Science & Math CESE Education

The BEACON

News from

The Coalition for Excellence in Science and Math Education

Volume VII, No.6

NO EXCUSES: Closing the Racial Gap in Learning

Abigail and Stephen Thernstrom

Simon and Schuster, 2003

I have finished Thernstroms' book: "*No Excuses: Closing the Racial Gap in Learning,"* They did *no* original research. It's a meta-analysis, a composite of research by others. I agree with most of their conclusions—that culture is the main cause of the racial gaps, that the gaps absolutely must be closed, that early family influences start minority kids poorly disposed towards success, that cultural trends can be reversed if there is the will to do it. Subpoints: schools succeed when principals lead and teachers teach, there must be a respectful and orderly climate in the classroom, demanding results is more likely to work than begging, teachers must have a good grounding in subject matter, test results really do tell how we're doing, more money won't solve the problem, racially homogenizing the schools (which is impossible) is unlikely to close the gaps.

The Thernstroms explain pretty well why some people come up with off-the-wall conclusions—they cheat. Remember my BEACON tutorial of a few months ago about cheating with statistics? Remember how you could throw out the data you don't like and keep the data you do like? That gets done—fortunately not very often. Then, there's stuff I disagree with. They make a big push throughout the book about the value of hard evidence. Then they end with a play for vouchers, without giving much evidence other than that lots of people want them. What people like or dislike isn't evidence. Testimony isn't evidence. Opinion isn't evidence. Examples, absent proof that they are representative, aren't evidence. I also have to wonder if they might have been selective about the studies they included

Most of their examples come to the same conclusions as my analyses. However, a few of the studies they present get results that I don't replicate. The disagreement might be attributable to the unique New Mexico school population, which is very different from other states. I don't have the data to check out the quoted studies myself.

Walt Murfin
CESE Statistician

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WWW.CESAME-NM.ORG
Dr. David Johnson Web Master

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Treasurer's Report

(Are *Your* Dues up to Date?)

I'm sad to report that CESE's financial condition is in decline. It's sort of a good-news/bad-news story, but the truth is that our bank balance today is lower than it's been at any time in the past six years—back to the very early days of this organization. There are good reasons for this: legal expenses for becoming a 501(c)3 corporation, increased frequency of mailing this newsletter, occasional special mailings, sponsorship of visiting lecturers. On the other hand, our dues-paying membership has dwindled, mostly because of people moving out of the area (including one major benefactor).

Your dues-paid-up-to date is shown on your mailing label. Not all of our members pay dues, of course; and that's OK since, within the boundaries of our 501(c)3 status, our main purpose is advocacy for better education, especially in science and math. Our members were very active in helping secure passage of new public school science standards—possibly the best in the country—a few months ago. Although the battle with Intelligent Design Creationism is far from over, this was a *major* victory!

So in view of our situation, CESE's board of directors has decided to curtail the frequency of publishing the Beacon, our major ongoing expense. Rather than semi-monthly, it will be quarterly in future.

Of course, your board of directors would welcome any infusion of additional cash, at any time. Remember we're tax deductible! And we fully intend to keep up the good fight for better education in science and math.

Jerry Shelton
CESE Treasurer

Notice: Re email addresses:

To all Ducks, Sub-Ducks, and anyone else on CESE-connected lists. If your email address changes, please notify Marilyn Savitt-Kring <mmkring@juno.com> so we can keep in touch.

TODOS*—FIRST IN THE NATION

A new national affiliate of the National Council of Teachers of Mathematics has been formed specifically to address the needs of Hispanic/Latino students. Called TODOS—Mathematics for All, the mission of this group is to advocate for an equitable and high quality mathematics education for all students, in particular Latino/Hispanic students, by advancing the professional growth and equity awareness of educators. Navajo Elementary School in Albuquerque, where I serve as the instructional coach, is the first official "TODOS "school in the nation! The leadership of TODOS is working to support us in our efforts to enhance our students' mathematical learning.

Navajo has developed a unique and exciting partnership with two pueblo Indian schools, Laguna and Sky City(Acoma) Elementary schools. This is a local cross-cultural collaboration! Sky City is still run by the U.S. Bureau of Indian Affairs, but Laguna has just become a "grant" school , which means it belongs to, and is run by, the pueblo and is no longer part of BIA.)

The three schools have joined together to study the math program adopted by all three, MathLand. Navajo is the only school in APS to use MathLand, and so sought more support in implementing the program well. We hooked up the two pueblo schools when we discovered that they, too, had adopted the same program. Funding for our study group has come from the Rural Systemic Initiative of which the two pueblo schools are a part. We've set six Saturdays to spend together learning more about the program as well as working on building our own understanding of mathematics.

Although our populations are different, the difficulties our students face are very similar, and both populations have needs that we feel we can address better as we learn together. Each school has contact persons to help plan and arrange the sessions. The RSI funds mileage, food, stipends for the pueblo teachers and honoraria for the Navajo Elementary teachers who serve as mentors. Some teachers in our group say that this study group is the best professional development they receive!

McGraw-Hill, owners of Creative Publications who published MathLand, have offered the first contribution to Navajo as a TODOS school. We will have the services of a national MathLand trainer at an upcoming in-service. We have invited our two partner schools to join us. We are all enjoying and benefiting from the collaboration of the three schools and we look forward to the rest of our sessions, sharing, growing, and learning together for the benefit of our students.

Cindy Chapman

*Todos means all or everyone.

About Cindy

In spring 2001, when Cindy chose not to run for reelection to CESE's board of directors, she said she had become " just too busy" and had to give up something. We shed a few tears, and began trying to persuade her to write about some of the many things that were keeping her so busy.

The short article above is her first installment. First she traded her seat on the CESE board for a seat on the Board of Directors of the National Council of Teachers of Mathematics (NCTM). This involved a lot of travel. One of her first trips was to Saltillo, Mexico, where she represented NCTM at a bi-annual national math teachers' conference. While there, she presented a workshop, in Spanish, for elementary teachers, and joined the Asociacion Nacional de Profesores de Matematicas.

In 2001-2002 she became involved in a "fascinating exchange of information through Best Practices in Education (BPE), a private organization based in New York." This organization seeks out mathematics programs in other countries that might work well here in the U.S. In January 2002 she attended a U.S.-Russian forum in Hawaii on the Elkonin-Davydov mathematics curriculum, which the University of Hawaii was studying. She later traveled with BPE to Moscow and Krasnoyarsk, Siberia, to see the curriculum in practice first-hand. "It was

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JOINT AND MARGINAL AND CONDITIONAL, OH MY!

Most of us will never have to work with these things, but we might hear the terms from time to time. The purpose of this tutorial is to prevent total bewilderment.

To illustrate the principle, I'll use 4th grade normal curve equivalent (NCE) scores in reading and math in 2002. Remember what NCEs are? Basically, they are the arguments of a normal distribution with a mean of 50 and a standard deviation of 21.06 for any given percentile. They are numerically the same as the percentiles at 1, 50 and 99. You can average NCEs, but you can't average percentiles, and shouldn't try. We'll assume that scores are normally distributed. The reasons for this assumption will be explained later.

The **joint distribution** tells us how math and reading scores behave together. The cumulative joint distribution function is the probability that reading scores are no greater than R **AND** math scores are no greater than M, for all values, R and M, of reading and math scores. The simplest case would be if reading and math were not correlated. The joint distribution would just be the product of the reading and math distributions. The joint distribution turns the bell curve into a bell in the round. (Fig.1)

Actually, reading and math scores are correlated. I don't have individual scores, but just for illustration, let's assume that the correlation for students' scores is the same as the correlation for schools' mean scores. The correlation in 4th grade is significant, but not extremely high: r = 0.54. Correlations are higher in upper grades. The joint distribution of two correlated normal distributions is a "bivariate normal distribution." Fortunately, the properties of bivariate normal distributions are well known. That's a good reason for assuming normally distributed scores.

Figure 1 shows the joint distribution. Because the correlation coefficient is not extremely high, it isn't a lot different from the uncorrelated distribution, just a little more sharply peaked. When we look at the detailed numbers,

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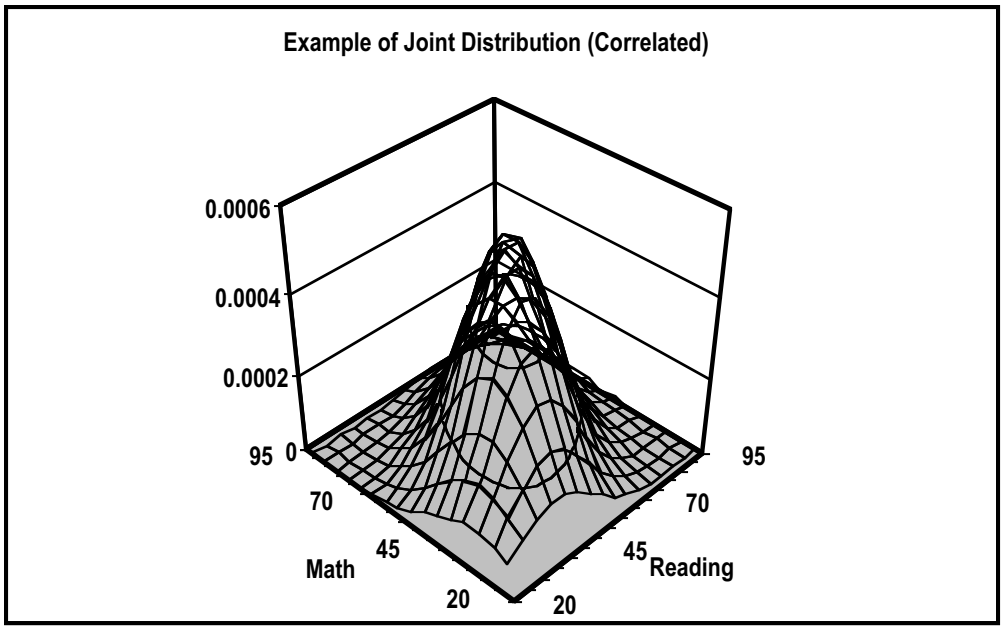

Figure 1. Example of joint distribution with correlated variables.

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diffferences pop up. If math and reading had not been correlated, 23% of students would have had reading ≤ 50 and math ≤ 50. In the correlated case it's 33%. The peak of the distribution is close to 50, 50. That's because the mean scores for both subjects are close to 50. You can see that it's possible for a student to have very low scores in both reading and math. Slightly over 1% could have scores less than 20 in both reading and math. There would have been even fewer if the two subjects had not been correlated. Joint distributions of more than two variables are possible, but are difficult to plot in our impoverished dimension set.

The **marginal** distribution is the distribution of one variable only, for any value of the other variable. Suppose we didn't care about reading, and just wanted the distribution of math scores. For the bivariate normal distribution, the marginal distribution is just the plain old univariate normal distribution, with its known mean and standard deviation – the usual bell curve. It is not generally true for all other joint distributions. In fact, finding the marginal distribution can be pretty hairy if the individual distributions are not normal. This simplicity is another good reason for assuming normality. Remember, joint means everything acting together, marginal means one at a time.

The **conditional distribution** is the distribution of one variable for some *specific* value of the other. Figure 2 shows the conditional distribution of math scores, given reading scores of 40 and 60. The distribution curve is about the same; it's just shifted. For the bivariate normal joint distribution, the conditional distribution at r=R is just the joint distribution at r=R divided by the marginal distribution for r=R. That is generally true, not just for the bivariate normal distribution.

You should hope that you would never have to use these concepts yourself. But think of the satisfaction of knowing what experts mean when they throw these terms around! And think how erudite you'll sound if you can work them into a conversation! If you get nothing else from this, you should begin to understand why we like to assume normal distributions, even though reality usually says otherwise.

Walt Murfin
CESE Stastistician

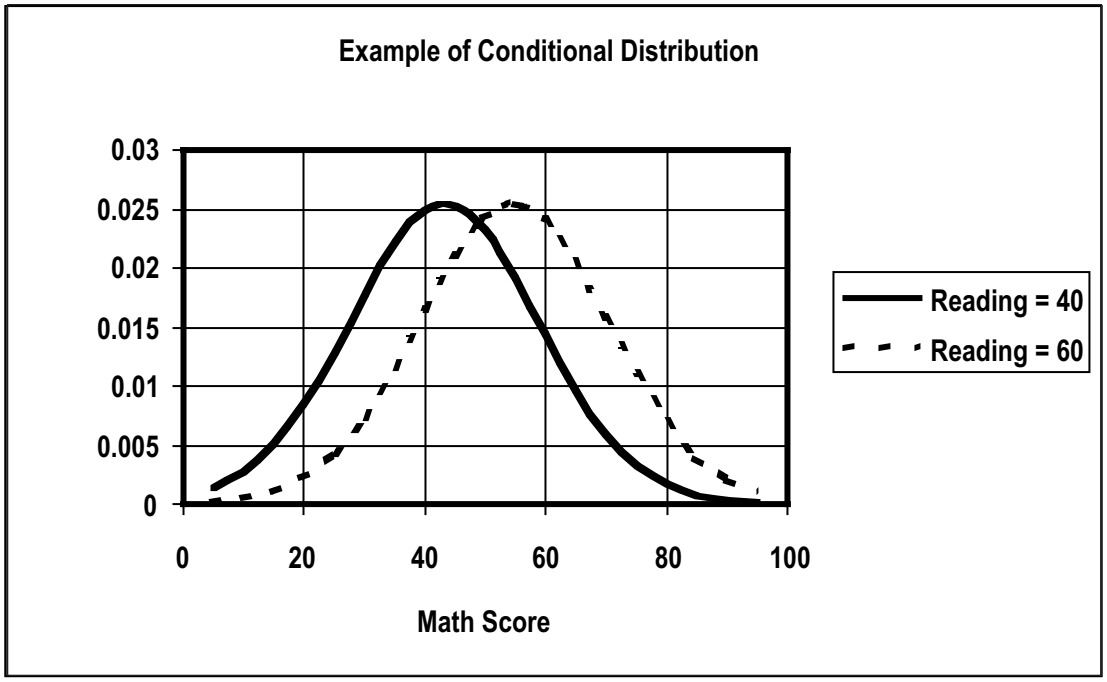

Figure 2. Conditional distribution of math scores for fixed values of reading scores.

YES YES STAR POEM

The universe exists because of opposites and tension,
A fact we sometimes overlook, but here deserves a mention.
For every action there's another action to oppose it:
It's common sense, for life is tense, and everybody knows it.
The white-hot heart of every star, its radiant extrusion,
Occurs as atoms, cracking up, cause thermonuclear fusion.
Hydrogen to helium—a force that pushes out:
Ten Billion Years Of Blowing Up is what a star's about.
The star could not exist; it would be blown to smithereens,
With so much inside pushing out lest something intervenes,
And something does, for pulling in is gravity, of course,
Which does the trick of holding in the thermonuclear force.
So one force pushes out, while one is pulling in,
And let's all thank our lucky stars that neither one can win!
For when the tension ceases and the totter doesn't teeter,
We'll all be painfully aware we've lost our solar heater.
For we will either freeze to death or get blown to Jehovah—
Depending if the sun becomes a Black Hole or a Nova.
And on that day I'm sad to say all life abruptly stops;
but there's five billion years before it shrivels or it pops.
So don't despair; instead reflect upon the stellar state
and on the fundamental fact that stars illuminate.
From grains of sand to giant stars all things share one condition:
the world we see would never be, except for opposition.

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one of the most spectacular professional opportunities I've ever had!"

Shortly after returning from Russia, she was off to Regina, Saskatchewan, for the NCTM Regional Conference. Various NCTM committees and task forces have taken her to San Diego; Park City, UT; Milwaukee; White Horse, MT; Ft. Lauderdale , FL; Chicago; San Antonio; Columbia, MO; Las Vegas, NV; Montclaire, NJ; and Reston, VA..Trips pending during the remainder of her three-year term include East Rutherford, NJ; Los Angeles; and Philadelphia.

Besides leaving CESE's board, she eventually left her job teaching second grade at Inez elementary science and math magnet school for a more flexible job as an instructional coach at Navajo Elementary school (also within APS). This is where she became involved with TODOS—Mathematics for All (See article on page 3.)

Regarding the possibility of future articles for the Beacon, she says, "I would like very much to write about my wonderful, wonderful job as an instructional coach. I think it's one of the most exciting things we've done with professional development yet. I consider my job a huge privilege and am serving at a school where I am welcome and trusted and given tons of freedom to make my position work for our school". Surely this sort of enthusiasm will rub off on others!

Oh, in her "spare time," Cindy and a partner have just completed a two-year project; writing six workbooks to be published by the McGraw-Hill Wright Group.

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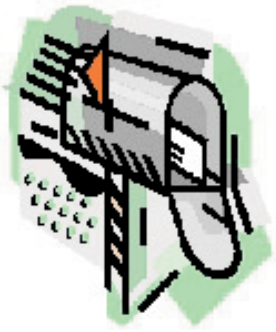

THE MAILBOX

The superficial intent of this letter to you is to have it printed as a Letter to the Editor.

The more significant intent of this letter is to "once and for all" end the human perceived "conflict" that exists and persists between the devout proponents of Creation and the devout proponents of Evolution, both of whom are trapped in limiting and limited perceptions of Reality.

Here is the message of this letter—Creation is the on-going process we call Evolution!

If only we human beings were willing to accept this message, we could cease all of our destructive squabbling and begin to work together to identify and solve the problems that we have created, and are creating, that threaten our very existence as a species. Let it be!

In the Service of the Evolution of Consciousness itself,

Robert Gardiner