Regression model assumptions: <http://www.sthda.com/english/articles/39-regression-model-diagnostics/161-linear-regression-assumptions-and-diagnostics-in-r-essentials/>

How to report regression result:

<https://www.statology.org/how-to-report-regression-results/>

When data points have high Cook’s distance scores and are to the upper or lower right of the leverage plot, they have leverage meaning they are influential to the regression results. The regression results will be altered if we exclude those cases.

In our example, the data don’t present any influential points. Cook’s distance lines (a red dashed line) are not shown on the Residuals vs Leverage plot because all points are well inside of the Cook’s distance lines.

Multiple regression was also performed, but none of the additional variables were significant, nor did the multiple regression model have higher R^2 value.

We further examined the relationship between Step 1 and Step 2 scores by testing whether Step 2 scores could predict Step 1 scores with statistical significance. To do so, we built a simple linear regression model. All of the assumptions for linear regression were checked and met, including linearity of the data, normality of residuals, homoscedasticity, and independence of residual errors. See Figure XXX for diagnostic plots. After fitting the regression model, we found that Step 2 score significantly predicted Step 1 score (β = 0.69, p < 2e-16). The overall model was

, with statistical significance (R2 = .44, F(1, 796) = 632.6, p < 2.2e-16).

Chart, scatter chart

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A screenshot of a computer

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Table

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Step

Discussion

* Summary of our results and its context
  + Step 2 scores (R = 0.67, p < 2.2e-16) represented the only variable with a correlation coefficient of R > |0.1|. This remained true when segmenting groups of applicants with Step 1 scores below 220, above 250, and between 220-250.
* Significance of our findings
  + Step 1 scores were moderately correlated with Step 2 scores, but not with any other variable. This poses a challenge for residency programs in their evaluation of applicants, as Step 2 scores are not currently required at the time of application and therefore not able to screen every applicant. Additionally, screening based on Step 2 scores will select a different cohort than screening based on Step 1 scores. In future match cycles, residency programs will need to identify new methods to screen candidates.
* acknowledge limitations of our study
* suggest directions that future studies could go in to further investigate the topic

**Introduction:**Beginning in 2022, USMLE Step 1 scores will be reported as Pass/Fail. Historically, numeric Step 1 scores have been an important component of residency applications, representing one of the few metrics standardized across all applicants. As such, they have frequently been used by programs as a cutoff to screen candidates for interview invitations. With this dramatic change, residency programs will require alternative ways to screen and select candidates. **Methods:**Otolaryngology applications to an academic medical center for the 2019-20 and 2020-21 ERAS cycles were reviewed. Board scores and quantitative research data (including number of journal articles/abstracts, book chapters, poster/oral presentations, and online publications) were extracted. Correlation coefficients were determined comparing applicant Step 1 scores to their corresponding Step 2 scores and quantity of research. **Results:**Step 2 scores (R = 0.67, p < 2.2e-16) represented the only variable with a correlation coefficient of R > |0.1|. This remained true when segmenting groups of applicants with Step 1 scores below 220, above 250, and between 220-250. **Conclusion:**Step 1 scores were moderately correlated with Step 2 scores, but not with any other variable. This poses a challenge for residency programs in their evaluation of applicants, as Step 2 scores are not currently required at the time of application and therefore not able to screen every applicant. Additionally, screening based on Step 2 scores will select a different cohort than screening based on Step 1 scores. In future match cycles, residency programs will need to identify new methods to screen candidates.

Step 1: (*M* = 245.2, *SD* = 12.68, NA = 7)

Given practical relevance, four metrics were examined in detail and their scatterplots with correlations: Step 2 scores (*M* =253, *SD* = 12.37, NA = 130), number of peer reviewed articles (*M* = 3.17, *SD* = 3.82), number of oral presentations (*M* = 2.54, *SD* = 2.85), and number of posters (*M* = 4.542, *SD* = 4.4).  Step 2 score t

We further examined the relationship between Step 1 and Step 2 scores by testing whether Step 2 scores could predict Step 1 scores with statistical significance.

The small Pearson’s *r* in all three cases means that one cannot reliably predict a student’s output/standing in any of the three metrics given Step 1 scores.

 While Step 2 score can be used to predict a student’s corresponding Step 1 score to a moderate extent, the correlation is not high enough—or, the relationship is not strong enough—for Step 2 score to serve as a replacement for Step 1 score.

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|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Metric | Min | Max | Median | Mean | SD | NA’s |
| Step 1 score | 198 | 270 | 247 | 245.16 | 12.68 | 7 |
| Step 2 score | 196 | 279 | 255 | 253.02 | 12.37 | 130 |
| Peer Reviewed Journal Articles/Abstracts | 0 | 35 | 2 | 3.17 | 3.82 |  |
| Peer Reviewed Journal Articles/Abstracts  (Other than Published) | 0 | 31 | 2 | 2.65 | 2.98 |  |
| Book Chapter (Peer Reviewed) | 0 | 7 | 0 | 0.13 | 0.52 |  |
| Poster Presentation | 0 | 46 | 4 | 4.54 | 4.40 |  |
| Oral Presentation | 0 | 25 | 2 | 2.54 | 2.85 |  |
| Online Publication (Peer Reviewed) | 0 | 10 | 0 | 0.19 | 0.65 |  |
| Online Publication (Non-Peer Reviewed) | 0 | 9 | 0 | 0.18 | 0.61 |  |
| Other Articles | 0 | 25 | 0 | 0.28 | 1.41 |  |