

Predictors of Doctoral Student Success in Professional Psychology: Characteristics of Students, Programs, and Universities*

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In the face of the rising number of doctoral recipients in professional psychology, many have voiced concerns about the quality of nontraditional training programs. Past research suggests that, on a variety of outcomes, graduates from clinical PhD programs outperform graduates from clinical PsyD and, to a lesser extent, counseling PhD programs. We examine an aggregate archival dataset to determine whether student or university characteristics account for the differences in outcomes among programs. The data show meaningful differences in the outcomes of clinical PhD, PsyD, and counseling PhD programs. Furthermore, graduates from research-intensive universities perform better on the psychology licensure exam and are more likely to become American Board of Professional Psychology diplomates. The available data support the notion that the ability to conduct research is an essential component of graduate education. In this light, PsyD programs represent a unique opportunity to train students in the types of evaluation and outcomes assessments used by practicing psychologists. We discuss implications for graduate-level training in professional psychology. © 2011 Wiley Periodicals, Inc. *J Clin Psychol* 67:340–354, 2011.

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Over the past 30 years, the number of students enrolled in doctoral programs in clinical and counseling psychology has more than doubled (Norcross, Kohut, & Wicherski, 2005; Peterson, 2003). As a result, significant concerns about the quality of both the students receiving those degrees and the institutions granting those degrees have been raised (Maher, 1999; Peterson, 2003). The present study examines the empirical evidence comparing clinical PhD, clinical PsyD, and counseling PhD graduate programs to determine their relative effectiveness in preparing students for licensure and practice as a psychologist. Although previous research has focused largely on comparing types of programs, we extend the evaluation of graduate psychology programs to include student and institution data. We use a conglomerate dataset to conduct an analysis of graduate student outcomes that addresses issues with multicollinearity unaddressed by previous research.

Graduate Outcomes in Psychology

Peterson (2003) described the primary purpose of graduate training in professional psychology as being “the attainment and advance of excellence in the education and training of psychologists for illustrious careers in professional service” (p. 797). Past research has measured the extent to which graduate programs meet this goal in a number of ways. Most clinical and counseling psychology graduates practice as licensed psychologists (Norcross & Prochaska, 1982). As such, researchers often measure outcome by considering how well those programs prepare students for licensure and practice. Given the lack of available standardized outcome data across programs, the methods of measuring student success in existing studies are imperfect at best. In the present study, we consider commonly used graduate program

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outcomes through a “lifespan” approach, following the progression of students through internship, to licensure, and beyond.

Internship. The overwhelming majority of clinical and counseling doctoral programs require the equivalent of a full-year professional internship to be completed before graduation. The process of applying for internship is generally competitive, with applicants competing against a national pool. As such, some internship programs with strong reputations tend to be seen as highly desirable. Although a variety of factors influence how desirable a particular internship may be, accreditation by the American Psychological Association (APA) is often a key factor. In most states, documentation of having completed an APA-accredited internship is sufficient for completing the internship requirements for licensure as a psychologist; if the internship is not APA accredited, then additional documentation is often necessary to demonstrate that the internship experience was of sufficient quality for licensure.

Although APA accreditation is a gross marker of an internship site’s quality, it is one that uses standardized criteria based on what is considered important to professional practice in psychology. As such, some outcome studies have considered the percentage of students from a program that receive APA-accredited internships as a measure of program quality. Of course, the measure is still imperfect. Because of financial, familial, or geographic constraints, it is quite possible that a student who could otherwise receive an APA-accredited internship would choose to accept a nonaccredited internship.

Examination for Professional Practice in Psychology (EPPP). To gain licensure as a psychologist, all 50 states in the United States and a variety of territories and Canadian provinces require that applicants successfully complete the EPPP (Ryan & Chan, 1999). The EPPP is a 200-item, multiple-choice test that was developed to measure the areas of importance to practicing psychologists (Richman, 1982; Rosenfeld, Shimberg, & Thorton, 1983). Although many test-takers feel that the content of the EPPP is irrelevant to the practice of psychology (Ryan & Chan), the fact remains that successful completion of the EPPP is necessary for licensure. Because of this, many studies have considered scores on the EPPP as a measure of success of graduate programs.

Despite the prevalence of using EPPP scores as outcomes measures, the practice is not without faults. EPPP scores have been correlated with factors that are unrelated to the practice of professional psychology, such as motivation and anxiety, and one’s belief in the validity of the test (Ryan & Chan, 1999). EPPP scores are also highly correlated with admissions selection criteria, such as grade point average (GPA) and scores on the Graduate Records Examination (GRE; Peterson, 2003; Yu et al., 1997). Because students who do well on the GRE also do well on the EPPP, the EPPP’s utility as an outcome measure may be compromised. Programs with strong reputations may recruit the strongest students, who go on to do well on the EPPP, not by virtue of the program, but because they are academically talented students in the first place (Templer & Tomeo, 1998).

Finally, because EPPP scores are reported by program (and not by student), some concerns about the use of test averages have been raised. Using average scores means that individuals who fail and retake the test are counted more than once; the more an individual fails and retakes the test, the more they are contributing to the program’s average score (Peterson, 2003; Yu et al., 1997). As a result, failures to pass the EPPP are weighted more heavily in the program’s EPPP average than those who pass the EPPP the first time.

American Board of Professional Psychology (ABPP). Although licensure is an important hallmark of success in professional practice, it is not sufficient if we consider Peterson’s (2003) injunction that graduate programs should strive to prepare students for *illustrious* careers. Rather, sufficient outcomes should include some recognition of excellence in professional practice. The ABPP provides one such outcome. The specific process varies by discipline; licensed psychologists seeking to gain diplomate status from ABPP submit work samples and complete oral and written examinations to a panel of experts for evaluation. Not all licensed psychologists choose to go through the process of ABPP credentialing. Those with ABPP diplomate status are often recognized as “master” practitioners. For example, many

state licensing boards waive experience documentation requirements for licensure applicants with demonstrated ABPP status. Although ABPP status is not the only manner of having an illustrious career in professional psychology, it is widely recognized and is directly tied to the practice of professional psychology.

Comparison of Program Types

In comparing programs that prepare students for professional practice, a number of different classifications are used. Primarily, programs can be divided by specialty (clinical vs. counseling) and degree type (PhD vs. PsyD). The vast majority of PhD programs in clinical psychology espouse the scientist-practitioner, or Boulder, model of training. Research training is seen as a central component of education in the scientist-practitioner model, as it allows psychologists to use research to inform their interventions. Clinical PhD programs tend to be more competitive for admission than other areas (APA, 2007) and are often used as the basis for comparison when examining differences across program and degree types.

Clinical PsyD versus PhD. The Vail, or scholar-practitioner model, emphasizes clinical training over training in research. To differentiate the Vail and Boulder training models, Vail model graduates receive a Doctor of Psychology (PsyD), rather than the Doctor of Philosophy (PhD) that is bestowed on graduates of traditional research-oriented programs (Peterson, 1976). Admission to PsyD programs tends to be less competitive than traditional PhD programs, with the acceptance rates of PsyD programs being almost four times as high as those of PhD programs (Mayne, Norcross, & Sayette, 1994; Norcross, Castle, Sayette, & Mayne, 2004; Norcross et al., 2004). The incoming class size of PsyD programs is over three times larger than the average PhD program (Norcross et al., 2005). Although there are fewer PsyD programs, the growth in PsyD students has been disproportionately larger (Peterson, 2003) producing more students each year than PhD programs (Norcross et al., 2005). Coupled with concerns about lower admission standards, this has been taken by some as evidence that the net effect of PsyD programs is to flood the field of psychology with lower quality (by traditional academic standards) psychologists. For example, when EPPP scores rank programs, the number of graduates from the lowest quartile (comprised primarily of PsyD programs) outnumbers those from the highest quartile (comprised primarily of clinical PhD programs) by over three to one (Yu et al., 1997). Maher (1999) found that the largest increase in the percentage of doctorates granted has been from the programs ranked in the lowest quartile of faculty scholarly quality. Thus, the largest increase in graduates is occurring primarily in schools with poor research programs.

Acceptance rates may be a poor measure of program quality for a variety of reasons. In focusing on “traditional” academic markers such as GPA and GRE scores, research-oriented PhD programs may overlook many nontraditional students with unique life experiences and good potential as psychologists (Jaffe, 2004). PsyD programs may serve the function of providing these nontraditional students the opportunity for graduate education. A focus on lowering acceptance rates might also result in programs encouraging unqualified applicants to apply for a program, so that they can be rejected and the program’s acceptance rate lowered. Rather than the quality of a program being determined by the number of students who are rejected, a better measure of quality may be the number of effective psychologists who are accepted and successfully trained (Jaffe).

PsyD programs provide less financial aid than even practice-oriented clinical PhD programs; this difference becomes even more marked when comparing PsyD programs to research-oriented PhD programs. PsyD students are from four (Norcross et al., 2004) to six (Mayne et al., 1994) times less likely to receive financial assistance than those in PhD programs. This, coupled with the fact that PhD programs are more likely than PsyD programs to be housed in public universities, results in PsyD graduates having a substantially higher level of postgraduation debt than PhD clinical students (Rapoport, Kohut, & Wicherski, 2000).

Early studies showed that the outcomes for PsyD programs were comparable to the outcomes for traditional PhD programs; however, these early studies examined primarily university-based (rather than freestanding) PsyD programs (Peterson, 2003). Since then, results of comparisons between PsyD and PhD programs have been less favorable to professional programs. In 2001, approximately 74% of PsyD students received APA accredited internships, compared with 96% of students in research-oriented PhD programs and 91% of students in equal practice/research emphasis PhD programs (Norcross et al., 2004). Students from clinical PhD programs also outperformed students from PsyD programs on the EPPP (Templer & Tomeo, 1998, 2000; Yu et al., 1997). Despite working in similar settings (Gaddy, Charlot-Swiley, Nelson, & Reich, 1995), graduates of PsyD programs are less likely to become Fellows of APA, presidents of state psychological associations, internship directors, and they are less likely to obtain ABPP credentials than graduates from PhD programs (Templer et al., 2000).

Counseling versus clinical psychology. Counseling psychology has its roots in the fields of guidance and vocational counseling. Although counseling psychologists receive the same licenses as clinical psychologists, the field of counseling psychology traditionally focused less on severe psychopathology and more on developmental and adjustment concerns. Counseling psychology is a smaller specialty field than clinical psychology: There are approximately three times as many clinical programs as counseling programs, and clinical programs graduate four times as many students as counseling programs (Neimeyer, Saferstein, & Rice, 2005). Although there is a great deal of diversity in training models espoused by clinical programs, counseling psychology programs are almost exclusively based on the scientist-practitioner model (Stoltenberg et al., 2000).

Counseling psychology programs tend to receive fewer applicants than clinical psychology programs (Norcross, Sayette, Mayne, Karg, & Turkson, 1998). Some research indicates that counseling psychology programs have acceptance rates similar to clinical PhD programs (Norcross et al., 1998), while other research indicates that the acceptance rates of counseling programs are higher than clinical PhD, but lower than those of clinical PsyD programs (Norcross et al., 2005). The GPA of incoming counseling psychology students is comparable to those of incoming clinical PhD students (Norcross et al., 1998). The major difference is that applicants to counseling psychology programs are much more likely to have a master's degree than applicants to clinical PhD programs (Norcross et al., 1998). As a result, the equal GPAs of incoming counseling and clinical programs may not be a fair comparison, if graduate grades are being compared to undergraduate grades. Finally, counseling and clinical PhD programs offer incoming students comparable levels of financial assistance (Norcross et al., 1998).

The research comparing the outcomes of counseling and clinical psychology programs has been more mixed than research comparing PhD and PsyD programs. Counseling and clinical PhD programs are similar in regards to their rates of obtaining APA-accredited internships and the types of internships that are obtained (Neimeyer et al., 2005; Norcross et al., 1998). Although a single study has found no differences between the EPPP scores of counseling and clinical psychology graduates (Kupfersmid & Fiala, 1991), the vast majority of work has suggested that clinical PhD students outperform counseling students on the EPPP (McGaha & Minder, 1993; Ross, Holzman, Handal, & Gilner, 1991; Tomeo, Arikawa, & Templer, 2000). Some have argued that one reason for these differences may be the fact that the EPPP includes more of an emphasis on psychiatric diagnoses over the humanistic tradition (Tomeo et al.). Counseling psychologists tend to work in more university counseling centers and clinical psychologists are more likely to work in medical settings (Brems & Johnson, 1997; Watkins, Lopez, Campbell, & Himmell, 1986). Consistent with the setting differences, counseling psychologists tend to engage in more group therapy, career counseling, and vocational testing when compared with clinical psychologists (Brems & Johnson). Despite these small differences, however, the daily practices of counseling and clinical psychologists are virtually identical.

Present Study

Although the existing literature appears to suggest that clinical PhD programs have better outcomes than other types of programs, several problems exist. Primary among these problems is the difficulty in unraveling what effects are because of the programs themselves and the characteristics of the students and universities. Few studies have attempted to tease apart the differences between student and program predictors of student outcomes. Though a wide variety of student and program characteristics were predictive of EPPP scores, Yu et al. (1997) found that only GRE quantitative scores remained statistically significant when the variables were entered into a simultaneous regression model. Another study controlled for university status and prestige by only comparing the EPPP of counseling and clinical programs housed in the same university (Tomeo et al., 2000); however, in controlling for university prestige, the opportunity to investigate the effect of prestige on scores was overlooked.

The present study seeks to address these concerns by simultaneously considering the effect of program, student, and university characteristics on student outcomes. By considering these different sources of predictors simultaneously, the positive outcomes created by strong students can be differentiated from the effects of strong programs or highly reputable universities. To assess the contributors to student outcomes, a variety of outcome measures across the lifespan of a professional was used: the percentage of students obtaining APA-accredited internships, average EPPP scores of graduates, and the percentage of graduates obtaining ABPP credentials.

Method

The initial sample included all counseling and clinical PhD and PsyD programs listed in the Association of State and Provincial Psychology Boards' (ASPPB) EPPP score report (ASPPB, 2006). We added additional programs to the sample as they were identified through other data sources. Three counseling programs awarding a Doctor of Education (EdD) were dropped from the sample, to keep the degree-type comparisons equivalent across counseling and clinical programs. The nine combined clinical/counseling/school programs were likewise discarded. Because Carnegie classification data were only available for universities in the United States, Canadian universities were also excluded from the sample. The final sample used in the analyses comprised 157 clinical PhD, 56 clinical PsyD, and 71 counseling PhD programs. In cases where data were missing, attempts were made to locate the relevant information (through the program's Web site, online APA accreditation reports, etc.).

The present study uses archival data from a variety of publicly available sources. Means for each of the study variables by program and degree type are shown in Table 1.

Outcome Variables

The present study assesses graduate program outcomes by considering the percentage of students receiving an APA-accredited internship, scores of program graduates on the EPPP, and an estimate of the percentage of graduates who gain ABPP credentials.

We obtained information on the percentage of intern applicants from each program who obtained an APA-accredited internship from Sayette, Mayne, and Norcross (2004). Originally, we intended that these data be obtained from the same self-report source as many of the other variables. However, Mayne, Norcross, and Sayette (2006) report the number of students obtaining APPIC-member internships instead of APA-accredited internships. Because APA-accreditation is a stronger measure of quality than simply APPIC-member status, an older edition was used to obtain this information.

The average EPPP scores obtained by graduates of the various programs were obtained from the EPPP score report (ASPPB, 2006). This report provides the average of EPPP scores obtained from 1997 to 2008, both overall and by subtest. It should be noted that, in practice, the EPPP is used as a criterion-referenced test. That is, examinees' performance is compared to a criterion point to determine whether an examinee passes. As such, the percentage of graduates passing the EPPP from a given program would be a better measure of program

Table 1
Means of Study Variables by Program Type

Level	Variable <i>N</i>	Clinical			
		Overall	PhD	PsyD	Counseling
		287	157	56	71
University:	Research (%)	67.3	78.3 ^a	12.5 ^b	88.7 ^a
	Special (%)	12.5	7.0 ^a	44.6 ^b	0.0 ^a
	Public (%)	55.8	63.1 ^a	8.9 ^b	77.5 ^c
Program:	Coll. ed.	18.1	0.6 ^a	0.0 ^a	69.0 ^b
	Balance	4.3	4.8 ^a	2.5 ^b	4.3 ^c
	Tuit./asst.(%)	64.8	78.4 ^a	13.9 ^b	73.7 ^c
	Incoming	14.2	9.7 ^a	37.4 ^b	7.4 ^c
	Selectivity	12.2	7.4 ^a	26.3 ^b	12.5 ^c
Student:	GRE	1,207.6	1,255.8 ^a	1,115.8 ^b	1,148.9 ^b
	GPA	3.6	3.6 ^a	3.4 ^b	3.6 ^a
	% Masters	32.7	20.4 ^a	29.8 ^b	62.0 ^c
	% Women	73.6	73.5	74.9	72.3
	% Minority	24.5	22.8 ^a	25.1	28.2 ^b
Outcome:	APA Intern.	87.7	92.8 ^a	66.0 ^b	92.7 ^a
	EPPP	154.8	159.0 ^a	148.1 ^b	150.4 ^b
	ABPP	2.1	2.9 ^a	0.5 ^b	1.7 ^c

Note. Coll. ed. = college of education; Tuit./asst. = percentage of students receiving partial tuition remissions and assistantships; GRE = Graduate Records Examination; GPA = grade point average; APA = American Psychological Association; EPPP = Examination for Professional Practice in Psychology; ABPP = American Board of Professional Psychology. Means with different superscripts are statistically significantly different from one another at the .05 level.

outcome than simply comparing the programs' mean EPPP scores. Because pass rates for each school are not widely available, this particular outcome is seldom used in graduate program outcome research. Instead, average EPPP scores are used. If the EPPP measures the knowledge necessary for the successful practice of professional psychology, then the average EPPP score considers the relative extent of that knowledge, rather than whether that knowledge is sufficient for licensure.

The number of ABPP members who graduated from each program was determined by manually searching the ABPP member database (ABPP, n.d.), and noting the degree-granting institution of each ABPP listed online between April and June 2008. Because a simple count of ABPPs would vary as a function of the age and size of the programs, the length (in years) that a program had been APA-accredited was multiplied by the incoming class size reported in Mayne et al. (2006); this number then divided the number of ABPP members from a program. We were not able to identify a standardized source of the creation dates of the programs, and several of our inquiries to individual programs revealed that trying to do this via the program itself was not a straightforward endeavor. The size of an incoming class for a program may vary from year to year; as such, generalizing a cohort size from a single year does not reflect the variations that may occur over time. The method we used also excluded non-APA accredited programs. Although the present method of determining the percentage of graduates who obtain ABPP status is imperfect, it does provide a rough approximation that can be used to make gross generalizations about the likelihood of students becoming ABPP members.

University Characteristics

The online database of the Carnegie Foundation (Carnegie Foundation, n.d.) provided information about the universities in which the programs were housed. We created

dummy-coded variables comparing research intensive universities (with a basic Carnegie classification of R/VH or R/H) to nonresearch intensive universities, “special” schools such as freestanding professional schools (with a basic Carnegie classification of “Special Focus Institution”) to nonspecial schools, and publically funded to privately funded schools.

Program Characteristics

We used characteristics of the programs in question from Mayne et al. (2006) to create dummy codes that indicated whether the program was in counseling psychology (vs. clinical psychology), awarded a PsyD (vs. a PhD), and housed in a college of education. The practice-research balance, reported in Mayne et al. (2006), provided an indication of the self-reported degree of emphasis that the program placed on practice (1) to research (7). The percentage of attending students receiving some form of both tuition waiver and assistantship provided an indication of financial incentives for attending a program. We also noted the size of the incoming class and the percentage of applicants that attend each program.

Student Characteristics

We obtained information on the characteristics of the students attending the programs from Mayne et al. (2006). We used the percentage of students who were female, ethnic minorities, and had already obtained a master’s degree before entering a doctoral program to describe the demographic composition of each program. Students’ average GPA and GRE scores gave an estimate of academic performance and ability.

Results and Discussion

The data were analyzed using hierarchical linear modeling (HLM; Bryk & Raudenbush, 1992). HLM uses random-effects regression to examine data with a nested structure. In the present analyses, program-level data (program and student characteristics) were nested within university-level data (university characteristics). In this way, the variance in the outcome variables was partitioned into the variance that existed between different universities, and between programs within the same university. HLM is ideally suited to the present research questions, as each of the regression coefficients provided by HLM can be thought of as being controlled for by each of the other predictor variables.

Predicting Outcomes

The three outcome variables (APA internship, EPPP, and ABPP) were used as dependent variables in separate analyses. The outcome variables were predicted at the program level, with the dummy codes indicating degree type, program type, and college of education status. Additionally, all of the nondummy-coded variables at the program level were group-mean centered and used to predict the outcome variables. The outcome variables were predicted at the university level by the uncentered dummy codes, indicating whether the institution was a research university, a specialty school, and a privately funded institution. To create an estimated model effect size, the unexplained variance of an unconditional model (comprising an outcome variable with no predictors) was compared with the unexplained variance of the conditional model (Bryk & Raudenbush, 1992). It should be noted that because HLM uses maximum likelihood estimation rather than ordinary least squares, the reported R^2 effect sizes are not true variance-accounted for effect sizes and should be considered rough estimates at best. The results of these analyses are shown in Table 2.

APA internship. The predictors explained 14% of the variance in the percentage of students who received an APA-accredited internship. Students in PsyD programs were statistically significantly less likely to receive an APA internship than students in PhD programs. This is consistent with past research that generally suggests poorer outcomes for PsyD programs. This finding may be the result of the fact that PsyD students are more likely

Table 2

Hierarchical Linear Modeling Results Predicting APA Internship Percentages, EPPP Scores, and ABPP Status

Level	Predictor	APA internship			EPPP			ABPP		
		Coeff.	SE	p	Coeff.	SE	p	Coeff.	SE	p
Intercept		91.30	2.43	<.001	156.47	1.77	<.001	1.73	0.31	<.001
University:	Public	3.65	1.94	.062	0.17	1.25	.893	-0.37	0.32	.257
	Research	3.20	2.62	.224	4.39	1.89	.022	1.70	0.33	<.001
	Special	-1.67	4.15	.688	0.77	2.20	.728	-0.57	0.31	.066
Program:	PsyD	-15.04	4.39	.001	-5.31	1.75	.003	-0.82	0.31	.010
	Counseling	-11.13	5.64	.050	-3.50	2.01	.083	-1.35	0.40	.001
	Coll. ed.	10.77	5.11	.036	-8.02	2.00	<.001	0.63	0.42	.133
	Balance	-3.09	1.78	.084	0.79	0.85	.356	-0.46	0.48	.337
	Tuit./asst.	0.35	0.10	.001	0.02	0.03	.431	0.04	0.02	.057
	Incoming	-0.17	0.26	.519	-0.14	0.13	.279	-0.16	0.07	.019
	Selectivity	14.98	29.71	.614	-13.55	12.64	.286	2.22	5.89	.706
Student:	GRE	-0.04	0.03	.288	-0.02	0.01	.123	0.00	0.01	.512
	GPA	3.70	8.34	.657	-8.16	3.20	.012	1.20	2.47	.628
	% Masters	-0.09	0.08	.234	-0.02	0.03	.658	-0.05	0.02	.011
	% Women	0.43	0.20	.035	0.18	0.06	.003	0.05	0.04	.230
	% Minority	-0.19	0.19	.302	-0.13	0.04	.001	-0.04	0.03	.137
	R ²	.14			.81			.40		

Note. Coll. ed. = college of education; Tuit./asst. = percentage of students receiving partial tuition remissions and assistantships; GRE = Graduate Records Examination; GPA = grade point average; APA = American Psychological Association; SE = standard error; EPPP = Examination for Professional Practice in Psychology; ABPP = American Board of Professional Psychology.

to be nontraditional students who have familial concerns and geographic constraints that prevent them from applying more broadly for internship, or it may be because of the fact that PsyD programs produce students that are less attractive as interns. PsyD students tend to match at a lower rate than PhD students, in spite of applying to more internship sites than PhD students (Callahan, Collins, & Klonoff, 2010). Keilin, Baker, McCutcheon, and Peranson (2007) found that approximately one fifth of students who failed to obtain an internship during the match process attributed their failure to a perceived bias against their particular degree program. The reason for the lower APA-accredited internship rates for PsyD students, whether because of actual applicant characteristics or a bias against PsyD applicants, is not readily apparent.

Students in counseling programs were less likely to receive an APA internship than students in clinical PhD programs; however, students from programs housed in colleges of education were statistically significantly *more* likely to receive an APA internship than clinical PhD students. Given the large proportion of counseling programs in colleges of education, this had the net effect of the APA internship rates of counseling being equal to the internship rates of clinical PhD programs, as seen in Table 1.

The students of programs that offered a high percentage of their students' tuition remission and assistantships were also more likely to receive APA internships. Students with few financial concerns may be able to focus more fully on their practica, research, and coursework, and, consequently, be seen as candidates that are more desirable. This finding mirrors previous research linking low levels of financial debt with a high likelihood of receiving an APA-accredited internship (Callahan et al., 2010). The available resources, including financial resources, that a university is able to use to support its students seem to be quite important in determining student outcomes. Alternatively, it might be that the strongest students (as determined by a characteristic other than GPA or GRE) are attracted to programs that offer fewer opportunities for debt.

Finally, the percentage of women admitted was positively associated with the percentage of students receiving APA internships. The reasoning behind these gender differences is unclear. No other university, program, or students characteristics emerged as statistically significant predictors of APA internship rates.

EPPP. The predictors explained 81% of the variance in EPPP scores. Programs housed in research intensive universities had statistically significantly higher EPPP scores than programs housed in other types of institutions. These results might be explained by the fact that students gain a greater understanding of the concepts covered on the EPPP through a greater exposure to research on those topics. It may be that being taught by faculty who are directly responsible for creating the knowledge base that is tested by the EPPP gives students in research-heavy schools an advantage. Alternatively, it may be that the students attracted to research universities differ from other students in a way not captured by the current data; it may be this student difference that accounts for the outcomes.

Programs granting PsyDs were associated with worse EPPP outcomes than PhD programs. This result is consistent with past research and is independent of student GRE, GPA, or other factors.

Programs housed in colleges of education were associated with worse EPPP outcomes than programs housed in other areas. Programs in colleges of education may have less access to faculty in other areas of psychology, such as social, cognitive, and developmental. Although such students may still be required to take coursework in these areas, perhaps lack of regular exposure to faculty and students in these other disciplines has a negative impact on their knowledge base in other areas of psychology as measured by the EPPP. The fact that this difference was attributed to a program being housed in a college of education, and not to counseling psychology alone, supports this notion. Alternatively, the content of the EPPP was determined by a job analysis of licensed psychologists (Greenberg & Jesuitus, 2003), the majority of whom are clinical psychologists. Some have argued that the test is weighted towards the knowledge and practice of clinical, rather than counseling psychology (Tomeo et al., 2000); however, differences between the daily practice of clinical and counseling psychology are relatively small.

Contrary to expectations, preadmission GPA was *negatively* associated with EPPP scores. This could be because the GPA cutoffs for most programs tend to be quite high, and as a result, the range of GPAs tends to be fairly restricted. Given this restriction, students selected solely on the basis of a high GPA may actually be ill-suited for graduate study unless other characteristics are also present. Graduate grades tend to be higher than undergraduate grades; therefore, these results may be partly because of the differences in the percentage of students with master's degrees admitted. The fact that none of the effects were assigned to the percentage of students with master's degrees suggests that this is not likely to be entirely the case, but it may contribute to the results.

Finally, programs accepting high proportions of women and low proportions of minorities had higher EPPP scores than their converse. The worse performance of minority students might be reflective of an overall bias in the EPPP, or it might reflect how the educational backgrounds of minority students are more likely to disadvantage them on standardized tests than others. No other predictors emerged as statistically significant.

ABPP. The predictors explained 40% of the variance in the percentage of graduates becoming ABPPs. Research-intensive universities produced statistically significantly more ABPPs than programs housed in other types of universities. Clinical PhD programs produced a higher proportion of ABPPs than clinical PsyD programs. This supports the notion that training in research is important to the high level of applied psychological practice that is necessary to obtain ABPP credentials. Alternatively, it might reflect the fact that an individual high in a personality trait such as achievement striving might be likely to pursue both a degree at a high-prestige research university and later diplomate status.

Clinical PhD programs also produced a higher proportion of ABPPs than counseling psychology programs. These results might be because of the fact that there are more entrees

into ABPP status in areas traditionally associated with clinical rather than counseling psychology. That is, while areas such as family psychology may be equally split across degree types, areas such as health psychology and neuropsychology are more traditionally associated with clinical rather than counseling psychology.

Programs accepting fewer students were more likely to produce ABPPs than programs accepting many students. This may be because of the fact that smaller class sizes are associated with lower student to faculty ratios and more faculty attention. Alternatively, it may be that smaller programs are more selective in the students they accept (though, it should be noted that in no case was plain selectivity predictive of outcomes).

Finally, programs accepting a high proportion of students who had previously obtained a master's degree produced fewer ABPPs than programs accepting few master's students. It might be that students with master's degrees from other fields (likely counseling, social work, or marriage and family therapy) may have a weaker professional identity as psychologists and be less likely to pursue further credentialing.

Relationships between outcomes. In examining outcomes across the development of professional psychologists, the present study, in part, assumes that later outcomes are related to earlier outcomes. To examine the relationships between outcome variables, a series of HLM models were tested. First, EPPP scores were predicted with the percentage of students receiving APA-accredited internships. The percentage of students receiving APA-accredited internships was a statistically significant predictor of program's EPPP scores, $t(230) = 7.90$, $p < .001$. Next, the percentage of graduates becoming ABPPs was predicted with the percentage of students receiving APA-accredited internships and with scores on each of the seven subtests of the EPPP. The results of this analysis suggested that only scores on the research and statistics subtest of the EPPP were predictive of later ABPP status, $t(213) = 2.05$, $p = .041$.

General Discussion

Overall, the current results reiterate what many previous studies have found regarding differences between program and degree types. Even when taking into account the characteristics of the universities and students, much of the variance in outcome remains meaningfully related to program and degree type; namely, clinical PhD programs outperform clinical PsyD programs on the outcomes examined here. The data comparing counseling PhD and clinical PhD programs were more mixed, with evidence suggesting that some differences can be attributed not to program type, but whether a program was housed within a college of education.

The present findings also shed new light on some previously considered explanations for differences between program types. Some researchers have suggested that differences between PhD and PsyD programs can be attributed to the size of the programs and the selectivity of the schools. Peterson (2003) has argued that a program that is less selective and admits more students will admit more weak students than those who admit only a small, elite group of students. As a result, these low performers drag down the outcomes of PsyD programs. The present analyses test this possibility by simultaneously considering the effect of program type, incoming class size, selectivity, and the average academic performance of students admitted to the program. When considering multiple predictors, HLM tests the effect of each predictor on the outcome variable while statistically controlling for the effects of the other predictors. In the present study, the program type, not the size or selectivity of the program, was the most widely supported as a source for the differences. Bigger, less selective PhD programs were not substantially worse than smaller, more selective PhD programs. Bigger, less selective PsyD programs were not substantially worse than smaller, more selective PsyD programs. Thus, it appears that the effect of selectivity and program size on graduate student outcomes is not a direct one; rather, selectivity influences other variables, which, in turn, affects outcomes.

Some researchers have suggested that decreased selectivity affects graduate outcomes by introducing a larger number of academically unqualified students into graduate school (Baker,

McFall, & Shoham, 2008). By necessity, when a discipline increases the number of applicants accepted from a finite pool of applicants with varying qualifications, the overall qualification level of the accepted students decreases. This truism is reflected by the fact that students attending PsyD programs have (on average) consistently lower undergraduate GPAs and GRE scores than students attending more selective programs (Norcross et al., 2004). Thus, differences in outcomes between programs might be attributed to the strengths of the students admitted to the various programs. In the present study, traditional markers of applicant quality such as GPA and GRE scores were generally unrelated to outcomes when considered simultaneously with other program and university-level variables. In the one instance in which admission GPA was related to outcomes when controlling for other factors, it was actually inversely related. Thus, although the quality of applicants is related to outcomes, it does not appear to be the driving force at work when considered outside of the context of the program and university.

In an attempt to explain differences in student outcomes between PsyD and PhD programs, some have argued that the type of institution is an important factor to consider. Freestanding professional schools, in particular, have been singled out in this regard. Baker et al. (2008) posit that to create a science-based profession, it is necessary for the training to take place in a research-oriented university with sufficient resources to train and support the students. The present data support this notion, even while controlling for other variables. However, while research-intensive universities provide better outcomes, there were no appreciable differences between programs housed in traditional nonresearch intensive universities or freestanding schools. Thus, it appears that research universities stand out as having the best outcomes, and not freestanding professional programs that stand out as having the worst outcomes. Presumably, programs housed in research universities provide students with more opportunities to engage in research, place a strong emphasis on the importance of empirical (vs. clinical) knowledge, and have a variety of financial resources obtained from grant-funded research with which students can be supported.

Although the present data provide more detailed information than was previously available on differences between programs and degrees, the underlying reasons why these differences exist remain open to debate. Many factors could be expanded upon but we will address two here. First, the data seem to suggest that training and experience in conducting research is an essential component of graduate training in professional psychology. Second, the present analyses fail to capture qualitative differences between the types of students who might be attending the different types of programs.

Importance of research. PhD programs outperformed PsyD programs for all outcomes, and students graduating from research-intensive universities outperformed other students on two out of three outcomes, even when controlling for a host of other program and student characteristics. Furthermore, scores on the research and statistics section of the EPPP were the only subtest scores predictive of later gaining ABPP status. Taken together, these findings underscore the importance of research in training professional psychologists. All of this data seem to point towards the fact that programs that incorporate research as a central component outperform those that do not.

Research-intensive universities provide resources and reputations that attract faculty who are actively involved in the creation of new knowledge; those faculty may, in turn, attract strong students, who go on to perform well on the various outcomes examined here. It is notable that the results did not suggest that programs housed in specialty schools underperformed university-based programs; rather, the data suggested that programs housed in research universities outperformed both specialty schools and other university-based programs. In looking at the relationships between outcomes, the research subtest of the EPPP was important in determining the number of ABPPs produced by a program. The finding that research is important to practice-related outcomes was nearly universal in the present data. In a survey of doctoral programs that evidenced a dramatic increase in EPPP scores, the number one reason cited for the increase was an increase in the scientific rigor of the program (Templer, Tyler, Nelson, Winstanley, & Chicota, 2004). Most psychologists recognize the

importance of research training and clinical practice experience (Conway, 1988). All available evidence suggests that experience in research is important to the training of professional psychologists.

Activities rooted in research, and not the provision of psychotherapy, uniquely differentiates doctoral-level professional psychologists from other mental health professionals. It is not appropriate to think of doctoral-level psychologists as merely being providers of psychotherapy. In fact, some research suggests that doctoral-level training is unnecessary for the provision of effective psychotherapy. In many cases, no differences in psychotherapy outcomes have been found between doctoral-level psychologists and master's level practitioners (Wampold & Brown, 2005; Wierbicki & Pekarik, 1993). In many studies examining the effects of training levels on outcomes, licensed doctoral and master's level therapists are considered *together* as part of the experienced therapist cohort (e.g., Weisz, Weiss, Alicke, & Klotz, 1987). The high number of doctoral graduates reported as "underemployed," or as having accepted positions for which a doctoral degree is not necessary (Wicherski & Kohut, 2007), is further testament to the fact that, for many jobs including the provision of psychotherapy, a doctoral degree is not necessary or efficient.

Doctoral-level professional psychologists are distinct from master's-level mental health professionals in their extensive training in research. Research experience allows psychologists to "perform needs assessments, design programs, gather and analyze data, assess cost-effectiveness, measure outcomes, and solve problems using an empirical approach in the context of practice" (Belar, 1998, p. 463). Because of psychologists' ability to create new knowledge, the scope of the practice of psychology has moved beyond the realm of mental health to become part of a broader health care arena (Belar, 2000).

To fill these diverse roles, experience *conducting* research is needed to train professional psychologists; familiarity with, or the ability to "consume" research is not enough (Belar, 2000; Peterson, Peterson, Abrams, & Stricker, 1997). As stated by Belar (1990), "One can no more ... develop research skills by discussion, reading, and critique than one can learn how to do psychotherapy by reading, viewing videotapes, and/or roleplaying. One must be trained to *conduct* research" (p. 81). To the extent that the variables examined here can be considered valid measures of outcomes in graduate training, the present results highlight the importance of training in research.

If it is true that the ability to conduct research and research-related activities differentiates the practice of professional psychology from other mental health professions, then it seems to be of the upmost importance that doctoral programs refocus their attention on research. PsyD programs need not commit their students and faculty to developing a program of basic experimental research to provide graduates with the training needed to distinguish them in professional psychology. Rather, professional programs are in a unique position to be able to excel at providing students exposure to those activities highlighted by Belar (1998). Rather than conducting basic research, graduates of PsyD programs could take with them research experience obtained from conducting needs assessments, community outcome research, and program design and assessment. Such an emphasis would honor the applied clinical focus of the Vail model, while still providing students with the experience conducting research necessary for their illustrious careers in professional psychology.

Nontraditional students. One explanation for the differences between programs may be the type of students served by the different programs. The importance of work experience to admissions decisions has declined over the past 30 years (Norcross et al., 2005). This puts many nontraditional students at a disadvantage when applying for doctoral programs in psychology. Students who follow the direct course from high school to undergraduate to doctoral education make up the preponderance of students in clinical PhD programs. Conversely, professional schools tend to value life experience and interpersonal skills more than programs administering a PhD (Peterson, 2003). Likewise, the high percentage of master's degree recipients in counseling PhD programs suggests a body of students who are more likely to have had work experience outside of academia.

Given the different populations served by clinical PhD, PsyD, and counseling programs, asking which training model is most effective is not an appropriate question. Rather, perhaps

the question should parallel Kiesler's (1966) plea for research on treatment matching: What types of programs do the best job of training which types of students? Collins, Callahan, and Klonoff (2007) address this more specifically when they ask, "What training experiences, under what set of circumstances, are most effective in developing competencies within a particular intern with specific goals and via what processes?" (p. 272). The United States' education system has been criticized for both training and rewarding analytic ability, to the detriment of practical and creative intelligence (Sternberg, 1985). Certainly, programs using GRE scores and GPA as admission requirements use analytic intelligence as an indirect admission criteria. Whether such analytic intelligence is necessary for the successful practice of professional psychology is an empirical question that warrants further research.

If it is true that students high in analytic ability and who follow a traditional academic path perform better in clinical PhD programs than in other types of programs, then is it safe to assume that the same is true of another, different type of student? Likely not. Other types of programs may be better suited to meet the needs of nontraditional students with a different set of financial and familial demands, different level of maturity, and different life experiences.

To determine which types of programs are effective for training which types of therapists, it will likely be necessary to develop outcome measures different from those described here. Many illustrious psychologists never pursue ABPP credentials, and one might initially struggle with the EPPP and later go on to excellence. It is important for doctoral programs in professional psychology to carefully consider what constitutes excellence in their graduates. Such markers could then be used to provide more appropriate outcomes.

Conclusion

The factors contributing to graduate success in professional psychology are complex and inter-related. The present results were obtained while controlling for a host of university, program, and student-level characteristics. However, it is possible that a variable, not examined here, better accounted for the results found here. For example, it could be that research-intensive universities attract students with desirable qualities not reflected by GPA and GRE, and it is these qualities, and not anything intrinsic to the university or program itself, that result in the stronger outcomes for programs housed in research universities. Additionally, the various sources used in obtaining the present data limit the ability to make assertions about the temporal directions of the effects shown. Despite the limitations, the present results underscore several key factors in the training of doctoral-level professional psychologists.

One of the strengths of doctoral-level psychologists is the ability to utilize empirical, science-based evidence in clinical practice. The available evidence seems to suggest that students can best learn these skills by gaining direct experience by conducting research and evaluation. Whether this research takes the form of formal research, needs assessments, or outcome evaluations is inconsequential. The face of graduate education in professional psychology is diverse. To best serve the public, the field of psychology must seek to continually question and evaluate its own success in training professional psychologists.

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