Research Focus I:
Insights in Higher Education Research for Admission Professionals

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ACT
This new ACT publication is an annual report offering meaningful research insights for some of the most pressing questions impacting admissions and enrollment practice.

In the first release of this report, ACT research sheds light on the following topics:

- the practice of super-scoring
- STEM major choice
- factors impacting retention and transfer
- test optional admission policy
- benefits for students who opt in to the ACT Educational Opportunity Service (EOS)
Roadmap

- Evaluation of Test-Optional Claims
- Research on the Validity of Different Methods of Combining Multiple ACT Scores
- Prototype User Tools
Test Optional or Not Test Optional? That’s a Research Question
Use of Test Scores in Admissions at Four-year Selective Colleges

- **Four-year colleges**
  - Required: 68.6%
  - Recommended: 14.7%
  - Neither: 16.7%

- **First-time students**
  - Required: 88.7%
  - Recommended: 7.2%
  - Neither: 4.1%
Reasons Schools Consider Test Optional

- **Environmental Challenges**
  - Enrollment declines & competitive challenges
  - Desire to simplify process – by school counseling and independent consultants

- **Student Considerations**
  - “…more than a test score”
  - “…test scores don’t fully show my academic talents”

- **An Analysis of Institutional Data**
  - “HSGPA is a better predictor of college success…”
We Agree That…

• Every school
  – Should continuously look at their data
  – Has the right to adopt test optional practices

• An over-dependence upon test scores is inappropriate
  – Students are much more than a test score
  – Holistic admission review is best practice
Where We Draw Different Conclusions

- Findings rooted in research
- The sum of peer-reviewed & internal research contradicts general support of test optional policies
ACT’s October 2016 Test Optional Report

- Requested by admissions and EM leaders
- Compilation of existing academic literature
- Summary of evidence drawn from ACT data
- Guidance and recommendations
In this report, empirical evidence that directly addresses the stated intentions and actual outcomes of test-optional practices is summarized. The five assertions reviewed in this report are:

1. Test-optional policies increase the diversity of enrolled students.
2. Test-optional policies do not result in admitting less qualified students.
3. Test scores do not add any information above and beyond HSGPA.
4. Test scores are not predictive of college success beyond the first year of college.
5. Test scores are biased measures of student readiness for minority and underserved students.
Assertion 1: Test-optional policies increase the diversity of enrolled students
“Test Optional Movement at America’s Selective Liberal Arts Colleges: A Boon for Equity or Something Else?”

“The test-optional movement in the United States emerged largely in response to criticism of standardized admissions tests as inadequate and potentially biased measures of postsecondary promise. Although anecdotal reports suggest that test-optional policies have improved campus diversity, empirical research has not yet confirmed this claim …Results show that, on average, test-optional policies enhance the perceived selectivity, rather than the diversity, of participating institutions.”

Co-authors: Andrew Belasco, Kelly O. Rosinger and James C. Hearn
Assertion 2: Test-optional policies do not result in admitting less qualified students
Students from the Bowd in class of 1999 who did not submit SAT scores performed about 120 points lower than those students who did submit them. Moreover, their FYGPA was substantially lower, as would have been predicted by their lower SAT scores (Wainer, 2011).
Assertion 3: Test scores do not add any information above and beyond HSGPA
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![Graph showing the probability of a 3.00 or higher FYGPA based on HS average for different ACT scores.](attachment:image.png)
Assertion 4: Test scores are not predictive of college success beyond the first year of college.
This is also true in terms of more long term indicators of success such as cumulative GPAs over six years of college and college completion.
Assertion 5: Test scores are biased measures of student readiness for underserved students
Subgroup Differences on ACT
Performance Gaps Exist Across Measures: High School GPA

Percentage of 2015 ACT-Tested Students by HSGPA and Race/Ethnicity

<table>
<thead>
<tr>
<th>Percent</th>
<th>African American</th>
<th>Asian</th>
<th>Hispanic</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>9</td>
<td>43</td>
<td>17</td>
<td>32</td>
</tr>
<tr>
<td>80%</td>
<td>11</td>
<td>20</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>60%</td>
<td>31</td>
<td>25</td>
<td>32</td>
<td>27</td>
</tr>
<tr>
<td>40%</td>
<td>26</td>
<td>20</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>20%</td>
<td>17</td>
<td>8</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>0%</td>
<td>7</td>
<td>4</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

Legend:
- Blue: 0.00-2.00
- Orange: 2.00-2.49
- Gray: 2.50-2.99
- Yellow: 3.00-3.49
- Dark Blue: 3.50-3.74
- Green: 3.75+
Subgroup differences exist on all academic measures: test scores, grades, and enrollment, persistence, and graduation rates.

Performance gaps by can be largely attributable to differences in course taking patterns, grades, school characteristics, and noncognitive characteristics (Figure 3).

Underserved students perform worse (not better) in college than what would be predicted based on their test scores.

Figure 3. Unadjusted and adjusted mean differences in ACT scores by family income
The results presented thus far are based on the total group. Some may wonder if these measures, in particular test scores, are valid for specific subgroups of students.

Differential prediction analyses test whether the relationship between test scores and an educational outcome is the same across subgroups of interest.

As shown in the figure, among students with the same ACT Composite score, African American and Hispanic students are less likely to earn a FYGPA of 2.5 or higher (and 3.0 or higher) than White students (Sanchez, 2013).
Conclusion

• More information enables more informed decisions
How should colleges treat multiple admissions test scores?
The Case for Superscoring
Impetus

- Frequency of retesting is increasing (Harmston & Crouce, 2016)
- Not consistent treatment of multiple scores across institutions
- Questions about fairness and equitable practices
- Dated literature; mainly focused on SAT
Previous Research

• Differential Validity
  – Slightly higher correlation coefficients for average score; $r_s$ are .01 to .02 higher (Boldt, Centra, & Courtney, 1986; Patterson, Mattern, & Swerdzewski, 2012; Roszkowski & Spreat, 2016)

• Differential Prediction
  – FYGPA for retesters was underpredicted (Boldt et al., 1986; Roszkowski & Spreat, 2016)
  – Underprediction ↑ as testing occasions ↑ (Boldt et al., 1986; Roszkowski & Spreat, 2016)
  – Average method > underprediction; superscoring < underprediction (Boldt et al., 1986)

• Roszkowski & Spreat (2016) analyzed the subject tests individually
Research Questions

1. Which composite scoring method (average, highest, last, and superscoring) is most predictive of first-year grade point average?

2. Which composite scoring methods exhibits the least amount of differential prediction by number of testing occasions?
Current Study

Extends previous findings in four substantive ways:

1. Majority of research on SAT which is comprised of 2 scores; ACT has 4 subject tests
2. Previous research assumed non-repeaters were accurately predicted
3. Admission decisions are rarely based solely on test scores; ran models with HSGPA
4. Examined diversity implications for various scoring methods
Sample

- Four-year institutions that provided first-year college grade data to ACT:
  - 2009 through 2012 freshman cohorts
  - Students had to have a valid FYGPA, HSGPA & ACT scores
  - 277,551 students, 221 four-year institutions
Measures

- **ACT tests scores.** English, mathematics, reading, and science – from all testing administrations were obtained from the student’s official ACT record.

- **Number of ACT Administrations.** This variable is a simple count of the number of times a student took the ACT during their sophomore through senior year of high school (M = 2.3). This variable was classified into four levels: 1 time (29.1%), 2 times (35.3%), 3 times (20.2%), and 4 or more times (15.4%).

- **High School Grade Point Average (HSGPA).** HSGPA was obtained from responses to ACT registration form, which asks students to self-report the coursework they have taken in English, mathematics, social studies, and science, and the grades earned in those courses (M = 3.40, SD = 0.50).

- **First-Year Grade Point Average (FYGPA).** First-year grade point average (FYGPA) was provided by participating colleges and universities (M = 2.73, SD = 0.95).
<table>
<thead>
<tr>
<th>Method</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last</td>
<td>The score that the student earned on the last time they took the ACT.</td>
<td>For composite scores submitted in chronological order (20, 24, 23), the last score would be the 23.</td>
</tr>
<tr>
<td>Average</td>
<td>The average of all ACT Composite scores earned across test administrations/attempts, rounded to the nearest whole number.</td>
<td>If a student took the ACT three times and earned a 20, 24, and 23, the Average ACT composite score would represent the average score across the three attempts– 22.</td>
</tr>
<tr>
<td>Highest</td>
<td>The highest ACT composite score earned during a single administration.</td>
<td>For the example of the student who took the ACT three times and earned a 20, 24, and 23, her Highest ACT composite score is a 24.</td>
</tr>
<tr>
<td>Superscored</td>
<td>The highest ACT subject test score (English, Reading, Mathematics, and Science) across administrations and then computes the ACT composite score for those highest subject test scores.</td>
<td>If a student who took the ACT twice and earned a 20 in English, 21 in Reading, 21 in Math, and 22 in Science on his first attempt. On his second attempt, he earned a 21 in English, 20 in Reading, 20 in Math, and 23 in Science. The Superscored ACT Composite score is 22 and based on his Reading and Math scores from his first attempt and on his English and Science scores from his second attempt.</td>
</tr>
</tbody>
</table>
Table 1. Means, standard deviations, and intercorrelations of study variables

<table>
<thead>
<tr>
<th>#</th>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Last</td>
<td>22.6</td>
<td>4.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Average</td>
<td>22.2</td>
<td>4.1</td>
<td>0.97</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Highest</td>
<td>22.9</td>
<td>4.2</td>
<td>0.98</td>
<td>0.98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Superscored</td>
<td>23.3</td>
<td>4.2</td>
<td>0.97</td>
<td>0.97</td>
<td>0.99</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>HSGPA</td>
<td>3.40</td>
<td>0.50</td>
<td>0.50</td>
<td>0.50</td>
<td>0.51</td>
<td>0.52</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>FYGPA</td>
<td>2.73</td>
<td>0.95</td>
<td>0.40</td>
<td>0.39</td>
<td>0.40</td>
<td>0.41</td>
<td>0.49</td>
</tr>
</tbody>
</table>

*Note. N= 277,551. All correlations are significant at p < .0001. FYGPA = first-year grade point average.*
Table 2. Predictive Strength of Scoring Method by Number of Testing Occasions

<table>
<thead>
<tr>
<th>Number of Testing Occasions</th>
<th>N</th>
<th>Last</th>
<th>Average</th>
<th>Highest</th>
<th>Superscore</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80,868</td>
<td>.38</td>
<td>.38</td>
<td>.38</td>
<td>.38</td>
</tr>
<tr>
<td>2</td>
<td>97,876</td>
<td>.39</td>
<td>.40</td>
<td>.39</td>
<td>.39</td>
</tr>
<tr>
<td>3</td>
<td>56,046</td>
<td>.41</td>
<td>.42</td>
<td>.41</td>
<td>.41</td>
</tr>
<tr>
<td>4 or more</td>
<td>42,761</td>
<td>.44</td>
<td>.45</td>
<td>.44</td>
<td>.44</td>
</tr>
<tr>
<td>Overall</td>
<td>277,551</td>
<td>.40</td>
<td>.39</td>
<td>.40</td>
<td>.41</td>
</tr>
</tbody>
</table>
Differential Prediction of Composite Scoring Method by Number of Testing Occasions
Differential Prediction of Composite Scoring Method by Number of Testing Occasions
Reduction of Differential Prediction with the Inclusion of HSGPA
Impact Analyses

- Diversity implications of different scoring methods by three levels of selectivity (top 15%, 50%, and 85%).
- Gender, ethnic, and income makeup is unaffected by the choice of scoring method.
  - For top 15% selectivity scenario, all scoring methods resulted in an admitted class:
    - 45% male
    - 4% minority
    - 9-10% low-income.
Implications

• Results can inform the college admission practice and policies
  – Superscoring minimized prediction error by retesting occasion

• Scoring method was unrelated to the diversity make-up of an admitted class
Future Directions

• Only had ACT scores
  – Results by both ACT and SAT scores

• Generalizability of results to other indicators of college success
  – Retention and graduation

• Understanding what individual differences are related to retesting?
  – Motivation, persistence?
Prototypes of Users Tools: Personalized Feedback & Insights

- Personalized College Readiness Zone
- Academic- and Interest-Major Fit
Prototype User Tool

<table>
<thead>
<tr>
<th>Major</th>
<th>Probability of Earning a B or Higher in College</th>
<th>Probability of Returning for a Second Year</th>
<th>Probability of Graduating in Four Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT Composite Score</td>
<td><img src="image1" alt="Gauge showing 74.8%" /></td>
<td><img src="image2" alt="Gauge showing 82.9%" /></td>
<td><img src="image3" alt="Gauge showing 45.1%" /></td>
</tr>
<tr>
<td>High School GPA</td>
<td><img src="image4" alt="Gauge showing 0%" /></td>
<td><img src="image5" alt="Gauge showing 100%" /></td>
<td><img src="image6" alt="Gauge showing 0%" /></td>
</tr>
<tr>
<td>Interest-Major Fit</td>
<td><img src="image7" alt="Gauge showing 0%" /></td>
<td><img src="image8" alt="Gauge showing 100%" /></td>
<td><img src="image9" alt="Gauge showing 0%" /></td>
</tr>
<tr>
<td>Engage: Academic Income</td>
<td><img src="image10" alt="Gauge showing 0%" /></td>
<td><img src="image11" alt="Gauge showing 100%" /></td>
<td><img src="image12" alt="Gauge showing 0%" /></td>
</tr>
<tr>
<td>Engage: Social Activity</td>
<td><img src="image13" alt="Gauge showing 0%" /></td>
<td><img src="image14" alt="Gauge showing 100%" /></td>
<td><img src="image15" alt="Gauge showing 0%" /></td>
</tr>
</tbody>
</table>
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Academic- and Interest-Major Fit Map

ACT Composite Score
11 Min 22
Arts 20 Min 60
Social Service 20 Min 43
Business Operations 20 Min 28
Business Administration and sales 20 Min 61
Science and Technology 20 Min 34
Technical 20 Min 33

Academic Challenge vs. Academic Fit

Academic Challenge vs. Academic Reach

Academic Fit vs. Interest Fit

Reset