Statistical Literacy in Psychology: Resources, Activities, and Assessment Methods

Society for the Teaching of Psychology
Statistical Literacy Taskforce 2012

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The Society for the Teaching of Psychology 2012 Taskforce on Statistical Literacy developed the following list of resources. Resources are categorized where they best fit, and some may pertain to more than one area; therefore, it is worth searching for terms or scanning other sections when looking for something specific.

The Taskforce consisted of two subcommittees, one focused on statistical literacy in the introductory psychology course at both the high school and college levels and one focused on statistical literacy across the undergraduate psychology curriculum. Because the resources developed by the two subcommittees overlapped a great deal, we created just one overall list of resources for statistical literacy.

Please note that this list provides examples of the kinds of resources that might be useful for instructors who want to implement the learning goals for Introduction to Psychology and for the psychology major. Some of these resources may cease to exist, whereas new, similar resources are likely to emerge.

Please send feedback or updates to Susan A. Nolan (susan.nolan@shu.edu).

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Statistical Literacy

Ben-Zvi, D., & Garfield, J. (Eds.) (2004). *The challenge of developing statistical literacy, reasoning, and thinking*. Dordrecht, The Netherlands: Kluwer Academic.
[This edited book is as synthesis of research on how people think and reason about statistics, with attention given to how statistical literacy develops. Researchers in statistical education wrote each chapter.]

Blessing, S. B., & Blessing, J. S. (2010). PsychBusters: A means of fostering critical thinking in the introductory course. *Teaching of Psychology, 37*, 178-182. http://dx.doi.org/10.1080/00986283.2010.488540
[The authors review activities in an Introductory Psychology course that include statistical literacy and also foster critical thinking in students. Activities include having students identify methods of analyzing results.]

Cengage/Wadsworth Research Methods and Statistics Tutorials (What is Science?): http://www.wadsworth.com/psychology_d/templates/student_resources/workshops/rs_methd/science/science_01.html
[Cengage Learning features this interactive software to help students learn about the fundamental components of the role that empiricism, including statistical analysis and rationalism, has to play in the science of psychology.]

Chance, B. L. (2002). Components of statistical thinking and implications for instruction and assessment. *Journal of Statistics Education*, *10*(3). Retrieved from http://www.amstat.org/publications/jse/v10n3/chance.html
[This article reviews statistical thinking as a form of statistical development. It covers methods for helping students develop the "habits of mind" for statistical thinking along with assessment of statistical thinking.]

delMas, R. C. (2002). Statistical literacy, reasoning, and learning: A commentary. *Journal of Statistics Education*, *10*(3). Retrieved from http://www.amstat.org/publications/jse/v10n3/delmas_discussion.html
[delMas applies what has been learned from research on the teaching of statistics, statistical literacy, and how students learn about statistics. He provides specific recommendations on what a classroom instructor can do along with assessment techniques.]

Derry, S. J., Levin, J. R., Osana, H. P., Jones, M. S., & Peterson, M. (2000). Fostering students' statistical and scientific thinking: Lessons from an innovative college course. *American Educational Research Journal*, *37*, 747-773.
[This article reviews specific classroom techniques involving high levels of student engagement, typically in small group settings where students are required to apply statistical concepts to form a useful argument from quantitative evidence.]

Dillion, K. M. (1999). I am 95% confident that the Earth is round: An interview about statistics with Chris Spatz. *Teaching of Psychology, 26*, 232-234. http://dx.doi.org/doi:10.1207/S15328023TOP260314
[This is an interview with researcher and teacher of applied statistics, Chris Spatz. Spatz reflects on students learning statistics.]

Garfield, J. (2002). The challenge of developing statistical reasoning. *Journal of Statistics Education*, *10*(3). Retrieved from http://www.amstat.org/publications/jse/v10n3/garfield.html
[Garfield reviews both correct and incorrect forms of statistical reasoning that students often make. The author provides specific examples of how to maximize students' statistical reasoning, building upon prior research, and she reviews methods for assessing statistical reasoning.]

Garfield, J., & Ben-Zvi, D. (2008). *Developing students' statistical reasoning: Connecting research and teaching practice*. New York: Springer.
[This book reviews the interrelationship between mathematics and statistics, as it guides teachers in helping students reason about statistics. This book helps integrate the research on students learning statistics with teaching practices.]

Giesbrecht, N., Sell, Y., Scialfa, C., Sandals, L., & Ehlers, P. (1997). Essential topics in introductory statistics and methodology courses. *Teaching of Psychology*, *24*, 242-246.
[Eighteen professors in the natural and social sciences were asked to identify the essential topics to be covered in a statistics and methods course. This article summarizes those findings.]

Groth, R. E. (2006). An exploration of students' statistical thinking. *Teaching Statistics*, *28*, 17-21. http://onlinelibrary.wiley.com/doi/10.1111/j.1467-9639.2006.00003.x/abstract
[Groth reviews results of carefully interviewed students between the ages of 14 and 19 regarding their thinking of statistics.]

Holmes, J. D., & Beins, B. C. (2009.) Psychology is a science: At least some students think so. *Teaching of Psychology, 36*, 5-11. http://dx.doi.org/10.1080/00986280802529350
[This article examines results from surveys of college students regarding their thinking of science in general, and psychology as a science specifically. Over time, college students develop a more sophisticated understanding of science, yet that development does not seem to translate to a deeper understanding of psychology as a science.]

Jones, G. A., Langrall, C. W., Thornton, C. A., Mooney, E. S., Wares, A., Jones, M. R., . . . Nisbet, S. (2001). Using students' statistical thinking to inform instruction. *Journal of Mathematical Behavior*, *20*, 109-144. http://dx.doi.org/10.1016/S0732-3123(01)00064-5

[Though this is an article about research conducted with elementary school children, both the methodology and the findings have applications to college students regarding statistical thinking.]

Landrum, R. E. (2005). Core terms in undergraduate statistics. *Teaching of Psychology*, *32*, 249-251.
[Landrum reviews three statistics textbooks, providing a listing of the most common terms used in the books.]

Lilienfeld, S. O. (2010). Can psychology become a science? *Personality and Individual Differences, 49*, 281-288. http://dx.doi.org/10.1016/j.paid.2010.01.024
[This article reviews threats to scientific thinking and methods for helping guide students toward more appropriate thinking.]

Lilienfeld, S. O., Lynn, S. J., Ruscio, J., Beyerstein, B. L. (2010). *50 great myths of popular psychology: Shattering widespread misconceptions about human behavior*. Malden, MA: Wiley-Blackwell. One online article about this book can be found at http://health.usnews.com/health-news/family-health/articles/2009/10/13/5-common-pop-psych-myths
[This book provides insight into how people generally think about popular psychology, including examples of the misuse of statistics that contributes to common myths. Topics that students find interesting, like "Opposites Attract", "People use only 10% of their brain," and others are reviewed, and effective examples of the use of statistics help clarify student understanding of these myths]

Mann, R. D. (1982). The curriculum and context of psychology. *Teaching of Psychology, 9*, 9-14. http://dx.doi.org/10.1207/s15328023top0901_3
[One may use the six orientations of psychology to demonstrate to students that even if their academic and/or career interests are geared toward clinical psychology, all of psychology is informed by science.]

Mill, D., Gray, T., & Mandel, D. R. (1994). Influence of research methods and statistics courses on everyday reasoning, critical abilities, and belief in unsubstantiated phenomena. *Canadian Journal of Behavioral Science*, *26*, 246-258. http://dx.doi.org/10.1037/0008-400X.26.2.246
[This article reviews a study of students that examines what increases their reasoning and critical thinking skills. Details of course structure (primarily what didn't work) and other methods are covered.]

Moore, D. S. (1998). Statistics among the liberal arts. *Journal of the American Statistical Association, 93*(444), 1253-1259. http://dx.doi.org/10.2307/2670040 Retrieved from http://statistics.uchicago.edu/~stat/teaching/1998MooreASAPresidentialAddress.pdf
[This article helps teachers of statistics frame and cover statistics as an important component of the liberal arts educational tradition.]

Nicholson, J. R., Ridgway, J., & McCusker, S. (2006). Reasoning with data—time for a rethink? *Teaching Statistics*, *28*, 2-9. http://dx.doi.org/10.1111/j.1467-9639.2006.0228a.x
[These authors argue that the mathematics curriculum at the secondary level should provide students with experience in interpreting data sets and understanding more complex statistical techniques. They present examples throughout the article.

Rumsey, D. J. (2002). Statistical literacy as a goal for introductory statistics courses. *Journal of Statistics Education*, *10*(3). Retrieved from http://www.amstat.org/publications/jse/v10n3/rumsey2.html
[This article reviews current perceived inadequacies in the teaching of statistical thinking, particularly to high school students. Rumsey reviews improved methods along with justification for such methods.]

Schield, M. (2005). *Statistical literacy: An evangelical calling for statistical educators. Statistical Literacy Project*. Paper presented at the 55th International Statistical Institute, Sydney, Australia. Retrieved from http://www.statlit.org/PDF/2005SchieldISI.pdf
[Schield reviews biases that could impede students' learning of statistics and provides direct methods for how instructors of statistics can help students to become "believers" in how important statistics are to the science of psychology.]

Sedlmeier, P. (2000). How to improve statistical thinking: Choose the task representation wisely and learn by doing. *Instructional Science*, *28*, 227-262. http://dx.doi.org/10.1023/A:1003802232617
[This article provides very specific examples of how to improve students' statistical thinking.]

Tempelaar, D. T., Gijselaers, W. H., & Schim van der Loeff, S. (2006). Puzzles in statistical reasoning. *Journal of Statistics Education*, *14*(1). Retrieved from http://www.amstat.org/publications/jse/v14n1/tempelaar.html
[Researchers used the Statistical Reasoning Assessment instrument to assess statistical reasoning. In particular they address why reasoning skills have low correlations with course performance, differences in female and male reasoning abilities, and the nationality effect.]

Tomcho, T. J. , Rice, D., Foels, R., Folmsbee, L., Vladescu, J., Lissman, R., Matulewicz, R., & Bopp, K. (2009). APA's learning objectives for research methods and statistics in practice: A multimethod analysis. *Teaching of Psychology, 36*, 84-89. http://dx.doi.org/10.1080/00986280902739693
[The authors assessed course syllabi and faculty self-reports of research methods and statistics course learning objectives. They found discrepancies between course learning objectives and APA's learning objectives.]

Utts, J. M. (2003). What educated citizens should know about statistics and probability. *The American Statistician*, *57*, 74-79. http://dx.doi.org/10.1198/0003130031630
[Utts suggests that that every student who takes an elementary statistics course should know seven ideas.]

Viken, R. J. (1992). Therapy evaluation: Using an absurd pseudotreatment to demonstrate research issues. *Teaching of Psychology, 19*, 108-110. http://dx.doi.org/10.1207/s15328023top1902_12
[An "absurd pseudotreatment" is used to demonstrate how appropriate research design is required for effective therapy evaluation.]

Walker, H. M. (1951). Statistical literacy in the social sciences. *American Statistician*, *5*, 6-12. http://dx.doi.org/10.2307/2685917
[Walker discusses tips on how to increase students' statistical literacy by drawing from techniques that have been successful in increasing reading and writing literacy. She also stresses that students should have experiences with statistics outside of their statistics courses.]

Wallman, K. K. (1993). Enhancing statistical literacy: Enriching our society. *Journal of the American Statistical Association*, *88*(421), 1-8. http://dx.doi.org/10.2307/2290686
[Wallman discusses the importance of statistical thinking and highlights methods that may be used to enhance statistical literacy.]

Wiberg, M. (2009). Teaching statistics in integration with psychology. *Journal of Statistics Education, 17*(1). Retrieved from www.amstat.org/publications/jse/v17n1/wiberg.html
[The instructor gave students research problems throughout the course. She also created a course web page for students to use computer-based assignments.]

Wild, C. J., & Pfannkuch, M. (1999). Statistical thinking in empirical enquiry. *International Statistical Review*, *67*, 223-265. http://dx.doi.org/10.2307/1403699
[Interviews with statistics students and practicing statisticians identified a four-dimensional framework involved in statistical problem solving. The authors characterize these processes as an investigative cycle, an interrogative cycle, types of thinking, and dispositions.]

Zeedyk, M. (2006). Detective work on statistics street: Teaching statistics though humorous analogy. *Psychology Learning & Teaching, 5(2)*, 97-109. http://dx.doi.org/10.2304/plat.2005.5.2.97
[Zeedyk used a police detective analogy and humorous style to teach statistics. Assessment of the approach showed improvement student performance.]

Teaching Statistics – General Resources

Advanced Placement. (2008). *AP psychology: Teaching statistics and research methods.* Curriculum Module. Retrieved from http://apcentral.collegeboard.com/apc/public/repository/AP_CurricModPsych.pdf
[This resource outlines lesson plans for correlations, as well as various objectives for learning. It also includes examples of tables and figures for demonstrations.]

Bartsch, R. A. (2006). Improving attitudes toward statistics in the first class. *Teaching of Psychology, 33*, 197-198.
[Bartsch designed an activity to improve student attitudes toward statistics. Students drew numbers from bags. The instructor asked questions about the numbers to illustrate what the students already knew about statistics.]

Beins, B. C. (1993). Writing assignments in statistics classes encourage students to learn interpretation. *Teaching of Psychology*, *20*, 161-164. http://dx.doi.org/10.1207/s15328023top2003_6
[Writing assignments focused on context and rationale for the statistics.]

Benedict, J. O., & Anderton, J. B. (2004). Applying the just-in-time teaching approach to teaching statistics. *Teaching of Psychology*, *31*, 197-199.
[Compared to a control class, students in the Just-in-Time Teaching class performed better on the final exam and expressed satisfaction with the approach.]

Berk, R. A., & Nanda, J. P. (1998). Effects of jocular instructional methods on attitudes, anxiety, and achievement in statistics courses. *Humor - International Journal of Humor Research*, *11*, 383-409. http://dx.doi.org/10.1515/humr.1998.11.4.383
[The researchers investigated the use of humor in teaching statistics courses. They found reduced anxiety and more positive attitudes toward statistics when comparing results before and after implementing humor into the course.]

Bradstreet, T. E. (1996). Teaching introductory statistics courses so that nonstatisticians experience statistical reasoning. *The American Statistician*, *50*, 69-78. http://dx.doi.org/10.2307/2685047
[The author suggests that teaching statistical reasoning should precede teaching statistical methods. He also proposes the importance of students' using realistic data and doing exploratory data analysis before using classical methods.]

Broers, N. J., & Imbos, T. (2005). Charting and manipulating propositions as methods to promote self-explanation in the study of statistics. *Learning and Instruction*, *15*, 517-538. http://dx.doi.org/10.1016/j.learninstruc.2005.08.005
[Conceptual understanding of statistics was promoted by exercises designed to stimulate students to explain the interrelations between statistical concepts.]

Brosnan, C. A., Ericksen, L. R., & Lin, Y. (2002). Teaching nursing research using large data sets. *Journal of Nursing Education, 41*, 368-371.
[The article describes how to teach research methods using data sets from the National Center for Health Statistics.]

Bryce, G. R. (2002). Undergraduate statistics education: An introduction and review of selected literature. *Journal of Statistics Education*, *10*(2). Retrieved from http://www.amstat.org/publications/jse/v10n2/bryce.html
[Bryce summarizes six symposium papers that covered issues in undergraduate statistics education.]

Carlson, W. L. (1999). A case method for teaching statistics. *Journal of Economic Education*, *30*, 52-58. http://dx.doi.org/10.2307/1183033
[Carlson reports the results of using case studies in teaching statistics in an economics class.]

Chew, S. L. (2007). Designing effective examples and problems for teaching statistics. In D. S. Dunn, R. A. Smith, & B. C. Beins (Eds.), *Best practices for teaching statistics and research methods in the behavioral sciences* (pp. 73-91). Mahwah, NJ: Erlbaum.
[Chew's chapter reviews the research literature on creating and using examples in teaching statistics. He also discusses how to create good examples.]

Cobb, G. W., & Moore, D. S. (1997). Mathematics, statistics and teaching. *The American Mathematical Monthly*, *104*, 801-823. http://dx.doi.org/10.2307/2975286
[The authors stress that the teaching of statistics is not all about math, but rather on the contextual meaning of the numbers.]

Cobb, P., McClain, K., & Gravemeijer, K. (2003). Learning about statistical covariation. *Cognition and Instruction*, *21*, 1-78. http://dx.doi.org/10.1207/S1532690XCI2101_1
[The researchers conducted an experiment in an 8th grade classroom that focused on learning and instruction of statistical data analysis.]

Conners, F. A., McCown, S. M., & Roskos-Ewoldsen, B. (1998). Unique challenges in teaching undergraduates statistics. *Teaching of Psychology*, *25*, 40-42. http://dx.doi.org/10.1207/s15328023top2501_12
[The authors review the literature to discuss the challenges and solutions of teaching undergraduate statistics.]

Cumming, G. (1983). The introductory statistics course: Mixed student groups preferred to streamed. *Teaching of Psychology*, *10*, 34-37. http://dx.doi.org/10.1207/s15328023top1001_9
[A study revealed little difference in the performance of two types of group structure. However, the students preferred small work groups with students of varied rather than homogenous ability.]

delMas, R. C., Garfield, J., & Chance, B. L. (1999). A model of classroom research in action: Developing simulation activities to improve students' statistical reasoning. *Journal of Statistics Education*, *7*(3). Retrieved from http://www.amstat.org/publications/jse/secure/v7n3/delmas.cfm
[The researchers designed a simulation program to help students understand sampling distributions. Additionally, graphics-based items tested the students' understanding.]

Derry, S. J., Levin, J. R., Osana, H. P., Jones, M. S., & Peterson, M. (2000). Fostering students' statistical and scientific thinking: Lessons learned from an innovative college course. *American Educational Research Journal*, *37*, 747-773. http://dx.doi.org/10.3102/00028312037003747
[The article describes an undergraduate statistics course based on collaborative activities and real-life problem solving.]

Derry, S., Levin, J. R., & Schauble, L. (1995). Stimulating statistical thinking through situated simulations. *Teaching of Psychology*, *22*, 51-57. http://dx.doi.org/10.1207/s15328023top2201_16
[The instructors designed a course for students who are considering a career in teaching. The class especially focused on using simulations of realistic social problem solving.]

Dolinsky, B. (2001). An active learning approach to teaching statistics. *Teaching of Psychology*, *28*, 55-56.
[Dolinsky proposes shifting from primarily a lecture method to using active learning strategies. She proposes the use of computer applications and intensive writing assignments.]

Dunn, D., Smith, R., & Beins, B. (Eds.). (2007). *Best practices for teaching statistics and research methods in the behavioral sciences*. Mahwah, NJ: Erlbaum.
[This edited volume is a resource for the teaching of statistics and research methods.]

Edirisooriya, G. (2003). The gourmet guide to statistics: For an instructional strategy that makes teaching and learning statistics a piece of cake. *Teaching Statistics*, *25*, 2-5. http://dx.doi.org/10.1111/1467-9639.00106
[The analogies and the activities of statisticians are compared to those of chefs to teach statistics.]

Fischer, H. W., III (1996). Teaching statistics from a user's perspective. *Teaching Sociology*, *24*, 225-230.
[The author describes how his department incorporated the recommendations of the American Sociology Association Task Force report, *Liberal Learning and the Sociology Major.*]

Friedman, H. (1987). Repeat examinations in introductory statistics courses. *Teaching of Psychology*, *14*, 20-23. http://dx.doi.org/10.1207/s15328023top1401_4
[Students who did poorly on an exam were able to take another equivalent exam. Sometimes they took as many as many two repeat exams. Students who took more repeat exams did better on the final exam than students who took fewer repeat exams.]

Friedman, H. H., Friedman, L. W., & Amoo, T. (2002). Using humor in the introductory statistics course. *Journal of Statistics Education*, *10*(3). Retrieved from http://www.amstat.org/publications/jse/v10n3/friedman.html
[The authors describe examples of humorous material that can be used for teaching statistical concepts. They also suggest strategies for being more humorous in the classroom.]

Gardner, P. L., & Hudson, I. (1999). University students' ability to apply statistical procedures. *Journal of Statistics Education*, *7*(1). Retrieved from http://www.amstat.org/publications/jse/secure/v7n1/gardner.cfm
[The researchers tested university students on how well they were able to identify appropriate statistical procedures for different research questions. The authors suggest alternative approaches to teaching problem areas that their findings revealed.]

Garfield, J. (1993). Teaching statistics using small-group cooperative learning. *Journal of Statistics Education*, *1*(1). Retrieved from http://www.amstat.org/publications/jse/v1n1/garfield.html
[The paper describes what cooperative learning is and why teachers should use cooperative groups.]

Giraud, G. (1997). Cooperative learning and statistics instruction. *Journal of Statistics Education*, *5*(3). Retrieved from http://www.amstat.org/publications/jse/v5n3/giraud.html
[The study compares a cooperative learning class to a lecture class. The results showed that final exam scores were higher for the cooperative class compared to the lecture class.]

Grosofsky, A. (2013). Instructor's guide to using research methods and statistics concept maps. Retrieved from http://teachpsych.org/resources/Documents/otrp/resources/grosofsky13.pdf
[This resource contains 11 concept maps for topics typically covered in research methods and statistics courses. The maps can be used to help students organize material in class. Pages in the resource are internally hyperlinked to help students visualize interconnections.]

Guttmannova, K., Shields, A. L., & Caruso, J. C. (2005). Promoting conceptual understanding of statistics: Definitional versus computational formulas. *Teaching of Psychology*, *32*, 251-253.

[The authors argue that computational formulas should not replace definitional formulas. because definitional formulas foster better conceptual understanding.]

Hansen, R. S., McCann, J., & Myers, J. L. (1985). Rote versus conceptual emphases in teaching elementary probability. *Journal for Research in Mathematics Education*, *16*, 364-374. http://dx.doi.org/10.2307/749358
[Students who read a textbook that emphasized conceptual learning of elementary probability performed better on an exam than those who read a textbook that emphasized rote learning.]

Harlow, L. L., Burkholder, G. J., & Morrow, J. A. (2006). Engaging students in learning: An application with quantitative psychology. *Teaching of Psychology*, *33*, 231-235. http://dx.doi.org/10.1207/s15328023top3304_3
[The authors implemented four learning activities: peer-mentored learning; students reports of what was clear from a previous lecture; "consult corners," where student groups provided solutions to problems; and applied projects.]

Holmes, P. (2002). Assessment: New ways of pupil evaluation using real data. *Teaching Statistics*, *24*, 87-89. http://dx.doi.org/10.1111/1467-9639.00095
[The author describes four learning activities that can be used in statistics and other psychology courses.]

Hong, E., & O'Neil, H. F. (1992). Instructional strategies to help learners build relevant mental models in inferential statistics. *Journal of Educational Psychology*, *84*, 150-159. http://dx.doi.org/10.1037//0022-0663.84.2.150
[The authors suggest using separate and diagrammatic strategies in teaching inferential statistics. Conceptual instruction should come before procedural and quantitative instruction.]

Hulsizer, M. R., & Woolf, L. M. (2008). *Guide to teaching statistics: Innovations and best practices.* Oxford, United Kingdom: Wiley-Blackwell.
Additional Web content: http://www2.webster.edu/teachstats/
[This volume is a good resource for how to teach a statistics class.]

Hunter, W. G. (1977). Some ideas about teaching design of experiments, with 2^5 examples of experiments conducted by students. *The American Statistician*, *31*, 12-17. http://dx.doi.org/10.1080/00031305.1977.10479185
[The author's experience with using student projects to teach experimental design is described. Also, Hunter proposes the advantages of using simulated data.]

Jackson, S. L., & Griggs, R. A. (2012). *Teaching statistics and research methods: Tips from ToP.* Retrieved from the Society for the Teaching of Psychology Web site: http://www.teachpsych.org/page-1588406

[The article is a thorough, 534 page compilation of references and resources for teaching statistics and methods. Over 50 articles each provides detailed information and data on how to optimize the teaching of statistics and research methods.]

Johnson, H. D., & Dasgupta, N. (2005). Traditional versus non-traditional teaching: Perspectives of students in introductory statistics classes. *Journal of Statistics Education*, *13*(2). Retrieved from http://www.amstat.org/publications/jse/v13n2/johnson.html
[The researchers used a regression analysis to explore why students prefer non-traditional instructional styles to traditional styles. Variables that they found related to teaching style preference were class size, years since graduated from high school, perceived learning styles, and attitudes about visual aids.]

Keeler, C. M., & Steinhorst, R. K. (1995). Using small groups to promote active learning in the introductory statistics course: A report from the field. *Journal of Statistics Education*, *3*(2). Retrieved from http://www.amstat.org/publications/jse/v3n2/keeler.html
[The authors describe an evaluation of a course that was changed from a lecture method to cooperative learning.]

Kester, L., Kirschner, P. A., & van Merriënboer, J. J. G. (2004). Timing of information presentation in learning statistics. *Instructional Science*, *32*, 233-252. http://dx.doi.org/10.1023/B:TRUC.0000024191.27560.e3
[The study showed that support information was more effective during practice than before practice. Also, simultaneous presentation of procedural information was most efficient before practice, whereas supportive information was most efficient during practice.]

Kher, N., Molstad, S., & Donahue, R. (1999). Using humor in the college classroom to enhance teaching effectiveness in 'dread courses.' *College Student Journal*, *33*, 400-406. http://jan.ucc.nau.edu/~slm/AdjCI/Startclass/Humor.html
[This study examines the effectiveness of using humor in the classroom and suggests that when implemented correctly, humor improves students' overall experience and knowledge in a classroom.]

Lane, D. M., & Tang, Z. (2000). Effectiveness of simulation training on transfer of statistical concepts. *Journal of Educational Computing Research*, *22*, 383-396. http://www.ruf.rice.edu/~lane/papers/effectiveness_simulation.pdf
[Lane and Tang compared simulation-based teaching to textbook-based teaching. Their research resulted in students being more accurate on questions after learning from stimulation-based teaching as compared to textbook-based teaching .]

Larsen, M. D. (2006). Advice for new and student lecturers on probability and statistics. *Journal of Statistics Education*, *14*(1). Retrieved from http://www.amstat.org/publications/jse/v14n1/larsen.html
[The article presents advice on increasing student involvement in lectures.]

Layne, B. H., & Huck, S. W. (1981). The usefulness of computational examples in statistics courses. *Journal of General Psychology*, *104*, 283-285. http://dx.doi.org/10.1080/00221309.1981.9921046
[Students did not do significantly better on a posttest when computational examples were used than when computational examples were not used.]

Lim, Kyu Yon (2008). *The effect of concept mapping with different levels of generativity and learners' self-regulated learning skills on knowledge acquisition and representation* (Doctoral dissertation, The Pennsylvania State University). Retrieved from https://etda.libraries.psu.edu/paper/8740/
[Lim conducted a study with students from an undergraduate statistics course to investigate whether students' level of self-regulated learning skills (high or low) and type of concept mapping (expert-generated, partially learner-generated, and fully learner-generated) affected their learning. Suggestions on how to have students effectively utilize each type of concept map are included.]

Lomax, R. G., & Moosavi, S. A. (2002). Using humor to teach statistics: Must they be orthogonal? *Understanding Statistics*, *1*, 113-130. http://dx.doi.org/10.1207/S15328031US0102_04
[The article presents examples of humor for 14 topics. The authors claim that humor reduces anxiety, motivates, and increases conceptual understanding.]

Lovett, M. C., & Greenhouse, J. B. (2000). Applying cognitive theory to statistics instruction. *The American Statistician, 54(3)*, 196-206. http://dx.doi.org/10.2307/2685590
[The authors propose five principles from cognitive theory to teach a statistics class.]

Low, J. M. (1995). Teaching basic statistical concepts through continuous data collection and feedback. *Teaching of Psychology*, *22*, 196-197. http://dx.doi.org/10.1207/s15328023top2203_9
[Students provided personal information at the beginning of each class. After each class, the instructor provided statistical information to the students about their data either daily (continuous feedback) or about twice a month (partial feedback). Students in the continuous feedback condition had higher test scores at the end of the semester compared to students in the partial feedback condition.]

Melvin, K. B., & Huff, K. R. (1992). Standard errors of statistics students. *Teaching of Psychology*, *19*, 177-178. http://dx.doi.org/10.1207/s15328023top1903_16
[The authors provide a handout of common errors made in statistics courses.]

Mills, J. D. (2003). A theoretical framework for teaching statistics. *Teaching Statistics*, *25*, 56-58. http://dx.doi.org/10.1111/1467-9639.00126
[The article proposes using computer simulations in the teaching of statistics.]

Mills, J. D. (2004). Students' attitudes toward statistics: Implications for the future. *College Student Journal*, *38*, 349-361.
[The research results show that student attitudes toward statistics are related to math ability, statistics experience, student confidence, and gender.]

Moore, D. S. (1997). New pedagogy and new content: The case of statistics. *International Statistical Review*, *65*, 123-137.
http://onlinelibrary.wiley.com/doi/10.1111/j.1751-5823.1997.tb00390.x/abstract
[The author stresses that statistics instruction should change to reflect new research on teaching and should incorporate more technology.]

Muttart, D. (2009). The obsolescence of computational formulae. *Teaching Statistics*, *31*(1), 12-14. http://dx.doi.org/10.1111/j.1467-9639.2009.00336.x
[The author takes the controversial position that computational formulas should no longer be taught. Instead instructors should use only definitional formulas because of their conceptual elegance.]

Myers, J. L., Hansen, R. S., Robson, R. C., & McCann, J. (1983). The role of explanation in learning elementary probability. *Journal of Educational Psychology*, *75*, 374-381.
http://dx.doi.org/10.1037//0022-0663.75.3.374
[Student performance depended on the type of problem and on the level of explanations underlying the construction of the formulas.]

Nolan, D., & Speed, T. P. (1999). Teaching statistics theory through applications. *The American Statistician*, *53*, 370-375. http://dx.doi.org/10.2307/2686059
[The article promotes the use of case studies in statistical/research methods labs.]

Onwuegbuzie, A. J. (2004). Academic procrastination and statistics anxiety. *Assessment & Evaluation in Higher Education*, *29*, 3-19.
http://dx.doi.org/10.1080/0260293042000160384
[Research results indicate several reasons why graduate students procrastinate and have other problems in an educational research methods course.]

Onwuegbuzie, A. J., & Wilson, V. A. (2003). Statistics anxiety: Nature, etiology, antecedents, effects, and treatments—a comprehensive review of the literature. *Teaching in Higher Education*, *8*, 195-209. http://dx.doi.org/10.1080/1356251032000052447
[This paper reviews the literature on statistics anxiety.]

Pan, W., & Tang, M. (2005). Students' perceptions on factors of statistics anxiety and instructional strategies. *Journal of Instructional Psychology*, *32*, 205-214.
[The study's findings show some of the factors that contribute to statistics anxiety in graduate students. The researchers also suggest strategies to reduce students' anxiety.]

Potthast, M. J. (1999). Outcomes of using small-group cooperative learning experiences in introductory statistics courses. *College Student Journal*, *33*, 34-42.
[The researcher explores the effects of small-group cooperative instructional techniques.]

Quilici, J. L., & Mayer, R. E. (2002). Teaching students to recognize structural similarities between statistics word problems. *Applied Cognitive Psychology*, *16*, 325-342. http://dx.doi.org/10.1002/acp.796
[The instructors taught students to form problem schemas in order to solve statistical problems.]

Roberts, D. M., & Bilderback, E. W. (1980). Reliability and validity of a statistics attitude survey. *Educational and Psychological Measurement*, *40*, 235-238. http://dx.doi.org/10.1177/001316448004000138
[The researchers developed an attitude scale that had moderate correlations with statistics grades.]

Sciutto, M. J. (1995). Student-centered methods for decreasing anxiety and increasing interest level in undergraduate statistics courses. *Journal of Instructional Psychology*, *22*, 277-280.
[The author describes various methods for reducing student anxiety in a statistics course.]

Sciutto, M. J. (2002). The methods and statistics portfolio: A resource for the introductory course and beyond. *Teaching of Psychology*, *29*, 213-215. http://dx.doi.org/10.1207/S15328023TOP2903_07
[Students created a portfolio that reflected their understanding of various topics. The portfolio integrated material from the text, lectures, and lab assignments.]

Sgoutas-Emch, S. A., & Johnson, C. J. (1998). Is journal writing an effective method of reducing anxiety towards statistics? *Journal of Instructional Psychology*, *25*, 49-57.
[Compared to controls, students who wrote journals had higher grades, lower anxiety, and lower physiological reactions.]

Shaughnessy, J. M. (1977). Misconceptions of probability: An experiment with a small-group activity-based model building approach to introductory probability at the college level. *Educational Studies in Mathematics*, *8*, 295-316. http://dx.doi.org/10.1007/BF00385927
[Small-group problem solving, keeping a log of work, and investigating the misuses of statistics were all related to positive effects.]

Shultz, K. S., & Koshino, H. (1998). Evidence of reliability and validity for Wise's Attitude Toward Statistics Scale. *Psychological Reports*, *82*, 27-31. http://dx.doi.org/10.2466/PR0.82.1.27-31

[Their study provides support for the reliability and validity of the Wise Attitudes Toward Statistics scale.]

Sieber, J. E. (Ed.). (1991). *Sharing social science data: Advantages and challenges*. Newbury Park, CA: Sage.
[The book highlights the advantages and concerns of data sharing for social scientists.]

Singer, J. D., & Willett, J. B. (1990). Improving the teaching of applied statistics: Putting the data back into data analysis. *The American Statistician*, *44*, 223-230. http://dx.doi.org/10.2307/2685342
[The authors argue that artificial data sets should be eliminated from the statistics curriculum. They also identify seven characteristics of good data sets.]

Smith, G. (1998). Learning statistics by doing statistics. *Journal of Statistics Education*, *6*(3). Retrieved from http://www.amstat.org/publications/jse/v6n3/smith.html
[The researcher evaluated the use of team projects in a statistics class. His appendix also includes examples of 20 projects for collecting data sets.]

Snee, R. D. (1993). What's missing in statistical education? *The American Statistician*, *47*, 149-154. http://dx.doi.org/10.2307/2685201
[Snee proposes that students should experience using statistics with real-world situations because these experiences produce a more favorable attitude toward statistics.]

Swingler, M. V., Bishop, P., & Swingler, K M.. (2009). SUMS: A flexible approach to the teaching and learning of statistics. *Psychology Learning & Teaching*, *8*(1), 39-45. http://dx.doi.org/10.2304/plat.2009.8.1.39
[Instructors could upload their own data to use to an online statistics tutorial generator. An evaluation of using the online tutorial revealed positive effects.]

Thompson, W. B. (1994). Making data analysis realistic: Incorporating research into statistics courses. *Teaching of Psychology*, *21*, 41-43. http://dx.doi.org/10.1207/s15328023top2101_9
[Thompson describes a Student Information Questionnaire that generates data sets. The questionnaire is designed to reduce the need for using artificial data.]

Truran, H., & Arnold, A. (2002). Using consultation for teaching elementary statistics. *Teaching Statistics*, *24*, 46-50. http://dx.doi.org/10.1111/1467-9639.00083
[The authors suggest that graduate students learn statistics best if they consult with real clients.]

Vanhoof, S., Sotos, A. E. C., Onghena, P., Verschaffel, L., Van Dooren, W., & Van den Noortgate, W. (2006). Attitudes toward statistics and their relationship with short- and long-term

exam results. *Journal of Statistics Education*, *14*(3). Retrieved from http://www.amstat.org/publications/jse/v14n3/vanhoof.html
[The researchers show a relation between attitudes toward statistics and results on statistics exams.]

Wise, S. L. (1985). The development and validation of a scale measuring attitudes toward statistics. *Educational and Psychological Measurement, 45*, 401-405.
[Wise reports the development of a scale to measure student attitudes toward statistics.]

Wulff, S. S., & Wulff, D. H. (2004). "Of course I'm communicating; I lecture every day": Enhancing teaching and learning in introductory statistics. *Communication Education, 53*, 92-103. http://dx.doi.org/10.1080/0363452032000135797
[The article focuses on the advantages of interactive teaching in a statistics course.]

Ward, E. F. (1984). Statistics mastery: A novel approach. *Teaching of Psychology*, *11*, 223-225.
[After 5 weeks, students who do well on the final exam are excused from further course work but are required to tutor other students. Students have the opportunity to repeat the course several times.]

Ware, M. E., & Chastain, J. D. (1991). Developing selection skills in introductory statistics. *Teaching of Psychology*, *18*, 219-222. http://dx.doi.org/10.1207/s15328023top1804_4
[The instructors evaluated the effectiveness of teaching students on the skills of selecting different statistical tests.]

Zeidner, M. (1991). Statistics and mathematics anxiety in social science students: Some interesting parallels. *British Journal of Educational Psychology*, *61*, 319-328. http://dx.doi.org/10.1111/j.2044-8279.1991.tb00989.x
[This study explored the correlates between math anxiety and statistics anxiety.]

Activities and Assignments

Ageel, M. I. (2002). Spreadsheets as a simulation tool for solving probability problems. *Teaching Statistics*, *24*, 51-54. http://dx.doi.org/10.1111/1467-9639.00084
[The author describes how using spreadsheets is an effective tool for developing statistical skills in students.]

Albert, J. (2003). *Teaching statistics using baseball*. Washington, DC: The Mathematical Association of America.
[The book has the same basic organization as other statistics textbooks but uses baseball for examples. It also provides a collection of exercises.]

Allen, G. A. (1981). The χ^2 Statistic and Weber's Law. *Teaching of Psychology, 8*, 179-180. http://dx.doi.org/10.1207/s15328023top0803_21

[The instructor used Weber's Law to introduce students to the chi square statistic. He points out their similarities and relates other psychological concepts to statistical measures.]

Andrews, D. F., & Herzberg, A. M. (1985). *Data: A collection of problems from many fields for the student and research worker*. New York, NY: Springer-Verlag.
[The goal of this resource is to assess and analyze different types of data and explain it in a concise fashion. The book uses historical examples as well as more modern examples.]

Ballman, K. (2000). Real data in classroom examples. In T. L. Moore (Ed.), *Teaching statistics: Resources for undergraduate instructors* (pp. 11-18). Washington, DC: Mathematical Association of America.
[This resource outlines the essential learning goals for an undergraduate statistics course. This book also stresses the importance of presenting data as examples as opposed to lecturing about concepts.]

Beins, B. (1985). Teaching the relevance of statistics through consumer-oriented research. *Teaching of Psychology, 12*, 168-169. http://dx.doi.org/10.1207/s15328023top1203_16
[Students learned research design and statistics in real-life situations by using information about a variety of consumer products.]

Cholkar, C. P., & Deshpande, M. N. (2004). Useful data for teaching statistics from Hockey World Cup matches. *Teaching Statistics*, *26*, 20-21. http://dx.doi.org/10.1111/j.1467-9639.2004.00139.x
[The instructors illustrated several statistical concepts using a major sports event.]

Christopher, A. N., & Marek, P. (2002). A sweet tasting demonstration of random occurrences. *Teaching of Psychology*, *29*, 122-125. http://dx.doi.org/10.1207/S15328023TOP2902_09
[The authors present a demonstration that uses different flavors of candy to teach students about probability and random occurrences.]

Christopher, A. N., & Walter, M. I. (2006). An assignment to help students learn to navigate primary sources of information. *Teaching of Psychology*, *33*, 42-45. http://dx.doi.org/10.1207/s15328023top3301_9
[The instructors describe an assignment using primary source journal articles to help students understand methodological and statistical concepts.]

Ciarocco, N., & Racaniello, J. (2010). Activity: Conducting a factorial ANOVA. Retrieved from http://www.teachpsychscience.org/pdf/11182010100939AM_1.PDF
[The activity provides data to conduct a factorial ANOVA. An answer key and output are included.]

Ciarocco, N., & Racaniello, J. (2010). Activity: Conducting a repeated measures ANOVA. Retrieved from http://www.teachpsychscience.org/pdf/11182010100807AM_1.PDF
[This activity teaches students how to perform a repeated measures ANOVA.]

Ciarocco, N., & Racaniello, J. (2010). Activity: Conducting a *t*-test for independent means. Retrieved from http://www.teachpsychscience.org/pdf/519201050027PM_1.PDF
[This activity is an exercise in conducting a t test for independent means. Students identify the independent and dependent variables, enter the provided data, compute the results, and interpret the findings.]

Connor, J. (2003). Making statistics come alive: Using space and students' bodies to illustrate statistical concepts. *Teaching of Psychology, 30*, 141-143.
[The demonstration uses students' bodies and the physical space in the classroom to illustrate statistical concepts. Concepts illustrated were central tendency, variability, correlation, and regression.]

Day, H. D., Marshall, D. D., & Rubin, L. J. (1998). Statistics lessons from the study of mate selection. *Teaching of Psychology, 25*, 221-224. doi:10.1207/s15328023top2503_17
[DYASIM, a FORTRAN program, assesses the degree of similarity of dyadic data. The researchers used DYASIM to illustrate conceptual difficulties associated with measuring dyadic similarity pertaining to mate selection.]

Dinella, L. M. (2010). Power and the elephant: Understanding the relation between sample size, effect size, and significance level. Retrieved from http://dl.dropbox.com/u/3251061/S5_3_TeachPsychScience_Activity_PowerElephants.ppt
[In this activity students learn statistical principles by participating in a game show.]

Dunn, D. S. (1996). Collaborative writing in a statistics and research methods course. *Teaching of Psychology*, *23*, 38-40. http://dx.doi.org/10.1207/s15328023top2301_8
[The author uses collaborative writing and peer review in a statistics and research methods course.]

Dunn, D. S. (2000). Letter exchanges on statistics and research methods: Writing, responding, and learning. *Teaching of Psychology*, *27*, 128-130.
[The article describes an exercise for teaching statistics and research methods. Students write a letter to a peer in another course section, then write a response, and finally another letter clarifying their ideas.]

Dyck, J. L., & Gee, N. A. (1998). A sweet way to teach students about the sampling distribution of the mean. *Teaching of Psychology, 25*, 192-195. http://dx.doi.org/10.1207/s15328023top2503_6
[The instructors used M&M® candy to teach the concept of the sampling distribution of the mean and found this method more effective than a traditional teaching method.]

Gelman, A., & Nolan, D. (2002). *Teaching statistics: A bag of tricks*. New York, NY: Oxford University Press.
[The book is a collection of ideas for student-led and instructor-led activities that can be used toteach a variety of statistical concepts.]

Gnanadesikan, M., Scheaffer, R. L., Watkins, A. E., & Witmer, J. A. (1997). An activity-based statistics course. *Journal of Statistics Education*, *5*(2). Retrieved from http://www.amstat.org/publications/jse/v5n2/gnanadesikan.html
[The authors propose that an activity-based approach is better than a lecture approach. They present several examples of what they believe are effective activities.]

Goldman, R. N., & McKenzie, J. D., Jr. (2009). Creating realistic data sets with specified properties via simulation. *Teaching Statistics*, *31,* 7-11. http://dx.doi.org/10.1111/j.1467-9639.2009.00350.x
[The authors explain how to create univariate and bivariate raw data sets. The provided data may be used to obtain graphs, test assumptions, and create new problems with specified outcomes.]

Gourgey, A. F. (2000). A classroom simulation based on political polling to help students understand sampling distributions. *Journal of Statistics Education*, *8*(3). Retrieved from http://www.amstat.org/publications/jse/secure/v8n3/gourgey.cfm
[An activity uses collaborative polling simulation to teach students about sampling distributions.]

Halley, F. S. (1991). Teaching social statistics with simulated data. *Teaching Sociology*, *19*, 518-525. http://dx.doi.org/10.2307/1317899
[The article describes how a data generation system called GENSTAT may be used to create sample data for demonstrations, homework, lab assignments, and testing.]

Hand, D. J., Daly, F., Lunn A. D., McConway, K. J., & Ostrowski, E. (Eds.). (1994). *A handbook of small data sets*. London, England: Chapman & Hall.
[This volume contains about 500 small data sets. The data sets are real rather than fictitious, and each is accompanied by a brief description and details of its source.]

Hettich, P. (1974). The student as data generator. *Teaching of Psychology*, *1*, 35-36. psycnet.apa.org/psycinfo/1975-30503-001
[The author argues that student-generated data increases student interest and nurtures critical thinking.]

Holmes, K. Y., Jemes A., & Stukes, R. (2008). Teaching statistics and research methods: A collection of hands-on activities and demonstrations. Retrieved from http://teachpsych.org/resources/Documents/otrp/resources/holmes08.pdf

[Each activity and demonstration includes a summary of the activity, how long it would take to complete, and expected outcomes. Activities can be used individually or in group environments.]

Holmes, K. Y., Thompson, L. N., Dodd, B. A., & Jemes, A. The guided question grid: A collaborative activity for teaching statistics. Retrieved from http://www.teachpsychscience.org/pdf/820201071242PM_1.PDF
[The authors describe an activity in which students work together to fill out a question grid regarding the purpose, assumptions, etc. of various statistical tests. The question grid and sample responses are provided.

Holmes, K. Y., & Weaver , A. (2010). Yes, you can write in a statistics class: An instructional tool to reduce anxiety and improve statistics performance. Retrieved from http://teachpsych.org/resources/Documents/otrp/resources/holmes10.pdf
[The authors provide a collection of 32 activities that demonstrate how writing can be incorporated throughout a statistics course. Instructions for each activity are included.

Holmes, K. Y., & Dodd, B. A. (2012). Teaching statistics using classic psychology research: An activities-based approach. *Teaching Statistics, 34*, 13-17. http://dx.doi.org/10.1111/j.1467-9639.2011.00499.x
[The authors describe three activities in which students apply their knowledge of descriptive/inferential statistics to data they collect during class.

Jacobs, K. W. (1980). Instructional techniques in the introductory statistics course: The first class meeting. *Teaching of Psychology*, *7*, 241-242. http://dx.doi.org/10.1207/s15328023top0704_17
[This article reviews activities that can help introduce students to their first statistics course on the first day of class.]

Jegerski, J. A. (1999). Probability distributions with real social judgment data. In L. T. Benjamin, B. F. Nodine, R. M. Ernst, & C. Blair-Broeker. (Eds.), *Activities handbook for the teaching of psychology* (Vol. 4, pp. 77-79). Washington, DC: American Psychological Association.
[The author describes an activity to help students better understand a binomial distribution using their own data..]

Johnson, A. C., & Drougas, A. M. (2004). Illustrating type I and type II errors via spreadsheet simulation in the business statistics course. *Decision Sciences Journal of Innovative Education*, *2*, 89-95. http://dx.doi.org/10.1111/j.0011-7315.2004.00024.x
[The article reviews an interactive spreadsheet that can be used to help illustrate type I and type II decision errors in hypothesis testing.]

Krus, D. J., & Webb, J. M. (1997). Demonstrating variance using the Müller-Lyer Illusion. *Teaching Statistics, 19,* 72-76. http://dx.doi.org/10.1111/j.1467-9639.1997.tb00339.x

[Almost all students are familiar with the Müller-Lyer Illusion, the basis of this activity that helps students to better understand the concept of variance. This article provides clear directions on how to make this activity work in the classroom.]

Lawson, T. J., Schwiers, M., Doellman, M., Grady, G., & Kelnhofer, R. (2003). Enhancing students' ability to use statistical reasoning with everyday problems. *Teaching of Psychology, 30,* 107-110. http://dx.doi.org/10.1207/S15328023TOP3002_04
[The authors created a reading packet on reasoning with statistics for students to use on a daily basis throughout the semester. Their performance was found to be superior to two different control groups. The authors provide details of the research method and the assignment.]

Lee, M. P., & Soper, J. B. (1986). Using spreadsheets to teach statistics in psychology. *Bulletin of the British Psychological Society*, *39*, 365-367.
[The authors discuss how technology can be used as a tool for teaching statistics.]

Lewandowski, G. (2010). Activity: Evaluating statistical information: Product selection. Retrieved from http://www.teachpsychscience.org/pdf/513201044940PM_1.PDF
[This activity provides a hypothetical real-world situation in which a therapist would need to make a decision using statistical information. Students are given arguments for three different products and are asked to analyze the statistical strengths/weaknesses of each argument to determine which product would be the best choice.]

Lutsky, N. (1986). Undergraduate research experience through the analysis of data sets in psychology courses. *Teaching of Psychology*, *13*, 119-122. http://dx.doi.org/10.1207/s15328023top1303_4
[Lutsky describes the process and benefits of an activity in which students complete the entire research process (including formulation of a research question, write-up of results, etc.) using data sets collected by other researchers.]

Martinez-Dawson, R. (2003). Incorporating laboratory experiments in an introductory statistics course. *Journal of Statistics Education*, *11*(1). Retrieved from http://www.amstat.org/publications/jse/v11n1/martinez-dawson.html
[The author discusses various experiments that can be used in science classes to help students understand statistical concepts. One such experiment involved the use of a spectrophotometer to demonstrate independent samples.]

Melton, K. I. (2004). Statistical thinking activities: Some simple exercises with powerful lessons. *Journal of Statistics Education*, *12*(2). Retrieved from http://www.amstat.org/publications/jse/v12n2/melton.html
[The author describes various activities to demonstrate to students the importance of establishing clear operational definitions before data collection to better ensure agreement in measurement and reduce error.]

Mills, J. D. (2004). Learning abstract statistics concepts using simulation. *Educational Research Quarterly*, *28*, 18-33.
[This article reviews the use of computer-simulated pedagogical practices for enhancing student understanding of statistical concepts. It discusses methods of implementation and benefits to students.]

Moore, T. L. (Ed.). (2000). *Teaching statistics: Resources for undergraduate instructors*. Washington, DC: Mathematical Association of America.
[This resource is a collection of articles covering various topics related to teaching statistics including ideas for classroom activities, incorporating technology, and choosing the right textbook.]

Morgan, B. L. (2001). Statistically lively uses for obituaries. *Teaching of Psychology*, *28*, 56-58.
[This article reviews an activity that requires students to analyze a data set comprised of information from obituaries.]

Nolan, S. A., & Heinzen, T. H. (2009). Graphing literacy in the psychology major: Florence Nightingale and the creation of a beautiful display of data. *APS Observer, 22*(7). Retrieved from http://www.psychologicalscience.org/index.php/publications/observer/2009/september-09/graphing-literacy-in-the-psychology-major.html
[This article provides three activities that can be used with students to help them understand critical concepts in graphing, including how to obtain information from graphs.]

Peden, B. F. (2001). Correlational analysis and interpretation: Graphs prevent gaffes. *Teaching of Psychology, 28*, 129-131.
[This activity allows students to work with actual data and discover the importance of graphs, especially when conducting Pearson correlation analyses.]

Riniolo, T. C., & Schmidt, L. A. (1999). Demonstrating the gambler's fallacy in an introductory statistics class. *Teaching of Psychology, 26,* 198-200. http://dx.doi.org/10.1207/S15328023TOP260308
[The authors describe the use of the Gambler's Fallacy in a classroom. This fallacy helps increase student understanding and helps emphasize the importance of statistical interpretation. The authors also include various activities and databases for use in the classroom.]

Rossi, J. S. (1987). How often are our statistics wrong? A statistics class exercise. *Teaching of Psychology*, *14,* 98-101. http://dx.doi.org/10.1207/s15328023top1402_8
[Rossi outlines an exercise that in which students calculate statistical formulas and determine if there are any discrepancies between their calculations and what the original study authors reported in their journal articles.]

Rossman, A. J., & Chance, B. L. (1999). Teaching the reasoning of statistical inference: A "top ten" list. *The College Mathematics Journal*, *30*, 297-305. http://dx.doi.org/10.2307/2687668
[The authors provide 10 principles regarding how to increase students' ability to make and understand statistical inferences. Examples and relevant class exercises are provided to illustrate each of the principles.]

Schacht, S. P., & Stewart, B. J. (1992). Interactive/user-friendly gimmicks for teaching statistics. *Teaching Sociology*, *20*, 329-332. http://dx.doi.org/10.2307/1318981
[The use of humorous examples has been found to decrease students' anxiety toward learning statistics. This article reviews two activities that use humor while increasing students' conceptual understanding of statistics.]

Scheaffer, R. L., Gnanadesikan, M., Watkins, A., & Witmer, J. (1996). *Activity-based statistics*. New York, NY: Springer-Verlag.
[This book provides a series of activities that help maximize students' intellectual engagement through hand-on activities encompassing critical concepts in introductory statistics.]

Smith, R. A. (1999). A tasty sample(r): Teaching about sampling using M&Ms. In L. T. Benjamin, B. F. Nodine, R. M. Ernst, & C. Blair-Broeker (Eds.), *Activities handbook for the teaching of psychology* (Vol 4, pp. 66-68). Washington, DC: American Psychological Association.
[This chapter within an edited book reviews the use of M&Ms for lessons on sampling. Techniques and student benefit are discussed.]

Sowey, E. R. (2001). Striking demonstrations in teaching statistics. *Journal of Statistics Education*, *9*(1). Retrieved from http://www.amstat.org/publications/jse/v9n1/sowey.html
[This article reviews the benefits of striking demonstrations and reviews over 30 different striking demonstrations noted to help increase student understanding of concepts like statistical distributions, estimations, or testing. This article is great for people already using some striking demonstration and looking for more, and for individuals unfamiliar with this form of pedagogy.]

Stalder, D. R., & Olson, E. A. (2011). *t* for two: Using mnemonics to teach statistics. *Teaching of Psychology, 38*, 247-250. http://dx.doi.org/10.1177/0098628311421321
[This article provides evidence for the benefits of including mnemonics throughout a statistics course. A table within the article includes all of the mnemonics as well as an explanation of how each mnemonic relates to a statistical concept.]

Stark, E. (2011). Using zodiac-based personality descriptions to teach about biases in thinking. Retrieved from http://www.teachpsychscience.org/pdf/316201165139AM_1.PDF

[The author describes an activity in which students examine their assumptions regarding the accuracy of the Zodiac. The personality descriptions needed for this activity are included.]

Stedman, M. E. (1993). Statistical pedagogy: Employing student-generated data sets in introductory statistics. *Psychological Reports*, *72*, 1036-1038. http://dx.doi.org/10.2466/pr0.1993.72.3.1036
[This article reviews methods for obtaining student-generated data sets, and demonstrates that such sets increase students' interest and understanding of statistics.]

Stern, S. E. (1999). The effect of gender on the number of shoes owned: Gathering data for statistical and methodological demonstrations. In L. T. Benjamin, B. F. Nodine, R. M. Ernst, & C. B. Broeker (Eds.), *Activities handbook for the teaching of psychology* (Vol. 4, pp. 74-76). Washington, DC: American Psychological Association.
[Stern's chapter reviews a method of gathering and analyzing data that helps increase students' interest and understanding in statistics.]

Vaughan, T. S. (2003). Teaching statistical concepts with student-specific datasets. *Journal of Statistics Education*, *11*(1). Retrieved from http://www.amstat.org/publications/jse/v11n1/vaughan.html
[The authors provide examples of how to used semi-randomly generated data for individual students to test statistics. With the data, students can better learn to perform hypothesis testing, confidence intervals, and regression, and increase their understanding of sampling distributions.]

Walsh, J. F. (1991). Using summary statistics as data in ANOVA: A SYSTAT macro. *Teaching of Psychology, 18*, 249-251. http://dx.doi.org/10.1207/s15328023top1804_17
[This resource provides instructors with a program (SYSTAT) to generate data sets with enough information for students to perform various analyses. Because many examples in research articles do not include all necessary information for complete statistical analysis (e.g., raw data), this program generates data sets that do provide this information.]

Ware, M. E., & Johnson, D. E. (Eds.). (2000). *Handbook of demonstrations and activities in the teaching of psychology, second edition: Volume I: Introductory, statistics, research methods, and history.* Mahwah, NJ: Erlbaum.
[This extensive handbook provides professors with several demonstrations and activities geared at increasing students' intellectual engagement and comprehension.]

Weinberg, S. L., & Abramowitz, S. K. (2000). Making general principles come alive in the classroom using an active case studies approach. *Journal of Statistics Education, 8*(2). Retrieved from http://www.amstat.org/publications/jse/secure/v8n2/weinberg.cfm
[The authors discuss how they have adapted their own experiences as consultants to provide real-world examples for students to apply their knowledge of research.]

Wiseman, F., & Chatterjee, S. (1997). Major League Baseball player salaries: Bringing realism into introductory statistics courses. *The American Statistician*, *51*, 350-352. http://dx.doi.org/10.2307/2685904
[A list of major league baseball players' salary is published in *USA Today*, annually. Using that readily available data set, this article takes a teacher of statistics through activities to help students better understand the application of statistics.]

Zacharopoulou, H. (2006). Two learning activities for a large introductory statistics class. *Journal of Statistics Education*, *14*(1). Retrieved from http://www.amstat.org/publications/jse/v14n1/zacharopoulou.html
[The author presents two activities, suitable to large class sizes, that involve students in learning the Central Limit Theorem: group peer teaching and in-class simulation of random sampling from the discrete Uniform Distribution.]

Zerbolio, D. J., Jr. (1989). A "bag of tricks" for teaching about sampling distributions. *Teaching of Psychology, 16*, 207-209. http://dx.doi.org/10.1207/s15328023top1604_9
[The author describes how he used imagery in his demonstrations of various types of distributions.]

Technology in the Teaching of Statistics

Anderson, R. H. (1990). Computers, statistics, and the introductory class. *Teaching Sociology*, *18*, 185-192. http://www.jstor.org/discover/10.2307/1318489?uid=3739864&uid=2&uid=4&uid=3739256&sid=21102727576933
[Anderson discusses how computer activities (specifically with SPSS) can be incorporated into statistics courses based on his own teaching experiences.]

Bartz, A. E., & Sabolik, M. A. (2001). Computer and software use in teaching the beginning statistics course. *Teaching of Psychology, 28*, 147-149. http://dx.doi.org/10.1207/S15328023TOP2802_16
[This article reviews how various departments use computer-assisted instruction in statistics courses.]

Bodemer, D., Ploetzner, R., Bruchmüller, K., & Häcker, S. (2005). Supporting learning with interactive multimedia through active integration of representations. *Instructional Science, 33*, 73-95. http://dx.doi.org/10.1007/s11251-004-7685-z
[This study revealed that actively integrating static representations before processing dynamic visualizations resulted in better performance. Moreover, students' experimentation became more systematic and goal-oriented during simulation-based discovery learning in a statistics class.]

Bradley, D. R., Hemstreet, R. L., & Ziegenhagen, S. T. (1992). A simulation laboratory for statistics. *Behavior Research Methods, Instruments & Computers, 24*, 190-204. http://dx.doi.org/10.3758/BF03203496
[The author discusses how Datasim (a data simulator) can be used to illustrate a variety of statistical concepts.]

Christensen, A. R., & Stephens, L. J. (2003). Microsoft Excel as a supplement in a high school statistics course. *International Journal of Mathematical Education in Science and Technology*, *34*, 881-885. http://dx.doi.org/10.1080/00207390310001595546
[The authors review the use of Excel as a supplement to learning statistics. Students performed better in the Excel condition compared to the control condition in several areas. The article includes details for implementation.]

Erdfelder, E., Faul, F., & Buchner, A. (1996). GPOWER: A general power analysis program. *Behavior Research Methods, Instruments, & Computers, 28*, 1-11.
[G*Power is free software to calculate statistical power; it is available at http://www.psycho.uni-duesseldorf.de/abteilungen/aap/gpower3/]

Feinberg, M., & Siekpe, J. (2003). An empirical comparison of student user-satisfaction between SPSS and Minitab. *College Student Journal*, *37*, 509-514.
[This study compares students' comfort level and sense of learning when using SPSS and Minitab during a statistics class.]

Garfield, J. B., & Burrill, G. (Eds.). (1997). *Research on the role of technology in teaching and learning statistics*. Voorburg, The Netherlands: International Statistical Institute.
[This e-book provides teachers of statistics with different methods of bringing technology into the classroom to improve student learning.]

Gibson, C. J., Klatzkin, R., & Littlefield, L. M. (2012). Research readings and statistical exercises using SPSS and Excel. Retrieved from http://teachpsych.org/page-1603793
[Five research readings, accompanied by data, allow students to simulate the psychological research process. Information is provided so students can analyze the data in SPSS or in Excel.]

Goldman, R. N., & McKenzie, J. D., Jr. (2002). Classifying data displays with an assessment of displays found in popular software. *Teaching Statistics*, *24*, 96-101. http://dx.doi.org/10.1111/1467-9639.00098
[This article provides a scheme for classifying data tables and graphs and then uses this scheme to organize and assess the tables and graphs found in three commonly used software packages: Microsoft Excel, Minitab and SPSS. The classification and assessment is of one–, two– and three–dimensional displays.]

Green, S. B., & Salkind, N. J. (2003). *Using SPSS for Windows and Macintosh: Analyzing and understanding data*. (3rd ed.). Upper Saddle River, NJ: Prentice Hall.

[This resource book reviews how to use SPSS for analyzing data.]

Hewett, T. T., & Porpora, D. V. (1999). A case study report on integrating statistics, problem-based learning, and computerized data analysis. *Behavior Research Methods, Instruments, & Computers, 31*, 244-251. http://dx.doi.org/10.3758/BF03207716
[This paper addresses the pedagogical advantages of teaching statistics not as a stand-alone subject, but rather as a topic integrated into teaching hands-on, problem-based computer-assisted data analysis.]

Hunt, N. (2005). Using Microsoft Office to generate individualized tasks for students. *Teaching Statistics*, *27*, 45-48. http://dx.doi.org/10.1111/j.1467-9639.2005.00207.x
[This article describes how the mail merge facility within Microsoft Word can be used in conjunction with Microsoft Excel to generate personalized assignments for students at all levels.]

Karp, D. R. (1995). Using SPSS for Windows to enhance, not overwhelm, course content. *Teaching Sociology*, *23*, 234-240. http://dx.doi.org/10.2307/1319215
[The author discusses how SPSS can be used to make course activities (e.g., papers, presentations) in advanced sociology courses more effective without becoming the sole focus.]

Kirkpatrick, L. A., & Feeney, B. C. (2007). *A simple guide to SPSS for Windows for version 14.0*. Belmont, CA: Thomson Wadsworth.
[This resource provides information on how to use SPSS for analyzing data.]

Krantz, J. H. (n.d.). Animated simulations of statistical concepts. Retrieved May 5, 2013 from http://psych.hanover.edu/JavaTest/NeuroAnim/stats.html
[This resource contains several resources and information about statistical theories and statistical tests. There are examples for each item, as well as background information.]

McCullough, B. D., & Wilson, B. (2005). On the accuracy of statistical procedures in Microsoft Excel 2003. *Computational Statistics & Data Analysis*, *49*, 1244-1252. http://dx.doi.org/10.1016/j.csda.2004.06.016
[This article reviews errors found in statistical calculations within Excel. The authors recommend that other software be used until Microsoft fixes the errors.]

Meehan, A. M., & Warner, C. B. (2000). *Elementary data analysis using Microsoft Excel*. Boston: McGraw-Hill.
[This workbook is designed to provide step-by-step instructions for introductory statistics students on how to use Microsoft Excel for statistics calculations. The authors stress that Microsoft Excel should be used over other statistical programs such as SPSS because Microsoft Excel is more widely available and easier to use.]

Miller, J. (1999). AnoGen: A program for generating ANOVA data sets. *Teaching of Psychology*, *26*, 230-231. http://dx.doi.org/10.1207/S15328023TOP260313
[The writer of AnoGen (a free computer program) explains how both teachers and students can use this program to create ANOVA data sets that include between and within-subjects variables.]

Mills, J. D. (2003). SPSS textbooks: A review for teachers. *Statistics Education Research Journal*, *2*(2), 59-70. Retrieved from http://www.stat.auckland.ac.nz/~iase/serj/SERJ2(2).pdf
[This resource outlines the importance of research examples in the teaching of statistics. Examples using SPSS are also included with activities.]

Mills, J. D., & Johnson, E. L. (2004). An evaluation of ActivStats for SPSS for teaching and learning. *The American Statistician*, *58*, 254-258. http://dx.doi.org/10.1198/000313004X1530
[This resource includes examples for teaching statistics with SPSS and how to implement SPSS into a lesson plan. Limitations of the program are also included.]

Morris, E. (2001). The design and evaluation of Link: A computer-based learning system for correlation. *British Journal of Educational Technology*, *32*, 39-52. http://dx.doi.org/10.1111/1467-8535.00175
[This resource discusses the program "Link," which is used to assess undergraduates' knowledge of correlations. Studies involving "Link" are included as well as evidence that it is a useful resource to implement into classrooms.]

Nash, J. C., & Quon, T. K. (1996). Issues in teaching statistical thinking with spreadsheets. *Journal of Statistics Education*, *4*(1). Retrieved from http://www.amstat.org/publications/jse/v4n1/nash.html
[This article discusses whether spreadsheets are a useful technique to aid in teaching statistics or if it reduces learning.]

Oswald, P. A. (1996). Classroom use of the personal computer to teach statistics. *Teaching of Psychology*, *23*, 124-126. http://dx.doi.org/10.1207/s15328023top2302_15
[Oswald reviews the methods, and technology used to teach undergraduate statistics. She argues that a computer and a projector should be used to statistics, as it has been shown to improve learning.]

Proctor, J. L. (2002). SPSS vs. Excel: Computing software, criminal justice students, and statistics. *Journal of Criminal Justice Education*, *13*, 433-442. http://dx.doi.org/10.1080/10511250200085561
[Proctor argues for the use of Microsoft Excel, as opposed to SPSS, for teaching undergraduates statistics. Students who learned statistics using Microsoft Excel showed increased knowledge compared to students that learned using SPSS.]

Prvan, T., Reid, A., & Petocz, P. (2002). Statistical laboratories using Minitab, SPSS and Excel: A practical comparison. *Teaching Statistics*, *24*, 68-75. http://dx.doi.org/10.1111/1467-9639.00089
[This article discusses three statistical laboratories on descriptive statistics, statistical inference, and regression for introductory statistics courses using Minitab, SPSS, and Excel.]

Quilici, J. L., & Mayer, R. E. (2002). Teaching students to recognize structural similarities between statistics word problems. *Applied Cognitive Psychology*, *16*, 325-342. http://dx.doi.org/10.1002/acp.796
[The authors emphasize the importance of applying statistical concept from examples that students already know and understand, to help teach more complex statistical problems. By implementing this, researchers were able to identify how to increase students' recognition of structural similarities in word problems. Though this article does not provide in-class activities, it could serve as the basis for an in-class activity.]

Rogers, R. L.. (1989). Using the microcomputer as a visual aid in the statistics classroom. *Behavior Research Methods, Instruments, & Computers, 21*, 96-98. http://dx.doi.org/10.3758/BF03205563
[This study found that using visual aids to teach statistics, especially spreadsheets, improves learning. Also, Rogers discusses different types of visual aids.]

Rosen, E. F., Feeney, B., & Petty, L. C. (1994). An introductory statistics class and examination using SPSS/PC. *Behavior Research Methods, Instruments, & Computers*, *26*, 242-244. http://dx.doi.org/10.3758/BF03204629
[This study failed to find a benefit of the use of technology in student comfort or understanding of statistics.]

Rosenberg, K. M. (2007). *The Excel statistics companion: CD-ROM and manual (Version 2.0)* (2nd ed.). Belmont, CA: Thompson Wadsworth.
[This book is a reference source for people using Excel for statistical analysis.]

Singamsetti, R. (2007). Teaching business statistics with real data to undergraduates and the use of technology in the classroom. *Journal of College Teaching & Learning*, *4*(7), 59-68.
[This article reviews the use of real data and technology to help students make real-life decisions by using statistics.]

Smith, B. (2003). Using and evaluating resampling simulations in SPSS and Excel. *Teaching Sociology*, *31*, 276-287. http://dx.doi.org/10.2307/3211325
[This article reviews an activity that helps students to better understand sampling distribution, Confidence Interval, and hypothesis testing through the use of SPSS and Excel.]

Spinelli, M. A. (2001, September/October). The use of technology in teaching business statistics. *Journal of Education for Business*, *77*, 41-44. http://dx.doi.org/10.1080/08832320109599669
[This study failed to provide evidence of the benefits of computer assisted testing in statistics for improving student performance, understanding, or attitudes.]

Strube, M. J., & Goldstein, M. D. (1995). A computer program that demonstrates the difference between main effects and interactions. *Teaching of Psychology*, *22*, 207-208. http://dx.doi.org/10.1207/s15328023top2203_15
[This authors discuss a program (QuickBASIC) that can help students understand complex factoral design ANOVAs. Specifically, this program simplifies and helps students understand the differences in interactions as opposed to main effects.]

Tagler, M. J. (2010). Statistics assignments using Excel®. Retrieved from http://teachpsych.org/Resources/Documents/otrp/resources/excel/introduction.pdf
[This resource links to 12 assignments ranging from measures of central tendency to Chi Square that students can complete using Excel.]

Taub, G. E. (2003). A review of ActivStats For SPSS: Integrating SPSS instruction and multimedia in an introductory statistics course. *Journal of Educational and Behavioral Statistics*, *28*, 291-293. http://dx.doi.org/10.3102/10769986028003291
[This review provides examples of how to integrate SPSS into the teaching of statistics. Direct methods and activities for successful integration are discussed.]

Ware, M. E., & Chastain, J. D. (1989). Computer-assisted statistical analysis: A teaching innovation? *Teaching of Psychology*, *16*, 222-227. http://dx.doi.org/10.1207/s15328023top1604_16
[This article evaluates the limited benefits of using computer assisted statistical analysis.]

Warner, C. B., & Meehan, A. M. (2001). Microsoft Excel™ as a tool for teaching basic statistics. *Teaching of Psychology*, *28*, 295-298. http://dx.doi.org/10.1207/S15328023TOP2804_11
[This article discusses Excel "Toolpack," a free addition to Microsoft Excel, that works as an alternative to more expensive software packages.]

Assessment of Learning in Statistics

American Statistical Association. (2010). *Guidelines for assessment and instruction in statistics education (GAISE) project*. Retrieved from http://www.amstat.org/education/gaise/
[This detailed report includes information on emphasizing statistical literacy and developing statistical thinking, using real data, stressing conceptual understanding rather than mere knowledge of procedures, fostering active learning in the classroom, using technology for developing conceptual understanding for analyzing data, and assessing student learning for the purpose of improving it.]

Beyth-Marom, R., Fidler, F., & Cumming, G. (2008). Statistical cognition: Towards evidence-based practice in statistics and statistics education. *Statistics Education Research Journal*, *7*(2), 20-39.
[Available from http://www.stat.auckland.ac.nz/~iase/serj/SERJ7(2)_Beyth-Maron.pdf]
[This article defines statistical cognition, reviews the use of evidence-based practice to improve statistical cognition, and includes methods of assessing student learning.]

Chance, B. L. (1997). Experiences with authentic assessment techniques in an introductory statistics course. *Journal of Statistics Education, 5*(3). Retrieved from http://www.amstat.org/publications/jse/v5n3/chance.html
[This article reviews the implementation of authentic assessment in teaching introductory statistics classes and discusses the impact on students.]

Cobb, G. W. (1993). Reconsidering statistics education: A National Science Foundation conference. *Journal of Statistics Education*, *1*(1). Retrieved from http://www.amstat.org/publications/jse/v1n1/cobb.html
[This paper grew out of a small conference of people associated with NSF programs involving the teaching of statistics. Cobb includes information on assessing statistics.]

delMas, R., Ooms, A., Garfield, J., & Chance, B. (2006, July). Assessing students' statistical reasoning. In *Proceedings of the seventh international conference on teaching statistics* (Vol. 2006). Minneapolis, MN: University of Minnesota.
[An NSF-funded project that developed assessment resources for statistics instructors. The link provides access to PowerPoint Slides: https://apps3.cehd.umn.edu/artist/]
[This link will get you to a list of resources on assessing statistics that was produced by an NSF-funded project geared at developing assessment resources for statistics instructors.]

Colvin, S., & Vos, K. E. (1997). Authentic assessment models for statistics education. In I. Gal & J. B. Garfield (Eds.), *The assessment challenge in statistics education* (pp. 27-36). Amsterdam, The Netherlands: IOS Press.
[Authentic assessment is one method of assessing statistics associated with lower student anxiety and deeper student thinking. This chapter reviews the techniques involved in authentic assessment.]

Desrochers, M., & Margolin, S. (2010). Factorial research design. Retrieved from http://www.acs.brockport.edu/~mdesroch/Factorial3/
[This link will lead students to an activity to help them better understand factorial research design. It includes an assessment that, once students complete it, will result in a certificate they can turn in to their professor.]

Gal, I., & Garfield, J. B .(Eds.). (1997). *The assessment challenge in statistics education*. Amsterdam, The Netherlands: IOS Press.

[This edited book reviews various methods to assess students' understanding of statistics including classroom assessment, curricular goals, conceptual understanding, and probability.]

Garfield, J. B. (1994). Beyond testing and grading: Using assessment to improve student learning. *Journal of Statistics Education*, *2*(1). Retrieved from http://www.amstat.org/publications/jse/v2n1/garfield.html
[This paper summarizes current trends in educational assessment and relates these to the assessment of student outcomes in a statistics course. Garfield presents a framework for categorizing and developing appropriate assessment instruments and procedures.]

Garfield, J. B. (2003). Assessing statistical reasoning. *Statistics Education Research Journal*, *2*, 22-38.
[This article discusses the Statistical Reasoning Assessment, a 20-item instrument created to provide 16 scores in eight different areas of statistical reasoning. Garfield provides an overview of demographics related to statistical reasoning and the measure.]

Garfield, J., & Chance, B. (2000). Assessment in statistics education: Issues and challenges. *Mathematical Thinking and Learning*, *2*, 99-125. http://dx.doi.org/10.1207/S15327833MTL0202_5
[This study found that using visual aids, especially spreadsheets, to teach statistics improves learning. Also, different types of visual aids are discussed.]

Garfield, J., & delMas, R. (2010). A web site that provides resources for assessing students' statistical literacy, reasoning and thinking. *Teaching Statistics*, *32*, 2-7. http://dx.doi.org/10.1111/j.1467-9639.2009.00373.x
[This article provides various assessments and resources for teaching statistics in a college setting. These assessments also include examples of when to use each one.]

Gottfried, G. M., Johnson, K. E., & Vosmik, J. R. (2009). Assessing student learning: A collection of evaluation tools. Retrieved from http://teachpsych.org/resources/Documents/otrp/resources/gottfried09.pdf
[This resource provides three assessment measures including a rubric for evaluating a psychology research report, evaluating students' understanding of interrater reliability, and assessing students' comprehension in reading a journal article.]

Higgins, J. J. (1999). Nonmathematical statistics: A new direction for the undergraduate discipline. *The American Statistician*, *53*, 1-6. http://dx.doi.org/10.2307/2685641
[This article reviews the critical components of statistics that go beyond the underlying mathematics and deal more directly with the applied components of the discipline.]

Hubbard, R. (1997). Assessment and the process of learning statistics. *Journal of Statistics Education*, *5*(1). Retrieved from http://www.amstat.org/publications/jse/v5n1/hubbard.html
[The authors focus on different techniques that instructors can use to construct questions that assess students' general understanding of concepts and the specific goals of statistical education.]

Moore, D. S. (2001). Undergraduate programs and the future of academic statistics. *The American Statistician*, *55*, 1-6. http://dx.doi.org/10.1198/000313001300339860
[The American Statistical Association created a review of undergraduate programs in statistics and future directions for curriculum, outcomes, and student learning. Moore reviews those findings in this article.]

Onwuegbuzie, A. J. (2000). Attitudes toward statistics assessments. *Assessment and Evaluation in Higher Education*, *25*, 321-339. http://dx.doi.org/10.1080/713611437
[The authors emphasize the importance of using different teaching techniques that students not only prefer, but also benefit from most. Previous research has shown that students' attitudes towards the material is important. This includes both positive attitudes (ease of understand, overall enjoyment) and negative attitudes (anxiety provoking tasks/examples).]

Onwuegbuzie, A. J., & Leech, N. L. (2003). Assessment in statistics courses: More than a tool for evaluation. *Assessment & Evaluation in Higher Education*, *28*, 115-127. http://dx.doi.org/10.1080/02602930301670
[This paper presents information on assessment in statistics courses, including authentic, performance, and portfolio assessment.]

Roiter, K., & Petocz, P. (1996). Introductory statistics courses—a new way of thinking. *Journal of Statistics Education*, *4*(2). Retrieved from http://www.amstat.org/publications/jse/v4n2/roiter.html
[This paper presents a framework for the design and analysis of introductory statistics courses. This framework includes the construction of a syllabus for an introductory statistics course, along with four paradigms applied to the creation of the course.]

Statistics Websites with More General Resources

Assessment Resource Tools for Improving Statistical Thinking: https://apps3.cehd.umn.edu/artist/
[This website includes sample items and articles regarding how to assess statistical thinking.]

CATALST: Change Agents for Teaching and Learning Statistics. https://netfiles.umn.edu/CEHD/EdPsy/delma001/www/CATALST/index.html

[This website includes resources for teaching statistics, especially teaching online. The site includes activities and research articles about statistics literacy.

Consortium for the Advancement of Undergraduate Statistics Education: www.causeweb.org
[This website includes several resources for the teacher of statistics, including articles on the teaching of statistics, https://www.causeweb.org/profdev/readings/.]

Correlation or causation Web site:
http://jfmueller.faculty.noctrl.edu/100/correlation_or_causation.htm
[This web site provides links to articles in the general press that misattribute cause to a variable. Activities to help students understand this concept are also included.]

Elementary Statistics Tutorials:
http://psychology.emory.edu/clinical/bliwise/Tutorials/index.htm
[These tutorials, created by Nancy Bliwise, provide key instruction to areas where students often struggle in statistics classes.]

International Association for Statistical Education:
http://www.stat.auckland.ac.nz/~iase/publications.php
[This organization provides resources on the teaching of statistics, with special attention given to statistical literacy. They also sponsor a series of conferences directed toward improving statistical education.]

Journal of Statistics Education: An International Journal on the Teaching and Learning of Statistics, http://www.amstat.org/publications/jse/
[This website provides links to full length articles published on statistics education.]

Not Awful and Boring Examples for Teaching Statistics blog:
http://notawfulandboring.blogspot.com/
[This site provides examples of graphs that display poor correlations.]

Royal Statistical Society Center for Statistical Education:
http://www.rsscse.org.uk/ts/gtb/contents.html
[This organization provides, among other things, resources, activities and articles directly related to the teaching of statistics.]

Society for the Teaching of Psychology (STP) online resources
http://www.apadiv2.org/otrp/resources/index.php
[Though many of these resources are listed individually in our references, as STP is in a perpetual state of adding additional online resources, this is a web site worth visiting.]

Desrochers, M., & Margolin, S. (2010). Factorial research design. Retrieved from http://www.acs.brockport.edu/~mdesroch/Factorial3/

Gibson, C. J., Klatzkin, R., & Littlefield, L. M. (2012). Research readings and statistical exercises using SPSS and Excel. Retrieved from http://www.apadiv2.org/Default.aspx?pageId=1603793

Gottfried, G. M., Johnson, K. E., & Vosmik, J. R. (2009). Assessing student learning: A collection of evaluation tools. Retrieved from http://www.apadiv2.org/resources/Documents/otrp/resources/gottfried09.pdf

Grosofsky, A. (2013). Instructor's guide to using research methods and statistics concept maps. Retrieved from http://www.apadiv2.org/resources/Documents/otrp/resources/grosofsky13.pdf

Holmes, K. Y., Jemes A., & Stukes, R. (2008). Teaching statistics and research methods: A collection of hands-on activities and demonstrations. Retrieved from http://www.apadiv2.org/resources/Documents/otrp/resources/holmes08.pdf

Holmes, K. Y., & Weaver , A. (2010). Yes, you can write in a statistics class: An instructional tool to reduce anxiety and improve statistics performance. Retrieved from http://www.apadiv2.org/resources/Documents/otrp/resources/holmes10.pdf

Tagler, M. J. (2010). Statistics assignments using Excel®. Retrieved from http://teachpsych.org/Resources/Documents/otrp/resources/excel/introduction.pdf

STP: Project Syllabus – peer-reviewed syllabi:
http://www.teachpsych.org/page-1567662
[Instructors submit their syllabus for various classes, including statistics. Peers review the syllabi and post those deemed of high quality. This is a great resource to see what your peers are doing in the teaching of applied statistics.]

STP: ToPIX (Teaching of Psychology Idea Exchange) – Statistics video clips:
http://topix.teachpsych.org/w/page/19981042/Statistics%20Video
http://topix.teachpsych.org/w/browse/#view=ViewFolder&param=Statistics
[Video clips that have been reviewed for accuracy and value are listed here.]

Statistical Literacy: http://www.statlit.org/
[This web site provides information and articles on improving statistical literacy.]

Statistical Sage Blog: http://statisticalsage.wordpress.com/
[This series of articles on the teaching of applied statistics focuses on the scientific applications of pedagogy to improving student learning in statistics.]

Statistical Instructors Lost in Cyberspace: A New Online Statistics Teaching Discussion Group: https://groups.google.com/forum/?fromgroups#!forum/onlinestats
[For more information about this group, please contact Dr. Michelle Everson at gaddy001@umn.edu]

TeachPsychScience: Resources for Teaching Research and Statistics in Psychology: www.teachpsychscience.org
[This web site provides peer reviewed activities and assignments that help students master statistics and research methods.]

Statistics, Research Methods, and Ethics

Bragger, J., & Freeman, M. A. (1999). Using a cost-benefit analysis to teach ethics and statistics. *Teaching of Psychology, 26*, 34-36. http://dx.doi.org/10.1207/s15328023top2601_6

Gelman, A. (2011). Ethics and statistics: Open data and open methods *Chance, 24*(4), 51-53. Retrieved from http://www.stat.columbia.edu/~gelman/research/published/ChanceEthics1.pdf

Shuster, E. (1977). Fifty years later: The significance of the Nuremberg Code. *New England Journal of Medicine, 337,* 1436-1440. http://dx.doi.org/10.1056/NEJM199711133372006

Obedience: Milgram

- Great Minds of the 20th Century Dr. Stanley Milgram [DVD] http://mediasales.psu.edu/ (Films about the original experiments)
- Jerry Burger's re-creation: http://thesituationist.wordpress.com/2007/12/22/the-milgram-experiment-today/
- Virtual reality recreation: Slater, M., Antley, A., Davison, A., Swapp, D., Guger, C., Barker, C., ... & Sanchez-Vives, M. V. (2006). A virtual reprise of the Stanley Milgram obedience experiments. *PLoS One, 1(1)*, e39. http://dx.doi.org/10.1371/journal.pone.0000039

Roig, M. (2007). *A student-faculty research agreement.* Retrieved from http://teachpsych.org/resources/Documents/otrp/resources/mr07research.pdf

Tuskegee Apology:

- An Apology 65 Years Late (1997, May 16). [PBS Newshour] Retrieved from http://www.pbs.org/newshour/bb/health/jan-june97/tuskegee_5-16.html

Stanford Prison Experiment: Zimbardo

- Zimbardo's Web site: http://www.prisonexp.org/

- Wells, M. (2002, January 24). BBC halts 'prison experiment.' *The Guardian.* Retrieved from http://www.guardian.co.uk/uk/2002/jan/24/bbc.socialsciences

Statistical Literacy Taskforce Members

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