

# Re: r-Squared Question

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*Source:* <http://sci.tech-archive.net/Archive/sci.stat.math/2005-07/msg00266.html>

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I wrote:

It depends how you defined R2. If you define it as the square of the correlation between observed and predicted, then it's a weakness. However if you define it as  $1 - \text{ResSS}/\text{TSS}$ , then, for an arbitrary model fitting procedure, R2 isn't even constrained to the interval  $[0,1]$ , since ResSS might exceed TSS.

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Here
> X   Y   YHat Y-Yhat
> 1  101  97   4
> 2  102  99   3
> 3  103  101  2
> 4  104  103  1
> 5  105  105  0
> 6  106  107 -1
> 7  107  109 -2
> 8  108  111 -3
> 9  109  113 -4
> 10 110  115 -5
```

Here, TSS=82.5 and ResSS=85, so  $R^2 = 1 - 85/82.5 = -0.03$ , and the fitted line predicts worse than always using the sample mean.

I should have added that there was an earlier version of this post that was in error, claiming that ResSS=TSS. We don't want the corrected SS, but the actual SS, which differs here because the mean of the residuals is not 0. I've canceled my earlier post, but given the way cancels propagate, some copies of the original will survive. So, for the record, keep this post and the one with  $R^2 = -0.03$ , and ignore the one with  $R^2 = 0$ .

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