

# Education Policy Analysis Archives

Volume 10 Number 9

January 28, 2002

ISSN 1068-2341

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A peer-reviewed scholarly journal

**Editor: Gene V Glass**

College of Education

Arizona State University

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## **Confusing the Messenger with the Message: A Response to Bolon**

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Citation: Willson, V.L. & Kellow, T. (2002, January 28). Confusing the messenger with the message: A response to Bolon. *Education Policy Analysis Archives*, 10(9). Retrieved [date] from <http://epaa.asu.edu/epaa/v10n9/>.

### **Abstract**

The conclusions by Bolon (2001) based on the relationship between per capita income and school mean grade 10 mathematics scores in Massachusetts and on instability in year-to-year mean school scores are criticized by us. Our concerns focus on the uninterpretable covariation of economic condition with test performance and the limitations in interpreting cross-time variability. We agree with Bolon's conclusions but consider the methodology employed inadequate to support them. We suggest alternative requirements and discuss our own previous efforts in this area.

In an analysis of the Massachusetts graduation examination, Bolon (2001) examined the aggregate grade 10 mathematics test scores for 47 high schools and the demographic characteristics of the communities in which they were situated. From several data analyses, Bolon determined that since the best single predictor of mean high school score was community per capita income,

"The state is treating scores and ratings as though they were precise educational measures of high significance. A review of tenth-grade mathematics test scores from academic high schools in metropolitan Boston showed that statistically they are not."

Further, when removing the variability due to per capita income,

"Large uncertainties in residuals of school-averaged scores, after subtracting predictions based on community income, tend to make the scores ineffective for rating performance of schools. Large uncertainties in year-to-year score changes tend to make the score changes ineffective for measuring performance trends."

While we agree with Bolon's concerns, on the whole, we find little support in the evidence he presents to support them. Our discussion below details our concerns.

## **Predicting aggregate test scores**

One of the problems with regression analysis is that without reasonable theoretical support, all sorts of predictors can be found that produce high correlation. In examining aggregate scores, such as high school test means, it is no secret that for many decades, as Bolon himself pointed out (Bolon, 2000), achievement has been associated with socioeconomic conditions in communities. In earlier eras, when school spending was much more unequal, these differences were more indicative of opportunity to learn for students. In a judicial climate that has tended to minimize, although not eliminate such disparities, it is much less persuasive, although it remains an important area for study.

The difficulty with using a community aggregate measure as a predictor is that it is a surrogate for many other indicators, some of which are absurd at face value but interpretable. Variables such as driver's-license passing rate or per capita champagne consumption may predict student achievement as well as community per capita income. We can construct meaningful arguments why they might. For none is the test invalidated using accepted standards (American Educational Research Association, American Psychological Association, and National Council on Measurement in Education, 1999).

In other areas of research such aggregation has produced fundamentally misleading conclusions. For example, the literature on intelligence and income is directly parallel to the discussion here. White (1982) demonstrated the difference between using an aggregate measure of SES (school or community) and individual measure in relating SES to intellectual functioning. Since Bolon used school as his unit of analysis, he eliminated proximate measures more appropriate to his analysis. The school-level variables Bolon eliminated are more appropriate than community per capita income on

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