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An Empirical Examination of Doctoral Training Models in Clinical Psychology in the United States

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by

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Each person whose signature appears below certifies that this dissertation in his/her opinion is adequate, in scope and quality, as a dissertation for the degree Doctor of Philosophy.

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ABBREVIATIONS

DCT	Director of Clinical Training
EBP	Evidence-Based Practice

ABSTRACT OF THE DISSERTATION

An Empirical Examination of Doctoral Training Models in Clinical Psychology in the United States

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Since as early as 1908, psychology as a discipline has grappled with how to integrate research and practice into the field's professional identity. To further define the area of expertise of a psychologist, three main models of clinical training have been proposed: the scientist-practitioner model, the practitioner-scholar model, and the clinical scientist model. Despite clinical psychology's universal claim for empirical moorings, the debate about the foundation of training in clinical psychology has remained primarily theoretical. The purpose of this study is to expand upon the limited research exploring the differences between training models to empirically determine which factors significantly predicted training models. To answer this question, a series of logistic regressions were run to determine if training models could be predicted by program admission criteria, faculty modeling, structural factors, differences in epistemological stance, and student factors. Results indicated admission criteria, faculty modeling, and structural factors significantly predicted training models. Results and implications for future research and clinical practice are discussed.

CHAPTER ONE

REVIEW OF THE LITERATURE

Since as early as 1908, when Henry Goddard integrated a clinically oriented internship into the Vineland Institute's research lab, psychology as a discipline has grappled with the question of how to integrate both research and practice into the field's professional identity. To answer this question and further define clinical psychologists' area of expertise, three main models of clinical training have been proposed: the scientist-practitioner model (i.e., Boulder Model), the practitioner-scholar model (i.e., Vail Model), and the clinical scientist model. In each of these models, psychologists have taken unique positions on psychologists' roles and training factors such as engagement in research, clinical involvement, faculty modeling, admission criteria, and the relationship between research and practice. Although the scientist-practitioner model was the first proposed and remains the most popular model, considerable debate has continued throughout the years regarding the intersection between clinical training and research (McFall, 1991; Peterson, 1997). Despite clinical psychology's universal claim for empirical moorings, the debate about the foundation of training in clinical psychology has remained primarily theoretical. The purpose of this study is to expand upon the limited research exploring the differences between training models to empirically determine which factors significantly predicted training models.

To better understand the current training models in clinical psychology, it is important to first consider the larger historical context and the needs each model was designed to meet. Before the Second World War, the primary domain of psychologists was confined to psychometrics, testing, research, and teaching in academia (Munson,

Saffier, & Chamness, 1940; Raimy, 1950; Routh, 2000). Although interest in clinical training began as early as 1908 with the initiation of the first yearlong, clinically oriented internship, such training experiences were considered elective and not graduation requirements (Doll, 1946). It was not until the beginning of the Second World War that psychologists began taking a more active role in providing therapeutic services and training models for psychology began to take on a more applied approach. Following World War II, there was an increasing demand for mental health providers as veterans returned from war with combat and non-combat related psychiatric issues. This need caused a major shift within the field of psychology, as many psychologists transitioned away from research and assessment positions and, despite their somewhat limited training, began providing therapeutic services to veterans. In addition to the change in functioning of current psychologists, training within psychology began to change as the Veteran's Administration (VA) began offering clinical practicum experiences and the United States Public Health Services (USPHS) began giving grants to support clinical coursework in major psychology departments (Raimy, 1950).

In addition to the growing need for mental health services for returning soldiers, many psychological concepts were also seeping into mainstream culture with increased lay interest in "mental hygiene," psychoanalysis, and professional counseling (Raimy, 1950). This integration of psychological concepts into the broader culture alongside the problems faced by war veterans further increased the demand for mental health services. Despite this increasing demand for applied psychologists, the field was divided as to whether clinical psychologists should assume the role of service providers or remain primarily researchers and psychometricians. While some in the field envisioned

psychologists in their traditional, research- and testing- oriented roles, others wished to expand psychology's domain to include treatment.

The division between those in favor of a more academic/research psychology and a more applied psychology can be seen clearly in the formation of the American Association for Applied Psychology (AAAP). In 1937, clinicians who believed the largest psychological association in the United States at that time, the American Psychological Association (APA), was not meeting the needs of applied psychologists, formed the AAAP to provide a new vehicle for expressing and meeting clinicians' needs (English, 1941; Shakow, 1942). In his presidential address to AAAP, Horace English denounced what he called research fundamentalism within psychology and psychologists who sought to delegitimize or marginalize clinical work (English, 1941). In particular, he pointed to deficits in clinical training where topics such as experimental psychology, statistics, and physiological psychology were over emphasized, while classes linked to clinical training and applied research such as abnormal psychology and social psychology were routinely overlooked. English (1941) implored his listeners to take a more balanced approach that appreciated clinical training as an important extension of training in the foundations of psychological science. English (1941) saw this balanced approach as not only important for practitioners but also for researchers, arguing that clinical training could help researchers more readily frame clinically relevant research questions and recognize the complexity of life outside of carefully controlled laboratory conditions.

In response to these tensions within the field and the need for a standardized approach to training in psychology, a committee headed by David Shakow was commissioned by AAAP in 1941 to create a unified approach to training in clinical

psychology. Shakow's work in this committee would later become the foundation for the scientist-practitioner model and be almost universally accepted by the field in the Boulder Conference. In this model, Shakow (1941) proposed a four-year training program in which students studied the formative core coursework in their first year, learned clinical skills and applied coursework in the second year, gained field experience during their third year internship, and used the final year to integrate their research and field experience through the completion of a dissertation. Within the formative coursework, students were expected to gain a general fund of knowledge in multiple domains, including sensation, perception, personality, motivation, abnormal psychology, physiology, anatomy, experimental psychology, intelligence tests, educational theory, and therapy. Fundamental to this theoretical model was the supposition that mastery of clinical psychology could not be "obtained solely from books, lecture, or any other devices which merely provide information about people. Rather, experience *with* people is held to be essential if the student is to acquire a proper perspective and the ability to apply the scientific facts which he has accumulated" (Shakow et al., 1945, p. 254).

According to this new training model, clinical psychologists trained in the scientist-practitioner model should be "competent to carry a triad of responsibilities: diagnosis, research, and therapy, at a reasonably high directive and consultative level" (Shakow et al, 1945, p. 246). By including both applied and research elements in the domain of clinical psychology, the scientist-practitioner model was an attempt to integrate key elements of clinical work and academic research into a mutually enriching model. In addition to attempting to unify opposing factions within the field, the definition proposed by the conference also met the needs of the Veteran's Association (VA) and

United States Public Health Services (USPHS), which had partially funded the conference to improve the training of mental health providers working with veterans. Despite the general acceptance of the scientist-practitioner model, some were skeptical of the approach. Some argued that the personality characteristics of clinicians and researchers were so opposed it would be folly to try to unite them (Raimy, 1950). Additionally, given the time constraint of training, some argued it might not be possible to train students to be proficient in both of these domains in one degree (Raimy, 1950). Although these objections would persist for years to come (McFall, 1991), the preponderance of the field supported the scientist-practitioner model. Despite there being no empirical evidence supporting its theoretical framework, the scientist-practitioner model became the standard model for training in clinical psychology and still is the most widely espoused model to date (Cherry, 2000).

Despite the fact that the majority of the field accepted the scientist-practitioner model, the tensions between clinical and research training persisted, as evidenced by the continued emergence of factions within the field that desired a greater focus on research or clinical training. The first major conference to propose a new model was the Vail Conference, which took place in 1973 in Vail, Colorado. In this conference, clinicians argued that training should be reflective of what the students were most likely to do following graduation (Korman, 1974). As most graduates at the time of the Vail Conference focused on clinical work, the conference argued that a new degree, a doctorate in psychology (Psy.D.), should be created that was more clinically oriented than the doctorate of philosophy in psychology (Ph.D.). Notwithstanding this departure from the traditional training within the scientist-practitioner model, the members of the

Vail Conference wished to maintain their dedication to science and empiricism. While the Ph.D. was conceptualized as a degree that should train students to conduct independent research projects in addition to clinical work, the Psy.D. was designed to have enough scholarly training for students to critically evaluate research and use that information to inform treatment (Korman, 1974). Given the more scholarly role of their training, the model undergirding the Psy.D. program became known as the practitioner-scholar model.

To immerse students into the world of clinical practice, the Vail Conference advocated for extensive "field training in multiple contexts and on a concerted effort at integrating these experiences with the skills and knowledge learned in the classroom" (Korman, 1974, p. 445). The conference also recommended that faculty and training directors in Psy.D programs be engaged in both clinical work and academic responsibilities to effectively model this integration of clinical practice. Additionally, instead of the traditional dissertation, Psy.D students were expected to complete applied projects prior to graduation (Korman, 1974). The goal of these projects was to help students explore the complex local realities they would face while doing clinical work and learn how to adopt a scientific attitude while applying knowledge learned in the classroom to real-world scenarios (Peterson, Peterson, Abrams, Stricker, & Ducheny, 2010). As such, practitioner-scholars have often been seen as *local* scientists who integrate information from the literature, their own clinical experience, the local environment, and their particular patient to provide the best possible care.

In addition to the emphasis on providing therapeutic services, the Vail Conference was keenly aware of the growing number of masters-level clinicians who provided

therapeutic services similar to what psychologists offered at a lower cost. Given the increasing competition, the Vail Conference recommended that Psy.D. programs have a broader approach than solely delivery of therapeutic services. Specifically, they recommended that Psy.D.s should be able to perform in the following domains: "(a) evaluation of service programs and new procedures, (b) design of new service delivery systems, (c) development of new conceptual models, (d) integration of practice and theory, (e) program development and administration, [and] (f) supervision and training" (Korman, 1974, p. 446). Given the clinical nature of these tasks, the conference also considered it to be of paramount importance that candidates for the Psy.D be selected with an eye toward personal experience, interpersonal skills, clinical career goals, and their motivations for being in the field. Although the Ph.D. model also highlighted the importance of interpersonal skills and experience, the Psy.D model placed an even stronger emphasis on this area than seen previously.

Although some might argue that the creation of another training model represented a fundamental flaw within the scientist-practitioner model, Shakow's original conceptualization of clinical training was intentionally flexible and included room for other degree types and diversity of training (Shakow, 1942; Shakow et al. 1945). When envisioning the future of clinical psychology, the founders of the Boulder Model argued that while certain elements of the Ph.D.'s training should be included in every program, too much structure and uniformity could prevent the field from diversifying or responding to the dynamic needs of society (Raimy, 1950). This philosophy pertained not only to variability within Ph.D. programs, but also the creation of a professional doctoral degree, which Shakow (1945) explicitly mentioned as an important consideration for the

field in the future. Given the lack of evidence supporting the superiority of either model, Shakow's flexible approach appears to be a prudent approach to attempting to find the best training in a constantly evolving world. Although many within the field, both at the time of the Vail Conference and now, find the increased variability within the field threatening or confusing, the founders of the scientist-practitioner model would have argued that room should be provided for the profession to grow and adjust in line with the needs of society (McFall, 1991).

In line with the freedom that Shakow and his colleagues envisioned, the field continued to grow and change, guided primarily by the untested, but theoretically minded models proposed in the Boulder and Vail Conferences. While psychologists provided only a small proportion of mental health's overall therapeutic services when Shakow wrote his original report, by 1997 psychologists were one of the largest providers of doctoral level mental health care (Peterson, 1997). Additionally, most programs by the 1990s not only emphasized student training outside of the academic department, but also in-house training programs prior to internship (Belar, 1998). By 2005, over half of the graduates within clinical psychology earned Psy.D. degrees (53%), while 47% of students graduating earned their Ph.D. (Grus, 2011). Similarly, the formalized internship was moved from the third year (as originally proposed by Shakow) to the final year, with students rarely returning to the university to complete their dissertation following internship. Partially due to decreased funding in academia and the shift toward clinical training, graduates by the 1990s were taking more clinically oriented jobs in medical centers and community mental health, with fewer students going on to work in academic settings (Belar, 1998).

As the field continued to expand and mature, researchers who feared the field was abandoning its scientific moorings became increasingly critical. Perhaps the most vocal of these critics was Richard McFall from Indiana University. In his *Manifesto for a Science of Clinical Psychology*, McFall (1991) described what he saw as a movement away from true science and towards pseudoscience. For McFall, the cardinal principle of clinical psychology was that "Scientific Clinical Psychology Is the Only Legitimate and Acceptable Form of Clinical Psychology" (McFall, 1991, p. 76). As the two main models of clinical training, the scientist-practitioner model and the practitioner-scholar model both made explicit and seemingly uncontroversial commitments in their founding documents to empiricism and a general scientific orientation. In the following pages, however, McFall detailed a definition of science and scientific investigation that many have argued consigned clinicians to the role of technicians, implementing interventions designed, tested, and validated by researchers (Peterson, 1997). Instead of seeing a bidirectional communication of information and ideas from research and practice, McFall argued that clinicians should only implement treatments that are empirically vetted. Further, McFall argued that when no empirically supported treatment is available, clinicians should not treat these patients, as no truly scientifically grounded intervention could be utilized.

One particularly strong critic of McFall's article was Peterson (1997), who argued that McFall oversimplified the complexities of clinical work, the importance of tailoring interventions for each individual, and how problems and experience in clinical work could be used to inform treatment. Additionally, Peterson argued that McFall's position did not take into account the idiographic application of the scientific method, stating that

a professional psychologist is "a reflective investigator, constantly reformulating the problem with which each client is concerned, designing and testing the solutions that each new case may invite" (Peterson, 1997, p. 186). Thus, while Peterson envisioned the professional psychologist as a scientific investigator iteratively integrating new information into the case, McFall saw clinicians as technicians implementing procedures founded in more rigorous, controlled research.

The division represented by McFall and Peterson continued to grow until it finally culminated in the creation of the Academy for Psychological Clinical Science (APCS). Falling in line with McFall's position, APCS advocated for a dedication to science first and foremost. To highlight programs they believed exemplified the clinical-science training model, APCS created their own accreditation system, the Psychological Clinical Science Accreditation System (PCSAS). Now, not only were there two different types of degrees within the field (Ph.D. and Psy.D.), but there were also two prominent theoretical models within the Ph.D. degree and two major accrediting bodies.

Although the scientist-practitioner model's original flexibility was designed to free the field to grow with the changing needs of the world, the diversity that grew out of this approach also contributed to considerable confusion about what it means to be a psychologist. In addition to the numerous areas psychologists specialize in (such as neuropsychology, health psychology, school psychology, and psychopathology), laymen and other professionals must also navigate the distinctions between degree types and training models. Indeed, even when looking at the same model, practicum requirements and courses offered often are highly variable (McFall, 2006). In fact, even McFall (1991) noted the confusion he encountered in students applying to graduate school as they

attempted to navigate the different programs and their emphases on research and practice. While the authors of the Vail model identified the scientist-practitioner model by its research component, proponents of the clinical science movement critiqued the scientist-practitioner model for being too clinical. Given the myriad of perspectives on any one of the three main models, it is not surprising that students, professionals, consumers, and other stakeholders are often confused about what distinguishes a clinical scientist from a practitioner-scholar or a scientist-practitioner. Additionally, although differences between models were regularly discussed in training meetings and among faculty, no empirical backing had yet been founded to support the distinctions between these models. Even though diversity within the field may be one of the field's strengths, it may come at the cost of clarity of roles and training models (Peterson, 1997).

Although the controversy regarding the distinctions among training models has been a substantive part of the history of psychology, relatively little research has been done exploring the differences between these proposed models and whether these three models accurately represent training in psychology. In particular, McFall (2006) has often criticized the field for not conducting controlled research on training models, lamenting the fact that a field that has built its reputation on research and making latent constructs measurable would not have more research exploring its own presuppositions and assumptions. Although there have been some studies that explore differences between training models, these studies are limited and lack replication. Despite the fragmented and limited empirical literature surrounding training models, the field continues to assume the veracity of these models without substantial empirical moorings.

Of the available literature, Cherry et al. (2000) found that students from scientist-practitioner, clinical science, and practitioner-scholar programs differed significantly with regards to grant supported research and publications, with clinical scientists having the highest rate of research related activities and practitioner-scholars having the lowest. With regard to research presentations, however, there was no significant difference between the median number of presentations for scientist-practitioners and clinical scientists. A similar trend emerged when considering employment immediately following graduation. Not surprisingly, clinical scientists were most frequently employed in academic settings and practitioner-scholars were employed mostly in community mental health settings. Scientist-practitioners had the broadest range of post-graduation employment, with large proportions of graduates residing in diverse settings such as medical centers, community mental health, hospitals, and post-doctoral residencies. Despite the importance of this study in giving the field the first scientific evaluation of these characteristics, there are no studies to our knowledge that have replicated these findings or extended this work. Additionally, as Cherry's sample was surveyed in 1997, it is not clear whether Cherry's results still represent training programs today.

As each model emphasized the importance of faculty modeling throughout students' training, one important area of consideration when comparing training models is the difference among faculty's involvement in each domain of psychology. In one study that surveyed 71% of all accredited clinical psychology programs at the end of 1997, researchers found that models differed significantly on numbers of publications, engagement in grant supported research, and clinical involvement (Cherry, 2000). In line with the hypothesized models, authorship of journal articles was 90% for clinical scientist

faculty, 79% for scientist-practitioners, and 42% for practitioner-scholars. In terms of research presentations, however, there was no significant difference between faculty from scientist-practitioner and clinical scientist programs. Similarly, while clinical science faculty had significantly fewer faculty currently engaged in professional services (44%) than the other models, there was no significant difference between scientist-practitioner and practitioner-scholar faculty in terms of professional service delivery (70% and 80%, respectively).

With regard to acceptance into doctoral programs, studies have shown significant discrepancies in acceptance rates between training models, with students being four times more likely to be admitted to a Psy.D. program than to a research-oriented Ph.D. program (Mayne, Norcross, & Sayette, 1994; Norcross, Castle, Sayette, & Mayne, 2004). Indeed, the APA Office of Research has shown that, while 41% of applicants were admitted into Psy.D. programs in 2003, only 10% of applicants applying for their Ph.D. are accepted (APA, 2003). Further, clinical scientist programs have been found to be even more selective, with APCS programs admitting even fewer students than other Ph.D. programs (Sayette, Norcross, & Dimoff, 2011).

Researchers have posited that, in line with the goals of each training model, programs may differ in the criteria used for selecting applicants (Peterson, 2003). While, as stated in the original Vail Model, professional schools may place more weight on experience and interpersonal skills, Ph.D. programs may more heavily weight academic qualifications such as the Graduate Record Examination (GRE) and grade point average (GPA). Following this rationale, research has shown that Ph.D. applicants have higher scores on the GRE and higher overall academic performance as measured by GPA prior

to admission to the program (Norcross, Ellis, & Sayette, 2010). A similar trend also emerges in regard to funding, with students from major research and clinical scientist institutions receiving the most funding, followed by non-clinical scientist Ph.D.s, and finally students earning Psy.D.s (Sayette, Norcross, & Dimoff, 2011). More specifically, while it is common for doctoral candidates from clinical scientist programs to be fully funded with a tuition waiver and stipend, Psy.D. students in many programs receive little to no financial assistance (Sayette, Norcross, & Dimoff, 2011).

Although early studies at the University of Illinois showed that Psy.D.s either outperformed or were equal to Ph.D.s in professional competence, career preparation, grades (specifically quantitative methods), and GPA in graduate school, later studies have shown greater disparity between the models (Peterson, 1971; Peterson & Baron, 1975). More specifically, when examining students' scores on the Examination for Professional Practice in Psychology (EPPP), students from research-oriented Ph.D. programs were found to outperform students from professional schools and students earning Psy.D.s (Yu et al., 1997). This is particularly striking, as the test is designed to assess an individual's readiness to practice the profession of psychology, which is a primary goal of virtually all Psy.D. programs (regardless of the specific training model they espouse). Furthermore, Templer et al. (2000) found that, following graduation, professional psychology graduates were less likely to be directors of internships, presidents of professional associations, editors of research oriented journals, or APA fellows.

Even though some research has been conducted to explore distinctions between training models, this area of the research is still underdeveloped. In particular, while several studies have explored variables related to training (student factors, faculty

modeling, etc.), no study has looked at all of the relevant domains together or, to our knowledge, substantially replicated these findings. Additionally, no study to our knowledge has substantially addressed the epistemological differences between models and the ways research is translated into clinical work. As much of the debate between Peterson and McFall has been characterized by the difference between ideographic and nomothetic approaches and the ways that those approaches to research are channeled into clinical work (manualized treatments from randomized control studies versus broader evidenced based interventions), this is a substantial gap in the available literature. Additionally, while some studies have considered the role of GPA and GRE as admission criteria, no studies to our knowledge have examined how life experience and interpersonal skills factor into application selection. As life experience and interpersonal skills were particularly emphasized in the founding of the scientist-practitioner model (Korman, 1974), these variables are of particular importance for examining the ways training models differ from each other.

The purpose of this study was to determine whether admission criteria, faculty modeling, structural factors, epistemology, and student factors significantly predicted training model. Given the debate in the field and overlap between models on relevant outcomes, we hypothesized that the odds of identifying as scientist-practitioner and clinical scientists would be the same regardless of admission criteria, faculty modeling, structural factors, epistemological approach, and student factors. Conversely, we hypothesized that the odds of identifying as a scientist-practitioner and practitioner-scholar would differ depending on admission criteria, faculty modeling, structural factors,

epistemological approach, and student factors. More specifically, we hypothesized the following:

(1) a program's preference for life experience and interpersonal skills over academic performance would significantly predict training models when comparing practitioner-scholars to scientist-practitioners, but not when comparing clinical scientists to scientist-practitioners. More specifically, we hypothesize that the odds of identifying as practitioner-scholar would be significantly greater than the odds of identifying as a scientist-practitioner if the program has a preference for interpersonal skills and life experience over academic performance. We hypothesized that the odds of identifying as scientist-practitioner and clinical scientist would be the same regardless of preference for interpersonal skills and life experience over academic performance.

(2) faculty engagement in weekly clinical work outside of research, holding leadership or committee positions, having an active clinical license, number of peer-reviewed publications, and number of professional publications would significantly predict training model when comparing practitioner-scholars to scientist-practitioners, but not when comparing clinical scientists to scientist-practitioners. Specifically, we believed the odds of being a practitioner-scholar would be greater if more than half of the faculty engages in weekly clinical work, hold leadership/committee positions, have a clinical license, and have fewer peer reviewed and professional publications when compared to scientist-practitioners. Additionally, we hypothesized that the odds of identifying as a clinical scientist and scientist-practitioner are the same regardless of whether the faculty engage in

weekly clinical work, do not hold leadership/committee positions, do not have a clinical license, or number of peer reviewed and professional publications.

(3) structural factors such as being housed in a freestanding or university based school, receiving a stipend, having tuition remission, and the number of students admitted to a program each year would significantly predict training model when comparing practitioner-scholars to scientist-practitioners, but not when comparing clinical scientists to scientist-practitioners. More specifically, we hypothesized that the odds of identifying as practitioner-scholar would be higher if the training program is housed in a free standing school, students do not receive a stipend, the program does not give tuition remission, and the program has higher numbers of students admitted each year. Additionally, we believed that the odds of identifying as a clinical scientist would be the same as scientist-practitioners, regardless of if they received a stipend, are within a university based institution, receive tuition remission, and have fewer students admitted each year when compared to scientist-practitioners.

(4) a program's epistemological approach (nomothetic/idiographic) and preference for manualized versus non-manualized therapies would predict training models when comparing practitioner-scholars to scientist-practitioners, but not when comparing clinical scientists to scientist-practitioners. More specifically, we hypothesized that the odds of being a practitioner-scholar would be higher if the program favored an idiographic approach and non-manualized approaches to treatment. We hypothesized that the odds of being a clinical scientist would be

the same as scientist-practitioners regardless of whether the program favored a nomothetic approach and manualized treatments.

(5) student factors such as face-to-face hours when applying for internship, work after graduation, and number of research presentations and publications would significantly predict training model when comparing practitioner-scholars to scientist-practitioners, but not when comparing clinical scientists to scientist-practitioners. More specifically, we hypothesized that the odds of identifying as a practitioner-scholar would be higher if the program has more than the average face-to-face hours when applying to internship, does clinical work after graduation, and has lower numbers of research presentations and publications as compared to scientist-practitioners. We hypothesized that the odds of identifying as a clinical scientist would be the same as a scientist-practitioner regardless of if the program had lower than average face-to-face hours, pursue primarily research following graduation, and have higher rates of presentations and publications than scientist-practitioners.

CHAPTER TWO

METHOD

Participants and Procedures

Directors of clinical training (DCTs) were surveyed using the Council of University Directors of Clinical Psychology (CUDCP) email list and the National Council of Schools and Programs of Professional Psychology (NCSPP) list serve. Each of these programs were created as forums for improving and discussing training, with CUDCP representing Ph.D. programs that adhere to the scientist-practitioner or clinical scientist model and NCSPP representing Psy.D. programs. Given the size and prominence of each of these organizations, data gathered from this sample is nationally representative of training in the United States.

Directors of clinical training were sent an invitation with the survey three times over a two-month period and 90 total DCTs responded. As nine of those individual did not fill out any of the items, those participants were excluded, leaving 81 total participants. Thirty-three of the participants identified as scientist-practitioner, 28 as practitioner-scholar, 14 as clinical scientists, three scholar-practitioners, and two practitioner-scientist. Given the small number of responses and theoretical similarity of the two models, practitioner-scholars were combined with scholar-practitioners (n = 31; here after called practitioner-scholars). As practitioner scientist was judged to not be similar enough to any of the other categories to be collapsed; those participants were excluded from the study leaving 79 total participants. Within our sample, the average time as a faculty member for DCTS was 14 years (SD = 9.05) and the average time as DCT was 6.31 years (SD = 6.58; see Table 1 for additional program characteristics).

Table 1. Program Characteristics

Degree Specialty	Percentage and Frequency
Clinical	93.6% (*n* = 73)
Counseling	1.3% (*n* = 1)
Combined School and Clinical	2.6% (*n* = 2)
Combined Clinical and Counseling	1.3% (*n* = 1)
Degree Type	
Ph.D.	62.8% (*n* = 49)
Psy.D.	34.6% (*n* = 27)
Ph.D. and Psy.D.	1.3% (*n* = 1)
Program Accreditation	
APA	80.8 % (*n* = 63)
PCSAS alone	0% (*n* = 0)
APA and PCSAS	11.5% (*n* = 9)
None	3.8% (*n* = 3)
Higher Learning Commission	1.3% (*n* = 1)
Regional Accreditation (WSCUC)	1.3% (*n* = 1)
Training Model	
Scientist-practitioner	42.3% (*n* = 33)
Practitioner-Scholar	37.2% (*n* = 29)
Clinical Scientist	17.9% (*n* = 14)

On a scale of 1 - 7 of how well DCTs believed they knew what professional activities their students were involved in following graduation, the average score was 5.82 (*SD* = 1.16).

Measures

Background Information

To assess each DCTs familiarity with the program, participants were asked the following items: “How long have you been at your psychology department?”, “How long have you been the DCT for your program?”, and “On a scale of 1 - 7, how well do you

think you know what professional activities your students are involved in after graduation?" Participants also asked what type of program they identified as (clinical, conseling, school, or other), degree type their students earn (Ph.D. Psy.D.), accreditation (APA, PCSAS, APA and PCS, none of the above, and other/fill in answer), what training model they follow (scientist-practitioner, practitioner-scholar, local clinical scientist, clinical scientist and other/fill in answer).

Indicators

To assess different domains related to training models, DCTs were asked a series of questions assessing their programs' admission criteria, faculty modeling, reasoning/epistemological assumptions, and student outcomes. Response options were mutually exclusive and, unless otherwise noted, "no" was coded as the reference group. Within the survey, the term "faculty" was defined as all faculty members (experimental, developmental, clinical, etc.) that meet the APA definition for core program faculty (see Table 2 for items).

Table 2. Items Grouped into Categories

Categories	Items
Admission Criteria	What does your program emphasize more heavily when considering an applicant, experience (e.g. life, clinical, or work experience), or academic performance (e.g. GPA and GRE)?
	What does your program emphasize more heavily when considering an applicant, interpersonal skills or academic performance?
Faculty Modeling	Do more than half of your core faculty engage in weekly clinical work outside of research?
	Do at least half of your faculty hold leadership or committee (e.g. task force) positions on local, regional, national, or international psychology organizations?
	Do more than half of your faculty have an active clinical license?
	On average, how many peer-reviewed publications do your core faculty publish each year?
	On average, how many professional publications do your core faculty publish each year?
Structural Factors	Is your institution university-based or within a free-standing professional school?
	How many of your first year students receive a stipend?
	How many years do your students receive stipends for?
	Is tuition remission available for your students?
	How many students do you admit into your program?
Reasoning/ Epistemology	Does your program primarily emphasize an idiographic or nomothetic approach to research? An idiographic approach is defined as one that focuses on understanding an individual's experience. Examples of idiographic research are case studies, unstructured interviews, qualitative research, and single subject designs. A nomothetic approach is defined as one that emphasizes discovering general laws, such as large sample quantitative studies, experiments, and randomized control trials
	APA defines evidence-based practice in psychology (EBPP) as 'the integration of the best available research with clinical expertise in the context of patient characteristics, culture, and preference' (American Psychological Association, 2008, p. 273). APA includes multiple types of research evidence in its description of best available research, including: clinical observation, qualitative research, systematic case studies, single-case experimental designs, public health and ethnographic research, process-outcome studies, effectiveness research, randomized control trials (RTC), and meta-analyses. Considering this definition of EBPP, does your program's curriculum place a stronger emphasis on empirically supported treatments (manualized therapies) derived from RCTs or evidence-based, non-manualized treatments derived from multiple types of research evidence?
Student Factors	When your students apply to internship (i.e. on their AAPI), do they have on average more than 776 face-to-face interventions/assessment hours? (Note: 776 is the sum of the median number of doctoral intervention and assessment hours from the 2017 match)
	When your students apply to internship (i.e. on the AAPI), do they have on average more than 10 presentations at regional, state, national, or international meetings/conferences (in any order of authorship)?
	When your students apply to internship (i.e. on the AAPI), do they have on average more than one publication (in any order of authorship)?
	When your students apply to internship (i.e. on the AAPI), do they have on average five or more publications (in any order of authorship)?

Admission Criteria

A program's admission priorities were assessed by asking, "What does your program emphasize more heavily when considering an applicant, experience (e.g. life, clinical, or work experience), or academic performance (e.g. GPA and GRE)?" (response options: experience or academic performance) and "What does your program emphasize more heavily when considering an applicant, interpersonal skills or academic performance?" (response options: interpersonal skills or academic performance).

Faculty Modeling

To assess faculty modeling, DCTs were asked, "Do more than half of your core faculty engage in weekly clinical work outside of research?" (response options: yes or no), "Do at least half of your faculty hold leadership or committee (e.g. task force) positions on local, regional, national, or international psychology organizations?" (response options: yes or no), "Do more than half of your faculty have an active clinical license?" (response options: yes or no), "On average, how many peer-reviewed publications do each of your core faculty publish each year?" (response options: 0 – 1, 2 – 4, or 5+), and "On average, how many professional publications do each of your core faculty publish each year?" (response options: 0 – 1; 2 – 4; 5+).

Structural Factors

Structural factors were assessed using the following items: "Is your institution university-based or within a free standing professional school?" (response options: university-based or freestanding professional school), "How many of your first year

students receive a stipend? (Note: Stipends are independent from financial aid through federal or private loans.)" (response options: all, some, or none), "How many years do your students receive stipends for? (Note: Stipends are independent from financial aid through federal or private loans.)" (response options: 1, 2, 3, 4, 5, or 6+), "Is tuition remission available for your students?" (response options: full, partial, or no tuition remission), and "How many students do you admit into your program?" (response options: 1 – 5, 6 – 10, 11 – 15, 16 – 20, 21 – 25, 26 – 30, or more than 30).

Reasoning/Epistemology

Participants were asked the following questions to assess for their epistemological assumptions: "Does your program primarily emphasize an idiographic or nomothetic approach to research? An idiographic approach is defined as one that focuses on understanding an individual's experience. Examples of idiographic research are case studies, unstructured interviews, qualitative research, and single subject designs. A nomothetic approach is defined as one that emphasizes discovering general laws, such as large sample quantitative studies, experiments, and randomized control trials"(response options: idiographic or nomothetic) and "APA defines evidence-based practice in psychology (EBPP) as 'the integration of the best available research with clinical expertise in the context of patient characteristics, culture, and preference' (American Psychological Association, 2008, p. 273). APA includes multiple types of research evidence in its description of best available research, including: clinical observation, qualitative research, systematic case studies, single-case experimental designs, public health and ethnographic research, process-outcome studies, effectiveness research,

randomized control trials (RTC), and meta-analyses. Considering this definition of EBPP, does your program's curriculum place a stronger emphasis on empirically supported treatments (manualized therapies) derived from RCTs or evidence-based, non-manualized treatments derived from multiple types of research evidence?" (response options: empirically supported, manualized therapies derived from RCTs or evidence-based, non-manualized treatments derived from multiple types of research evidence).

Student Factors

To identify relevant student factors, participants were asked the following questions: "When your students apply to internship (i.e. on their AAPI), do they have on average more than 776 face-to-face interventions/assessment hours? (Note: 776 is the sum of the median number of doctoral intervention and assessment hours from the 2017 match)" (response options: yes or no), "Following graduation, do the majority of your students primarily conduct research or provide therapeutic/clinically-oriented services?" (response options: yes or no), "When your students apply to internship (i.e. on the AAPI), do they have on average more than 3 presentations at regional, state, national or international meetings/conferences (in any order of authorship)?" (response options: yes or no), "When your students apply to internship (i.e. on the AAPI), do they have on average more than 10 presentations at regional, state, national, or international meetings/conferences (in any order of authorship)?" (response options: yes or no), "When your students apply to internship (i.e. on the AAPI), do they have on average more than one publication (in any order of authorship)?" (response options: yes or no), and "When

your students apply to internship (i.e. on the AAPI), do they have on average five or more publications (in any order of authorship)?" (response options: yes or no).

CHAPTER THREE

RESULTS

A series of five multinomial logistic regressions were run to determine whether admission criteria, faculty modeling, structural factors, epistemology, and student factors significantly predicted training model (clinical scientist, scientist-practitioner, and practitioner-scholar). Given that previous theoretical and empirical literature would suggest that clinical scientist and practitioner-scholars would be on the opposite ends of the training model spectrum, scientist-practitioner was selected as the reference group (see Table 3 for regressions).

Admission Criteria

A logistic regression predicting type of training model from admission criteria was run and results indicated no significant violations of assumptions or outliers. The regression model was significant, χ^2 (4) = 17.91, p >.01. Consistent with our hypothesis, the odds of valuing interpersonal skills over academic performance were 6.43 times greater for programs that identified as practitioner-scholars than for programs who identified as scientist-practitioners (95% CI [2.06, 20.10]). Contrary to our hypothesis, there was no significant difference between experience and academic performance for clinical scientists and scientist-practitioners, p > .05. Similarly, there was no significant difference between how clinical scientists and scientist-practitioners and scientist-practitioners and practitioner-scholars valued interpersonal skills or academic performance, ps > .05.

Table 3. Logistic Regressions Predicting Training Models

Variable	Practitioner-scholar/Scholar Practitioner				Clinical Scientist			
	Wald	OR	95% CI	*p*	Wald	OR	95% CI	*p*
Admission Criteria								
Emphasis on Experience or Academic (Academic)	4.65	1.07	.34, .37	>.90	.59	.557	.13, 2.49	>.40
Emphasis on Interpersonal Skills or Academic (Academic)	10.23	6.43	2.06, 20.10	<.002	2.29	.557	.125, 2.49	>.40
Faculty Modeling								
Weekly Clinical Work (Yes)	12.99	14.54	3.39, 62.38	<.001	1.23	.37	.06, 2.16	>.20
Leadership Committee Position (Yes)	.002	.97	.251, 3.73	>.97	5.60	7.93	1.42, 44.17	<.02
Professional Publication (0 - 1)	8.22	9.04	2.01, 40.70	< .01	.034	1.20	.18, 8.13	>.80
Structural Factors								
Time to Completion	2.77	.32	.08, 1.23	>.10	.034	1.10	.34, 3.07	>.80
Non APA and APA Internship Match Rate	1.70	1.20	.92, 1.55	>.09	.570	.86	.59, 1.26	>.40
APA Internship Match Rate	9.22	.74	.608, 90	< .005	.767	1.16	.83, 1.63	>.30

Note. Reference category for training model is scientist-practitioner. Reference group for categorical predictors is in parentheses.

Faculty Modeling

A second logistic regression was run to determine whether faculty modeling significantly predicted training models. Number of peer reviewed publications and clinical licensure were removed and professional publications was collapsed due to inadequate expected frequencies (0 – 1 or 1+). One outlier was removed due to a standardized residual greater than three. No other violations of assumptions or outliers were observed. Results indicated that faculty modeling significantly predicted training model, χ^2 (6) = 43.08, $p < .001$. The odds of a program having more than half of their faculty engage in weekly clinical work were 14.54 times greater for practitioner-scholar programs than scientist-practitioners, 95% CI [.06, 2.16]. The odds of faculty having one or fewer professional publications a year were 9.04 times greater when compared to scientist-practitioners, 95% CI [.06, 2.16]. Contrary to our hypothesis, the odds of holding leadership positions were 7.93 times more likely if the program identified as clinical scientist than if it identified as scientist-practitioner, 95% CI [1.42, 44.17]. There was no significant difference between engagement in weekly clinical work and number of professional publications for scientist-practitioners and clinical scientists, or between leadership positions for scientist-practitioners and scholar practitioners/practitioner-scholars *p*s > .05.

Structural Factors

A third logistic regression predicting training models from structural factors was run. Due to insufficient cell frequencies, school location, tuition remissions, and stipend were removed and number of students admitted into the program was collapsed into two

categories (ten or fewer versus more than 11 students). Although number of students admitted was initially included in the analysis, the confidence intervals appeared unstable and so it was also removed from the final model (95% CI [6.56, 37.64]). There were no other violations of assumptions or outliers observed. Results indicated structural factors significantly predicted training models, χ^2 (6) = 57.18, $p < .001$. For every percentage increase in APA accredited internship match rate, the odds of identifying as a practitioner-scholar program decreased by 26.1% (95% CI [.608, 90]). APA accredited match rate was not a significant predictor when comparing scientist-practitioners to clinical scientists, $p > .05$. Time to completion and non-APA versus APA-accredited match rate combined were not significant predictors, *ps* > .05.

Reasoning/Epistemology

A fourth logistic regression was run to determine whether approaches to epistemology and manner of applying research in clinical practice predicted training model. Although there was a relationship between nomothetic/idiographic approaches and preference for manualized versus non-manualized treatments, the effect was moderate and thus did not violate the assumption of multicollinearity ($\phi = .29$). One participant was considered an outlier and excluded due to a standardized residual greater than three. All other assumptions were met. When the logistic regression was run predicting training model from epistemology, a warning message appeared, indicating unexpected singularities in the Hessian matrix. After reviewing the cell frequencies for these variables, it is likely that singularity was due to frequencies near 0 in several cells (see Table 4 for indicator frequencies). As a result, this analysis could not be run.

Table 4. Actual Frequencies and for Categorical Indicators

Variables	Response Options	Practitioner-Scholar	Scientist Practitioner	Clinical Scientist
Experience or Academics	Experience	11	12	3
	Academics	17	19	9
Interpersonal Skills or Academics	Interpersonal Skills	18	7	1
	Academics	11	24	12
Weekly Clinical Work	Yes	22	9	2
	No	8	24	12
Leadership Committee	Yes	16	16	12
	No	14	17	2
Professional Publications	0 - 1	16	7	2
	More than 1	13	26	12
Epistemology	Idiographic	12	2	0
	Nomothetic	17	31	14
Approach to EBP	Manualized	10	15	12
	Non-Manualized	20	16	1
More than 776 Clinical	Yes	17	21	8
	No	11	12	6
Career After Graduation	Research	0	3	9
	Clinical	27	30	3
3 + Presentations	Yes	7	29	14
	No	21	4	0
10 or More Presentations	Yes	1	13	5
	No	27	20	8
More than 1 Publication	Yes	1	27	14
	No	27	6	0
5 + Publications	Yes	0	7	8
	No	28	26	5

Student Factors

A fifth logistic regression was run predicting training models from student factors. Given our small sample size and corresponding lack of statistical power, the variables assessing for whether the average student from the program had more or less than ten presentations and three presentations were removed from the analysis, as they appeared the most redundant with other variables. When testing for multicollinearity, results indicated that variables assessing for if students has one publication and three presentations before internship were highly related. Given this, the three presentations variable was removed. One significant outlier was detected and removed (standardized residual = 5.64). When the logistic regression was run predicting training model from student factors, a warning message appeared, indicating unexpected singularities in the Hessian matrix. When examining the cell frequencies for these variables, it is likely that singularity was due to frequencies near 0 in several cells.

CHAPTER FOUR

DISCUSSION

The purpose of this study was to determine whether or not admission criteria, faculty modeling, structural factors, research/epistemology, and student factors predict a program's identified training model. We hypothesized that the odds of being scientist-practitioners or practitioner-scholars would differ depending on admission criteria, faculty modeling, structural factors, epistemology, and student factors. Conversely, we hypothesized that the odds of identifying as clinical scientist versus a scientist-practitioner would not. Overall, the results indicate that, while there are some noteworthy distinctions among training models, there are also significant commonalities.

In terms of admission criteria, our hypothesis that the odds of valuing interpersonal skills over academic performance would be greater for practitioner-scholars than scientist-practitioners was supported. This finding is consistent with the theoretical base of the Vail model, which emphasizes that, while academic performance is important, admission strategies should be broader, incorporating interpersonal skills and social experiences that would enable psychologists to work with individuals from diverse backgrounds (Korman, 1974). To be able to apply evidenced-based techniques, psychologists must first be able to create and maintain strong therapeutic alliances with patients, particularly patients whose diagnoses may make it difficult to form and maintain relationships.

Even though this finding is consistent with the broader practitioner-scholar model, several critics of professional degrees and training models have argued that emphasizing interpersonal skills and life experience may lower the quality of psychology education

(Maher, 1999; McFall, 1991; McFall, 2000l). While early Psy.D. programs performed equally or better than Ph.D.s in professional competence, GPA, and career preparation, later studies showed significant differences in outcomes between degrees (Peterson, 1971; Peterson & Baron, 1975). A study examining which programs were disproportionately responsible for unmatched students from 2000 - 2006 found that 15 programs accounted for 30% of the unmatched students. Within those 15, 14 of those programs were Psy.D. programs. Inasmuch as match rates are "a crude proxy for student outcomes…. a doctoral program that consistently has a significantly poor match rate should read that outcome as feedback about their selection process or about the adequacy of the training they're providing" (Clay, 2012). Similarly, Yu et al. (1997) found that, on the EPPP, which is a test specifically designed to assist in the assessment of an individual's readiness to practice the profession of psychology, clinically-focused programs performed worse than research-focused programs. Other researchers have noted that graduates from professional psychology programs were less likely to be directors of internships, presidents of professional organizations, or APA fellows (Templer et al., 2000). Given that initially graduates of Psy.D. programs performed as well or better than their Ph.D. counterparts, it is possible that the differences we are detecting between programs is not a function of the training model itself. Rather, it could be a function of who is admitted in to the program. Our results, then, could shed light on one particular factor (value of interpersonal skills over academic performance) that may be influencing who is admitted into programs and thus one possible explanation for why clinical degrees and training models such as the Psy.D. degree and practitioner-scholar model are associated with poorer outcomes.

Additionally, researchers have noted biases towards the Psy.D. degree (i.e. anyone can get it, there is never any funding, Psy.D. programs are primarily for profit) that may discourage higher quality applications from applying to practitioner-scholar programs, which in turn may affect these program's outcomes (Norcross et al., 2004). Norcross and his colleagues (2004) have argued that while freestanding Psy.D. programs are associated with higher application and acceptance rates, these findings should not be generalized to university based Psy.D. programs, who tend to have lower acceptance and application rates than their freestanding counter parts. While both Norcross and his colleagues (2004) and Peterson (1997) acknowledge that lowering the standards for admittance may decrease the overall quality of the education, the heterogeneity of programs within the Psy.D. degree and the practitioner-scholar training models may lead to overgeneralizations from a few programs to all programs. For this reason, future studies may consider how controlling for school location (free standing or housed within a university) impacts comparisons between models. Additionally further research should explore whether perceived bias against training models or degree types impacts the type of students who apply to different programs and how that in turn may contribute to differences in outcomes such as the EPPP, internship match rate, and research productivity.

Consistent with our hypothesis, prioritizing interpersonal skills over academic performance did not predict training models when comparing scientist-practitioners to clinical scientist. In the same vein, prioritizing life experience did not significantly predict training models when comparing scientist-practitioners to clinical scientists or when comparing scientist-practitioners to practitioner-scholars. These results support our

larger hypothesis that training models tend to have more similarities than differences. Thus, academic performance appears to be consistently valued higher than life experience, regardless of model.

With regards to faculty modeling, we found that the odds of identifying as a practitioner-scholar were significantly greater than identifying as a scientist-practitioner if more faculty members engage in regular clinical work outside of research. This finding is consistent with the spirit of the practitioner-scholar model, which emphasizes the importance of faculty being actively involved in their own clinical work and modeling that engagement for their students (Korman, 1974). In addition to modeling clinical practice, the Vail model argues that engaging in regular clinical work also enriches the perspective of faculty members, allowing them to regularly experience and be a part of the mutually informed relationship between research and practice. Given this, proponents of the practitioner-scholar training model believe faculty engagement in clinical work improves both a faculty's ability to apply nomothetically derived findings into their clinical work, while incorporating ideographic complexity into their research.

Despite this theoretical backing, our finding that the odds of identifying as a practitioner-scholar were significantly greater than identifying as a scientist-practitioner if more faculty members engage in clinical work outside of research is inconsistent with Cherry's (2000) work. In Cherry's (2000) study, there was not a significant difference between scientist-practitioners' and practitioner-scholars' engagement in clinical work. It is possible that the difference between our findings and Cherry's could be accounted for by our specification that the clinical work must be outside of research, a specification Cherry did not make. Given this, it may not just be the amount of clinical work that

differentiates training philosophies, but also the manner in which and reasons why the work is done. Thus, while both practitioner-scholars and scientist-practitioners engage in clinical work, the reasons behind their work may differ (clinical work exclusively focused on helping an individual versus clinical work performed in the context of research primarily aimed at deriving broader nomothetic truths). This finding then may emphasize how adherence to different training models may qualitatively shift the ways practitioners from different models engage in the same activity. Additionally, if higher rates of clinical work done by scientist-practitioners are within the context of research, it is also possible that the populations they work are more homogeneous, particularly as carefully controlled studies often necessitate the exclusion of patients with comorbid disorders. With this in mind, further research should consider not just how much clinical work is done by each model but also for what purpose, how, and with whom.

Consistent with our hypothesis, the odds of identifying as a practitioner-scholar program were significantly higher than the odds of identifying as a scientist-practitioner when faculty endorsed having one or fewer professional publications a year. This result is consistent with previous findings that scientist-practitioners tended to publish more research than practitioner-scholars (Cherry, 2000). Additionally, this finding is consistent with both of the models' conceptualizations of what it means to be a psychologist. Within the scientist-practitioner models, psychologists are envisioned as being able to generate new research for the purpose of clinical practice. For this reason, Shakow (1942; 1945) stipulated that trainees should have advanced training in research methods and statistics. In the practitioner-scholar model, however, both the training and emphasis is not on

generating research, but on being a critical consumer who is able to evaluate the quality of the research and apply it to their own patients.

Our study's finding that the odds of identifying as a clinical scientist or scientist-practitioner were the same regardless of the amount of clinical work the faculty engaged in was also contrary to Cherry's (2000) work. In Cherry's (2000) study, scientist-practitioners had significantly higher engagement in clinical work than their clinical scientist counterparts. Again, it is possible that our study's specification that clinical work must occur outside of the context of research may have influenced this finding as both the clinical scientist and scientist-practitioners might be doing all if not the majority of their clinical work in conjunction with research. Thus, while scientist-practitioners might have more clinical hours, the reasons why faculty are engaging in clinical work could be the same regardless of training model.

Also inconsistent with our hypothesis were our findings regarding faculty involvement in committee or clinical work groups. Our results indicated that the odds of identifying as a scientist-practitioner were the same as the odds of identifying as a practitioner-scholar regardless of faculty involvement in a committee. This result is contrary to the Vail model, which emphasizes the importance of practitioner-scholars being on committees as part of community involvement. Surprisingly, the odds of identifying as a clinical scientist were higher when the programs indicated more than half of their faculty is involved in active clinical committees, as compared to scientist-practitioners. As clinical scientists have been found to be involved in more research related activities (Cherry, 2000), it is possible that this finding is reflective of clinical scientists' emphasis on disseminating research in a rigorous way to providers who serve

as technicians replicating empirically validated findings. This would be consistent with McFall's (1991) vision of clinical scientists having a top down influence on the implementation of science into society at large. Within this framework, clinical scientists could not only be assured that research is being disseminated, but they could have hand in making sure that the evidenced base practices they were discovering in research were being followed with fidelity.

With regards to structural factors, our finding that identifying as a practitioner-scholar was associated with lower odds of matching for an APA accredited internship was consistent with recent results that Psy.D. students (who tend to follow the practitioner-scholar model) may match at lower rates than their Ph.D. counterparts. However, there were no significant differences between clinical scientists and scientist-practitioners (who also both tend to follow the scientist-practitioner model). This may indicate that perhaps match rate functions more as a product of degree (Ph.D. versus Psy.D.) and admission criteria than training model. Surprisingly, time to completion was not a significant predictor for any of the models.

The regression predicting training models from a program's emphasis on idiographic and nomothetic research and use of manualized versus non-manualized treatments revealed warning messages identifying an unexpected singularity in the Hessian matrix. After reviewing the cell frequencies of predictors in this regression, we found that the items were able to discriminate extremely well between models. In particular, no clinical scientists and only two scientist-practitioners identified having an idiographic approach to training, findings that would be consistent with McFalls' (1991) exhortation for a top down approach. It is also important to note that the emphasis on

nomothetic research among clinical scientist and scientist programs is consistent with research paradigms and designs (e.g., efficacy and effectiveness research) that value the generation of principles that hold true for the hypothetical average patient. Furthermore, all but one clinical scientist showed a strong deference towards manualized trainings, scientist-practitioners were virtually evenly split between a preference for manualized and non-manualized treatments, and practitioner-scholars showed a proclivity towards non-manualized evidence based approaches. The strong preference for non-manualized treatments among practitioner-scholar programs illustrates their broader view of what constitutes acceptable scientific evidence and is consistent with research paradigms and designs (e.g., patient-focused research) that focus primarily on individual patient response to treatment rather than group response to treatment. As logistic regression may run into difficulties with singularities with near perfect discrimination, these warnings may be due to limitations in the statistic itself and the item's strong ability to discriminate.

A similar problem arose when attempting to predict training models from student factors. When examining the cell frequencies, these variables also appear to be strongly discriminating between items, a finding consistent with previous research that student factors such as engagement in research and clinical work are closely related to training model (Cherry, 2000). In particular, no practitioner-scholar program identified research as a career most of their students engaged in following graduation, while the majority of clinical scientists did. Additionally, 90% of scientist-practitioners identified that the majority of their students went into clinically oriented careers. Similar results were present with regards to research productivity, with programs spanning from practitioner-

scholar programs with the least amount of research to clinical scientists with the highest. This again is consistent with previous research that showed higher rates of research for clinical scientists and lower rates for practitioner-scholars (Cherry, 2000). Although we were not able to run a regression to definitely determine whether or not these factors would predict membership in each training model, given the cell frequencies and the high item discrimination between models, it is possible that a larger sample or items that discriminated more poorly would not have produced a singular matrix and the regressions would have been able to run.

Overall, the results of our study show that, while there are distinctions between training models, the similarities are much more striking than the differences. Where there are differences, it is possible that they arise from differences in admission criteria and epistemological stance towards research and the integration of science into practice. The view that there are more similarities than differences was also echoed in several qualitative comments sent to the researchers. Upon completing the survey, several DCTs spontaneously sent their reactions to the researchers. In several of the comments, DCTs noted that the ways in which the questions were written forced them to choose between two things they might value equally. As an example, one DCT wrote, "On questions of most importance when considering applicants (e.g., GRE/GPA vs. experience), neither is more important for our program. We evaluate applicants as a whole, so both are equally important." As a result, several writers noted that they had difficulty completing the survey or had left the questions blank intentionally. Given this finding, it is possible that some of the significant results may be an artifact of participants being forced into one option versus another. While our questions might allow for strong discrimination between

groups (as was also evidenced by the singularities in our final two regressions), it might also create a false impression of the strength of a preference when, in fact, a "both" response option might more accurately capture their individual experience. In other words, the very nature of our questions may have forced DCTs to make constructs that are grey black and white.

Along the same lines, one DCT upon completion of the survey critiqued the questions as a "false dichotomization" of research and practice. In particular, the participant expressed the fear that this study would only serve to "perpetuate a split between science and practice" that the authors saw as plaguing the field. This comment illustrates two main points. First, the fact that the DCT felt strongly enough to write the researchers emphasizes the strife and contention the field has experienced as we have attempted to define the relationship between research and practice in clinical psychology training programs. Second, this comment shows that perhaps research and practice are far more integrated than the loudest proponents of each of the models would perhaps initially admit. This DCT's sentiment appears to parallel our data, which indicate that, while there are some differences, there are far more similarities between training models. Given this, further research should be conducted to determine whether or not these models do in fact represent qualitatively different models, or if perhaps they could be more accurately represented as a continuum. Despite clinical psychology's universal claim for empirical moorings, the debate about the model for training clinical psychologists has, until now, remained mostly theoretical, with no known study actually exploring whether programs would be empirically grouped into these three proposed categories. Future research should attempt to address gap in the literature by examining whether or not programs can

actually be empirically grouped into scientist practitioner, practitioner-scholar, and clinical scientist training programs.

There are several limitations to this study. First, given the sample size, it is possible that we do not have adequate power to detect small to moderate effects, particularly for regressions with multiple predictors. As a result, we chose to eliminate predictors from several regressions that may have accounted for a significant proportion of the variance in training models if the sample size had been larger. More specifically, as we only had 14 clinical scientist training programs, our sample size may inhibit our ability to detect truly significant effects with this group in particular. Given that the *p*-value for APA and non-APA accredited match rates was approaching significance, it is possible that this result would have been significant with a larger sample. Additionally, our low response rate may also indicate that our sample could be biased with regards to who responded.

Additionally, as logistic regression requires expected cell frequencies above five and not equal to zero for more than 20% of the variables, several variables were removed that violated this assumption. After examining actual cell frequencies, it is likely that these variables were almost perfectly discriminating among training models. Additionally, if we had a larger sample, it is possible that we would have had greater numbers in each of the cells, which could have enabled to models to converge. Similarly, when attempting to run two of the regressions examining whether or not student factors or epistemology significantly predicted a program's identification as a scientist-practitioner, practitioner-scholar, or clinical scientist, the regressions encountered unexpected singularities in the Hessian Matrix that prevented the results from being

interpretable. These singularities may also be due to the near perfect discrimination between the models.

While the regressions for faculty modeling and student factors had less than 5% missing data, the regressions for epistemology, structural factors, and admission criteria had 7.6%, 8.86%, and 8.86% missing data, respectively. Given that, the results from those three final regressions may have some bias due to missing data. Additionally, while there are models that identify as local clinical scientists and other variations of the three major models, not enough of those programs responded to our survey. As such, their perspectives, though important, are not represented. Additionally, it is possible that by asking DCTs to identify their training model before answering the other items may have shifted or biased their responses to later questions. Thus, DCTs may have answered in a way that was more consistent with the training model as opposed to what might actually be reflective of their program. Similarly, even though the average time as faculty member was 14 years and the average time as a DCT was 6.31, it is possible that DCTs were not as knowledgeable of all the answers to the questions we surveyed. Thus, our results may be surveying more of what the DCT's believe to be about their program rather than how their program actually is.

Finally, the design of the logistic regression made it so that our comparison group was scientist-practitioner training programs. Thus, there were no predictors directly comparing the odds of identifying as a clinical scientist versus the odds of identifying as a practitioner-scholar training program. Future research should consider how this comparison might add to our understanding of training models. Additionally, the critique that several DCTs raised about our questions forcing participants to select one option is

valid. While designing the questions in a forced-choice format enabled us to gain a clearer distinction between models, it also may have obscured the commonalities between models. Given the forced-choice nature of our questions, it is possible that some of the effects we found might not have been significant if we had not constrained responses to two answers.

In addition to the recommendations for research already made throughout our discussion, perhaps the most important direction for future research is to find a way of empirically testing whether or not training models would spontaneously be grouped into the clinical scientist, scientist-practitioner, and practitioner-scholar categories. Despite clinical psychology's universal claim for empirical moorings, the debate about the model for training clinical psychologists has unto now remained mostly theoretical, with no known study actually exploring whether programs would be empirically grouped into these three proposed categories. Although our a study provides ancillary support for the argument that there are more similarities between training models than differences, we were unable to test this directly due to our limited sample size. Future research should focus on empirically verifying that these constructs of training models actually are valid representations of how training programs would naturally group. Given each model's emphasis on incorporating scientific research and the scientific method into our identity as psychologists, not doing so would appear to undermine the very foundations that they models claim to support. Additionally, as there is a paucity of research on this subject in general, further research should be conducted to determine whether there are other variables that better account for differences between training models.

REFERENCES

American Psychological Association. (2003). Graduate study in psychology (2003). Washington, DC: Author.

Belar, C. D. (1998). Graduate education in clinical psychology." We're not in Kansas anymore". *The American Psychologist*, *53*(4), 456-464.

Cherry, D. K., Messenger, L. C., & Jacoby, A. M. (2000). An examination of training model outcomes in clinical psychology programs. *Professional Psychology: Research and Practice*, *31*(5), 562 - 568.

Doll, E. A. (1946). Internship program at the Vineland Laboratory. *Journal of Consulting Psychology*, *10*(4), 184 - 190.

English, H. B. (1941). Fundamentals and fundamentalism in the preparation of applied psychologists. *Journal of Consulting Psychology*, *5*(1), 1.

Grus, C. L. (2011). Training, credentialing, and new roles in clinical psychology: Emerging trends. In D. H. Barlow (Ed.), The Oxford handbook of clinical psychology (Editor-in-Chief Peter E. Nathan, pp. 150–168). New York: Oxford University Press.

Korman, M. (1974). National conference on levels and patterns of professional training in psychology: The major themes. *American Psychologist*, *29*(6), 441 - 449.

Lanza, S. T., Collins, L. M., Lemmon, D., & Schafer, J. L. (2007). PROC LCA: A SAS procedure for latent class analysis. Structural Equation Modeling, 14(4), 671–694.

Lanza, S. T., Lemmon, D., Schafer, J. L., & Collins, L. M. (2006). PROC LCA user's guide. University Park: The Methodology Center, The Pennsylvania State University. Lynskey,

Maher, B. A. (1999). Changing trends in doctoral training programs in psychology: A comparative analysis of research-oriented versus professional-applied programs. *Psychological Science*, *10*(6), 475 - 481.

Mayne, T. J., Norcross, J. C., & Sayette, M. A. (1994). Admission requirements, acceptance rates, and financial assistance in clinical psychology programs: Diversity across the practice-research continuum. *American Psychologist*, *49*(9), 806–811.

McFall, R. M. (1991). Manifesto for a science of clinical psychology. *The Clinical Psychologist*, *44*(6), 75 - 88.

McFall, R. M. (2006). Doctoral training in clinical psychology. *Annual Review of Clinical Psychology*, *2*, 21.

Munson, G. R. A. C. E., Saffir, M. A., & Chamness, H. U. (1940). An objectified practical test for clinical psychologists. *Journal of Educational Psychology*, *31*(3), 215- 222.

Norcross, J. C., Castle, P. H., Sayette, M. A., & Mayne, T. J. (2004). The PsyD: Heterogeneity in practitioner training. *Professional Psychology: Research and Practice, 35*(4), 412 - 419.

Norcross, J. C., Ellis, J. L., & Sayette, M. A. (2010). Getting in and getting money: A comparative analysis of admission standards, acceptance rates, and financial assistance across the research–practice continuum in clinical psychology programs. *Training and Education in Professional Psychology*, *4*(2), 99 - 104.

Peterson, D. R. (1971). Status of the Doctor of Psychology program, 1970. *Professional Psychology*, *2*, 271–275.

Peterson, D. R., & Barron, A. (1975). Status of the University of Illinois doctor of psychology program, 1974. *Professional Psychology, 6*(1), 88 - 95.

Peterson, D. R. (1997). Educating professional psychologists: History and guiding conception. Washington, DC: APA Books.

Peterson, R. L., Peterson, D. R., Abrams, J. C., Stricker, G., & Ducheny, K. (2010). The national council of schools and programs of professional psychology: Educational model 2009. In M. Kenkel & R. L. Peterson (Eds.), *Competency-based education for professional psychology* (pp. 13 - 42), Washington, DC, US: American Psychological Association.

Peterson, D. R. (2003). Unintended consequences: ventures and misadventures in the education of professional psychologists. *American Psychologist*, *58*(10), 791 - 800.

Raimy, V. (1950). Training in clinical psychology. New York: Prentice-Hal

Routh, D. K. (2000). Clinical psychology training: A history of ideas and practices prior to 1946. *American Psychologist, 55*(2), 236- 241.

Sayette, M. A., Norcross, J. C., & Dimoff, J. D. (2011). The heterogeneity of clinical psychology Ph. D. programs and the distinctiveness of APCS programs. *Clinical Psychology: Science and Practice*, *18*(1), 4-11.

Shakow, D. (1942). The training of the clinical psychologist. *Journal of Consulting Psychology, 6*(6), 277 - 288.

Shakow, D., Brotemarkle, R. A., Doll, E. A., Kinder, E. F., Moore, B. V., & Smith, S. (1945). Graduate internship training in psychology. A report by the Subcommittee on Graduate Internship Training to the Committees on Graduate and Professional Training of the American Psychological Association and the American Association for Applied Psychology. *Journal of Consulting Psychology*, *9*(5), 243-266.

Templer, D. I., Tomeo, M. E., Pointkowski, S. R., Mitroff, D. Niederhauser, R. N. & Siscoe, K. (2000) Psychology of the scientist: LXXXL professional school and traditional program graduates: Comparison on measures of achievement in clinical psychology. *Psychological Report, 86*, 951 - 956.

Yu, L. M., Rinaldi, S. A., Templer, D. I., Colbert, L. A., Siscoe, K., & Van Patten, K. (1997). Score on the examination for professional practice in psychology as a function of the attributes of clinical psychology graduate programs. *Psychological Science, 8*(5), 347 - 350.