



The **BEACON**

News from
The Coalition for Excellence in Science and Math Education

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SPECIAL ELECTION

A special election is coming up in September which will, among other things, propose two amendments to the State Constitution of particular interest to the membership of CESE.

One concerns reorganization of the entire education system in New Mexico. It would eliminate the office of Superintendent of Public Instruction, to be replaced by a Secretary of Education who would head a new State Department of Education as a cabinet department of the Executive Branch. The current State Board of Education would be abolished, and replaced by a purely advisory 10 member elected board. If you have read the many letters to the editor and OP ED pieces we have generated over the past two years, you know that your Board and officers are firmly against this proposal. We urge you to vote against it in the special election. Just to recap our reasons: 1.) Our data show that the form of governance of a state's education system has no effect on student performance, and 2.) To reorganize the system would cause a great deal of disruption and jeopardize the good work of the current BOE, some of which is just coming to fruition.

The other concerns distributions from the Land Grant Permanent Fund. The amendment would increase the amount of money the state could take from the permanent fund. CESE is always in favor of more money for schools, but we're not in favor of depleting the principal in perilous economic times. Right now, we don't know if this course of action is affordable.

We have not firmly made up our minds on this amendment and it has been one of the knottiest problems the CESE Board has had to deal with in a long time. We are getting additional input from various people (Virginia Trujillo, Governor Richardson's Education Policy Advisor, for one) before we finally decide. We will let you know what our recommendation is well in advance of the special election.

Bill MacPherson
CESE President

Bring a friend to the
7th ANNUAL MEETING
Sunday, June 22nd, 1:00 to 5:00 PM
First Unitarian Church (Southwest corner
of Carlisle and Comanche)

Bill Hume, New Mexico Policy and Planning Director, Office of the Governor (and previous Editorial Page Editor of the Albuquerque Journal) will speak on ***The Education of a Journalist and the Future of Education in New Mexico.***

DUES help us to award science fair prizes, issue white papers, sponsor public events, pay for postage and printing of the BEACON, etc.

If your mailing label does not show 2003 beside your name, your dues are due. Discrepancy? Contact Jerry Shelton <jshelton101@comcast.net> or (505) 296-1467.

Please use the enclosed envelope to send in your dues. Remember, CESE dues and contributions are tax deductible. Thank you for your continuing support.

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Book Review

The Zuni Enigma

By Nancy Yaw Davis

The hypothesis of "The Zuni Enigma" is that explorers of Japanese ancestry visited America in the late 13th Century, traveled east and mixed their blood and culture with the ancestors of the modern Zuni people. This is a fascinating idea that seems rather outrageous at first blush but has been gaining proponents for further research and possible elevation to the rank of a theory.

It is well known to anthropologists that the Zuni skeletal structure, blood types, religious beliefs and language are startlingly different from any other Native Americans, but also that these features bear a resemblance to those of the Japanese. They are not identical to the Japanese, but are suggestive of a blending of the Japanese and Native American. Dr. Davis presents a convincing case for further research into all these areas.

Dr Davis gives us a picture of what the pueblo looks like at the present time, comparing and contrasting the Zuni with the other neighboring pueblo cultures. The Zuni kinship system is apparently linked with everything in Zuni society. To quote Davis, "The Zuni have so many relatives in so many different categories—all in the same town—that they have successfully and perhaps permanently confused anthropologists. In all, four systems weave people and their relationships into a complex fabric of social and religious ties: clans, kiva groups, curing societies and priesthoods." The Zuni system seems to be a strange mixture of patrilineal and matrilineal lines of descent.

Questions persist about the relationship of the Zuni to other Native Americans including other pueblo cultures. Why does the Zuni language have no known affiliation to any other language in North America? How did the blood type B get to this pueblo and not to others? How did the religion system get to be so complex?

Davis explores possibilities for how the Japanese may have made it to the American west coast. Japanese sea going vessels of the thirteenth century were capable of traveling not only to the Pacific Northwest, but all the way to the tip of South America. It has always mystified archaeologists why the signs of settlement by early humans frequently are older in South America than in North America. The mystery goes away if you abandon the Bering land bridge approach and assume that the earliest explorers used the Pacific Ocean as a highway up and down the west coast of North and South America. Although far older

than the period Davis is discussing here, Kennewick Man of the Pacific Northwest seems to have a bone structure closer to a group of Japanese people than to the Native American tribes of the region.

Davis discusses similarities in dental morphology, bone structure, blood type, and diseases between the Zuni and the Japanese. The so called "Cusp of Caraballa" is one of many dental characteristics that vary in frequency among different human populations. It is an extra cusp on the upper first molar. As far as is known, the cusp confers no evolutionary advantage, it is just a peculiar genetic feature that appears in human populations in different forms and frequencies. Caucasians are much more likely to have it than are Asians. Native Americans are more likely to have it than Japanese. The Zuni incidence of the cusp is about the same as the Japanese, (i.e. it is relatively rare.) Another dental feature is the shovel shaped incisor. Most Native Americans have the feature, but fewer Japanese have it. The Zuni have the feature at an incidence rate between the Native American and the Japanese.

Two early studies of Zuni remains reveal distinctive changes in skeletal measurements suggesting new additions to the gene pool about the thirteenth century. Japanese skulls and skeletons have features consistent with these changes (i.e. broader and smaller crania and shorter stature.)

Another physical trait that is remarkably similar in both the Zuni and Japanese populations is the incidence of renal disease. The Zuni incidence is 14 times higher than in Caucasian Americans, 6.2 times greater than in black Americans, 6.3 times greater than in the Ramah Navaho and 3.7 times greater than in the Hopi, their neighbors. The Japanese have an unusually high incidence of this particular disease. As Davis states, ". . .we must consider a genetically based (and shared) vulnerability to this disease."

There are many other similarities mentioned in her book: similarities in pottery making, parallels in traditions and religion, the similarity of

the Zuni sacred rosette to the Japanese chrysanthemum crest and many, many more too numerous to mention here.

While presently there is insufficient evidence to prove Davis' hypothesis, she presents a plethora of places where research can be done to strengthen the idea. This seems like an excellent start toward a theory, and it seems better tied together than Gavin Menzies' ideas presented in "*1421, The Year China Discovered America*." I must confess to not having read Menzies' book, but from the scathing criticism it has gotten in the press, it seems like he is trying to do what the creationists do, bypassing the scientific journals and taking ideas directly to the public.

I recommend "The Zuni Enigma." It is extremely interesting and well written.

Bill MacPherson



UNBELIEVABLE STATISTICS

It has been said that there are “lies, damn lies, and statistics.” Many of us might not realize how easy it is to present falsehood disguised as statistical truth. People who have an economic, political, ideological, or emotional investment in a certain result will find ways to omit data that might invalidate their preconceptions. They will often not admit, even to themselves, that they are doing anything dishonorable.

Here is an example. Suppose we plot the average rank on NAEP tests against the rank of school financing in dollars spent per pupil. The first rank on the tests is the highest average score and the first rank in financing is the greatest amount spent per pupil. Most states actually spend pretty close to the same amount. There are a few anomalous jurisdictions like the District of Columbia— fiscally generous but academically abysmal, and North Dakota—low in spending but with fine schools. There is a slight trend for better results with more spending, but it is not at all important. Because there is so little difference in spending for many states, it would be hard to see a trend even if there were no wild cards like DC. (See Figure 1.)

This state of affairs is unsatisfying to many people. Is it not obvious that more money spent on the schools will give better results? Don't you imagine that some states have misstated the amount they spend on education? And is it not likely that different jurisdictions have different methods of accounting for and reporting their education funding? Maybe all of these are true, so doesn't it make perfect sense to eliminate the obviously false data? We are quite positive that there should be a definite trend in the data. It is certain that some of the data in this plot are spurious.

We only have to eliminate a few jurisdictions to get much nicer results. There are 16 states that are obviously wrong, so let's eliminate those. We don't alter a single data point. We simply get rid of some that are clearly too wild to be genuine. Now we have a very nice correlation be-

tween funding and scores. We could have referenced the same data source as before; we just didn't use all of it. (See Figure 2.)

Data deletion could have been done with complete honesty. We could have examined each state's accounting details and eliminated those that were inconsistent with the majority. Then we tell people how and why we eliminated some data. If all they see is the second plot, and are told (without details) that “inconsistent” data have been omitted, they don't know whether the plot is true or spurious. It would be difficult to get away with this sort of chicanery in a refereed mainstream publication. Unfortunately, the people presenting this stuff don't always tell us where, or if, they have published it. They don't always let us know the details of their calculations. It would be unusual for the average legislator or school administrator to demand those details, especially if the conclusions are consistent with their own preconceptions and desires.

Even experimental data can be bogus. Honest experimenters write an experiment protocol before they even start their experiment. Some organizations require protocols to be signed off by an ethics committee. The experimenter ought to have other qualified scientists who are not involved in the project review the experimental protocol. Surely it is unnecessary to say that the experimental procedure must not be surreptitiously changed in midcourse. If changes must be made, get approval for a new protocol. Many organizations require data to be kept in ink in a permanently bound hardcover notebook. Honest experimenters keep every scrap of scratch paper.

It is unfortunately not unknown for experimenters to violate these rules. If it doesn't work out the way you want it, change the procedure until it does. If the results seem to be unstable, the dishonest experimenter is in luck. Just rerun the experiment until it happens to come out the way you want it, and discard all the “bad”

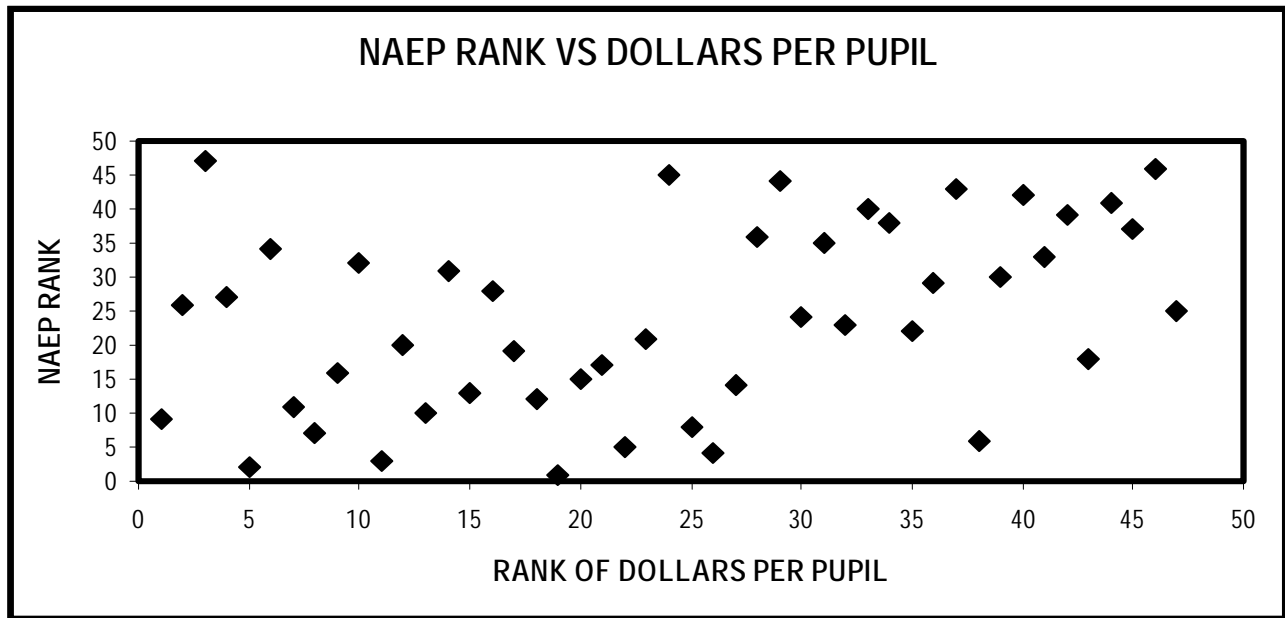


Figure 1

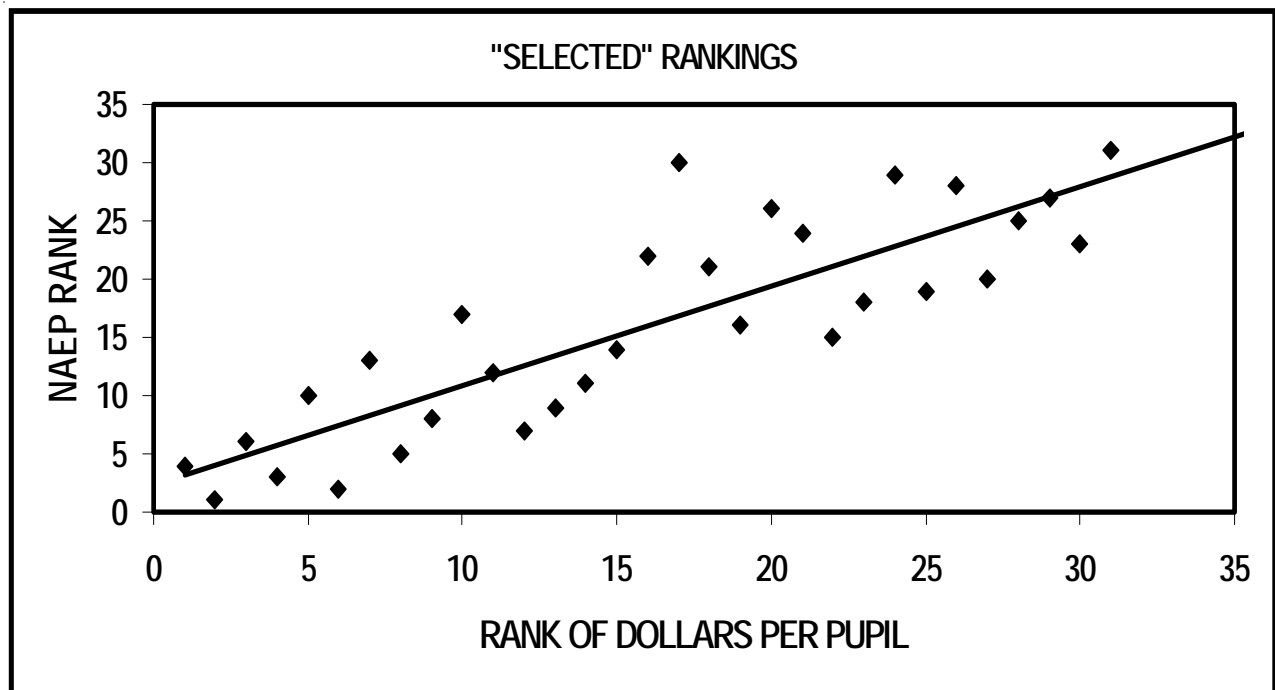


Figure 2

runs. Clever but less than honorable experimenters can set up experimental conditions to improve the chance of getting the results they want.

Lying with statistics is not the rule, and may not even be very common. However, it does exist. Your

index of suspicion should be heightened whenever you see data that supports the presenter's strongly held viewpoint. If the data is presented without details or sources, we should be especially skeptical. Unfortunately, the usual thing

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is a bare bones, bottom line presentation and listeners have to rely on the presenter's honesty. It is unusual to let readers know exactly

how the results were obtained, and readers seldom ask for the information.

Walt Murfin
CESE Statistician

Editor's note: The following article written *after* Murfin's is an excellent example of why we should apply *caveat emptor* to all statistics.

May 7, 2003

ON EDUCATION; What Some Much-Noted Data Really Showed About Vouchers By Michael Winerip (NYT)

In August of 2000, in the midst of the Bush-Gore presidential race, a Harvard professor, Paul E. Peterson, released a study saying that school vouchers significantly improved test scores of black children. Professor Peterson had conducted the most ambitious randomized experiment on vouchers to date, and his results—showing that blacks using vouchers to attend private schools had scored six percentile points higher than a control group of blacks in public schools—became big news.

The Harvard professor appeared on CNN and "The NewsHour With Jim Lehrer." Conservative editorial writers and columnists, including William Safire of The Times, cited the Peterson study as proof that vouchers were the answer for poor blacks, that Al Gore (a voucher opponent) was out of touch with his black Democratic constituency and that George W. Bush had it right.

"The facts are clear and persuasive: school vouchers work,"

The Boston Herald editorialized on Aug. 30, 2000. "If candidates looked at facts, this one would be a no-brainer for Gore."

Then, three weeks later, Professor Peterson's partner in the study, Mathematica, a Princeton-based research firm, issued a sharp dissent. Mathematica's report emphasized that all the gains in Professor Peterson's experiment, conducted in New York City, had come in just one of the five grades studied, the sixth, and that the rest of the black pupils, as well as Latinos and whites of all grades who used vouchers, had shown no gains.

Since there was no logical explanation for this, Mathematica noted the chance of a statistical fluke. "Because gains are so concentrated in this single group, one needs to be very cautious," it said.

Several newspapers wrote about Mathematica's report, but, coming three weeks after the first round of articles, these did not have the same impact.

And Professor Peterson, a big voucher supporter, continued, undaunted. His 2002 book, "The Education Gap," largely ignored Mathematica's concerns and ballyhooed voucher gains for blacks. "The switch to a private school had significantly positive impacts on the test scores of African-American students," he wrote.

While he still couldn't explain why only blacks had gained, he offered theories. Perhaps heavily black public schools were even worse than urban Latino or white schools. Or, since most vouchers in New York were used in Catholic schools, perhaps a religious "missionary commitment is required to create a positive educational environment" for blacks.

David Myers, the lead researcher for Mathematica, is hesitant to criticize Professor Peterson. ("I'm going to be purposely vague on that," he said in an interview.) But he did something much more decent and important. After many requests from skeptical academ-

ics, he agreed to make the entire database for the New York voucher study available to independent researchers.

A Princeton economist, Alan B. Krueger, took the offer, and after two years recently concluded that Professor Peterson had it all wrong—that not even the black students using vouchers had made any test gains. And Mr. Myers, Professor Peterson's former research partner, agrees, calling Professor Krueger's work "a fine interpretation of the results."

What makes this a cautionary tale for political leaders seeking to draft public policy from supposedly scientific research is the mundane nature of the apparent miscalculations. Professor Krueger concluded that the original study had failed to count 292 black students whose test scores should have been included. And once they are added—making the sample larger and statistically more reliable—vouchers appear to have made no difference for any group.

Some background. In 1997, 20,000 New York City students each applied for a \$1,400 voucher to private school through a project financed by several foundations. A total of 1,300 were selected by lottery to get a voucher, and 1,300 others—the controls, who had wanted a voucher but were not selected—were tracked in public schools. When the first test results came back, the vouchers made no difference in test scores for the 2,600 students

as a whole. So the original researchers tried breaking the group down by ethnicity and race, and that's when they noted the sixth-grade test gains for the black voucher group.

But there was a problem. The original researchers had never planned to break out students by race. As a result, their definition of race was not well thought out: it depended solely on the mother. In their data, a child with a black mother and a white father was counted as black; a child with a white mother and a black father was counted as white.

When the father's race is considered, 78 more blacks are added to the sample. Professor Krueger also found that 214 blacks had been unnecessarily eliminated from the results because of incomplete background data. These corrections by Professor Krueger expanded the total number of blacks in the sample by 292, to 811 from 519.

In recent weeks, Mr. Myers, of Mathematica, has reviewed Professor Krueger's critique and found it impressive. Mr. Myers has now concluded that Professor Krueger's adjustments mean that "the impact of a voucher offer is not statistically significant."

It is scary how many prominent thinkers in this nation of 290 million were ready to make new policy from a single study that appears to have gone from meaningful to meaningless based on whether 292 children's test scores are dis-

counted or included. "It's not a study I'd want to use to make public policy," Mr. Myers said. "I see this and go 'whoa.' "

Professor Krueger of Princeton (who also writes a monthly business column in *The Times*) said, "This appeared to be high-quality work, but it teaches you not to believe anything until the data are made available."

As for Professor Peterson of Harvard, the star of newspapers and TV news in 2000 remains curiously mum these days. In a brief interview, he declined to comment on Professor Krueger's or Mathematica's criticisms. He said he stood by his conclusion that vouchers lifted black scores, and would "eventually" respond in a "technical paper." But he said he would not discuss these matters with a reporter.

"It's not appropriate," he said, "to talk about complex methodologies in the news media."

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