



Comparing Praxis[®] Performance Based on NASP Program Approval Status

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ABSTRACT

The National Association of School Psychologists (NASP) provides national review and approval of graduate programs in school psychology. Program approval represents an important quality indicator and offers important credentialing benefits to graduates of those programs. However, no research has previously examined the relationship between NASP program approval and the performance of program completers on tests such as the Praxis School Psychologist exam. The current study compared performance on the Praxis among NASP-approved and nonapproved programs before and after controlling for Graduate Record Exam (GRE) scores, which are a common admissions requirement for graduate programs in school psychology. Results revealed that graduates of NASP-approved programs score significantly higher on the Praxis, even after controlling for GRE, although much of the variance can be linked to GRE scores. This finding was most pronounced among institutions offering either a specialist-level program or both specialist- and doctoral-level programs as opposed to those offering a doctoral-level program only.

Keywords: NASP Approval, Praxis, School Psychology, graduate preparation, accreditation

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Since 1988, the National Association of School Psychologists (NASP) has provided national review and approval of graduate programs in school psychology as part of its efforts to support the preparation of qualified school psychologists. These reviews have been conducted both through the National Council for Accreditation of Teacher Education (NCATE), which is now the Council for the Accreditation of Educator Preparation, and independently (for school psychology programs that are not in NCATE/CAEP accredited colleges, schools, or what are called “units” or “providers” of education).

The NASP program review process identifies critical graduate education experiences and competencies needed by candidates preparing for careers in school psychology based on NASP standards. The first set of NASP graduate preparation standards was developed in 1972 (NASP, 1984). NASP standards for professional preparation were the first set to be approved by NCATE (Prus & Strein, 2011) and have been revised in conjunction with its related standards (e.g., for credentialing and ethics) approximately every 10 years. Currently, the program review process follows the *Standards for Graduate Preparation of School Psychologists* (NASP, 2010). These standards address a range of program components, including faculty requirements, instructional content, supervised field experiences, positive student impact, and assessment of content knowledge of graduate students, which is often accomplished using program-designed measures and the Praxis School Psychologist assessment (hereinafter referred to as the Praxis).

The Praxis was first administered by the Educational Testing Service (ETS) in 1988 and has remained a requirement to earn the Nationally Certified School Psychologist (NCSP) credential since. Additionally, ETS (2015) reports 22 states that currently require a passing score on the Praxis to earn a state school psychology credential. The content of the exam has historically aligned with NASP standards. See ETS (2013) for specific information about the content of the version of the exam used in this study.

Each program’s submitted materials are reviewed independently by two or three trained reviewers using rubrics designed to judge adherence to each major standard. Reviews are then considered by the NASP Program Accreditation Board (called the Program Approval Board prior to 2014), which makes the final decision regarding program approval. If not approved, programs have the option to submit materials for reconsideration, or to appeal a decision under certain circumstances.

Attainment of program approval is an important indicator of quality graduate education as judged by trained national reviewers. Program approval communicates that an institution’s graduates enter the profession as competent and capable, and that the institution has the appropriate infrastructure to adequately prepare and support its students. Within school psychology, maintaining program approval affords a streamlined process for graduates to earn the NCSP credential, and in many states (e.g., Minnesota, Georgia, South Carolina) either qualifies programs for state approval and/or helps graduates fulfill a requirement to earn a credential to work in the state. Despite these benefits afforded to graduates of approved programs, no study has examined the impact of program approval on the actual outcomes of programs in school psychology. Nevertheless, there has been a strong movement toward outcome assessment and increased pressure to demonstrate the effectiveness of preparation as a component of the program review process (Prus & Strein, 2011).

The purpose of this research was to determine if significant differences exist between scores on the Praxis, the most commonly used external assessment in school psychology, among individuals who attended NASP-approved school psychology programs compared with students who attended school psychology programs without program approval. These findings may support the benefit to prospective students of attending a NASP-approved program, and the possible benefit to internship sites and employers of giving preference to graduates of NASP-approved programs.

METHODS

This study was approved by the NASP Research Committee as a research partnership between NASP and ETS. A formal research proposal and request for data were submitted to ETS and approved in July 2012.

Sample

Educational Testing Service (ETS) provided Praxis scores and attending institution codes for 7,692 individuals taking the exam from January 2010 through December 2011 and their corresponding GRE exam verbal and quantitative scores, if taken on or after January 2005. Scores were matched by individual and de-identified. The GRE quantitative score and GRE verbal score were added to form Total GRE Score. The analysis included only those institutions that produced individually matched Praxis and GRE scores for students within the dataset.

Analyses

The data were reviewed for inconsistencies, missing values, data entry errors, and inaccurate information and values. Due to missing data, 1,188 cases were deleted from the dataset, which resulted in 6,504 complete cases. Of the complete cases, only those cases that included scores for both the Praxis and GRE were used in the analyses. This further reduced the sample size to 2,704 cases, or 35% of the original ETS sample. Of the 2,704 cases use for the analyses, the majority attended approved programs ($n = 2,367$; 88%) with a smaller portion from programs without program approval ($n = 337$; 12%). These sample sizes were large enough to conduct the analyses. In cases where students took the Praxis or GRE multiple times, the highest scores obtained were used for the analyses.

Program approval status for all known institutions offering school psychology graduate preparation programs (243) was provided by NASP based on the program's status in Fall 2011. The approval status variable had four categories: fully approved, conditionally approved, not approved, and mixed. Institutions that had a program(s) with full or conditional approval were considered approved for this study given that NASP treats both equally in terms of rights and benefits of program approval. Mixed status refers to institutions with two programs (i.e., specialist and doctoral) in which one of the levels was approved and the other was not approved. Mixed programs were not included in the recoding and analysis, leaving 202 total institutions for the analysis, or 83% of all known institutions offering a school psychology program. Among the 202 institutions included in the analysis, 163 (81%) were NASP approved and 39 (19%) were not approved (See Table 1).

Program level (specialist, doctoral) was determined by institution. Institutions offering both specialist and doctoral degrees were classified as a third level (both) because the data file did not indicate from which program students at these institutions graduated. Among the 202 institutions, 20 (10%) offered only doctoral programs, 129 (64%) offered only specialist programs, and 53 (26%) offered both programs.

RESULTS

GRE and Praxis score means were calculated by program degree level (i.e., specialist level, doctoral, or both; see Table 1). Three analyses were conducted. The first examined the relationship between GRE and Praxis scores. The second examined differences in GRE scores across program degree level and NASP approval status. The third and primary analysis examined differences in Praxis scores controlling for differences in GRE scores.

Table 1. GRE and Praxis II Descriptive Statistics by Program Degree Level and Program Approval

Program Degree Level	Not Approved			Approved/ Conditionally Approved		
	Mean	SD	n	Mean	SD	n
Praxis						
Specialist	169.34	8.21	290	173.46	8.29	1389
Doctoral	175.13	7.77	15	179.69	6.89	130
Both	163.22	11.28	32	176.17	8.25	848
All programs	169.35	8.47	337	174.77	8.39	2367
GRE						
Specialist	925.79	181.48	290	982.94	172.32	1389
Doctoral	986.67	155.00	15	1123.38	174.55	130
Both	961.87	161.41	32	1045.57	177.90	848
All programs	931.93	178.84	337	1013.09	178.86	2367

Note. "Both" indicates that the institution had a specialist and doctoral program with the same approval status.

The first analysis examined the overall association between the Praxis and Total GRE, which identified a significant correlation between Praxis and Total GRE scores, $r(2702) = .63, p < .001$. This is a large effect, $r^2 = .39$. The second analysis employed a 2 (Program Approval: Approved/Conditionally Approved, Not Approved) \times 3 (Program Degree Level: Doctoral, Specialist, Both) between-subjects analysis of variance (ANOVA) to determine whether GRE scores from programs with and without program approval differed at each program degree level. The interaction was not significant, $F(2, 2698) = 1.54, p = .22$, allowing for interpretation of the main effects. The main effect of Program Degree Level was significant, $F(2, 2698) = 11.90, p < .001$. Doctoral programs had higher mean GRE scores than both specialist programs ($d = .78$) and institutions offering both degree programs ($d = .38$). Institutions offering both degrees also had higher mean GRE scores than those offering only specialist programs ($d = .39$). The main effect of Program Approval was also significant, $F(1, 2698) = 22.674, p < .001$, with approved programs having significantly higher GRE scores than nonapproved programs ($d = .45$).

Praxis data form a two-level hierarchy of students nested within programs; therefore, multilevel modeling (MLM) was used (Heck, Thomas, & Tabata, 2013). Level 1 consisted of measures at the individual (student) level and was comprised of total GRE score, which was treated as a random factor. GRE scores were centered around the mean for the entire sample (grand mean centering) to provide a meaningful reference value (i.e., the mean) to aid in interpretation (Heck et al., 2013). Level 2 consisted of measures at the program (school) level and was comprised of Program Approval (Approved/Conditionally Approved, Not Approved) and Program Degree Level (Doctoral, Specialist, Both), which were both treated as fixed factors because all possible values of these factors were included in the analysis. The analysis was conducted using IBM SPSS version 22 software. In order to examine the effect of NASP approval after controlling for GRE scores, maximum likelihood estimation was used because it enables comparisons between nested models.

Five multilevel models were used to examine the relationship between NASP approval and Praxis scores (see Tables 2 and 3). The first model was an intercept-only model to evaluate whether MLM was appropriate for the data. The interclass correlation coefficient (ICC) was .2899, meaning that approximately 28.99% of the variance in Praxis scores was attributable to differences between schools, well above the 10% threshold described by Lee (2000) and confirming that MLM was appropriate.

The second model examined the effects of GRE scores at the student level (level 1). GRE scores were modeled with random intercepts to permit GRE scores to vary by program. The addition of GRE scores significantly improved the fit of the model based on the likelihood ratio test, $\chi^2(1) = 1087.42, p < .001$. GRE scores accounted for approximately 43.23% of the within-school variance in Praxis scores.

The third model examined the relationship between NASP approval and Praxis scores; the primary research question. Three school-level (level 2) factors were added to the model, Program Approval (Not Approved was used as the reference group), Program Level (Specialist was used as the reference group), and the Program Approval \times Program Level interaction. The addition significantly improved model fit based on the likelihood-ratio test, $\chi^2(5) = 44.53, p < .001$. Neither Program Level nor the Program Level \times Program Approval interaction were significant, $p = .06$ and $p = .13$, respectively. The effect of Program Approval, however, was significant ($b = 2.72, SE_b = 0.63, p < .001$). Students from NASP-approved programs scored 2.72 points higher on the Praxis after controlling for individual differences in GRE scores and differences between schools.

Random effects were added in the fourth and fifth models using an unstructured covariance matrix to permit the possibility that the relationship between GRE and Praxis scores may change across programs (i.e., to allow for the possibility that higher GRE scores may be associated with weaker correlations with Praxis scores). The fourth model added random slopes for GRE scores, permitting the relationship between GRE and Praxis scores to vary by program. Adding random slopes significantly improved model fit based on the likelihood-ratio test, $\chi^2(2) = 7.83, p = .02$. The final model added cross-level interactions between the school-level factors (Program Approval, Program Level) and the student-level factor (GRE score). Adding the cross-level interactions in the fifth model did not significantly improve model fit based on the likelihood-ratio test, $\chi^2(3) = 2.50, p = .48$. This indicates that the correlation between GRE and Praxis scores doesn't differ based on NASP approval or program level. The nonsignificant fifth model was discarded in favor of the more parsimonious fourth model.

The addition of random factors in the fourth model did not significantly change the relationship between the fixed effects and Praxis scores. Program Level and the Program Level \times Approval interaction remain nonsignificant, $p = .06$ and $p = .13$, respectively. The relationship between GRE and Praxis scores did not vary across programs (the random slopes component was not significant, $p = .09$); however, the relationship between GRE and Praxis scores became weaker as the GRE intercept got larger ($b = -0.004, SE_b = 0.002, p = .04$). The relationship between GRE and Praxis score was virtually identical in the third model ($b = .027, SE_b = 0.001$) versus the fourth model ($b = .026, SE_b = 0.001$). This means that a 1 point increase in GRE score was associated with a .026 point increase on the Praxis; however, this version of the GRE increased in 10-point increments, so the smallest possible change in GRE scores (10 points) would result in a .26-point change in the Praxis score. More importantly for the present analysis, the effect of NASP approval remained unchanged: $b = 2.72 (SE_b = 0.63)$ in the third model versus $b = 2.74 (SE_b = 0.64)$ in the fourth model. Students from NASP-approved programs scored 2.74 points higher on the Praxis after controlling for individual differences in GRE scores and differences between schools, including different relationships between GRE and Praxis scores.

Table 2. Unstandardized Multilevel Modeling Coefficients

Factor	Model 1: Null Model		Model 2: Student-Level Factors		Model 3: School- Level Factors		Model 4: School- Level Factors With Random Slopes for GRE Scores	
	<i>b</i>	<i>SE_b</i>	<i>b</i>	<i>SE_b</i>	<i>b</i>	<i>SE_b</i>	<i>b</i>	<i>SE_b</i>
Fixed effects								
Student level								
Intercept	173.99***	0.38	174.15***	0.23	171.39***	0.56	171.42***	0.58
GRE			.027***	0.001	.027***	0.001	.026***	0.001
School level								
Program Level ^a								
Doctoral					4.00	2.18	3.87	2.18
Both programs					-3.03	2.15	-3.11	2.19
NASP approval					2.72***	0.63	2.74***	0.64
NASP approval x Doctoral ^a					-1.39	2.33	-1.23	2.32
NASP approval x Both ^a					4.15	2.20	4.28	2.24
Random effects (Unstructured)								
School level	22.35***	2.90	7.01***	1.09	5.09***	1.08	5.04***	0.86
GRE Slopes							< .001	< .001
Slope & intercept covariance							-.004*	.002

^aSpecialist is the reference category for these analyses.

p* < .05, *p* < .01, ****p* < .001

Table 3. Model Fit Statistics Predicting Praxis Scores

Model Fit	Model 1: Null Model	Model 2: Student- Level Factors	Model 3: School- Level Factors	Model 4: School- Level Factors With Random Slopes for GRE Scores
Log likelihood	-9421.03	-8877.32	-8855.05	-8851.14
Deviance	18842.06	17754.64	17710.11	17702.28
AIC	18848.06	17754.64	17728.11	17724.28
BIC	18865.76	17786.25	17781.23	17789.21

Note. AIC = Akaike's Information Criterion; BIC = Schwarz's Bayesian Information Criterion.

DISCUSSION

This research explored the impact of program approval on Praxis scores, a common measure of content knowledge in school psychology. The results indicate that a significant difference exists between the Praxis scores of graduates from approved programs when compared to graduates from programs without approval. Mean Praxis scores ranged from 4.1 (specialist) to 12.9 (both degrees) points higher among approved programs when compared to programs without approval. The standard deviation of scaled scores nationally is 8.9 (Educational Testing Service, 2010), which corresponds to a difference of .5 to 1.4 standard deviations and a significant impact of program approval on the number of students passing the exam. The higher Praxis scores associated with program approval persists even while controlling for GRE scores and the differences between graduate programs; however, the magnitude of this difference is reduced to 2.74 points higher for graduates from approved programs, or 0.3 standard deviations. This indicates that much of the variability in Praxis scores can be linked to GRE scores, which could be expected given the significant correlation between the Praxis and the GRE.

The MLM analysis controlled for differences in Praxis scores due to other sources of between-program variation that may affect performance on the Praxis (e.g., differences in career commitment, satisfaction with the program, financial assistance, etc.). Using MLM to control for differences between programs may have reduced our ability to detect differences in program level. Even though 33% of participants came from institutions offering both degrees, the data file did not specify from which program (specialist or doctoral) each participant graduated within that institution. These institutions (and the students graduating from them) were classified as a third level of program (both). Because program level and institution are significantly confounded (each institution offering only one level of program, specialist, doctoral, or both), using MLM to control for differences between institutions might have obfuscated differences due to program level. Nevertheless, taken as a whole, graduates from NASP-approved programs still obtained higher Praxis scores even after controlling for GRE and differences among programs.

This research examined whether significant differences exist in Praxis scores based on program approval. While the MLM analysis allowed for statistical control of interprogram differences, the mechanisms that contribute to higher Praxis scores among students from approved programs are unclear. Potentially, approved programs provide a more effective graduate preparation experience by virtue of the review process. These effects may also result from approved programs attracting a larger applicant pool, or approved programs preparing students for the Praxis as a requirement of the program. Regardless of the mechanism, students from approved programs achieve higher scores than those from nonapproved programs, even after controlling for differences among programs. Additional work is needed to determine which program characteristics and components might be related to higher Praxis scores.

The current study has several limitations worth noting. First, the data provided by ETS did not report Praxis scores by degree level, requiring a determination of degree level by examining the degrees offered in school psychology at each university. Thus, it is not possible to determine the specific degree program from students attending institutions offering both degree levels. Second, this analysis considered both fully approved and conditionally approved conditions as a single category. Looking only at fully approved programs compared to nonapproved programs may well have revealed more significant differences, thereby demonstrating a more significant impact of program approval. Third, the highest Praxis score obtained by each individual was used for the analyses. The data set showed that some individuals took the Praxis multiple times, in some cases as many as 13 attempts between January 2010 and December 2011, and that many of these individuals were from programs without approval. Thus, our use of the highest score for statistical purposes likely masked some differences that might exist among multiple-test takers. It

is also important to note that the Praxis exam is criterion-referenced and designed as a screener for minimum competency for entry-level practitioners; thus, the Praxis exam may not be as sensitive to differences in analytical knowledge and does not purport to assess actual skills as a practitioner. Finally, since the time that the data for this study were obtained, a new version of the Praxis exam in school psychology has been released. Future research should attempt to replicate these findings with the new exam.

Overall, this research supports a benefit, in terms of Praxis scores, of attending a NASP-approved program, although the degree of that benefit is significantly mitigated by the general ability of the students as measured by the GRE. Given that NASP-approved programs offer more benefits to their graduates and therefore can be more competitive and selective when admitting students, as demonstrated by consistently higher GRE scores among those from approved programs, it stands to reason that those same graduates would perform better on the Praxis, particularly given the significant correlation between the Praxis and GRE. Therefore, despite a small increase in Praxis scores after adjusting for GRE and differences between programs, a statistically significant finding is meaningful and demonstrates a measurable benefit of attending a NASP-approved program.

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