**How Can a Person's Reading Score be Higher than Their IQ?**

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I looked up my height and weight on a chart for 70-year-old men in the U.S.

My height (67 inches) is in the 25th percentile, equivalent to a standard score of 90. That means that my weight must also be in the 25th percentile (standard score 90) or 164 pounds. You can't pour a quart into a pint bottle, so with 25th percentile height, I must have 25th percentile weight. I must weigh 164 pounds.

Oops, wait, I forgot that height and weight are not perfectly correlated. I looked up a correlation of 0.71 between height and weight. Because of "regression toward the mean," the weight predicted from my height would be closer to the 50th percentile (standard score 100) than is my height.

Okay, my height (standard score 90) is 10 points below the mean (arithmetic average) of 100. I multiply that difference by the correlation: -10 \* 0.71 = -7.1. Then I add -7.1 to 100 and get 92.9 or about 93. My predicted weight is a standard score of 93, not 90. A standard score of 93 is equivalent to a percentile rank of 32. The chart tells me that, for 70-year-old men in the U.S., the 32nd percentile rank is a weight of 169 pounds. You can't pour a quart into a pint bottle, so with 25th percentile height, I must have 32nd percentile weight. I must weigh 169 pounds.

Now I weigh myself and look up my actual weight (206 pounds) on the chart. My actual weight is in the 81st percentile for 70-year-old men, equivalent to a standard score of 113! How can I have a standard score of 113 (percentile rank 81) for weight when my height is only a standard score of 90 (percentile rank 25)?

After more research, I learned that people of the same height have different weights. Some people's weights are lower than we would predict from their height and, some people's weights (like mine) are higher than we would predict from their heights. Pints, quarts, and bottles have nothing to do with it.

It turns out that the same thing is true of IQ and reading. First, the average reading standard score of persons with a particular IQ score will be closer to 100 than is the IQ. The average reading standard score for persons with below-average IQs is higher than their IQ. The average reading standard score of persons with above-average IQs is lower than their IQ. You can see this "regression toward the mean" effect in tables in the manuals for many IQ and academic achievement tests, which show the predicted reading, writing, math, and oral language achievement scores on a particular achievement test for persons with a given IQ on a particular IQ test.

Second, half of people with a particular IQ score on an IQ test will score higher than the predicted achievement score and half of them will score lower. Most folks will score fairly close to the predicted score, some will score farther from the prediction, and a few will score a lot higher or lower than the prediction. Pints, quarts, and bottles are still irrelevant.

Notes:

1. The IQ and standard scores referenced above (there are different kinds) have an average (mean) of 100 and a "standard deviation" of 15, which means that the scores of most people (about 68 percent of them) are between 85 and 115 and about half are between 90 and 110. Standard scores are equal units, so you can add and subtract them.

2. Percentile ranks tell the percentage of persons who scored the same as or lower than you did. For example, my percentile rank of 25 for height means that I am as tall as or taller than 25 percent of American men my age and shorter than the other 75 percent. Percentile ranks are not equal units, so we cannot do math with them.

Standard

Score or IQ 60 65 70 75 80 85 90 100 105 110 115 120 125 130 135 140

Percentile Rank 0.4 1 2 5 9 16 25 50 63 75 84 91 95 98 99 99.6

3. We have known about regression toward the mean for a long time. Just ask Francis Galton (Regression towards mediocrity in hereditary stature. *Journal of the Anthropological Institute, 15*, 246-263 [1886]).

4. For much better explanations than mine, please see Kevin McGrew's "A lesson from Forrest Gump regarding expectations for students with cognitive disabilities" (<http://www.iapsych.com/iqach.pdf> and <http://www.slideshare.net/iapsych/forrest-gump-and-iq-expectations>) and W. Joel Schneider's <https://assessingpsyche.wordpress.com/2013/12/28/potential-misconceptions-about-potential/>

5. Yes, following Shakespeare and others, I am using the singular "their."