments are important and how to plan them. Causality vs. correlation, experimental design, manipulation of independent and dependent variables, control groups, testing hypotheses, alternative explanations, participant ethical issues.</p> <p><i>Statistics</i> t tests ANOVA. Between groups designs.</p> <p><i>Handout</i></p>

	<p>Hinds, P. J. (1999). The curse of expertise: The effects of expertise and debiasing methods on prediction of novice performance. <i>Journal of Experimental Psychology: Applied</i>, 5, 205-221.</p>	<p>Experiments module homework (due 11/2)</p>
<p>Mon 10/26</p>	<p>Read for today Martin: Chapters 8-12</p> <p>Crano, W. D., & Brewer, M. B. (2002). Social cognition methods: Measuring implicit thought and feelings. In <i>Principles and methods of social research</i> (2nd. ed., pp. 293-306 only). Mahwah, NJ: Lawrence Erlbaum Associates.</p> <p>Lisa Barrett op ed “What emotions are and aren’t.” <i>NY Times</i></p> <p>Kruger, J., Epley, N. , Parker, J. & Ng, Z-N. (2005). Egocentrism over email: Can we communicate as well as we think? <i>Journal of Personality and Social Psychology</i>, 89, 925-936.</p> <p>McCall, M., & Belmont, H. J. (1996). Credit card insignia and restaurant tipping: Evidence for an associative link. <i>Journal of Applied Psychology</i>, 81, 609-613.</p> <p>Explore online experiments & surveys at psych.hanover.edu/research/exponnet.html</p> <p>psychcentral.com/blog/archives/2008/08/18/to-p-ten-online-psychology-experiments/</p>	<p>Designing experiments – II</p> <p>Experiments on implicit thought and emotional responses.</p> <p>Behavioral (“objective”) observations, unobtrusive measures, archival data, automated measures of behavior including head and eye trackers, event-related brain potential, MRI, and other physiological recordings.</p> <p>Within subject designs</p>
<p>11/02 (3pm EST!)</p>	<p>Turn in Experiments homework</p> <p>Read for today Weingart, L. R. (1997). How did they do that? The ways and means of studying group process. <i>Research in Organizational Behavior</i>, 19, 189-239. Pp. 212-228.</p>	<p>Studying groups</p> <p>Levels and logic of analysis, group and organizational processes and tasks</p> <p>Practice in-class experiment</p>

	<p>Tajfel, H., Billig, M. G., Bundy, R. P., & Flament, C. (1971). Social categorization and intergroup behavior. <i>European Journal of Social Psychology, 1</i>, 149-178. (The “classic” study of group identity.)</p> <p>One of the following studies of social identity: Kim, H. and Markus, H. R. (1999). Deviance or uniqueness, harmony or conformity? A cultural analysis. <i>Journal of Personality and Social Psychology, 77</i>, 785-800.</p> <p>Frank, M. G., & Gilovich, T. (1988). The dark side of self- and social perception: Black uniforms and aggression in professional sports. <i>Journal of Personality and Social Psychology, 54</i>, 74-85.</p>	<p><i>Statistics</i> Nested and mixed designs Deciding which model to use</p> <p>Field experiments (e.g., how to add and study an extra control group)</p> <p><i>Handouts</i> Table from McGrath on tasks (1984). Hackman on organizational research.</p>
Mon 11/09	<p>Read for today Dillman, Chapters 2, 3; 8, 9, 11</p> <p>Either of these papers: Lerner, J. S., Gonzalez, R. M., Small, D. A., & Fischhoff, B. (2003). Effects of fear and anger on perceived risks of terrorism: A national field experiment. <i>Psychological Science, 14</i>, 144-150.</p> <p>Walsh, J. P. & Lee, Y-N. (2015) The bureaucratization of science. <i>Research Policy, 44</i>, 1584-1600.</p>	<p>Surveys <i>Topics</i> Use of surveys, general survey design, sampling, response bias and other sources of bias, online vs. offline surveys.</p> <p><i>Statistics</i> Introduction to regression. Control variables, main effects and interactions in regression.</p> <p>Longitudinal analysis and controlling for change over time.</p> <p><i>Handouts</i> Catching bad actors in surveys</p>
Mon 11-16	<p>Read for today Dillman, Chapter 12</p> <p>Mosely, J. B., O’Malley, K., Petersen, N. J., Menke, T. J., Brody, B. A., Kuykendall, D. H., Hollingsworth, J. C., Ashton, C. M., & Wray, N. P. (2002). A controlled trial of arthroscopic surgery for osteoarthritis of the knee. <i>The New England Journal of Medicine, 347</i>, 81-88.</p>	<p>Evaluation research <i>Topics</i> Random controlled trials vs. other designs A/B testing Surveys and questionnaires – self report</p> <p>Types of evaluation – formative vs. summative Politics and evaluation (Head Start and Sesame St evaluations)</p>

<p>Mon 11/23</p>	<p>Read for today</p> <p>Scott, J. (1998). <i>Social network analysis: A handbook</i>. Thousand Oaks, CA: Sage. Chapters 1 & 3.</p> <p>Garton, L., Haythonthwaite, C., & Wellman, B. (1997). Studying online social networks. <i>JCMC</i>, 3. http://www.ascusc.org/jcmc/vol3/issue1/garton.htm</p> <p>Krackhardt, D., & Hanson, J. (1993). Informal networks: The company behind the chart. <i>Harvard Business Review</i>, 71, 104-113.</p>	<p>Social networks</p> <p><i>Topics</i> Understanding strong/weak ties, social network theory, communication research, visualization and analysis techniques.</p> <p><i>Guest speaker</i> Jonathon Cummings, Duke University</p> <p><i>Handouts</i> Types of networks Online resources for social network analysis.</p> <p>Social networks module homework due 12/7 (two weeks).</p>
<p>Mon 11/30</p>	<p>Read for today,</p> <p>Mueller, P. A. & Oppenheimer, D. M. (2014). The pen is mightier than the keyboard: Advantages of longhand over laptop note taking. <i>Psychological Science</i>, 25, 1159-1168.</p> <p>Online explanations of mediator and moderator factors found in Wikipedia or www.uni.edu/butlera/courses/org/modmed/moderator_mediator.htm</p>	<p>JMP tutorial</p> <p><i>Topics</i> A review of the entire process of analyzing data from a study: Defining variable types (nominal vs. continuous). Examining distributions, normality. Cleaning data, correcting for skew. Making scales. Correlations and cross-tabs. Comparing proportions and counts. Within subject designs (repeated measures) Mixed designs Mediation and moderation analysis</p> <p><i>Handouts</i> What methods for which research question? What analysis for which method?</p>
<p>Mon 12/7</p>	<p>Turn in social network homework</p> <p>Read for today: Martin, Chapter 13.</p> <p>Golden-Biddle, K., & Locke, K. (1993). <i>Appealing work: An investigation of how</i></p>	<p>Writing & presenting research</p> <p><i>Topics</i> Qualitative paper challenges APA guidelines for quantitative work</p> <p>Interpreting results, writing up results, discipline differences, standards for</p>

	ethnographic texts convince. <i>Organization Science</i> , 4, 595-616. Bem, D. (1987). Writing the empirical article (pp. 171-201). In M.P. Zanna & J.M. Darley, <i>The compleat academic: A practical guide for the beginning social scientist</i> . NY: Random House.	conferences vs. journals, reviewing, responding to reviews. <i>Statistics</i> Choosing the right statistics to use and to report. Graphs vs. tables. Discipline differences. <i>Handouts</i> Checklist for submission How to write an abstract
12-9	Semester project paper due, hard copy.	

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Links (more on Blackboard)

Howard Seltman's stats book from his webpage
He teaches statistics for the behavior/social sciences, and the course is wonderful.
<http://www.stat.cmu.edu/~hseltman/309/Book/Book.pdf>

International Personality Item Pool: A Scientific Collaboratory* for the Development of
Advanced Measures of Personality and Other Individual Differences
<http://ipip.ori.org/ipip/>

Workplace surveys from NIOSH
"Measurement Tools for Research and Practice"
<http://www.cdc.gov/niosh/topics/workorg/results.html?area=any&type=any&match=any>

Top Ten Online Psychology Experiments
<http://psychcentral.com/blog/archives/2008/08/18/top-ten-online-psychology-experiments/>

Psychological Research on the Net
<http://psych.hanover.edu/research/exponnet.html>

Logistic regression (when you have a discrete dependent variable)
<http://faculty.chass.ncsu.edu/garson/PA765/logistic.htm>

<http://quantpsy.org/sobel/sobel.htm>

Interactive Mediation Tests

Survey Monkey
<http://www.surveymonkey.com>

Annotated assigned books and articles

Edmonson, A. C. & McManus, S. E. (2007) Methodological fit in management field research. *Academy of Management Review*, 32, 1155 – 1179. [When to use qualitative research and when to use quantitative research.]

Other Recommended Books and Articles (*Especially Recommended!)

Qualitative research

Agar, M. H.. (1996). *The professional stranger: An informal introduction to ethnography*, 2nd ed. San Diego,CA: Academic Press.

Barley, S., Meyer, G., & Gash, D. (1998). Cultures of culture: Academics, practitioners, and the pragmatics of normative control. *Administrative Science Quarterly*, 33, 24-60.

Dominowski, P. and Bartholet, A. (1997) the Listener Survey ToolKit. Advice for radio stations that do audience surveys. Some useful tips. <http://www.wksu.org/toolkit/>

*Emerson, R.M., Fretz, R.I., Shaw, L.L. and Thompson, I. (1995). *Writing ethnographic fieldnotes*. University of Chicago Press, Chicago.

Geertz, C. (1973). Deep play: Notes on the Balinese cockfight. In *The interpretation of cultures*. Basic Books. pp. 142-153.

*Glaser, B. and Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago: Aldine.

*Golden-Biddle, K., & Locke, K. (1997). *Composing qualitative research*. Thousand Oaks, CA: Sage.

Hackman, J. R. (1985). Doing research that makes a difference. In E. Lwaler III, A. Mohrman, S. Mohrman, G. Ledford, T. Cummings, and Associates (Ed.). *Doing Research That Is Useful for Theory and Practice*. New York: Rowman and Littlefield.

Hargadon, A., & Sutton, R. (1997). Technology brokering and innovation in a product development firm. *Administrative Science Quarterly*, 42, 716-749.

LeCompte, M. D., & Goetz, J. (1982). Problems of reliability and validity in ethnographic research. *Review of Educational Research*, 52, 31-60.

Pratt, M. G. (2008). Fitting oval pegs into round holes: Tensions in evaluating and publishing qualitative research in top-tier North American journals. *Organizational Research Methods*, 11, 481-509.

Shah, S. K., & Corley, K. G. (2006) Building better theory by bridging the quantitative-qualitative divide. *Journal of Management Studies*, 43, 1821-1835.

Strauss, A. L. and Corbin, J. Basics of qualitative research. Sage Publications, 1990.

*Suddaby, R. (2006). From the editors: what grounded theory is not. *Academy of Management Journal*, 49, 633-642.

Measures and measurement techniques

Bibliography on methods for content analysis (only up to 2000).

<http://academic.csuohio.edu/kneuendorf/content/bibs/bookbib.htm>

Clancey, W.J. (2006) Observation of work practices in natural settings. In A. Ericsson, N. Charness, P. Feltovich & R. Hoffman (Eds.), *Cambridge Handbook on Expertise and Expert Performance*. New York: Cambridge University Press, pp. 127-145. Download at <http://bill.clancey.name/>

Dabbs, J. M. Jr. & Ruback, R. B. (1987). Dimensions of group process: Amount and structure of vocal interaction. In *Advances in experimental social psychology* (pp. 123-169). NY: Academic Press.

Holsti, O. R. (1969). *Content analysis for the social sciences and humanities*. Reading, MA: Addison-Wesley.

Magidson, J. (1982). Some common pitfalls in causal analysis of categorical data. *Journal of Marketing*, XIX, 461-471.

Maurer, T. J., Palmer, J. K., & Ashe, D. K. (1993). Diaries, checklists, evaluations, and contrast effects in measurement of behavior. *Journal of Applied Psychology*, 78, 226-231.

McGrath, J. E. (1984). *Groups: Interaction and performance*. Englewood Cliffs, NJ. Prentice Hall.

Schwarz, N. (1999). Self-reports: How the questions shape the answers. *American Psychologist*, 54, 94-105.

Seidman, I. (2006). *Interviewing as qualitative research: A guide for researchers in education and the social sciences*, 3rd edition. NY: Teachers University Press.

Webb, E. J., Campbell, D. T., Schwartz, R. D., & Sechrest, L. (1966). *Unobtrusive measures: Nonreactive research in the social sciences*. Chicago: Rand McNally. Reprinted as Sage Special Classics, 2. 1999.

Examples of different qualitative and mixed method approaches

Linde, C. (1988). The quantitative study of communicative success: Politeness and accidents in aviation discourse. *Language and Society*, 17, 375-399.

Grinter, R. E., Herbsleb, J. D., & Perry, D. E. (1999). The geography of coordination: Dealing with distance in R&D work. *Proceedings of SIGGROUP Conference on Supporting Group Work* (pp. 306 – 315). GROUP '99. Phoenix, AZ. New York: ACM Press.

Hargadon, A., & Sutton, R. (1997). Technology brokering and innovation in a product development firm. *Administrative Science Quarterly*, 42, 716-749.

Herbsleb, J. D., Mockus, A., Finholt, T. A., & Grinter, R. (2000). Distance, dependencies, and delay in a global collaboration. *CSCW 2000* (pp. 319-328). Philadelphia, PA. NY: ACM Press.

Perlow, L. A. (1999). The time famine: Toward a sociology of work time. *Administrative Science Quarterly*, 44 (1), 57–81

Spillane, J. P., Pareja, A. S., Dorner, L., Barnes, C., May, H., Huff, J., & Camburn, E. (2010). Mixing methods in randomized controlled trials (RCTs): Validation, contextualization, triangulation, and control. *Educational Assessment, Evaluation, and Accountability*, 22, 5-28.

Sutton, R. I. (1997). The virtues of closet qualitative research. *Organization Science*, 8, 97-106.

Quantitative methods and research design:

*Baron, R. M. & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality & Social Psychology*, 51, 1173-1182.

*Bruning, J. L., and Kintz, B. L. (1997). *Computational handbook of statistics*, 4th edition. Reading, MA: Addison-Wesley Longman. (Includes methods for running statistics manually.)

Campbell, D. T. & Stanley, J. C. (1966.) *Experimental and quasi-experimental designs for research*. Boston: Houghton Mifflin Co.

Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues*. Chicago: Rand McNally.

Cronbach, L.J. (1982) *Issues in planning evaluations: Designing evaluations of education and social programs. Or Designing Evaluations of Educational and Social Programs (A Joint Publication in the Jossey-Bass Series in Social and Behavioral Science & in Higher)* Both out of print but in many libraries.

Fields DL (2002) *Taking the Measure of Work: A Guide to Validated Scales for Organizational Research and Diagnosis*. Thousand Oaks, CA: Sage Publications. Fitz-Gibbon, C. T., & Morris, L. L. (1987). *How to design a program evaluation*. Newbury Park, CA: Sage.

Joint Committee on Standards for Educational Evaluation (1981). *Standards for evaluation of educational programs, projects, and materials*. NY: McGraw Hill.

Kenny, D. A. et al. (2002). The statistical analysis of data from small groups. *Journal of Personality and Social Psychology*, 83, 126-137.

Krumhuber, E., Manstead, A., & Kappas, A. (2007). Temporal aspects of facial displays in person and expression perception: The effects of smile dynamics, head-tilt, and gender. *Journal of Nonverbal Behavior*, 31(1), 39-56.

*Rosnow, R. L., & Rosenthal, R. (1995). Some things you learn aren't so: Cohen's paradox, Asch's paradigm, and the interpretation of interaction. *Psychological Science*, 6, 3 - 9.

Rossi, P. H., & Freeman, H. E. (1993). *Evaluation: A systematic approach* (5th ed.). Newbury Park, CA: Sage.

Winer, B. J. & Michels, K. M. (1991) *Statistical principles in experimental design*. 3rd Ed. NY: McGraw Hill.

Measures and measurement techniques:

Clancey, W.J. (2006) Observation of work practices in natural settings. In A. Ericsson, N. Charness, P. Feltovich & R. Hoffman (Eds.), *Cambridge Handbook on Expertise and Expert Performance*. New York: Cambridge University Press, pp. 127-145. Download at <http://bill.clancey.name/>

Dabbs, J. M. Jr. & Ruback, R. B. (1987). Dimensions of group process: Amount and structure of vocal interaction. In *Advances in experimental social psychology* (pp. 123-169). NY: Academic Press.

Holsti, O. R. (1969). *Content analysis for the social sciences and humanities*. Reading, MA: Addison-Wesley.

Magidson, J. (1982). Some common pitfalls in causal analysis of categorical data. *Journal of Marketing*, XIX, 461-471.

Maurer, T. J., Palmer, J. K., & Ashe, D. K. (1993). Diaries, checklists, evaluations, and contrast effects in measurement of behavior. *Journal of Applied Psychology*, 78, 226-231.

- McGrath, J. E. (1984). *Groups: Interaction and performance*. Englewood Cliffs, NJ. Prentice Hall.
- Salvucci, D. D. & Anderson, J. R. (2001). Automated eye-movement protocol analysis. *Human-Computer Interaction*, 16, 39-86.
- Sarter, M., Berntson, G. G., Cacioppo, J. T. (1996). Brain imaging and cognitive neuroscience: Toward strong inference in attributing function to structure. *American Psychologist*, 51, 13-21.
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