# Marshall Memo 443

A Weekly Round-up of Important Ideas and Research in K-12 Education
July 2, 2012

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## Quotes of the Week

"Want to run the world? Start by tucking in your shirt."
Merel van Beeren (see item #6)

"Although the details are subject to revision based on new and better evidence, the fundamental hypothesis of common ancestry has been verified so many times, by so many independent kinds of experiments spanning different scientific specialties, that *there is no longer serious debate that evolution has occurred*. This justifies confidence in the claim that, as much as any sound scientific statement, evolution is true."
Michael Berkman and Eric Plutzer (see item #1)

"Given that public sentiment is at odds with the nation's scientific organizations and in direct conflict with the rulings of the U.S. Supreme Court, it cannot be easy to be a high school biology teacher."
Michael Berkman and Eric Plutzer (*ibid*.)

"If students come to think that science is simply a matter of one's opinion, and that those opinions come from our values and faith, then it will be impossible for science to provide trusted, unbiased information to citizens and policymakers."
Michael Berkman and Eric Plutzer (*ibid*.)

"[B]est practices for instructing students with special needs are also very effective with general-education students. Conversely, best practices for general-education students are effective with students with special needs… ALL students can benefit from the same tool chest of instructional methods and strategies…"
Lucinda Spaulding and Jenny Sue Flannagan (see item #3)

## 1. Teaching Evolution in the U.S.A.

In this thoughtful article in *American Educator*, Michael Berkman and Eric Plutzer of Pennsylvania State University say that despite a national consensus on the need to improve student learning in STEM subjects – science, technology, engineering, and mathematics – our schools have a long way to go. One of the worst areas – highlighted in the 2011 National Research Council's *Framework for K-12 Science Education* as one of the four core ideas in the life sciences – is evolution.

Scientists are very confident about the theory of evolution. In 2008, the National Academy of Sciences said, "there is no controversy in the scientific community about whether evolution has occurred. On the contrary, the evidence… is both overwhelming and compelling." Berkman and Plutzer concur: "Although the details are subject to revision based on new and better evidence, the fundamental hypothesis of common ancestry has been verified so many times, by so many independent kinds of experiments spanning different scientific specialties, that *there is no longer serious debate that evolution has occurred*. This justifies confidence in the claim that, as much as any sound scientific statement, evolution is true."

But many Americans are skeptical. Isn't evolution just a *theory*? Aren't scientific theories tentative and open to challenge and revision in light of new facts? Shouldn't schools be teaching both sides of the story? "[S]uch a view," say Berkman and Plutzer, "fails to appreciate that when a theory survives decades of rigorous testing – as evolution has and its opposing assertions have not – scientists are justified in their high confidence in the theory. It is only after findings have been replicated many, many times that scientists begin to consider them 'facts.' Modern evolutionary science rests on a foundation of such facts."

Charles Darwin was an exemplar of this kind of scientific research and thinking; his 1859 book, *On the Origin of Species*, was 22 years in the making. "Meticulous in its presentation of evidence," say Berkman and Plutzer, "written in a style that remains accessible to nonexperts, and rich in its description of the natural world, Darwin's compelling argument about common ancestry offered a theoretical understanding of what naturalists had long observed: dogs resemble wolves, housecats resemble tigers, and apes resemble human beings. To read *On the Origin of Species* is to be invited inside the mind of a scientist who questions everything, responds fully to actual and anticipated challenges to his conclusions, and understands that his argument will not stand or fall based on any individual finding."

Darwin's theory is based on three well-established processes that lead to changes in populations of living things:

- Individuals within a population are genetically diverse and variations can be inherited.
- Population growth is limited by the food and environmental features in a particular habitat, and as a result, not all individuals survive.
- Those individuals with traits best suited to get food and cope with the environment are the most likely to survive and reproduce, passing along those advantageous traits to their offspring.

Darwin had the theory right but didn't know exactly how traits are passed along. It was only after Gregor Mendel's work on heredity, and the development of population genetics in the 20th century, that scientists filled in the details, explaining how mutations occur, how new genetic features spread through a population, and how, given time and isolation, entirely new species emerge.

Evolutionary theory explains the extraordinary diversity of life on earth and provides "a cornucopia of testable hypotheses," say Berkman and Plutzer. Schoolchildren can look at branching diagrams of species and see how bats are more similar to mice than to birds and mastodons are more similar to modern elephants than to modern rhinos. And these diagrams can be checked against DNA evidence and compared to the fossil record, confirming that primitive species (starfish, for example) did, in fact, live earlier than more advanced species (bony fish). Fossils also show us transitional features, for example, the wrists, elbows, and necks of *Tiktaalik* fish, which lived between 365 and 380 million years ago in an area with freshwater streams. Additional evidence comes from the field of developmental evolutionary biology, which has found striking similarities in vestigial embryonic features across species.

So why did 40 percent of U.S. adults say in a 2010 Gallup Poll that human beings were created "pretty much in their present form at one time within the last 10,000 years or so"? Why did 39 percent say it's not true that "Human beings, as we know them today, developed from earlier species of animals" (National Science Foundation Science Literacy survey, 2010)? Why did 45 percent reject the idea that "Evolution is the best explanation for the origins of human life on earth" (Pew Forum poll in 2007)?

Clearly the scientists' message isn't getting through. In addition, a significant number of Americans don't want the messengers (science teachers) to teach that evolution is true. A 2005 Pew Research Center poll found that 57 percent of Americans say evolution should be taught "along with" creationism, with only 22 percent supporting teaching only evolution. Even in Massachusetts, the most pro-evolution of all the states, only 50 percent support the exclusive teaching of evolution. "Given that public sentiment is at odds with the nation's scientific organizations and in direct conflict with the rulings of the U.S. Supreme Court," say Berkman and Plutzer, "it cannot be easy to be a high school biology teacher."

What are the origins of this widespread resistance to evolution? Berkman and Plutzer trace it back to the birth of fundamentalism in the mid-1800s, which asserted the literal truth of the Bible's creation story and declared war on evolution. By the 1920s, fundamentalism had spread beyond its southern Evangelical roots to other denominations and to all parts of the nation, and the teaching of evolution in public schools was seen as a dangerous idea. Even though the clergy and leadership of mainline Protestant and Catholic churches accept the idea of evolution, 35-45 percent of their followers believe evolution is false. Among major American religious groups, only adherents of Judaism overwhelmingly accept evolution.

Confronted with court rulings that creationism cannot be taught in public schools, anti-evolutionists have made a tactical shift to "intelligent design." They argue that the odds are close to zero that natural selection and mutation alone could account for complex biological features (mainstream evolutionary biology disagrees). They present a three-part argument: (a) evolution is scientifically controversial; (b) evolution and religion are incompatible; and (c) to be fair, both sides must be taught. This argument has been widely accepted, including by many high-school biology teachers, even those who don't consider themselves anti-evolution.

Berkman and Plutzer surveyed 900 ninth- and tenth-grade biology teachers in 49 states, asking about their classroom practices and experiences, personal beliefs, and pre-service education, and how they respond to student comments and questions on evolution. Based on the responses, teachers fell into one of three groups:

• *Evolution advocates* (28 percent) – These teachers tell their students that scientists overwhelmingly say evolution is a fact (while saying that scientists disagree on specific mechanisms), don't present it as a theory in crisis, treat it as a major unifying theme in biology, and believe it's impossible to offer an excellent biology course without including Darwin and evolutionary theory. Many of these teachers use evolution to show how science and religion ask different questions, thereby countering the notion that evolution is in conflict with religion.

• *Creationism advocates* (13 percent) – These teachers minimize the teaching of evolution and spend at least an hour presenting creationism or intelligent design as a valid scientific alternative to evolution, stating that many reputable scientists agree. One Illinois teacher told students that neither evolution nor creationism can be proved or disproved since "man was not present at the beginning to satisfy his or her curiosity as to the nature of the situation."

• *The cautious middle* (60 percent) – These teachers use a range of strategies. About 10 percent are closet creationists; they don't advocate, but in response to a student's question or comment, they'll validate creationism as credible science. Eighty-five percent accept evolution but avoid controversy by implicitly accepting the three-pronged argument of creationists. They do this by (a) distinguishing between micro- and macroevolution (saying evolution only applies *within* species); (b) saying they are required to teach evolution and students must learn it because it will be on state tests (this dissociates everyone from the validity of the science); (c) "teaching the controversy" and encouraging students to use "critical thinking" to make up their own minds (this plays into creationists' hands by putting creationism on the same playing field as evolution); and (d) scheduling biology units at the end of the semester so evolution is covered in a big rush.

"Whether the teacher is trying to introduce creationism, hoping to avoid controversy, or simply manifesting great confidence in students' ability to learn by exploration," say Berkman and Plutzer, "the effect is the same. One teacher put it this way: 'I encourage my students to gather as much information as possible and make their own conclusions.' But it is simply not realistic to expect that, with only 10-15 class hours devoted to evolution, students are really equipped to assess and perhaps reject the thousands of peer-reviewed scientific papers that form the empirical foundation of evolutionary theory. This approach tells students that science is not a cumulative body of highly technical knowledge, but is instead something that has some element of personal preference, like whether Claude Monet created more beautiful paintings than Paul Cézanne."

Berkman and Plutzer believe that teachers who inhabit the cautious middle play a bigger role in hindering scientific literacy than teachers who explicitly advocate creationism. The tactics they use to avoid controversy are exactly what creationists use to make their case. Their approach seems fair-minded, but they fail to explain evolution properly and don't help students reconcile the differences between religion and science.

Why don't these teachers do a better job with evolution? "Our research suggests that many teachers do not feel like they have the expertise they need to confidently teach evolutionary biology in a rigorous and unapologetic manner," say Berkman and Plutzer. As part of their survey, they asked teachers about their academic training in evolutionary theory. Not surprisingly, 56 percent of evolution advocates had completed a college-level course on evolution, compared to 37 percent of those in the cautious middle and 33 percent of creationism advocates. The difference between evolution advocates and the other two groups was even more striking when teachers were asked to rate their knowledge of the scientific evidence on evolution. The stronger their knowledge and training, the more likely teachers were to do a responsible job teaching evolution.

"In the coming decade," conclude Berkman and Plutzer, "the United States will have to make important choices about energy policy…, the environment…, the wisdom of increasing our production of genetically modified foods, and much more. Because the disciplines of evolutionary biology, paleontology, climate science, and astrophysics each share similar methods with all sciences, any undermining of children's trust in science – intentional or not – will have important consequences. If students come to think that science is simply a matter of one's opinion, and that those opinions come from our values and faith, then it will be impossible for science to provide trusted, unbiased information to citizens and policymakers."

What is to be done? Berkman and Plutzer believe better pre-service education for science teachers will make a difference in the long term. The goal is a new generation of teachers who can teach controversial subjects with the same confidence and commitment to scientific accuracy as when they teach other topics in science. "We would never ask students to debate or make up their own minds about whether the atmosphere of Venus contains sulfuric acid, whether protons and electrons have opposite charges, or which gene on chromosome 11 is linked to sickle cell disease," they say. "Rather, to the extent possible at each grade level, we expect students to learn both scientific facts and what constitutes scientific evidence."

"An Evolving Controversy: The Struggle to Teach Science in Science Classes" by Michael Berkman and Eric Plutzer in *American Educator*, Summer 2012 (Vol. 36, #2, p. 12-17, 20-23, 40), http://www.aft.org/pdfs/americaneducator/summer2012/berkman_plutzer.pdf

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## 2. Catching Math Learning Problems Early

In this article in *Exceptional Children*, Russell Gersten, Rebecca Newman-Gonchar, and Kelly Haymond (Instructional Research Group), Ben Clarke (University of Oregon), Nancy Jordan (University of Delaware), and Chuck Wilkins (Edvance Research) report on their search for efficient, sensitive, and specific mathematics screening instruments for early primary students. Why is this important? Because kindergarten children who are struggling with math have a very high probability of failing math in later grades – and early intervention can make a difference.

The key is using a screening instrument that pinpoints the children who will have difficulty later if they don't get help. "Just as the persistence of reading disabilities stimulated widespread investment in early intervention and screening in reading," say the authors, "we hope that the concurrent findings for the persistence of mathematics difficulties will incite similar leaps for identifying measures to screen students likely to experience difficulties in mathematics."

What are the screening priorities in kindergarten and first grade? Researchers have found that children with good number sense appear to develop a mental number line on which they can represent and manipulate numerical quantities. But there's more to number sense than that, say the authors. Children who have good number sense understand the meaning of numbers, can make simple magnitude comparisons, develop strategies for solving number problems, and invent procedures for conducting numerical operations. Gersten, Clarke, Jordan, Newman-Gonchar, Haymond, and Wilkins prefer the term *number proficiencies* to describe these understandings and skills.

The authors' search for good screening instruments started with 48 studies and zoomed in on 16 that met their criteria for accurately and quickly predicting mathematical difficulty in later grades (they rejected instruments that took more than a few minutes per student as impractical). Here are the areas measured by the best instruments, each correlating quite well with later math success:

- *Magnitude comparison* – For example, understanding that 11 is a bit bigger than 9 and 18 is a lot bigger than 9. The predictive validity was .62.
- *Strategic counting* – Understanding how to count efficiently and use counting strategies – for example, being able to identify a missing number (between 1 and 10 in kindergarten and 1 and 20 in first grade) and "count on" (if asked "what is 9 more than 2", seeing that it's quicker to reverse the problem and count on from 9). The predictive validity was .37 for kindergarten students and .68 for first graders.
- *Word problems involving simple addition and subtraction* – Surprisingly, young children find it easier to solve a word problem (How many sheep are left if you start with 9 and lose 2?) than a number sentence (9 – 2 = 7). The predictive validity was .51.
- *Retrieval of basic arithmetic facts* – The ability to efficiently store and retrieve abstract information (semantic memory) appears to be crucial for students to succeed in mathematics. Weakness in this area may be an early sign of a learning disability or it may stem from a lack of number sense: "It is difficult for children to become automatic

with addition and subtraction number combinations when they do not have a good sense of relations between and among numbers and operations," say the authors. The predictive validity was .55 for first graders and .59 for second graders.

Gersten, Clarke, Jordan, Newman-Gonchar, Haymond, and Wilkins also examined the Number Knowledge Test, which takes 10-15 minutes per child and has a predictive validity coefficient of .73 – somewhat higher than the individual screening measures listed above.

The authors then explore other measures that seem to be correlated to later proficiency in mathematics:

• *Working memory* – This can be assessed by asking students to repeat a set of numbers read to them (9, 4, 17, 8) in precisely the reverse order (8, 17, 4, 9). Working memory is important in mathematics because students need to be able to juggle several bits of abstract information – basic facts, positions of numbers on a mental line, computational procedures, etc. Measuring working memory is a less effective screening tool than those described above, but it can add precision.

• *Student engagement and attentiveness* – This had a .35 correlation with future mathematics achievement, say the authors. "This effect was striking because the impact of student engagement was greater than time spent on instruction and the effect showed the greatest impact for the lowest achieving students," they write. "This finding suggests that interventions for students with problems in mathematics might seriously consider adding a component that promotes attentiveness to academic tasks and activities."

Finally, the authors address classification accuracy – the sensitivity and specificity of various tools. The two things early math screening should avoid are: (a) missing students who truly need and will benefit from extra help (false negatives), and (b) identifying students who will succeed in math without extra help (false positives). "A measure with perfect sensitivity ensures that all students who require intervention receive extra support," say the authors. "A measure with perfect specificity ensures that schools do not spend resources on students who do not need extra support. However, measurement in education, medicine, psychology, and most human endeavors is far from perfect and consists of a series of compromises and balances… Here we face a bit of a paradox. The more we increase sensitivity, the more we try to ensure that we do not miss any students who might need intervention, but in doing so the more we decrease specificity."

The key question is where to set the cut scores. "Determining risk status is as much an art as a science," say the authors. Literacy educators are learning from using Response to Intervention (RTI) that casting too broad a net results in wasting valuable resources and misclassifying students – but nobody wants to miss students who are truly in need. The authors believe the introduction of Common Core State Standards and new assessment technology will focus and speed up the screening process.

The authors conclude by saying that "the collection of screening data in and of itself does not change student outcomes. Any advances that schools make in screening students in mathematics must occur alongside efforts to improve instructional practices and to develop effective interventions."

"Universal Screening in Mathematics for the Primary Grades: Beginnings of a Research Base" by Russell Gersten, Ben Clarke, Nancy Jordan, Rebecca Newman-Gonchar, Kelly Haymond, and Chuck Wilkins in *Exceptional Children*, Summer 2012 (Vol. 78, #4, p. 423-445), http://cec.metapress.com/content/b75u2072576416t7/; Gersten can be reached at rgersten@inresg.org.

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## 3. Universal Design for Teaching Science

In this *Teaching Exceptional Children* article, Lucinda Spaulding (Liberty University VA) and Jenny Sue Flannagan (Regent University VA) embrace the concept of universal design. "[B]est practices for instructing students with special needs are also very effective with general-education students," they say. "Conversely, best practices for general-education students are effective with students with special needs… ALL students can benefit from the same tool chest of instructional methods and strategies…" When they were teachers, Spaulding and Flannagan came up with the acronym $DIS_2ECT$ to capture the kind of science teaching they used to reach all students: Design, Individualization, Scaffolding, Strategies, Experiential learning, Cooperative learning, and Teacher teamwork:

• *Design* – Using backwards design, they (a) got to know their learners (prior knowledge, learning style, hobbies and interests, academic strengths and weaknesses, learning disabilities); (b) identified curriculum priorities for the unit (knowledge, skills, and links to the big ideas of science); (c) designed essential questions that led to their quizzes, tests, performance tasks, and projects; and (d) created daily lesson plans.

• *Individualization* – This starts by ascertaining and planning for predictable difficulties students would have with the material – for example, not being able to use inductive and deductive thinking skills, their reading levels compared to the textual material they'll have to read, independent study skills, and areas where they'll need practice, repetition, feedback, and reinforcement.

• *Scaffolding* – "Scaffolds can be viewed as bridges," say Spaulding and Flannagan. "Each student comes to class with a certain level of knowledge and understanding on a topic, and each may have certain obstacles to overcome in order to learn new concepts… By providing just the right level of support, students can move from their current understanding to higher levels of understanding." For example, some students would be unable to design their own science experiment at first, but by working with a peer or small group, they will gain confidence, conceptual understanding, and skills, and with repetition and reinforcement, reach the point where they can do it on their own. Providing books at students' reading levels is another vital kind of scaffolding. Graphic organizers, text organizers, and semantic maps can help students understand the relationship between concepts (e.g., organisms and their habitats) as well as scientific laws (force and motion).

• *Strategies* – This involves explicitly teaching approaches to solving problems and organizing information – self-monitoring, self-regulation, self-questioning (*Does this make sense?*), summarizing, study skills, mnemonics, and repeated reading.

• *Experiential learning* – The key to getting all students to learn science, say Spaulding and Flannagan, is to engage them in discovery and exploration. Don't start with content, they advise, start with experiences. For example, to teach about how matter can change chemically, have students write and report their observations of peroxide and yeast being mixed in a bottle.

• *Cooperative learning* – Having students collaborate as they do experiments and present their observations builds social skills, self-confidence, and positive attitudes about the classroom as well as academic understanding.

• *Teacher teamwork* – That is, the collaboration of the regular-education and special-education teacher. Ideally, say Spaulding and Flannagan, both teachers are skilled instructors, work well together, are excited about teaching science, have time for co-planning (the principal is key here), use good curriculum materials, and adapt instruction to meet children's individual needs. A key decision during planning time is when to use team teaching, parallel teaching, alternative teaching (one teacher leads an activity or investigation, the other follows up by teaching the concepts and vocabulary), and learning station teaching.

"DIS$_2$ECT: A Framework for Effective Inclusive Science Instruction" by Lucinda Spaulding and Jenny Sue Flannagan in *Teaching Exceptional Children*, July/August 2012 (Vol. 44, #6, p. 6-14); http://bit.ly/MP4qmr; Spaulding can be reached at lsspaulding@liberty.edu.

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## 4. Skillful Use of Interactive Whiteboards in Science Classrooms

In this article in *Teaching Exceptional Children*, Peggy Whitby (University of Nevada/ Las Vegas), Mark Leininger (a psychologist in the Clark County Public Schools, NV), and Kelly Grillo (High Point University, NC) suggest ways to maximize the learning benefits of interactive whiteboards, with a special focus on helping students with disabilities grasp abstract concepts and succeed academically. The examples are from a middle-school science class.

• *Pair a sound with an image to focus on the learning objective*. The teacher kicks off the class by showing a large magnifying glass on the whiteboard with a sound bite of Inspector Gadget (http://www.youtube.com/watch?v=e-JHfXVlkik).

• *Use avatars to confirm the learning objective*. The teacher taps the whiteboard and a mad scientist avatar says in a digitized voice, "Here is the critical question for today: Do you know your blood type? What is it? And why are blood types important?"

• *Use anchoring activities with video, multimedia, or photos*. The teacher then shows a four-minute video clip on blood typing and its importance to saving lives, followed by several questions in an interactive PowerPoint.

• *Use simulations and manipulatives for specific models*. Students' stations have an activity called Using Blood Tests to Identify Babies and Criminals, and they read it while the timer on the whiteboard counts down from eight minutes. Then the teacher calls for a student volunteer to model a blood type simulation through a transfusion game displayed on the whiteboard: http://www.nobelprize.org/educational/medicine/landsteiner/landsteiner.html. The student works at the simulation with support from classmates. Students then have 25 minutes to work on a lab packet while the teacher calls groups up one at a time to complete the transfusion game on the whiteboard.

• *Use clicker response as data*. The teacher calls the class back together (the whiteboard says, "In five, four, three, two, one, hands down and heads up"), shifts to Poll Everywhere (http://www.polleverywhere.com), and has students use their cell phones to respond to several anonymous clicker questions, with the responses to each one instantly displayed. The teacher looks at the responses to each question and decides whether to re-teach and/or have students engage in peer instruction within their groups.

• *Use feedback through coaching opportunities*. The teacher strategically groups students so there will be productive collaboration and peer tutoring for students most in need of help.

• *Use varied assessment strategies*. The teacher calls the class together again and asks students to partner with the lab group to their right. Students then share one thing they learned in the lesson and one thing they still need to learn. Then the teacher puts a word cloud on the whiteboard and has students write an essay using 10 percent of the words in the cloud. The teacher might also use an interactive assessment tool like Quiz Revolution http://www.quizrevolution.com to test students at the end of the lesson.

• *Refine the lesson*. A well-planned interactive whiteboard lesson "allows students to acquire knowledge and skills, and provides multiple practice sessions to hone skills to fluency," conclude Whitby, Leininger, and Grillo. Teachers also get immediate feedback on student understanding and can tweak the lesson to make it even better.

• *Clean up*. The teacher manages the end of the lesson by playing photos on the whiteboard of students in the class cleaning up and putting things back where they belong.

"Tips for Using Interactive Whiteboards to Increase Participation of Students with Disabilities" by Peggy Whitby, Mark Leininger, and Kelly Grillo in *Teaching Exceptional Children*, July/August 2012 (Vol. 44, #6, p. 50-57), http://cec.metapress.com/content/n810001677w5p203/; Whitby can be reached at peggy.whitby@unlv.edu.

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## 5. Another Look at the Los Angeles Value-Added Data on Teachers

In this National Education Policy Center brief, Derek Briggs and Ben Domingue of the University of Colorado/Boulder reexamine the value-added analysis of Los Angeles teachers conducted by Richard Buddin, a senior economist at the RAND Corporation, and published by the *Los Angeles Times* in August 2010. Here are Buddin's key questions and Briggs and Domingue's comments:

• *How much does quality vary from teacher to teacher?* Buddin found significant variation in students' reading and math test scores depending on which teachers they had. Briggs and Domingue agree with this finding. In fact, they found a slightly larger teacher effect.

• *How important are teachers' qualifications to their students' results?* Buddin found that years of experience, advanced degrees, having a full teaching credential, race, and gender had only a weak association with student results. Briggs and Domingue disagree. Based on their reanalysis of the data, they found that some factors did play a role, with more-experienced and better-qualified teachers getting better results.

Another important question with the Buddin data is whether it's possible to pin down an individual teacher's effectiveness based on student test scores. Computing individual value-added scores for teachers presupposes that students are randomly assigned to different teachers. Briggs and Domingue found that students are *not* randomly assigned – especially in reading. "If students are non-randomly assigned to teachers in ways that systemically advantage some teachers and disadvantage others (e.g., stronger students tending to be in certain teachers' classrooms)," they say, "then these advantages and disadvantages will show up whether one looks at past teachers, present teachers, or future teachers. That is, the model's outputs result, at least in part, from this bias, in addition to the teacher effectiveness the model is hoping to capture."

So how accurate were the 5-4-3-2-1 teacher ratings published in the *Los Angeles Times*? Briggs and Domingue used the same test and demographic data to construct a more sophisticated estimate of each teacher's value-add and compared it to Buddin's. The result: in reading, only 46.4% of teachers had the same effectiveness rating in both studies. In math, 60.8% of teachers had the same rating. According to Briggs and Domingue, 22 percent of reading teachers and 14 percent of math teachers were misclassified. There were lots of false positives (teachers rated effective who were really average) and false negatives (teachers rated as ineffective who were really average).

Briggs and Domingue believe that the value-added ratings reported by the *LA Times* were inaccurate, unfair to many teachers, and failed to provide useful feedback to help mediocre and ineffective teachers improve. Proponents of value-added information on teachers argue that it's better than the teacher-evaluation data we have now. True, but that's not saying much. And it doesn't mean that opponents of value-added data are supporters of the status quo.

"The use of standardized test scores to evaluate teachers involves making difficult choices in which there are invariably some tradeoffs between decisions that might be optimal from the perspective of estimating an unbiased causal effect," say Briggs and Domingue, "but not optimal from the perspective of crafting an educational accountability polity with a coherent theory of action. The obligation for those with expertise in statistical and econometric methods is to be explicit and transparent about these choices, so that policymakers and administrators have the information they need to weigh the costs and benefits, and so that all stakeholders have an entry point to the policy debate.

"The Buddin white paper presents a picture that implies a 'have your cake and eat it too' scenario," Briggs and Domingue conclude: "that from a technical standpoint we know how to validly isolate the causal effect of a teacher, and from a policy standpoint we know how to create an incentive structure that winnows away the ineffective teachers while rewarding the effective ones enough to encourage new ones to enter the field. This picture is an illusion.

Causal inference may well be the holy grail of quantitative research in the social sciences, but it should not be proclaimed lightly. When the causal language of teacher 'effects' or 'effectiveness' is casually applied to the estimates from a value-added model simply because it conditions on a prior year test score, it trivializes the entire enterprise. And instead of promoting discussion among parents, teachers and school administrators about what students are and are not learning in their classrooms, it seems much more likely to shut them down."

"Due Diligence and the Evaluation of Teachers: A Review of the Value-Added Analysis Underlying the Effectiveness Rankings of Los Angeles Unified School District Teachers by the *Los Angeles Times*" by Derek Briggs and Ben Domingue, February 2011, National Education Policy Center, http://nepc.colorado.edu/publication/due-diligence

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## 6. How Do Clothes Affect Behavior?

"Want to run the world? Start by tucking in your shirt," says Merel van Beeren in this *Psychology Today* article reporting on research on the effect of clothing on behavior. She describes an experiment by Northwestern University psychologists Hajo Adam and Adam Galinsky (in the *Journal of Experimental Psychology*) in which participants completed various tasks. Some were wearing a white lab coat (associated with attentive and caring doctors), some worked with a lab coat in their field of vision, and some neither wore nor looked at a lab coat. Those who wore a lab coat did significantly better at the tasks than the other two groups – unless they were told it was a painter's coat. This shows that wardrobe-inspired behavior change is not just the result of a pre-existing mood or a reaction to the responses of onlookers.

How does this work outside the lab? "Sometimes a mood catches up with an outfit, but what we wear is generally based on how we feel," says clinical psychologist and author Jennifer Baumgartner. In sports, players' uniforms have been shown to affect their behavior. Black jerseys are perceived as more malevolent, and those who wear black tend to play more aggressively. In studies in the 1980s and 90s, Cornell psychologists Mark Frank and Thomas Gilovich found that study participants wearing black jerseys chose more aggressive games to play against a fictional opponent. They also found that National Hockey League teams wearing black received more penalties – but in another study, they discovered that football referees gave more penalties to players in black than players in white, even when their actions were the same. "Your behavior is often in tune with what you're wearing," says Santa Clara University psychologist Jerry Burger, "but people are going to quibble about why."

"Dress to Impress Yourself" by Merel van Beeren in *Psychology Today*, July/August 2012 (Vol. 45, #4, p. 39), no e-link available

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***Do you have feedback? Is anything missing?***

*If you have comments or suggestions, if you saw an article or web item in the last week that you think should have been summarized, or if you would like to suggest additional publications that should be covered by the Marshall Memo, please e-mail:* kim.marshall48@gmail.com

# About the Marshall Memo

### *Mission and focus:*

This weekly memo is designed to keep principals, teachers, superintendents, and others very well-informed on current research and effective practices in K-12 education. Kim Marshall, drawing on 43 years' experience as a teacher, principal, central office administrator, and writer, lightens the load of busy educators by serving as their "designated reader."

To produce the Marshall Memo, Kim subscribes to 44 carefully-chosen publications (see list to the right), sifts through more than a hundred articles each week, and selects 5-10 that have the greatest potential to improve teaching, leadership, and learning. He then writes a brief summary of each article, pulls out several striking quotes, provides e-links to full articles when available, and e-mails the Memo to subscribers every Monday evening (with occasional breaks; there are about 50 issues a year).

### *Subscriptions:*

Individual subscriptions are $50 for the school year. Rates decline steeply for multiple readers within the same organization. See the website for these rates and information on paying by check or credit card.

### *Website:*

If you go to http://www.marshallmemo.com you will find detailed information on:

- How to subscribe or renew
- A detailed rationale for the Marshall Memo
- Publications (with a count of articles from each)
- Article selection criteria
- Topics (with a count of articles from each)
- Headlines for all issues
- What readers say
- About Kim Marshall (including links to articles)
- A free sample issue

Marshall Memo subscribers have access to the Members' Area of the website, which has:

- The current issue (in PDF or Word format)
- All back issues (also in PDF or Word)
- A database of all articles to date, searchable by topic, title, author, source, level, etc.
- How to change access e-mail or log-in

### *Publications covered*

*Those read this week are underlined.*

American Educational Research Journal
<u>American Educator</u>
American Journal of Education
American School Board Journal
<u>ASCD, CEC SmartBriefs, Daily EdNews</u>
Better Evidence-Based Education
EDge
Education Digest
<u>Education Gadfly</u>
Education Next
Education Week
Educational Leadership
Educational Researcher
Elementary School Journal
Essential Teacher (TESOL)
<u>Harvard Business Review</u>
Harvard Education Letter
Harvard Educational Review
JESPAR
Journal of Staff Development
Kappa Delta Pi Record
Language Learner (NABE)
Middle Ground
Middle School Journal
<u>New York Times</u>
<u>Newsweek</u>
<u>PEN Weekly NewsBlast</u>
Phi Delta Kappan
Principal
Principal Leadership
Principal's Research Review
Reading Research Quarterly
Reading Today
Rethinking Schools
<u>Review of Educational Research</u>
Teachers College Record
Teaching Children Mathematics
The Atlantic Monthly
The Chronicle of Higher Education
The Language Educator
<u>The New Yorker</u>
The Reading Teacher
The School Administrator
Theory Into Practice