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How to Lie with Statistics

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How to Lie with Statistics

The title for this column is borrowed from Darrell Huff's 1954 book, *How to Lie with Statistics*. The book was revisited in a 2005 issue of *Statistical Science* and acknowledged as "the most widely read statistics book in the history of the world" (p. 205). While laced with humor and written in a causal style, the text also contains substantial intellectual content. A quick Internet search for the text listed it as required reading on recent courses such as Quantitative Reasoning 32 at Harvard University and Statistics 21 at the University of California. The first illustration in the book is a cartoon of two men talking and the dialogue reads, "Don't be a novelist, be a statistician. Much more scope for the imagination." Listening to my graduate students talk about their struggles with statistics classes I suspect more than a few view the subject as an imaginative creation designed to challenge their intellect. In our sister publication, *Gifted Child Quarterly*, the authors take great care to present their data accurately and to support their findings and recommendations with sound statistical reasoning. Most K-12 students probably do not encounter such in-depth statistical analysis in their readings but they still need the skills to understand the data they encounter.

The American Statistical Association's (AMSTAT) *Guidelines for Assessment and Instruction in Statistics Education (GAISE) Report* seeks statistical literacy for all. While you may not know (or remember from your stats classes) all the different statistical terms and tests you read about in research journals, our world is such that we consistently encounter data as part of an effort to influence the choices we make.

In their 2004 book, *Math through the Ages*, Bertlinghoff and Gouvêa describe probability and statistics as two sides of the same coin. Probability seeks to understand characteristics of an unknown sample of a known collection (what

riculum and include the following topics and skills:

Grade 6

- Develop understanding of statistical variability.
- Summarize and describe distributions.

Grade 7

- Use random sampling to draw inferences about a population.
- Draw informal comparative inferences about two populations.
- Investigate chance processes and develop, use, and evaluate probability models.

Grade 8

- Investigate patterns of association in bivariate data.

High School Statistics & Probability

- Interpreting categorical and quantitative data
- Making inferences and justifying conclusions
- Conditional probability and the rules of probability
- Using probability to make decisions

Waiting until middle school to introduce the statistical tools and concepts children need to make sound decisions does a disservice to all and denies our gifted students the opportunity to engage in critical thinking and seek answers to their research questions. AMSTAT offers additional resources for K-12 classroom teachers. Information on their programs is summarized in a PDF flyer at <http://amstat.org/education/pdfs/EducationResources.pdf>.

As a discipline, Statistics is young. Bertlinghoff and Gouvêa's chapter on the history of Statistics (pp. 215-222) begins with an English shopkeeper's work in 1662 and the new field of "Political Arithmetic." Others who shared an interest in developing an understanding of the "mathematics of uncertainty" include Halley, Bernoulli, Fisher, Galton, Gauss, Laplace, Legendre, Pearson, Quetelet, and Tukey among many others. Fisher's 1925 book, *Statistical Methods for Research Workers*, served as guide for many generations. Fisher writes about a summer tea party in Cambridge, England, and a woman who tells the guests she could detect a

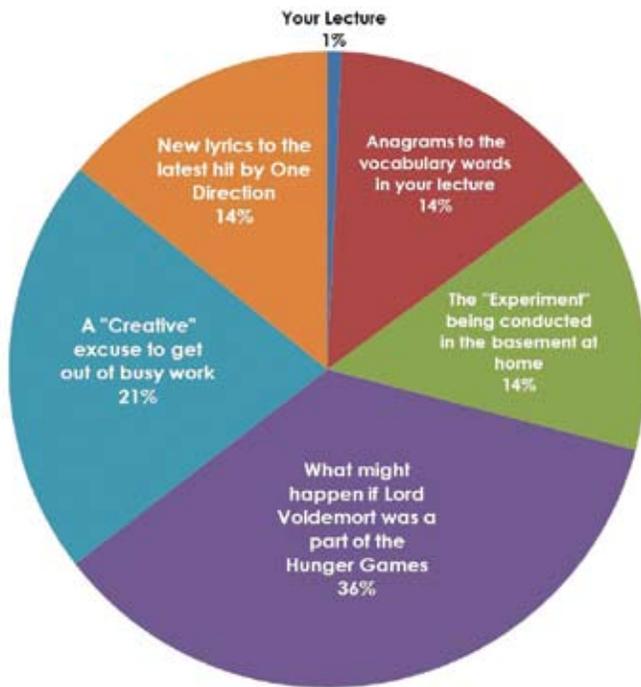
“Our world is such that we consistently encounter data as part of an effort to influence the choices we make.”

is the chance of...), while statistics seeks to extend our understanding of an unknown population from data collected from a small sample. Unfortunately the distinctions between the two sides of the coin are often blurred.

Statistics and probability first appear in the Common Core State Standards for Mathematics in the middle school cur-

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What A Gifted Child Is Thinking About During Class



The Teacher's Corner

Featured in monthly editions of *Compass Points*, *The Teacher's Corner*



provides insight and conversation starters along with related book titles, websites, professional papers, other relevant resources for educators. The complete



archives of the Teacher's Corner, which will soon be available as individual pdf's, are available at <http://www.nagc.org/teacherscorner.aspx>

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difference between a cup of tea that had milk added after the tea was poured and one in which milk was added to the cup first. Dismissed by most in attendance, Fisher designed an experiment to test her statement. It is a great conversation or lesson starter for your students, and for you! For more on the growth of statistics as a discipline see *The Lady Tasting Tea: How Statistics Revolutionized Science in the Twentieth Century*, by David Salsburg. **THP**

References

Bertlinghoff, W. P., & Gouvêa, F. Q. (2004). *Math through the ages: A gentle history for teachers and others*. Washington, DC: Mathematical Association of America.

Franklin, C., Kader, G., Mewborn, D., Moreno, J., Peck, R., Perry, M., & Schaeffer, R. (2007). *Guidelines for assessment and instruction in statistics education (GAISE) report: A pre-k-12 curriculum framework*. Alexandria, VA: American Statistical Association.

Huff, D. (1954, Reissued 1993). *How to lie with statistics*, New York, NY: W. W. Norton & Co.

Institute of Mathematical Statistics. (2005). Special section: How to lie with statistics turns fifty. *Statistical Science*, 20(3).

Salsburg, D. (2002). *The lady tasting tea: How statistics revolutionized science in the twentieth century*. New York, NY: Holt Paper-back.

ART matters

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of ownership. It facilitates re-interpretation of any text they read, whether it be a young adult novel, a mathematical proof, or a non-fiction account of a scientific discovery. The more students are given opportunities to re-design and re-interpret the canonical work in our curriculum, the more readily they might experiment and think outside the box as they progress through education and life. **THP**

Resources

Eisner, E W. (2002). *The arts and the creation of mind*. New Haven, CT: Yale UP.

Gavin, M. K., Casa, T. M., Firmender, J. M., & Carroll, S. R. (2013). The impact of advanced geometry and measurement curriculum units on the mathematics achievement of first-grade students. *Gifted Child Quarterly*, 57, 71-84.

McEwen, K. (2012). *Welcome to silverstreet farm*. Somerville, MA: Candlewick.

Redmond, R. (2004). *Putting the arts in the picture: Reframing education in the 21st century*. Chicago, IL: Center for Arts Policy at Columbia College.

Wilson, B. (2010). *Teaching children to draw*. Worcester, MA: Davis Publications.