

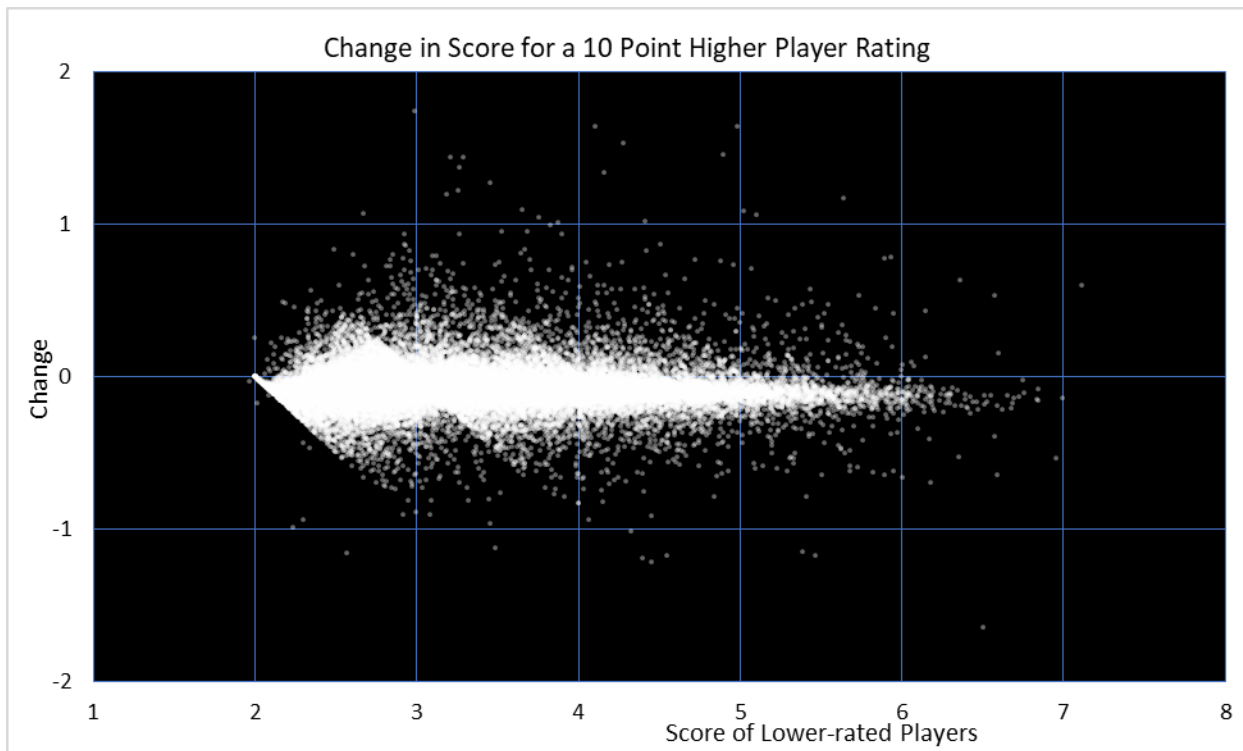
How Much Does Average Score Change per 10 Points of Player Rating?

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I calculated scoring distributions for 13,818 disc golf holes for ratings of 950, 960, 970 ... 1050. Not all holes had data across this whole range. For every hole that had data for two ratings that were 10 points apart, I compared the average scores at those two ratings.

The raw data looks like this:



Looking at the diagonal line on the left bottom you can see that it is quite unexpected for the higher rated players to get scores lower than 2. So, there cannot be much improvement in scores until the lower rated players are averaging more than 2. This is sometimes called the "36 wall".

The higher rated players also can't get higher scores until the hole becomes difficult enough to give some of the lower rated players scores of 3.

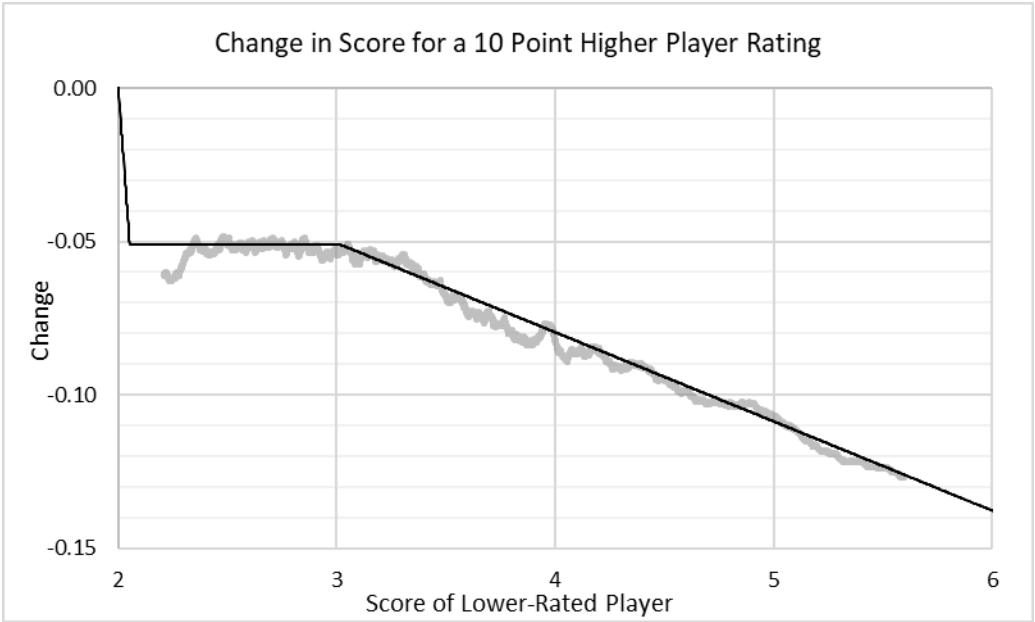
These two effects echo through the higher scores with less and less impact.

There are many outliers, which is explained by the low number of observations for some ratings for some holes. There were left in the data because they should average out over the 13,818 holes.

This chart gives hints that the change in average score would be larger for higher-scoring holes. It is easier to get a four on a hole where someone else got a 5 than to get a 1 on a hole where someone else got a 2.

The following chart shows the moving-weighted-average for 1000 holes at a time (in gray). Notice that the size of the improvement is now clearly bigger for higher scores. But, when the lower-rated players are getting an average of 3, the difference in scores levels out to a constant -0.05.

The black line is fit to the underlying data, not to the moving-weighted-averages. It shows that when the lower-rated players are getting scores of 2.05 or less, the only feasible improvement is to get rid of those remaining few scores of 3.



The following table gives the fitted values of Change per 10 Ratings Points. To give a sense of scale, the chart also translates that value into what may be a more-familiar format of Ratings Points per Throw on a course with 18 of the holes.

Average of Lower-Rated Players	Change/10 Points	18 x Average	Ratings Points Per Throw
2.05	-0.05	36.9	11.3
3	-0.05	54	10.9
4	-0.08	72	7.0
5	-0.11	90	5.1
6	-0.14	108	4.0
7	-0.17	126	3.3

Note that to calculate the changes over larger jumps in rating, one cannot simply use a multiple of the change per 10. Each 10-point step should be calculated separately. For example, to find what a 100-point increase in ratings would do for a hole that averages 6.00, you would calculate that the first 10 points would change it to 5.86, the next 10 points would change it to a 5.63, etc., down to the last 10 points changing it from a 4.89 to a 4.79.

Similarly, to find out how much a course's total score would change, you would need to compute all the holes separately to account for the different rates of change for the harder and easier holes.

Another caveat is to look at the first graph again. The actual change due to ratings can be quite different than these fitted values. Especially when there only are few players.