Graduate Admissions: Finding [Some] Solace in the Numbers

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Admissions Questions

1. What is “success” in graduate school?

2. Are we concerned with student success, program success, or both?

3. What best predicts success in graduate speech-language pathology?
Previous Success Indicators

- Graduate GPA
- Clinical GPA
- Comprehensive exams
- PRAXIS
- Program completion rates
- Employment rates
Related Questions

1. What objective and subjective information should admissions committees consider in predicting success?

2. What is the best mix of objective and subjective data?

3. What impact does the university’s admission requirements have on our process?
Presentation Purpose

- Discuss previous research related to SLP admissions and graduate “success”
- Present current research
- Open a dialogue for discussion
Previous Research
Steffani & Slavin (1997)

Surveyed graduate programs regarding admissions practices and preferences. Of >200 surveys sent, 105 respondents were utilized (49% response rate).
Steffani & Slavin (1997)

Importance of entrance requirements (6 point equal-interval scale: 0-5). Mean scores:

- GPA in major (4.37)
- GPA overall (4.35)
- Letters of recommendation (3.89)
- GRE scores (3.38)
- Letter of intent (3.29)
- Member of underrepresented group (3.16)
Steffani & Slavin (1997)

GPA: 49% had a min of 3.0
35% had no minimum

GRE: 53% had a min GRE requirement
- 54% of these: V+Q below 1000
- 45% of these: V+Q 1000
Ryan, Morgan, & Wacker-Mundy (1998)

84 graduate students from two grad programs; performed a multiple regression analysis.

- Dependent variables:
  - PRAXIS score
  - GGPA

- Independent variables:
  - GRE V, Q, and V+Q
  - Overall UGPA
  - GPA in CSD
MULTIPLE REGRESSION ANALYSIS

- Variables (except overall UGPA) were significantly correlated with PRAXIS, but none accounted for > 18% of the variance in the PRAXIS scores.
- GRE Q ($r^2 = .12$) but not V ($r^2 = .03$) was significantly correlated with GGPA (low correlation).
- UGPA in CSD was moderately correlated with GGPA ($r^2 = .34$).
Ryan, Morgan, & Wacker-Munday (1998)

- Overall UGPA was no better than chance at predicting PRAXIS or GGPA.
- GRE scores (V+Q) were weak predictors of GGPA ($r^2=.10$) and PRAXIS scores ($r^2=.18$).
Forrest & Naremore (1998)

45 grad students.

Group 1 (30 students selected in previous years to Group 2): Classified (1) by faculty at the top and bottom of the class, creating two subgroups and (2) confirmed by the following:

- Success group 1: GGPA > 3.7, GRE > 700
- Success group 2: GGPA 3.0-3.2, GRE 600-650

Group 2 (15 students): Selected randomly from program.
Forrest & Naremore (1998)

Data from Group 1 used for discriminant analysis.

Discriminant function calculated from Group 1 was used to predict membership in Group 2 (based on GGPA as dependent variable).
RESULTS.

- Top and bottom students in Group 1 could be discriminated with 93% accuracy by UGPA alone.
- Students with UG degrees in other disciplines were more likely to be successful in SLP grad program than those with degrees in the field.
- Of all variables, GRE scores were the least predictive of success (63% were classified correctly).
Forrest & Naremore (1998)

Cross-validation procedure between the groups:
- 80% in Group 2 were classified correctly (based on UGPA)

Based on the authors’ findings, they suggest
- A reduction in the weighting of GRE scores in admissions
- A reduction of the minimum GRE V+Q score to 900
Reed (2007)

43 students from a historically black institution with 59% Caucasian and 36% African Americans. Multiple regression analysis dependent variables were:

- PRAXIS score
- Grad clinical GPA

Independent variables were:

- UGPA
- GRE V, Q, and V+Q
Reed (2007)

GRE $\rightarrow$ PRAXIS

- GRE V signif in predicting PRAXIS (2.4 x more likely to pass PRAXIS with GRE V of $\geq 400$)
- GRE V+Q signif in predicting PRAXIS (3.2 x more likely to pass PRAXIS with V+Q of $\geq 800$)
- Students with < 3.0 GPA but with > 800 on GRE V+Q was 5 times more likely to pass the PRAXIS compared to a person with < 3.0 and < 800.
Reed (2007)

UGPA, GRE $\rightarrow$ CLINICAL GRADES

- No signif correlation between UGGPA and graduate clinical practicum grades
- Signif and mod correlations between GRE V ($r=0.36$), GRE V+Q ($r=0.37$) and clinical practicum grades
Shriberg, et al. (1977)

**Part 1.** 239 UG and grad students, comparing discipline specific course grades (introductory clinical course, language development, and speech-hearing science) with GPA.

- SH Science captured as much as 34% of the variance in the final UGPA.
- Students one SD below the mean UGPA: 57% received a “C” or less in SH Science and no student received an “A”
Shriberg, et al. (1977)

**Part 2.** Compared individual UG course grades (speech and hearing science, articulation, and language) and final GPA to clinical performance. Two groups:

Group 1: Very Good-Excellent Performance
Group 2: Poor-Good Performance
RESULTS.

Grades of A or AB

UG Speech-Hearing Science:
- Did not discriminate groups (39% vs. 42%)

UG Articulation:
- Did discriminate groups (47% vs. 64%)

UG Language:
- Did discriminate groups (25% vs. 54%)
Shriberg, et al. (1977)

Part 3. UGPA and Graduate GPA

Students divided into three clinical groups based on overall clinical rating.

Group 1: Excellent

Group 2: Very Good

Group 3: Good
Shriberg, et al. (1977)

CLINICAL GROUP RESULTS.
Mean UG GPA
- Group 1 (Excellent): 3.45
- Group 2 (Very Good): 3.30
- Group 3 (Good): 3.27
Mean Graduate GPA
- Group 1 (Excellent): 3.70
- Group 2 (Very Good): 3.63
- Group 3 (Good): 3.48
Kjelgaard & Guarino (2012)

122 students from a single university over two academic years. Performed MANOVA and regression analysis to discover relationship between dependent variables of:

- Summative clinical evaluation
- PRAXIS score

and independent variables of:

- Major and non-CSD major
- GRE Q and V
- UG GPA
- Grad course grades
- Formative clinical evaluation
Kjelgaard & Guarino (2012)

RESULTS

Significant differences:
Majors > Nonmajors UGPA
Majors < Nonmajors GRE V and GRE Q
Majors < Nonmajors Grad course grades
Kjelgaard & Guarino (2012)
Previous Research Findings

Summary
Summary

- Disparate findings for GRE scores and PRAXIS
- Disparate findings for UGGPA and PRAXIS
- Clinical success unrelated to PRAXIS
- Disparate findings for GRE V and clinical success
- GRE Q related to clinical success
Summary cont’d

- UG SH Science grades are a better predictor of academic/PRAXIS success than clinical success
- UG articulation and language courses are a better predictor of clinical success (compared to SH Science)
- Clinically successful students tend to make better overall grades (disparate results)
Current Research
Current Research

Part of a larger study, graduate programs at four universities in two states participated. The purpose of the study was to discover the value of typical admissions variables in predicting graduate school success. Graduate success was defined by:

1. PRAXIS score (n=117)
2. 1st grad semester clinical performance (n=125)
Universities supplied the first PRAXIS score, clinical performance scores, and the following data:

- GPAs (Overall, last 60 hours, CSD)
- GRE (V, Q, Writing)
- Grades in UG courses: speech-hearing science, biological science, physical science
Praxis Score.

Students (n=117) were divided into two groups based on their scores on the first PRAXIS performance.

- Group 1, < 600 (fail), n=17
- Group 2, ≥ 600 (pass), n=100
Clinical Performance.

- First semester graduate students (n=125) were evaluated on clinical performance based on the Clinical Fellowship Scale Inventory (five point likert-type scale that assesses clinicians relative to their need for supervision in: evaluation, management, and intervention).
Clinical Performance.

- Based on their clinical scores, students were divided into two groups:
  - Group 1, with scores of 1-5 (requiring more supervision), n=62
  - Group 2, with no scores of 1-2 and must have a majority of 4-5 scores (clinically successful, requiring less supervision), n=63
Stepwise discriminant analyses were performed using PASW 18.0 with the PRAXIS score grouping and clinical performance grouping as the dependent variables and the admissions data as the independent variables:

- **GRE**: V, Q, V+Q, and writing
- **GPA**: Overall, last 60 hours, and CSD Major
- **Course Grades**: speech-hearing science, biological science, and physical science
## Current Research: PRAXIS

<table>
<thead>
<tr>
<th>Subject</th>
<th>Pass Group</th>
<th>Fail Group</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA Ovr</td>
<td>3.49 (0.33)</td>
<td>3.10 (0.41)</td>
<td>18.0</td>
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<tr>
<td>GPA CSD</td>
<td>3.75 (0.29)</td>
<td>3.42 (0.35)</td>
<td>17.3</td>
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<td>GPA 60</td>
<td>3.57 (0.36)</td>
<td>3.12 (0.51)</td>
<td>19.6</td>
<td>.000</td>
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<tr>
<td>SH Sci</td>
<td>3.68 (0.53)</td>
<td>2.88 (0.60)</td>
<td>31.7</td>
<td>.000</td>
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<tr>
<td>Bio Sci</td>
<td>3.11 (0.83)</td>
<td>2.53 (1.00)</td>
<td>6.7</td>
<td>.01</td>
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<tr>
<td>Phy Sci</td>
<td>3.33 (0.84)</td>
<td>2.26 (0.64)</td>
<td>24.3</td>
<td>.000</td>
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</table>
Current Research: PRAXIS

<table>
<thead>
<tr>
<th>Pass Group</th>
<th>Fail Group</th>
<th>F</th>
<th>Sig</th>
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</thead>
<tbody>
<tr>
<td>GRE V+Q</td>
<td>916 (120)</td>
<td>766 (84)</td>
<td>24.5</td>
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<tr>
<td>GRE V</td>
<td>421 (65)</td>
<td>355 (30)</td>
<td>16.5</td>
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<tr>
<td>GRE Q</td>
<td>496 (92)</td>
<td>411 (75)</td>
<td>12.9</td>
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<tr>
<td>GRE Wr</td>
<td>3.8 (0.6)</td>
<td>3.3 (0.6)</td>
<td>10.3</td>
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</table>
Current Research: Discriminant Analysis

Chi-Square Test was significant (Wilks’ $\lambda = 0.635$, Chi-square $= 51.55$, df $= 3$, Canonical correlation $= 0.604$, $p < .000$)

- Standardized Function Coefficients
  - SH Science: 0.493
  - Phy Science: 0.541
  - GRE V+Q: 0.544

- These three variables accounted for 36.5% of the variance in the PRAXIS scores.
Current Research: Discriminant Analysis – Structure Matrix

<table>
<thead>
<tr>
<th>Variable</th>
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<th>Variable</th>
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<tbody>
<tr>
<td>SH Sci</td>
<td>0.693</td>
<td>GRE Q</td>
<td>0.505</td>
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<tr>
<td>GPA Ovr</td>
<td>0.609</td>
<td>Bio Sci</td>
<td>0.423</td>
</tr>
<tr>
<td>GRE V+Q</td>
<td>0.608</td>
<td>GRE V</td>
<td>0.402</td>
</tr>
<tr>
<td>Phy Sci</td>
<td>0.606</td>
<td>GRE Wr</td>
<td>0.283</td>
</tr>
<tr>
<td>GPA 60</td>
<td>0.553</td>
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<tr>
<td>GPA CSD</td>
<td>0.524</td>
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Current Research: Discriminant Analysis

Reclassification of cases based on the canonical variables was highly successful: 89.6% of the cases were correctly reclassified into their original categories.
Current Research: Discriminant Analysis – ROC Curve

ROC Curve was calculated for GRE V+Q score and the PRAXIS group. The total area under the curve was 0.806 at a significance level of $p < .000$ (SE = 0.043 and 95% CI of 0.722 to 0.891).

- The optimal cut score that maximizes sensitivity and specificity was a total (V+Q) GRE score of 835.
## Current Research: Clinical Performance

<table>
<thead>
<tr>
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<th>Success Grp</th>
<th>Other Grp</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA Ovr</td>
<td>3.46 (0.34)</td>
<td>3.37 (0.39)</td>
<td>1.8</td>
<td>.177</td>
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<tr>
<td>GPA CSD</td>
<td>3.71 (0.29)</td>
<td>3.65 (0.35)</td>
<td>1.3</td>
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<tr>
<td>GPA 60</td>
<td>3.52 (0.37)</td>
<td>3.46 (0.44)</td>
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<tr>
<td>SH Sci</td>
<td>3.60 (0.58)</td>
<td>3.46 (0.64)</td>
<td>1.7</td>
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<td>Bio Sci</td>
<td>3.02 (0.86)</td>
<td>2.93 (0.87)</td>
<td>0.3</td>
<td>.570</td>
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<tr>
<td>Phy Sci</td>
<td>3.13 (0.89)</td>
<td>3.07 (0.93)</td>
<td>0.1</td>
<td>.703</td>
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</table>
## Current Research: Clinical Performance

<table>
<thead>
<tr>
<th></th>
<th>Success Grp</th>
<th>Other Grp</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRE V+Q</td>
<td>917 (137)</td>
<td>864 (111)</td>
<td>5.4</td>
<td>.022</td>
</tr>
<tr>
<td>GRE V</td>
<td>412 (71)</td>
<td>409 (62)</td>
<td>0.1</td>
<td>.770</td>
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<tr>
<td>GRE Q</td>
<td>503 (97)</td>
<td>456 (85)</td>
<td>8.6</td>
<td>.004</td>
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<tr>
<td>GRE Wr</td>
<td>3.7 (0.7)</td>
<td>3.7 (0.6)</td>
<td>0.1</td>
<td>.914</td>
</tr>
</tbody>
</table>

*Note: GRE V+Q = Verbal + Quantitative, GRE V = Verbal, GRE Q = Quantitative, GRE Wr = Writing.*

*Source: Abilene Christian University*
Current Research: Discriminant Analysis

Chi-square Test was significant (Wilks’ $\lambda = 0.935$, Chi-square $= 8.23$, df $= 1$, Canonical correlation $= 0.26$, $p < .004$)

Standardized Function Coefficients

GRE Q: 1.00

- This variable accounted for 6.5% of the variance in the Clinical Performance scores.
Current Research: Discriminant Analysis

Reclassification of cases based on the canonical variable was marginally successful: 60.8% of the cases were correctly reclassified into their original categories.
**Current Research: Discriminant Analysis – Structure Matrix**

<table>
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<tbody>
<tr>
<td>GRE Q</td>
<td>1.000</td>
</tr>
<tr>
<td>GRE V+Q</td>
<td>0.853</td>
</tr>
<tr>
<td>GRE Wri</td>
<td>0.344</td>
</tr>
<tr>
<td>GPA 60</td>
<td>0.314</td>
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<tr>
<td>GPA Ovr</td>
<td>0.270</td>
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<tr>
<td>SH Sci</td>
<td>0.243</td>
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</table>

<table>
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<th>Variable</th>
<th>Loading</th>
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</thead>
<tbody>
<tr>
<td>GRE V</td>
<td>0.234</td>
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<tr>
<td>Bio Sci</td>
<td>0.218</td>
</tr>
<tr>
<td>GPA CSD</td>
<td>0.201</td>
</tr>
<tr>
<td>Phy Sci</td>
<td>0.133</td>
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</table>
Current Research: Summary

Academic

- All of the “objective” admissions variables tested can be helpful in predicting success in passing the PRAXIS. However,

- Redundancy in data suggests the best predictors may be
  - GRE V+Q
  - UG grades: SH Science and Physical Science
The success of the undergrad sciences grades in prediction suggests they should be considered in both UG and graduate program admission.
Current Research: Summary

Clinical

- There is no academic variable that is a good predictor of clinical success.
- Our best clinicians tend to have higher GRE V+Q and Q scores.
  - Is this related to better skills in reasoning and critical thinking?
Discussion
Discussion

- Despite contrary previous findings, the GRE, science grades, and GPAs are good predictors of PRAXIS success.
- There is redundancy in our objective admissions data.
- Consider minimum science grades as a requirement for undergraduate admissions.
Discussion

- High GRE scores as a “first cut” for applicants may disallow otherwise good students and clinicians.
- Academic and clinical success are not always synonymous!
- Find a balance between academic and clinical success.
  - How do we capture the best students who are also the best clinicians?
Discussion

- Most (perhaps all) schools struggle with this *subjective* piece of admissions.
  - Writing sample/letter of intent
  - Letters of recommendation
  - Resume
  - Interview
  - Other
Discussion

- We must answer these questions:
  - What makes a good clinician?
  - How can we measure these variables at the admissions level?
  - Can these measurements be standardized?
  - How do we balance the “good clinician” with the “good student”?
References


References


References


Correspondence

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Dialogue