The Statistics Teacher Network

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Book Review

Seeing Through Statistics

by Jessica Utts

Duxbury Press, Wadsworth Publishing

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Jessica Utts has two main objectives in *Seeing Through Statistics*: to educate the reader on the important information that can be obtained by the careful application of statistical methodology to real-world problems; and, to eventually enable the reader to "see through" false statistical reasoning in his or her own life. It is this second objective that truly characterizes her book and makes it unique.

Seeing Through Statistics is different not only on its emphasis, but also on its organization and approach. The material of the text is grouped into four main parts, each consisting of several related chapters that form a unit. The majority of the chapters follow a specific format. First, they are prefaced by several "thought questions" to be read and discussed before a study of the chapter is undertaken. These questions provide an excellent resource for small group discussions and "set the stage" for their respective chapters. The chapters themselves are well written and instructive. Most concepts are explained clearly, and numerous actual case studies are integrated throughout the text. These studies illustrate key concepts and help to emphasize the applicability of statistical techniques to problems from various fields of interest.

It should be noted that "the emphasis is on understanding, rather than computing." From my own experience, all too often the average student is overwhelmed by a list of mathematical formulas. Even the student who can identify and use appropriate formulas may have some difficulty in understanding why they are doing so. The author addresses this problem, sometimes successfully and sometimes less so. Nevertheless, the emphasis is not on the use of standard notation and formulas, as step-by-step presentations of the necessary computations are provided. For the instructor who wishes to be somewhat traditional in approach, all relevant chapters end with a section entitled "For Those Who Like Formulas." Most chapters end with an ample supply of exercises, many of which require careful thought and verbal interpretation. Mini-projects are also included; many of them require the student to research and analyze articles found in the media or to conduct a small-scale study. Not only do these activities encourage the student to be an active learner, but they serve as a valuable aid to the instructor as they help to facilitate creative teaching.

Part 1, "Finding Data in Life," provides a clear and thorough presentation of the terminology and concepts behind some of the most common research strategies such as the sample survey, the observational study, and the experiment. But more importantly, it educates the reader on how to identify which type of study is most appropriate for the problem at hand, and it focuses on how to correctly collect data so as to conduct a valid study. Such an emphasis so early on is a feature somewhat unique to this text, and I found it to be very effective.

Chapter 2 proves to be the most original chapter in Part 1, for in it the author outlines

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what she terms the "Seven Critical Components" that determine the soundness of statistical studies. To help illustrate the points made, the author provides four hypothetical news articles that are problematic in nature. Not only are the articles of interest, but the accompanying analyses are instructive in helping the student become an educated consumer of data. The author does an excellent job in Chapter 3 of enumerating problems such as nonresponse or convenience sampling that can arise when conducting a survey. In Chapter 5, the critical elements of a well-designed experiment are considered in detail. By guiding the reader through a careful analysis of several case studies, the author ensures that some experience in troubleshooting is obtained. Also, several types of observational studies are examined. Chapter 6, "Getting the Big Picture," provides in-depth analyses of several case studies which incorporate the important points made in the previous chapters. For example, the reader is presented with a summary and corresponding analysis of a study to determine the effect of daily meditation on the levels of DHEA-S, an age-associated enzyme. A discussion of a Supreme Court decision regarding gender-based differences in drinking and driving provides an excellent illustration of how statistical evidence can influence our laws.

Part 2, "Finding Life in Data," is as creative in approach as was the first part. In addition to traditional graphical presentations of measurement data, the author successfully includes material that focuses on how to critically evaluate presentations of data made by others, such as reports given in the media. Regarding numerical computation, throughout the text the author's preference is to present the calculations as verbal procedures. For example, a six-step verbal procedure for calculating the sample standard deviation is provided. Accompanying this is an example illustrating the use of the outlined sketch. While this approach may be advantageous for some students, I am not convinced that this is true in general. A more effective approach would be to include the standard formula along with the verbal procedure. I have found that formulas often serve as visual aids for the student as they help the student to recall how the necessary computation is to be performed.

Chapter 9 is an in-depth discussion of common problems that plots, graphs, or pictures might demonstrate. Several examples of published graphs that are misleading are discussed, and a checklist for use in interpreting statistical pictures is outlined.

Chapter 11, entitled "Relationships Can Be Deceiving," addresses such issues as the impact that outliers can have on correlations. In emphasizing that correlation does not necessarily imply causation, the author cites the link between prostate cancer and consumption of red meat. Chapter 12, "Relationships between Categorical Variables," is atypical not so much in its presentation as in its placement. For it is through the careful analysis of a 2x2 contingency table that the reader first gains exposure to a formal statistical test. It should also be noted that while the author does a good job of explaining the concept of statistical significance, attention is restricted to the 5% level. Chapters 13 and 14 are primarily designed to aid the reader in interpreting the economic news. The Consumer Price Index and other economic indicators utilized by the U.S. government are analyzed, and the importance of such knowledge is demonstrated. In addition, a checklist for reading time-series data is presented to the reader.

Part 3, "Understanding Uncertainty in Life," provides an introduction to probability which does much more than familiarize the reader with the material considered essential to a formal discussion of inference. It presents the student with informative ideas that can be applied to daily life. For example, the author introduces the "personal-probability" interpretation of probability and discusses the accuracy of personal probabilities often used by weather forecasters and physicians. An example regarding insurance policies provides excellent motivation for the concept of expectation, and a presentation of some recent research on decision-making makes for interesting reading. Several exercises and a mini-project enable the reader to gain experience in working with the sensitivity and specificity of medical diagnostic tests.

Part 4, "Making Judgments from Surveys and Experiments," provides an effective conclusion to the text. Numerous practical examples demonstrate the importance of earlier material and the usefulness of the confidence interval and test of hypotheses in summarizing statistical results. A case study titled "A Winning Confidence Interval Loses in Court" provides an account of a legal case which shows the validity of using confidence intervals for estimation. Chapter 21, "Hypothesis Testing—Examples and Case Studies," contains several excerpts taken from journal articles. Chapter 25 discusses the need for meta-analysis and presents the benefits and criticisms of this relatively new technique. The final chapter consists solely of case studies

whose analyses require the careful integration of important concepts and techniques introduced throughout the text.

While Jessica Utts's new text has many strong features, and she has done an excellent job of making statistics "come alive" for the student, the use of this book may not be appropriate for all audiences or instructors. While Minitab outputs are provided and discussed at several points in the text, no attempt has been made to integrate technology into the presentation or exercises. Consequently, for the instructor inclined to use technology or who feels that its use can only enhance the learning process, this text would not be the best choice. As there is little emphasis on the use of formulas or the underlying statistical theory, the instructor with a preference for a more traditional approach may have difficulty in utilizing this text. Similarly, *Seeing Through Statistics* may not be suitable for a course geared to the mathematically-oriented student. I should note, however, that this is not the intent of the author. This book is specifically designed to fit into the general education curriculum. At times this textbook has a tendency to feel too verbal. This may be due to the repeated analyses of several case studies in various contexts. The inclusion of some additional case studies for illustrative purposes would help to eliminate some of the redundancy.

In summary, *Seeing Through Statistics* would make an excellent choice of textbook for the instructor who desires a highly readable text with the primary focus on the use of statistical methods in the real world. While the approach is nontraditional, I feel confident that the successful use of this text would result in a high degree of statistical literacy. Not only does it enable the student to develop an understanding of the key ideas and techniques, it aids the student in developing a "critical eye." The creative use of this innovative and appealing text would place the student in a better position to analyze reports of statistical studies found in the media or in other sources. Such a student will have taken an active role in the learning process and will have gained considerable experience in providing verbal analyses to various problems. Finally, since the text provides numerous case studies from a wide range of disciplines, its use could only foster student interest in the subject.

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Statistics in the Classroom

How Beginning Students Were Able to Spot an Error in the *Against All Odds* Video

The heroes were the students in our introductory business statistics course. They were mostly sophomores and freshmen who feared statistics ("sadistics") as much as do other undergraduates, and many of whom say they "hate math." The class spotted a fundamental error in the video series *Against All Odds* (*AAO* hereafter) because it learned the resampling approach to inference as well as the conventional approach. The error itself is a direct result of the conventional formulaic approach taught in the video.

It happened this way. An *AAO* program shows the quality measurement procedures of the National Institute of Standards and Technology (NIST), and then examines the case of PCB samples. Various laboratory users throughout the country purchase individual bottles of PCBs to use as a standard in their work. The researchers need to know the amount of PCB per billion parts, and they are told that the mean value in the bottles produced by the NIST is 289. They also wish to know how close their particular bottle is likely to be to that mean. The video offered an answer to that question using the apparatus of a *t* test for the confidence limits around the mean of a sample of ten bottles. The computing formula was given; the actual computation is quite incomprehensible to viewers. Accompanying the formula are such phrases as "plug in the values" and "robust against non-normality."

To make clear to the students the meaning of the procedure that the video followed, we showed how to estimate the same sort of confidence limits the program does—that is, solving the same problem of obtaining confidence limits around the mean of ten observations—but using a resampling procedure instead of the conventional procedure the video showed. The students generally understand resampling simulations fairly easily, while the underlying logic of confidence limits is always difficult, being exceedingly subtle in its underlying philosophy.

Then one student asked: Why estimate variation in the mean of a sample of ten bottles, if the customer will get only one bottle? Quite right. As soon as he asked his question, it was clear that the question went to the heart of the procedure. So another student chimed in. The

students saw that the actual problem is: If you send someone an unknown sample, within what bounds is the single bottle likely to be? However, the problem that the machinery used in the *AAO* video was designed to deal with is quite different: You have ten observations and you wish to decide the "true" parameter of the population.

Notice, please: These are "ordinary" undergraduates and not professional statisticians. This shows that resampling has the power to bring out extraordinary thinking in "ordinary" students. In contrast, we don't believe that they are as likely to ask such penetrating questions if taught conventional parametric statistics, or from the *AAO* video alone.

How should one best handle the question at hand—estimating the reliability of a single bottle-sample sent out? If we had data on (say) thousands of bottles, we could simply observe directly from the data how much the bottles vary from one another and make statements for the customer like "98% of the bottles fall between 9.89 and 10.12." But what do we do when we have only these ten observations? That's not enough to make a precise statement like the above.

We are forced to make an "inference," based on our sample, about how large numbers of bottles are distributed. A sample with few observations, say less than ten, obviously contains very scant information, especially at the tails of the distribution. Hence we tell the students that with very few observations it makes sense to utilize additional information that is known in general. Because the observations of the chemical are a sample of "errors," it makes sense to use the normal "error distribution" to help us. The normal distribution is the theoretical, empirically-based description of how error spreads out the observations in a homogeneous population where there are many small causes of error. Our students come to understand the shape and the nature of the normal distribution by using the quincunx, that shows the normal as a limit of the binomial.

One can then fit the ten chemical observations to the normal error curve with a graph, or with the standard deviation. This procedure harks back two hundred years to the start of the intellectual stream of statistics that began with astronomy. It seemed natural then that an appropriate procedure is to use the observations themselves as the basis for directly estimating the amount of variation in the positions of stars.

To recap, let's put the issue into different words. We must distinguish between variation among elements in the population, which is of interest in the case of the PCBs, and variation in the means of samples drawn from that population. The latter obviously is much less variable than the former. This entire issue is subtle, and if the film, made by professional statisticians, gets it mixed up, it should not surprise us that introductory students find it confusing.

The students find it helpful to compare PCB's with another case. A maker of hog rations wants to advise prospective buyers about the average gain in weight that hogs achieve with this food, because that is what the farmers are interested in; the variation among nutritive quality from bag to bag is of little concern to the farmer, and hence to the manufacturer, unlike the case with PCBs.

It should be noted that the error our students discovered was non-trivial. The discussion of the problem occupies perhaps a third of an entire video program. And these students probably are not the first to discover this error. Hundreds of Ph.D. statisticians have undoubtedly seen the series, and millions of television viewers, so some surely have spotted the error. The review of *AAO* by Gabriel et al. (1991) in *The American Statistician* symposium alluded to errors in the general topic of confidence limits, and mentioned a similar fault in the discussion of SAT scores. But most viewers apparently are so snowed by the algebra, the fundamental problem with all conventional statistics, that the error goes unnoticed. Years ago, Allen Wallis and Harvey Roberts in *Statistics: A New Approach* made the same point: "The great ideas of statistics are lost in a sea of algebra." (Free Press, Chicago, 1956, p. viii.)

It is surely because our students were freed by the resampling approach to think hard about the essential nature of the problem that they discovered this error. And just as surely, trying to memorize formulas keeps most students from thinking hard about such problems. This seems a powerful argument for using the resampling method, and therefore for teaching it.

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Book Review

Probability and Statistics
by Alan Barson
Frank Schaffer Publications, Inc. 1995
Torrance, CA 90505

What are the most commonly used letters in the English language? Are you a square or a rectangle? These questions, as well as others, were answered by a group of fifth through seventh grade students as they completed some of the activities contained in *Probability and Statistics*. An excellent resource book (108 pages) for teachers in grades four through eight, it's divided into five sections: "All About Me and My Friends," "My Class, My Grade, My School," "Games People Win," "Food, Wonderful Food!" and "My Favorite Sports." Alan Barson has done a splendid job including a wide assortment of topics to engage children in activities involving probability and statistics. Each section contains more than ten activities or experiments, and is preceded by several pages of "Teacher Tips." To assist the classroom teacher, these pages contain practical suggestions, background information, answers (where applicable), and ideas to extend each activity. This book will give math teachers ideas to which incorporate the NCTM standards related to probability and statistics.

In section two, "My Class, My Grade, My School," my fifth grade students had a great time with the experiment entitled "We Get Letters!" This is an activity that challenges children to predict the most commonly used letters in the English language. Each child predicted the letters they felt would be the top five most popular. They recorded these predictions in their copybooks, then began collecting data. The children brought in a book other than their usual math book, opened it randomly, and picked a spot to begin counting letters. A's were counted, then B's and so on. Line plots were used to record results. They thought it was great using a social studies book or a science book in math class. After collecting data from this paragraph, limiting our time to about a ten minute period, the children were asked to stop and compare these data to their prediction. It was easy for them to see the most frequently used letters since the data were recorded as a line plot. Most were astonished that they were able to predict at least three of the five most popular letters. This led to an impressive discussion of how their predictions were formulated.

Barson also gives several excellent suggestions for extending this experiment. He suggests playing a game of hangman to see if this new knowledge assists them in discovering the secret word. Another suggestion was to examine the keys on a typewriter and explain their positioning based on this research. In the third follow-up activity the children are required to write three sentences about themselves without using any of these five most commonly used letters. I assigned this particular activity for homework that night, and many thought writing three sentences for homework would be a snap. But the next day my students came to class saying how much fun they'd had trying, although they found it impossible, to come up with three good, coherent sentences. This activity also generated much discussion.

Another interesting activity in section two is a "True-False, Multiple Choice" worksheet. The task is to speculate what the odds are at passing a true-false test and a multiple choice test by just "guessing." Your students will enjoy taking *this* test. The children flip a coin (heads—true, tails—false) to determine the answer, summarize this information, and graph the data. What do you think the odds are?

How many three-letter words can be made from the letters A, E, T, and S? is the initial challenge in the game "Making Words," found in section three—"Games People Win." Then, a little twist is added. You must now put all four letters (A, E, T, and S) in a container and remove three letters, one at a time. You must place the letters in front of you in the same order they were drawn. Yes, you don't always get a three-letter word! If you get a three-letter word you score a point. This continues for 20 rounds and the player with the most points wins. Our seventh grade students loved this game so much, they continued to play during recess. This is an excellent game to incorporate language skills into the math classroom.

"Food, Wonderful Food!" is the fourth section. What an inviting topic! Fast food restaurants are a favorite with almost every student so the title itself, "Fast Food Favorite," was enticing. My sixth grade class could hardly wait to jump into this project. I assigned partners, as suggested in part one of the directions, and this worked nicely with sharing the work. In part two of the directions, instead of asking for their favorite fast food establishment, we brainstormed and recorded a list of fast food establishments in our area. This made it easier for the students to do their survey. The list of the fast foods provided on the given worksheet did not include pizza, so we

included that in our survey. This part of the worksheet can be customized to your own geographic area. We tallied and graphed our results and displayed them outside the classroom for all to see. The last part of the worksheet asks the children to draw some conclusions from their collected data. This is a great way to incorporate writing into the math class.

If you're planning to add a new resource book to your teachers' library, we suggest you make it *Probability and Statistics* by Alan Barson. In our opinion, this book gives a varied selection to suit most any ones appetite for probability and statistics. You can find activities and experiments like those described above as well as research projects for your sports enthusiast. This is sure to be money well spent.

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Software Review

Student SYSTAT

Interest in statistics and data analysis (Quantitative Literacy) has been stimulated through the activities of the Joint Committee on the Curriculum in Statistics and Probability of the American Statistical Association and the National Council of Teachers of Mathematics. Now interest in Quantitative Literacy has been heightened with the announcement that on May 6, 1997 the Advanced Placement Examination in Statistics will be given for the first time by The College Board. Of particular significance is the role of technology in AP Statistics. As it will be necessary for teachers of statistics to choose an appropriate statistical software package to facilitate data analysis, several factors that seem to me to be significant in the selection of the statistical software system are:

1. The teacher's personal confidence in using the selected software.
2. Compatibility of the software used for the examples in the selected text with the chosen software. In selecting a statistics text, it would be desirable to have a text that uses the selected software for the data analysis examples.
3. The desirability of using student versions of larger statistical packages. This consideration would allow for the acquisition of multiple copies of the student version and perhaps one copy of the larger system. The knowledge obtained with the student version would allow students to use the larger system easily.
4. The cost of the software.

Student SYSTAT (STUSTAT)

To assist *STN* readers in their investigation of statistical software, a brief review of the DOS version of STUDENT SYSTAT (STUSTAT) is presented below. STUSTAT is also available in Macintosh and Windows. It is one of several "sub-versions" of the larger and more expensive "SYSTAT Statistics and Graphics" statistical package. STUSTAT is a subset of version 5 of the larger SYSTAT which is now in version 6.0 for DOS.

The earliest "sub-version" of SYSTAT was MYSTAT which was reviewed in *STN* by Dennis Leitner in October, 1989. Later versions include BUSINESS MYSTAT, BUSINESS MYSTAT With QCTOOLS, and FASTAT (no longer available). Most of the "sub-versions" are available in Macintosh, DOS and Windows.

The following comments will refer to both STUSTAT (version 1.0) and the accompanying text, "Data Analysis With Student Systat" by Kenneth Berk. Since STUSTAT was designed to be compatible with the larger SYSTAT software system version 5, the Berk text refers to SYSTAT throughout all discussions.

The text was designed to teach ". . . data analysis and SYSTAT usage at the same time." It includes examples of the use of the SYSTAT programs applied to real-life data from the 54 data sets included on the accompanying SYSTAT Data Disk.

The DOS version is designed for ease of use with pull-down menus for beginners and powerful commands for experienced users. Even though the text indicates that there is "extensive help on-line," when "help" is requested with the F1 key, there are many responses of "Cannot find help for the item you requested—the help file may be damaged." These "non-helps" occur only in the graphing commands of the SYGRAPH group.

An essential feature of any data analysis software is the capability to perform file maintenance and organization. STUSTAT has a spread-sheet format for storing data and it has commands for importing and exporting files in a wide variety of formats. Furthermore, the capability to sort, match and merge files provides for good data processing and organization. These file processing capabilities are far superior to the very limited file

processing operations available in the MYSTAT programs.

While the data files are edited in a spread sheet array with a command "EDIT," a very important feature is the full-screen text editor called "FEDIT." This allows the user to perform text editing without leaving the STUSTAT programs.

A powerful graphing program, SYGRAPH, provides capability for a wide range of 2-dimension and 3-dimension graphics. Among SYGRAPH commands are:

SPIN—for spinning three-dimensional data plots.
PLOT—for producing scatter plots and function plots.
BAR—for producing bar graphs.
PIE—for producing pie charts.
BOX—for producing box plots.
STEMLEAF—for producing stem-and-leaf displays.

The graphical displays can be controlled by an extensive array of commands, including color options.

Statistics Section Commands

CORR—provides for both the Pearson product-moment correlation and the Spearman rank correlation coefficient.
MGLH—allows the user to estimate and test regression models.
ANOVA—allows the user to perform analysis of variance for full factorial designs that include all interactions.
NPAR—provides for several nonparametric computations. These include Sign Test, Wilcoxon, Friedman, Kruskal, and Kolmogorov-Smirnov.
SERIES—allows for the interactive analysis of time series.
STATS—computes basic summary statistics.
TABULATE—lets you specify the variables for multiway tables.

Cautions While Using STUSTAT, DOS Version

- As mentioned above many of the commands in SYGRAPH group of commands do not have active "help" comments.
- It is necessary to enter the program STUSTAT (DOS) by using the command LOADFIX STUSTAT. This can be done with a simple BAT file such as STU.BAT, which is stored in C:

```
C:
CD\
CD STUSTAT
LOADFIX STUSTAT
```

(LOADFIX ensures that the program is loaded above the first 64K of conventional memory.)

- Caution is advised when using a small number of characters in file NAMES. For example, when using data files with names consisting of only four characters, the program *sometimes* will store the data in memory locations that are not accessible by the user.

Acquisition and Technical Support

The best source of general information is Martha O'Connor, Duxbury Press, 10 Davis Drive, Belmont, CA 94002, E-mail: martha_o'connor@wadsworth.com, 1-800-876-2350 x338. University faculty can request review copies from 1-800-423-0563 if they are considering the book for adoption in their courses.

For site licenses for software and technical questions call Ashley Basinger, 1-800-423-0563 x5402.

High school educators can call 1-800-824-5179 for limited information. This phone number is serviced by too many people, some of whom may know less than the caller. It may be best to contact an area representative of International Thompson Publications or Martha O'Connor. Educators can obtain technical support from either: Wadsworth at 1-800-327-0325 or SYSTAT at 1-312-494-3283.

Helpful information about SYSTAT can be obtained from the internet by subscribing (for no charge) to the SYSTAT-L list. Send a message to "listproc@spss.com". The message should include: SUBSCRIBE SYSTAT-L Fname Lname (where Fname and Lname are your first and last names) To order books by credit card call 1-800-354-9706.

The STUDENT SYSTAT ISBN numbers are:

Windows Price: Text only: 1-56527-132-7 $23.75; Text and SYSTAT software: 1-56527-131-9 $39.75; SYSTAT Installation program: 1-56527-266-8 $23.75; Data Disk: 1-56527-573-X FREE.

For DOS: Text only: 1-56527-090-8 $23.75; Text and SYSTAT software: 1-878748-97-1 $39.75; SYSTAT Installation program: 1-56527-270-6 $23.75; Data Disk: 1-56527-253-6 FREE.

For Macintosh: Text only: 1-56527-089-4 $23.75; Text and SYSTAT software: 1-878748-95-5 $39.75; SYSTAT Installation program: 0-760034-796 $23.75; Data Disk: 1-56527-321-4 FREE.

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From the Editor

I hope that your summer was relaxing and educational, and that you have begun the new year with interesting statistical activities. Keep in mind the national project and poster competitions. See ASA's web site for details, or contact me. Also, some areas are holding local competitions. For example, Tom Short (short@monet.vill.edu) and Rosemary Reshetar (rreshetar@abim.org) are holding a competition for the state of Pennsylvania. Those of you in northeast Ohio can contact me for one by the ASA Cleveland Chapter.

This is a very exciting year for statistical education. The first exam in Advanced Placement Statistics will be given next May 1997. The AP Stats listserv is busy with discussion on texts, curriculum and activities.

Two excellent four-week long Science Education And Quantitative Literacy workshops were held last summer in Cleveland, Ohio and San Jose, California. Look for more information on SEAQL in a future issue of *STN*.

Check out "other resources" under Paul Meyers' AP Stats web site at http://www.mindspring.com/~waus2/apstat. Be sure to send me your favorite web sites as well as what topics you want to see in future issues of *STN*. Have a great year!

—Jerry Moreno

Keep Us Informed...

The Statistics Teacher Network is a newsletter published three times a year by the American Statistical Association—National Council of Teachers of Mathematics Joint Committee on the Curriculum in Statistics and Probability.

We need your letters, announcements, articles, and information about what is happening in statistics education! Please send hard copy, and, if possible, a disk written in standard ASCII text to the editor:

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1996 American Statistics Poster Competition Awards

Winners

Grades K-3, Award Winner
Samantha Wang
What Kind of Cookies do People Buy
advised by Steve Wang
May Morley Elementary School
Lincoln, Nebraska

Grades 4-6, Award Winner
RaQwin Young and Kristin Kelly
People's Ears Do Grow Throughout Life
advised by Sue Kirby
Lincoln Public Schools
Lincoln, Nebraska

Grades 7-9, Award Winner
Steven Wise
Crime in America
advised by Dan D'Orazio
Cuyahoga Heights Middle School
Cuyahoga Heights, Ohio

Honorable Mention

Grades K-3, Honorable Mention Award
Stephen Discenza
Animals, People, Things?
advised by Naomi Macari
St. Lawrence School
Huntington, Connecticut

Grades K-3, Honorable Mention Award
Jessica Perille
Which Ice Cube Melts Fastest?
advised by Naomi Macari
St. Lawrence School
Huntington, Connecticut

Grades K-3, Honorable Mention Award
Daniel Guido
That's Entertainment
advised by Naomi Macari
St. Lawrence School
Huntington, Connecticut

Grades 4-6 Honorable Mention Award
Cody Stolle and Jamie Unger
Favorite Colors Through the Ages
advised by Mrs. Prettyman and Mrs. Stolle
Humann Elementary School
Lincoln, Nebraska

Grades 4-6 Honorable Mention Award
Ellen Hukkelhoven, Alexandra Denby,
Juliana Schulze, and Maria DeOliveira
How Far Can a Fourth Grader Kick a Soccer Ball
advised by Mrs. Julia Donnelly
Mountain Park Elementary School
Berkeley Heights, New Jersey

Grades 7-9 Honorable Mention Award
Anne Petrak and Beth Calderone
Skittles: Taste the Rainbow
advised by Carol Davies
Memorial Junior High School
Mentor, Ohio

Grades 7-9 Honorable Mention Award
Kristen Chappel and Jill Luteran
Is There a relationship between Volcanic Height and Deaths?
advised by Carol Davies
Memorial Junior High School
Mentor, Ohio

Grades 7-9 Honorable Mention Award
Erin Varner and Sarah Zeigler
Smoking: Lit Up or Butt Out
advised by Susan Misiolek-Lee
Dallastown Middle School
Dallastown, Pennsylvania

Grades 10-12 Honorable Mention Award
Melissa Hampton and Megan Spurling
Parents + Participation = Better Education
advised by Wanda Siebert
Hauser High School
Hope, Indiana

Grades 10-12 Honorable Mention Award
Julie Lynch, Dawn Weseli,
and Lynn Wesseler
Tracking the Mini-Marathon
advised by Mary Riehle
Roncalli High School
Indianapolis, Indiana

Poster Competition information is available on the ASA web site at
http://www.amstat.org/

1996 American Statistics Project Competition Awards Winners

Grades K-3 Award Winner
RaQwin Young and Kristin Kelly
People's Ears Do Grow Throughout Life
advised by Sue Kirby
Lincoln Public Schools
Lincoln, Nebraska

Grades 4-6 Award Winner
Jared Glover and Kevin Kress
Environmental Wipe-Up
advised by Carolyn J. Glover
Chestnut Academy
Pittsburgh, Pennsylvania

Grades 7-9 Award Winner
Deann Akins, Shelley Dominy,
Alice Rigdon, and Crystal Covington
A Comparison of Male and Female Scores in High School/Higher Level Mathematics and Science Courses
advised by Sandra P. Griffin
Tift Co. Jr. High School
Tifton, Georgia

Grades 10-12 Award Winner
Nathan French, Tory Jay,
Jeremy McCrary, Jonathan McCrary
and Jeffrey Quinn
An Introductory Pscholphysical Study of Cookies
advised by Evelyn Osman Maxwell
Greenwood Lab School
Springfield, Missouri

Grades 7-9 Computer Prize
Matthew Hathorn and Daniel Hathorn
How Random is Random
advised by John Hathorn
Home School
Kent, Ohio

Grades 10-12 Computer Prize
Brad Lega and Todd Gureckis
The Application of Mathematical Regression Models to Study the Effect of Bovine Somatotropin on Somatic Cell Count in Jersey Cows
advised by Joe H. Ward, Jr.
Health Careers High School
San Antonio, Texas

Honorable Mention

Grades 4-6 Honorable Mention Award
James Anderson and Daniel Amendola
Liar, Liar, Pants on Fire
advised by Linda Inlay
Napa Valley Unified School District
Napa, California

Grades 4-6 Honorable Mention Award
Lauren Di Bianca, Lauren Kennedy,
and Megan Ritchie
Tropical Madness
advised by Susan Edge
Hanes/Lawrence Middle School
Winston-Salem, North Carolina

Grades 7-9 Honorable Mention Award
Nick Staubach and Karen Staubach
Where in the World is Carmen Sandiego
advised by Peter Tanaka
Sycamore Junior High School
Cincinnati, Ohio

Grades 7-9 Honorable Mention Award
Matthew Hathorn and Daniel Hathorn
How Random is Random
advised by John Hathorn
Home School
Kent, Ohio

Grades 10-12 Honorable Mention Award
Claire Henson, Bridget Rogers,
and Nadia Reynolds
Always Coca-Cola
advised by Carol Castellon
University High School
Urbana, Illinois

Poster Competition information is available on the ASA web site at
http://www.amstat.org/