



Comparing Psychopharmacological Prescriber Training Models via Examination of Content-Based Knowledge

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Comparing Psychopharmacological Prescriber Training Models
via Examination of Content-Based Knowledge

Ryan R. Cooper

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Abstract

The debate over whether psychologists with postdoctoral degrees in psychopharmacology are adequately trained to prescribe (RxP), has grown increasingly contested over the years. Five states, the U.S. government, and Guam currently allow psychologists with advanced training to prescribe limited medications. The literature is wrought with strong opinions on both sides of the debate. RxP opposers argue that the prescribing psychologists' training is truncated and less effective than other available options (medical and nursing school); while RxP supporters argue that medical school is essentially overkill for prescribing psychology's narrow aim, and that nursing schools are less rigorous than the postdoctoral training uniquely designed for psychologists. Comparing each prescriber's basic competence, side-by-side, via examination, had never been attempted (each has their own licensing examination). This study tested 66 providers: psychiatrists, general physicians, psychiatric nurse practitioners, general nurse practitioners, prescribing psychologists, and general psychologists.

Psychiatrist performed the best, followed by prescribing psychologists, then psychiatric nurse practitioners. There was no statistical difference in the performance of these three groups. Non-psychiatric physicians and non-psychiatric nurses—who ironically write 80-90% of psychiatric prescriptions—performed worse than the first three groups, and non-psychiatric nurses performed *significantly* worse. General psychologists performed significantly worse than prescribing psychologists, indicating that the achieved level of competency is due to postdoctoral training. Arguments that

psychologists wishing to prescribe should merely attend nursing school, should be re-evaluated in light of these findings. Prescribing psychologists' performance is superior to the performance of those trained as nurse practitioners (both family and psychiatric).

Dedication

I dedicate this thesis to my family. Ricky and Kaye Cooper, my mom and dad, have been my number one teachers since day-one, to this day. I appreciate the encouragement I have received from my little sister, Dr. Khimen K. Cooper. Finally, there is no way to express in words the amount of love and appreciation I have for my partner, Ivan S. Chee. He has remained encouraging, understanding, supportive, and most of all patient, throughout over half of our fifteen years together—the amount of time it has taken to pursue this degree from Harvard.

Acknowledgments

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Table of Contents

Dedication	v
Acknowledgements	vi
List of Tables	ix
List of Figures	x
I. Introduction	01
Early Development of RxP Training	02
From Early DoD Training to Today	05
Current Approaches to Demonstrating Training Adequacy	10
The Program Comparison Approach	10
The Physician Opinions/Reviews Approach	12
Other Approaches	14
A More Direct Approach	15
Significance of Study & Hypotheses	17
II. Method	19
Participants	19
Measures	21
Procedures	22
Data Analysis	23
III. Results	25
Descriptive Statistics	25

Testing of Hypotheses	27
Analysis & Post hoc Analysis	28
IV. Discussion	31
Applied Findings	33
Limitations	35
Robustness of Examination	35
The Competency “Blur” & Time-In-Practice Differences	36
Knowledge vs. Quality of Care	37
Examinee Attentiveness	38
Selection Bias	38
Statistical Assumptions	39
Future Directions	39
References	44
Appendices	49
Appendix A: Examination Questions	49
Appendix B: Consent & Instructions	62
Appendix C: Debriefing	64
Appendix D: Write-In Answer Review	65

List of Tables

Table 1: All group descriptives	27
Table 2: Test of Normality (Shapiro-Wilk)	28
Table 3: Test of Homogeneity of Variances (Levene's Test)	28

List of Figures

Fig. 1 Test scores for all groups	26
Fig. 2 Box & whisker for all groups	26
Fig. 3 Test scores for prescribing groups only	29
Fig. 4 Prescribing versus non-prescribing psychologists	30

Chapter I

Introduction

From its earliest beginnings, the prescribing psychology movement (RxP) was born out of a need for increased access to psychopharmaceutical treatment, especially in rural and less populated areas. That need continues today, which is one reason that the RxP movement has continued to persist from one state to the next. In fact, access to care is one specific area within American mental health that researchers consistently cite as problematic (Merwin et al., 2003). Recent reports from the National Alliance on Mental Illness (2020) indicate that 47.6 million Americans suffered from some form of mental illness in 2018. Suicide is the second leading cause of death in the 10-34-year-old age group. Further, 90% of those who die by suicide are reported by family to have shown some mental health symptoms, prior to death. However, some estimates suggest that 96% of the total counties in the U.S. lack access to adequate psychopharmacological services (Thomas et al., 2009).

The United States Department of Health and Human Services estimated that the U.S. would require almost 3000 more psychiatrists to eliminate the 4000 designated Mental Health Shortage Areas (Health Resources and Services Administration, 2015). Other experts claim that America is shy about 45,000 psychiatrists to meet the need, and that this need may increase, as many psychiatrists are currently near retirement age (Carlat, 2010). Wait times to see a psychiatrist can range conservatively from two weeks to a few months (Williams et al., 2008). Although the Affordable Care Act assisted in

decreasing access-barriers due to insurance, psychiatrists are now accepting less (sometimes no) forms of insurance than ever before – leaving many Americans to forgo treatment by a mental health specialist (Bishop et al., 2014). This trend has been consistent throughout the last decade.

Early Development of RxP Training

The evolutionary history of RxP training is best understood through a chronological review. The bulk of what follows is taken from the accounts of those psychologists trained in the original Department of Defense (DoD) program. For a full history, see the full-text volume edited by McGrath & Moore (2010).

Since the nineteen fifties, psychologists have been involved with psychopharmacological research (Wiggins & Cummings, 1998). Aside from research, Wiggins and Cummings also highlight that patients presenting for mental health treatment often had their psychopharmacological medications monitored and managed, at least in part, by psychologists. They document that medication usage was able to decrease “dramatically” as psychologists provided psychotherapy in addition to medication monitoring.

The first psychologist to prescribe medication in the United States was Dr. Floyd Jennings, in the mid-nineteen-eighties (DeLeon & Wiggins, 1996; DeLeon et al., 1991). Facing an urgent need for not only psychological, but also psychotropic intervention, one hospital within the Indian Health Services (Santa Fe Indian Hospital) boldly granted Dr. Jennings the authority to prescribe. He treated 378 patients during his first year. This unprecedented allowance was highly risky, given that no law—neither state nor federal—

permitted a non-physician to prescribe. Additional risk was inherent based on the fact that Dr. Jennings essentially learned psychopharmacology on the job, as he went. He received positive reports from his prescribing colleagues on the hospital faculty, some of whom he considers close friends to this day (F. Jennings, personal communication, November 2, 2019).

By 1987 Congressman Daniel Inouye, a senator noted for his advocacy toward better military healthcare, recommended that the Department of Defense (DoD) pilot a program whereby a select few psychologists would undergo training to prescribe a limited range of psychiatric medications (Sammons, 2010). For this task, the first-ever RxP Curricular Committee, known as the Blue Ribbon Panel, was formed. The panel considered various pre-existing training models, including physician assistant and nurse practitioner programs. They were, however, ultimately rejected because these models were not designed to produce independent prescribers (note that this fact is no longer true of nurse practitioner programs, as all accredited nursing programs now satisfy independent licensure in those states that permit independent licensure).

By 1990 the panel had formulated a two-year program which would include a mix of didactic coursework designed to train an *independent* prescriber, as well as various practical (hands-on) experiences. All but two of the chosen psychologists started with this two-year training program. The other two psychologists were sent to participate in physician-assistant (PA) training, for experimental reasons. The PA-training option proved unsuccessful as the curriculum focused almost exclusively on physiology with no training in psychopharmacology. In other words, the PA program seemed perfect to train students to assist in the general practice of medicine, but not at all appropriate for

providers whose ultimate goal was safely prescribing psychiatric medications, and the physiology that relates to that goal. Additionally, the PA program was geared toward military soldiers without a college degree, and this was not the level of academic rigor that doctoral psychologists were accustomed to. Finally, as expected, the PA curriculum maintained the presumption that the graduate would work under a physician (which was not the goal of the DoD). Both psychologists were ultimately removed from the PA training program, and rejoined the 8 other psychologists.

The DoD program required that all psychologists who had extensive biological training be screened “out” as opposed to “in.” This decision is often misstated in the literature, as the reverse - that psychologists who participated in the program already had extensive training in the biomedical sciences (Tompkins & Johnson, 2016). In fact, the idea of selecting only psychologists with a heavy sciences background was discussed and noted in the minutes of the panel meetings; but this idea was ultimately not adopted as a policy. The sole reason for this decision was that the Blue Ribbon Panel wanted to ensure that results of the DoD training could generalize to all military psychologists, not just those with uncharacteristically strong biological backgrounds (McGrath & Moore, 2010).

In contrast, the initial DoD program did take into account that psychologists are doctoral-level practitioners with training in clinical decision-making, evidence-based practice, ethics, etc. This was another reason that two of the original psychologists were removed from the PA program. It was a program designed for military students with no college experience whatsoever, which did not fit the academic experience of the two psychologists that were sent to that program.

The final version of the DoD curriculum consisted of: introduction to primary care, anatomy, biochemistry, neuroscience, physiology, pathophysiology, clinical medicine, clinical concepts, pharmacology, clinical pharmacology, and psychopharmacology. The DoD RxP program matriculated 10 prescribing psychologists (including the two that started in the PA program, but then rejoined the eight other psychologist-students). Most of those psychologists are advocates for the RxP movement today.

In addition to the development of prescriptive training, many states also began to enact legislation expanding clinical psychologists' scopes of practice to include collaboration with prescribers and making formal recommendations on psychopharmacological options (McGrath et al., 2004; McGrath & Sammons, 2011). States with such legislation include Massachusetts, Pennsylvania, Oklahoma, Florida, Missouri, and Louisiana. The latter ultimately adopted prescriptive rights for psychologists, overseen by the state's medical board.

From Early DoD Training to Today

By the early '90s, the American Psychological Association had formed its own Ad Hoc Task Force on Psychopharmacology to help determine where psychopharmacology fits within the general practice of psychology (Smyer et al., 1993). The APA's first comprehensive formal position on the matter was published in 1996, and revised in 2009; it was most recently updated in February of 2019. The APA originally defined three levels of psychopharmacological training for licensed (not academic) psychologists (Ax & Resnick, 2001). Level one training referred to basic education in the

doctoral curriculum that simply provides an introduction to psychopharmacology. The focus of this level was to arm clinical psychologists with the ability to recognize and incorporate a basic understanding of a patient's medication into treatment. Level two training referred to the collaborative experience of working with nurses, physicians, psychiatrists, and prescribing psychologists, while continuing to develop one's own understanding of psychopharmacology in the process. Level two training occurs in practicum, internship, and through continuing education after licensure. Level three concerns the present research study and refers to education specifically designed toward an adequacy to matriculate independent psychopharmacological prescribers. As of 2020 there are currently six active postdoctoral master's degree programs available to provide level-three training (independent prescriptive training) for psychologists. These include New Mexico State University, Fairleigh Dickinson University, The Chicago School, University of Hawaii at Hilo, Alliant International University, and Idaho State University.

The American Psychological Association bases its current advocacy position on two foundational pillars: (1) the "rigorous education in the psychological sciences with training as a practitioner of psychological interventions," as well as (2) "a firm grounding in the basic medical sciences that form the basis for utilizing biological interventions in a safe and effective manner" (American Psychological Association, 2019, p. 2).

One particular criticism often cited by opponents of RxP is that since the Department of Defense's first RxP-training program, curricular standards and didactic hours have significantly decreased (Heiby, 2010; Tompkins & Johnson, 2016). This claim is indeed mathematically accurate. The initial proposal before the Blue Ribbon Panel consisted of 1,365 contact hours of total training. After significant evaluation by

both the psychologists-in-training as well as the members of the panel, it became clear that psychologists were actually going through a mirror of medical school curriculum, which was deemed unwarranted (McGrath & Moore, 2010). The 1,365 hours were reduced to 660 contact hours. This 660-hour curriculum was found to be more concisely applicable to the goal of a prescribing psychologist (this was the curriculum that actually matriculated all 10 psychologists). As compared to today's non-military RxP curriculum, three of the current M.S. in Clinical Psychopharmacology degrees available require 544, 462, and 480 contact hours (Respectively: University of Hawaii, 2018; Alliant International University, 2018; Fairleigh Dickinson University, 2018). To reaffirm: recommended training hours have dropped from 1,365 in 1990, to as low as a possible 480 today (e.g., Fairleigh Dickinson University). As of 2020, the APA requires that all prescribing psychologists who plan to sit for the Psychopharmacology Examination for Psychologists (PEP) complete course work as follows:

(I) Basic sciences *may* be taken at the undergraduate level and must include: human anatomy, human physiology, biochemistry, and genetics.

(II) Functional neuroscience must be taken at the graduate level and must include: neuroanatomy, neurophysiology, and neurochemistry.

(III) Physical examination must be taken at the graduate level and must include: measurement and interpretation of vitals, neurological exam, cardiovascular exam, respiratory exam, abdominal exam, eye ear nose and throat exam, gastrointestinal, genitourinary, integumentary, allergic/immunologic, and musculoskeletal.

(IV) Interpretation of laboratory tests must be taken at the graduate level and must include: therapeutic drug monitoring, other blood and urine tests, radiology,

electrocardiogram and brain electrophysiology, various neuroimaging techniques to include MRI, fMRI, and CT, and applied genetics.

(V) The pathological basis of disease must be taken at the graduate level and must include pathophysiology of common clinical cardiovascular, respiratory, gastrointestinal, hepatic, neurological, and endocrine conditions.

(VI) Clinical medicine must be taken at the graduate level and must include clinical manifestations, differential diagnosis, laboratory or radiological evaluation of commonly encountered medical conditions. Training must also include a review of special cases such as children, women, older adults, pregnancy, hormone therapy, as well as chronic conditions (hypertension, diabetes, HIV/AIDS, Hep C, breast and hematological cancers and conditions).

(VII) Clinical neurotherapeutics must be taken at the graduate level and must include topics in electrophysiology, non-invasive interventions, electroconvulsive therapy.

(VIII) Systems of care must be addressed at the graduate level and include coordination of care with medical specialties, consultations and referrals, and coordination and consultation in long-term care.

(IX) Pharmacology must be taken at the graduate level and must include: pharmacokinetics and drug delivery systems, pharmacodynamics, neuropharmacology, toxicology, and mechanisms of medicational interactions.

(X) Clinical pharmacology must be taken at the graduate level and include all major drug classes, as well as nutritional supplements, and an examination of special populations.

(XI) Psychopharmacology must be taken at the graduate level and must include: sedatives/hypnotics, antidepressants, antipsychotics, mood stabilizers, anxiolytics, stimulants, medications for drug dependence, medications for drug adverse effects, pediatric psychopharmacology, geriatric psychopharmacology (including medications for cognitive impairment, polypharmacy), psychopharmacological issues of diversity (gender identity, sex, generational status, drug metabolism access, acceptance, and adherence), clinical decision-making and standard practice guidelines, and guidelines for prescribing controlled substances.

(XII) Psychopharmacology research must be taken at the graduate level and must include: phases of drug development, clinical trials in psychiatry, and critical evaluation of evidence.

(XIII) Professional, ethical, and legal issues must be covered at the graduate level, and must include documentation (e.g., nomenclature, abbreviations, prescription writing), conflicts of interest and relationships with the industry, scope of practice issues, and diversity and equity issues related to treatment access and adherence.

In addition, the APA requires specific documented supervised clinical experience in all domains. The physical examination and prescribing psychology practica and fellowships must cover mentorship in issues such as medical strategies, polypharmacy, tapering/discontinuing medications, integrating other forms of psychological care into the treatment plan, and consultation/liaison with other inpatient and outpatient providers. More specifically, the APA requires that all prescribing psychologists address the following competencies with their supervisors: (1) physical exam and mental status, (2) review of systems, (3) medical history interview and documentation, (4) assessment

indications and interpretation, (5) differential diagnosis, (6) integrated treatment planning, (7) consultation and collaboration, and (8) treatment management.

Whether the current number of training hours (reduced from the original DoD training) included in the prescribing psychologists' program amounts to adequate or inadequate training (especially in comparison to nurse practitioner programs) depends on whether the initial requirement set in 1990 was ideal, deficient, or gratuitous. Graduates of the DoD program itself argue that it was gratuitous (McGrath & Moore, 2010). There has been some research undertaken in an effort to effectively compare training variation between prescribing psychologists, physicians, and nurse practitioners, but the approaches have largely been met with criticism.

Current Approaches to Demonstrating Training Adequacy

In light of the training criticism levied at prescribing psychology (sometimes described by opponents as RxP training's "truncated approach"), two research approaches have been taken to help provide some empirical data to diffuse the concern over training differences. These two approaches are (a) curricular side-by-side training comparisons, and (b) physician-colleague review/rating (and to a lesser extent, self-review/rating).

The Program Comparison Approach

First, some researchers have examined which of the prescriber training programs (psychology, medicine, nursing) "appear" most robust when compared side-by-side. Muse & McGrath (2010) compared the curricula of prescribing psychologists, general

physicians, and psychiatric nurse practitioners side-by-side. They concluded that psychologists get more training in pharmacology (288 contact hours) than either psychiatric nurses or general physicians (56 and 59, respectively). They also reported that while physicians get more contact hours in biochemistry and neuroscience (216 hours), psychologists (161 hours) get significantly more than do psychiatric nurses (56). Muse & McGrath also reported that psychologists spend an average of 6.5 years in post-baccalaureate training, compared to general physicians (4 years) or nurses (2.5 years). Finally, they concluded that psychologists receive more training in all of the following areas, when compared to general physicians and psychiatric nurses: research and statistics, behavioral assessment and diagnosis, psychosocial interventions and psychotherapy, and “other mental health” coursework.

Heiby (2010) highlights two relevant methodological faults of the Muse and McGrath study. First, she asserts that the study used arbitrarily defined “key content areas” (e.g., biochemistry-neurosciences, pharmacology, clinical practicum, research statistics, behavioral assessment/diagnosis & psychometrics, psychosocial interventions-psychotherapy, other mental health/psychology coursework); and that these areas excluded much of the additional “standard medical curricula for nurses and physicians to prescribe.” Second, she asserts that the study omitted important aspects of training like undergraduate prerequisites, and supervised practicum experiences. Aside from Heiby’s criticisms, one additional major criticism seems worthy of mention: a study demonstrating that one provider might be trained differently, better, or worse, than another provider, does not demonstrate any given outcome on ability. In other words, comparing programs side-by-side does not assist in concluding which is better in the end,

based on the knowledge/talent obtained through the respective training program. One may look better on paper, but this type of study design cannot demonstrate that it is. Therefore program comparative studies may have demonstrated that prescribing psychologists get more training in certain domains, but they cannot demonstrate that the program prepared its clinicians to apply that knowledge in practice any better than an alternative training approach may have (e.g., psychiatric nursing).

The Physician Opinions/Reviews Approach

A second approach that has been used to help inform the RxP debate is the solicitation of opinions from physicians who know the quality of work prescribing psychologists provide because they have worked side-by-side with a prescribing psychologist. Two such studies have been conducted to date. Shearer and colleagues (2012) surveyed forty-seven primary care physicians who had worked with embedded prescribing psychologists for at least two years in a major U.S. Army medical facility. Those physicians reported that (1) the role of the prescribing psychologist was helpful to the medical practice, (2) that they found no negative impact or concern regarding patient safety, (3) that the presence of the prescribing psychologist added convenience for both the physicians and patients, and (4) that overall patient care was improved by the added services of the prescribing psychologist. A more recent study conducted by Linda & McGrath (2017) surveyed thirty prescribing psychologists and twenty-four of their medical colleagues. These participants provided opinions regarding the safety and clinical ability of prescribing psychologists. Results indicated that they were “overwhelmingly perceived positively by their medical colleagues.” For example, none

of the physicians were concerned that the prescribing psychologist would inappropriately prescribe a medication or prescribe an incorrect dosage, and none of them had concerns that the prescribing psychologist did not know when to refer to other medical providers. Over ninety-five percent of their medical colleagues agreed that prescribing psychologists were adequately trained to prescribe medication. Over ninety-five percent also agreed that the prescribing psychologist had adequate knowledge of medical tests relevant to prescribing.

Other studies have been conducted measuring the opinion of psychologists' performance post-training. However, they utilize the opinion of *the prescribing psychologist themselves*, as opposed to a medical colleague (Vento et al., 2014). While those studies may be of value, they do not provide an objective opinion of those third-party physicians trained in the medical model, as do the first two studies described in this section.

Notably, the Shearer (2012) and Linda & McGrath (2018) studies are especially useful in helping provide some evidence that RxP training is at least *deemed* safe for patients. As the profession with the greatest amount of biomedical training, physicians are likely in an ideal position to opine on whether a psychologist was trained to prescribe safely. However, where this approach fails, is twofold.

First, RxP opponents correctly point out that the absence of evidence of improper treatment cannot lead to the definitive conclusion that there is no risk of improper practice. According to Robiner and colleagues (2019) it is “inappropriate to consider the absence of quality data... as evidence that there are no problems” (p. 14). On the other hand, proponents point out that given the controversial nature of prescribing psychology,

and the microscope under which it has been positioned for decades, likely any misstep would be quickly reported by opponents. For comparison, in 2012, the Nursing Service Organization (the nation's largest administrator of liability insurance coverage for professional nurses) reported that psychiatric nursing claims accounted for only six percent of the overall nursing malpractice claims; however in 2017 that percentage had risen to account for over fifteen percent of the overall claims (Nursing Service Organization, 2017).

Second, while studies reporting ratings and reviews are helpful, they do not provide data on the content knowledge of the prescribing psychologist compared to other prescribers. For example, a prescribing psychologist may well be able to court the approval of a physician-colleague based merely on their experience working in the hospital settings, their personality, their tendency to defer to another provider, etc. Colleague opinions do not necessarily zero-in on the actual knowledge of the prescriber. In addition, these studies have not assessed the level to which the prescribing psychologist compares to other prescribers.

Other Approaches

A third and less common approach to RxP research targets students and psychologists themselves. These studies attempt to provide evidence that students and practitioners would indeed pursue prescriptive training if it led to prescriptive rights (Ax et al., 1997). However, such studies do not address the adequacy-of-training issue that is so often at the center of the RxP debate. Further, opponents to RxP scope expansion generally argue that evidence of a psychologist's or student's interest in obtaining

prescriptive privileges, does not necessarily mean that result (choosing to actively obtain the prescriptive training) would follow (Tompkins & Johnson, 2016). Tompkins also argues that the current survey research more generally suggests that while some psychologists might support the idea of RxP, that may simply mean that they support the idea of prescribing “in principle, but not the post-doctoral training in psychopharmacology model offered by the APA” (p. 131).

A More Direct Approach

Measuring definitive competence can prove especially challenging. Though several definitions of competence exist, one particularly thorough clinical definition is “the habitual and judicious use of communication, *knowledge, technical skills* (emphasis added), clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individuals and communities being served” (Epstein, 2007, p. 387).

Post-training competency is already measured by licensing exams for all prescribers. All prescribing psychologists are required to take and pass a national licensing examination after completing a two-year post-doctoral degree in clinical psychopharmacology. This exam is known as the Psychopharmacology Examination for Psychologists (PEP, 2019). After passing the PEP, the psychologist can prescribe medications within a limited scope in those states that have statutory laws permitting such (currently there are five: New Mexico, Louisiana, Iowa, Idaho, and Illinois, with bills pending in many other state legislatures). In addition, several federal entities permit psychologists to prescribe, including the Federal Military, Public Health Service, Indian Health Service, and Guam.

All Psychiatric Mental Health Nurse Practitioners are also required to take and pass a national examination after completing a two-year Master of Science in Nursing degree. The American Nurses Credentialing Center administers their examination (ANCC, 2019). After passing, the nurse becomes board certified in psychiatric nursing and can independently prescribe in states that permit them to do so (currently twenty-three states statutorily permit this), and can prescribe with physician collaboration in all states.

All physicians are required to take and pass a board examination to practice within a certain specialty. Psychiatrists are certified by the American Board of Psychiatry and Neurology.

Of note, it is considered appropriate and within-scope for family nurse practitioners and family physicians to prescribe psychiatric medications; neither of whom take the above-listed specialty examinations. Research demonstrates that non-mental health providers actually write anywhere from 80 to 90 percent of psychotropic prescriptions (Balestra, 2019; DeLeon & Wiggins, 1996; Mark et al., 2009).

While many would likely agree that licensing examinations help gauge the success of any potential licensee's training, the fact that these professions administer their own unique examinations, makes it extremely difficult to compare and contrast the adequacy of each one's different training approach. This is especially true considering that primary care providers do not actually take a licensing examination covering psychiatric care in depth. For example, while the ANCC examination pass rate for psychiatric nurses for 2017 was 88%, the pass-rate for the PEP examination for prescribing psychologists is not available to the public. Would psychiatric nurses have

performed as well on the PEP examination? Would prescribing psychologists have performed as well on the ANCC examination? Would the providers writing over eighty percent of psychiatric medications have performed well on either? Is one examination easier than the other?

Significance of Study & Hypotheses

This study was the first to help gauge differences in the various training approaches by measuring the content-based knowledge of each provider, via the same examination for each. In addition to providing general testing results between the populations, this study attempted to test the following two hypotheses, driven from the available research:

Hypothesis 1

Based on the presented findings from Muse & McGrath (2010) that clinical psychologists receive more training in psychopharmacology than non-psychiatric prescribers, *it was hypothesized that prescribing psychologists would outperform non-psychiatric prescribers* (the population that writes the majority of psychiatric prescriptions in the U.S.).

Hypothesis 2

In addition, based on the substantial postdoctoral education that prescribing psychologists receive beyond that of a clinical psychologist (see APA standards for

prescriptive training above) *it was hypothesized that psychologists with postdoctoral training would outperform psychologists who had not obtained this additional training.*

Chapter II

Method

This study was conducted using an online examination format with twenty-five total multiple-choice questions. The target sample was 66 participants from within six pre-existing professional groups. Participants were recruited using invitations sent via listservs in the fields of psychology, psychiatry, and nursing, as well as via invitations forwarded to various departments of psychology, psychiatry, and nursing across several universities and medical schools, all within the U.S.

Participants

Power analyses (a priori) using G*Power (Faul et al., 2007) predicted that a medium-to-large effect size (.6), would require 66 total participants, with approximately 11 participants in each group ($\alpha = .05$; power = .95). Ultimately, a total of exactly 66 participants completed the study, all of whom belonged to one of the six pre-existing professional groups. While the average group number was 11, groups were not ideally balanced. Group details are as follows:

Group 1 (MD): “Non-Psychiatric Physicians” ($N = 16$) have generally completed four years of medical school, and two to three years of non-psychiatric residency. However, generally medical school curriculum does often include a six to eight-week rotation in psychiatry.

Group 2 (PsychMD): “Psychiatric Physicians” ($N = 6$) have generally completed four years of medical school, and two to three years of psychiatric residency focused specifically on psychopharmacology, neurology, psychotherapy, etc.

Group 3 (NP): “Non-Psychiatric Nurse Practitioners” ($N = 10$) have generally completed an undergraduate degree as a registered nurse, followed by graduate training (generally two years) as a Family Nurse Practitioner, or other non-psychiatric nurse specialist.

Group 4 (PsychNP): “Psychiatric Nurse Practitioners” ($N = 13$) have generally completed an undergraduate degree as a registered nurse, followed by graduate training (generally two years) as a psychiatric mental health nurse practitioner (PMHNP).

Group 5 (PhD): “Non-Prescriptive Psychologists” ($N = 7$) have generally completed a doctoral degree in clinical psychology, with no additional training in psychopharmacology beyond their initial doctoral degree.

Group 6 (RxPhD): “Prescriptive Psychologists” ($N = 14$) have generally completed a doctoral degree in clinical psychology, followed by a postdoctoral master’s degree training (also generally two years + clinical practica) in clinical psychopharmacology.

For purposes of this study, whether a participant held an active license, was not relevant due to the fact that the hypothesis is based solely on their completed education, not their licensure status. More specifically, some psychologists in group 6, though trained in clinical psychopharmacology, may not prescribe and may not be licensed to do so, given that only a limited number of states permit them to actively prescribe. Finally,

all participants necessarily had a working familiarity with technology and online forms/exams, based on the online nature of the examination.

Measures

This study was designed to measure one dependent variable: the general content knowledge of prescribing mental healthcare providers. The independent/predictor variable was groups one through six, as described above (non-psychiatric physicians, psychiatric physicians, non-psychiatric family nurse practitioners, psychiatric nurse practitioners, non-prescribing psychologists, and prescribing psychologists).

To measure the dependent variable, a brief 25-question multiple-choice exam was created specifically for this study (Appendix A) which was used to measure didactic knowledge about clinical psychopharmacology. To avoid unfair advantage to one professional category over another, exam questions were not taken from the American Nurses Credentialing Center (ANCC), the American Board of Psychiatry and Neurology (ABPN), nor the American Psychological Association's Psychopharmacology Examination for Psychologists (PEP). Instead, the examination comprised questions commonly utilized in the *preparation* of licensing exams for each (Selvaraj & Ramaswamy, 2012), but altered in such a way as to make them immune from being searchable online.

The final questions selected for the examination were vetted by a practicing psychiatrist, and only questions applicable to the regular practice of prescribing psychiatric medication were used (e.g., pharmacology, psychopharmacology, neuroscience, neurochemistry, lab assessment, physical examination, etc.). Questions

included scenarios from pediatric, adolescent, adult, and geriatric practice populations. Each of the twenty-five questions was worth 4 points, resulting in a possible perfect score of 100.

Procedure

Following the approval of the Harvard Committee on the Use of Human Subjects (CUHS), participants were invited through several listservs affiliated with the relevant participating professions, as well as other university-based departmental contacts (graduate psychology departments, medical schools, nursing schools, etc.). No invitee was under any obligation to participate, and were in no way affiliated with, or had prior knowledge of, this study. Participants were informed that the survey would only take approximately a half-hour, could be completed entirely online, that their participation was voluntary, and that they could stop participating at any point before submitting their results (Appendix B). The informed consent also asked the participant to identify the way in which they were academically trained (one of the six groups described above), as well as the date and time of their agreement to initiate participation.

Upon completing an informed consent, each participant was presented with the exam described above. Participants were informed that they could answer the questions in any order and that they had thirty minutes to complete the exam. They were informed that they should answer based on what clinical research and “best practices” would indicate, and that while each answer did have a “correct” answer, they could use the “other” box to write in an answer to be later reviewed by a panel of three psychiatrists.

After completing and submitting their exam, the time stamp was recorded and the participant was presented with a debriefing screen (Appendix C) thanking them for their participation, and encouraging them to invite other colleagues to participate. Data was collected from January 15, 2020 until March 15, 2020.

Upon completion of the data collection, all “write-in” answers were sent to a panel of three psychiatrists for review. Each psychiatrist reviewed the answer, and indicated whether it should be passed or failed (Appendix D). Psychiatrists were not permitted to see one another's answers, nor were they permitted to know which professional group each participant belonged to. If an answer received at least two passes, the answer was counted as correct, otherwise, it was counted as incorrect.

In an effort to ensure all data were clean, each entry was examined for duplications, or for participants who failed to indicate their profession, neither of which were present. Additionally, although the exam instructions indicated that participants could skip questions for which they did not know the answer, data were examined to determine if any participants completed the entire examination without answering any questions. All of the data were included in the final analysis.

Data Analysis

The first aim of this study was to provide a general breakdown of the differences in clinical psychiatric prescriptive knowledge between six types of providers that are not commonly tested together. To do this, data were entered into SPSS and descriptive statistics (number, mean, standard deviation, confidence intervals, etc.) were analyzed and presented visually.

For hypothesis testing, a one-way ANOVA was conducted to more closely compare the difference between each of the six groups to determine the significance, if any, between prescribing psychologists and other prescriber groups, and whether an inference of significantly more knowledge for prescribing psychologists is appropriate (Hypothesis 1). In addition, the difference between prescribing psychologists and non-prescribing psychologists was also noted to determine if an inference can be made about whether prescribing psychologists' post-doctoral training makes them significantly more knowledgeable than non-prescribing psychologists (Hypothesis 2). Normality was verified using a Shapiro-Wilks test, and homogeneity of variances was tested using Levene's. Welch's adjusted F ratio was used to test mean differences; after which, post hoc analyses were conducted using Games-Howell and Glass's Δ .

Chapter III

Results

The final sample included in this study consisted of sixty-six total participants: sixteen non-psychiatric physicians (MD), six psychiatric physicians (PsychMD), ten non-psychiatric nurse practitioners (NP), thirteen psychiatric nurse practitioners (PsychNP), seven non-prescribing psychologists (PhD), and fourteen prescribing psychologists (RxPhD). While no names were collected, results indicate that faculty or students participated from schools across the country, including the University of Vermont, Rutgers University, Indiana University, Emory University, State University of New York, University of Alabama, Icahn School of Medicine at Mount Sinai, and others. Fifty-eight participants (87.88%) answered every single question, seven participants (10.60%) skipped one question, and one participant (1.52%) skipped seven questions.

Descriptive Statistics

In total, the average exam score across all 66 participants was 52, with a lowest score of 24 (participant = non-prescriptive psychologist) and a highest score of 84 (non-psychiatric physician). As a whole, the highest-to-lowest average scores, for each professional group was Psychiatrists ($M = 67, SD = 10$), Prescribing Psychologists ($M = 62, SD = 7$), Psychiatric Nurse Practitioners ($M = 58, SD = 15$), Non-Psychiatric Physicians ($M = 51, SD = 14$), Non-Psychiatric Nurse Practitioners ($M = 43, SD = 14$),

and Non-Prescribing Psychologists ($M = 28, SD = 3$). These data are presented in Figures 1 and 2, and Table 1 below.

Figure 1

Test scores for all groups

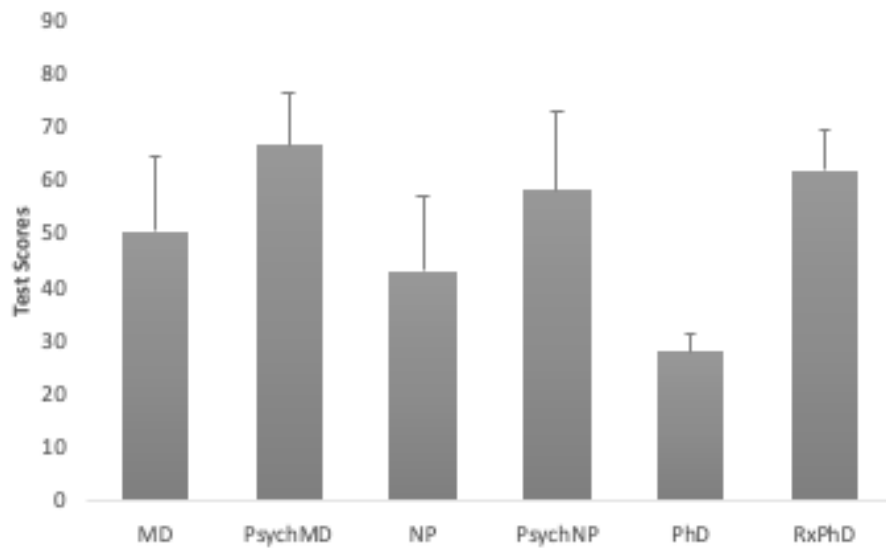


Figure 2

Box and whisker for all groups

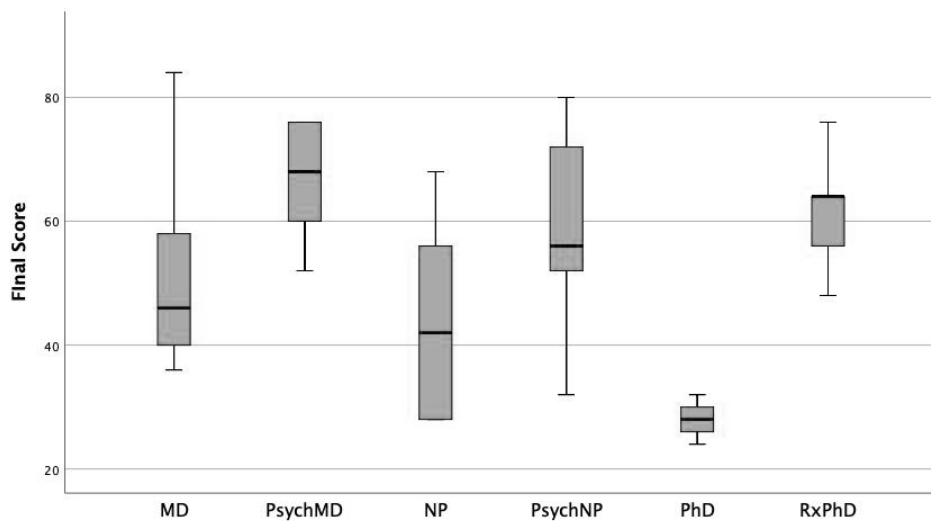


Table 1*All group descriptives*

Final Score	N	Mean	SD	Std. Er.	95% Confidence Interval for Mean		Min	Max
					Lower	Upper		
MD	16	50.50	13.924	3.481	43.08	57.92	36	84
PsychMD	6	66.67	9.688	3.955	56.50	76.83	52	76
NP	10	43.20	13.831	4.374	33.31	53.09	28	68
PsychNP	13	58.15	14.662	4.067	49.29	67.01	32	80
PhD	7	28.00	3.266	1.234	24.98	31.02	24	32
RxPhD	14	62.00	7.317	1.956	57.78	66.22	48	76
Total	66	52.42	15.909	1.958	48.51	56.34	24	84

Testing of Hypotheses

Independence of observations is met, as the subject variable is professional group – participants belonged to one of six professional groups: non-psychiatric physicians (MD), psychiatrists (PsychMD), non-psychiatric nurse practitioners (NP), psychiatric nurse practitioners (PsychNP), psychologists with no prescriptive training (PhD), and psychologists with prescriptive training (RxPhD). The assumption of normality is met for this data set as tested for each professional group using Shapiro-Wilks tests (all $p > .05$). See Table 2. Also, all professional group skewness values were ≤ 1.097 . However, the assumption for homogeneity was violated, as indicated by Levene's Test for Homogeneity of Variances ($F(5, 60) = 3.132, p = .014$). See Table 3.

Table 2.

Tests of Normality (Shapiro-Wilk)

Professional Group	Statistic	Df	Sig.
Non-Psychiatric Physician (“MD”)	.891	16	.057
Psychiatrist (“PsychMD”)	.907	6	.415
Non-Psychiatric Nurse Practitioner (“NP”)	.920	10	.356
Psychiatric Nurse Practitioner (“PsychNP”)	.960	13	.751
General Clinical Psychologist (“PhD”)	.858	7	.144
Prescriber-Trained Psychologist (“RxPhD”)	.948	14	.530

Table 3.

Test of Homogeneity of Variances (Levene’s Test)

Final Score	Levene Statistic	df3	df2	Sig.
Based on Mean	3.132	5	60	.014
Based on Median	2.310	5	60	.055
Based on Median w/ Adj. df	2.310	5	44.3	.060
Based on trimmed mean	2.929	5	60.	.020

Analysis and Post hoc Analysis

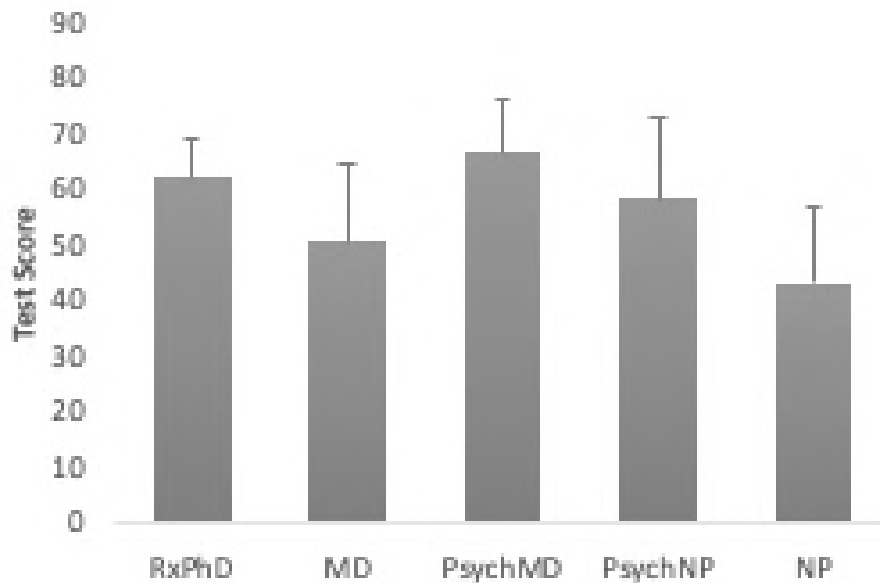
Since the assumption of homogeneity of variance was not met for this data, the obtained Welch’s adjusted F ratio was used, which was significant [Welch’s $F(5, 23.71) = 52.780, p < .001, \text{est. } \eta^2 = 0.80$]. See Welch (1951).

To explore which groups differed based on each hypothesis of the current study, Games-Howell post hoc comparisons were performed. Based upon Hedges’ (1981) recommendation, Glass’s Δ was used to calculate effect sizes for all relevant post hoc pairwise comparisons, with prescribing psychologists (RxPhD) used as the comparison group.

The first hypothesis was to compare prescribing psychologists to other prescribing groups. Post hoc analyses revealed that prescribing psychologists scored similarly to non-psychiatric medical doctors ($p = .079$, Glass's $\Delta = 1.57$), psychiatrists ($p = .885$, Glass's $\Delta = 0.64$), and psychiatric nurse practitioners ($p = .953$, Glass's $\Delta = 0.53$). They scored significantly better than non-psychiatric nurse practitioners ($p = .018$, Glass's $\Delta = 2.57$). See Figure 3, the means and standard deviations of these comparisons.

Figure 3

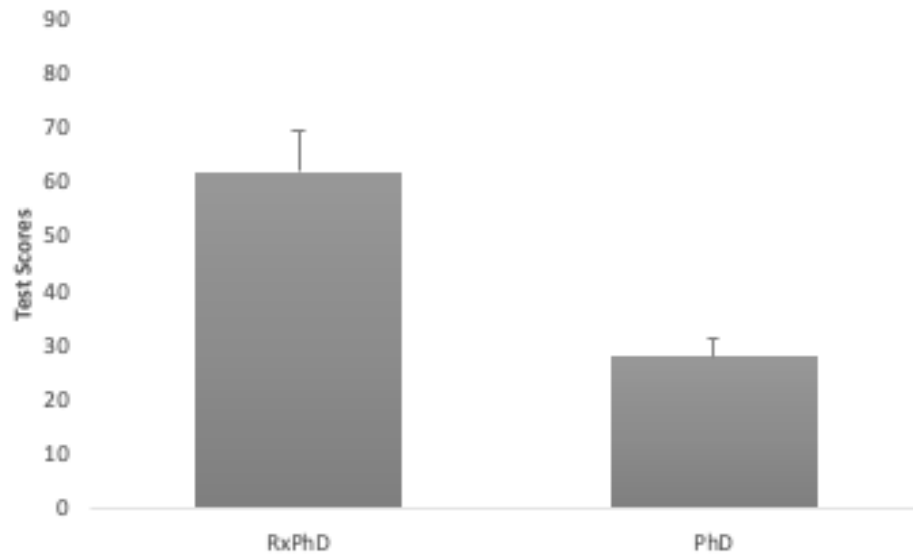
Test scores for prescribing groups only.



The second hypothesis was to examine whether prescribing psychologists' post-doctoral training makes them significantly more knowledgeable than non-prescribing psychologists. As shown in Figure 4, Prescribing psychologists scored significantly better than non-prescribing psychologists ($p < .001$, Glass's $\Delta = 3.27$).

Figure 4

Prescribing versus non-prescribing psychologists



Chapter IV

Discussion

The purpose of this study was to fill a void in the prescribing psychology literature: direct quantitative exam comparison between differently-trained psychiatric prescribers. The debate regarding whether the training of prescribing psychologists makes them a safe and competent prescriber dates back to the late-eighties and early nineties, when the first committee was formed to determine what additional coursework clinical psychologists would need to expand their scope to include safely prescribing limited medication (McGrath & Moore, 2010). Since that time, a few studies have emerged attempting to quantitatively compare the competency of prescribing psychologists against independent prescribers who already have well-established educational models (namely physicians and nurse practitioners).

Prescribing psychology's critics argue that the "truncated" nature of their training makes them unsafe prescribers compared to physicians and independent-practice nurses (Tompkins & Johnson, 2016; Heiby et al., 2004). Prescribing psychologists point to the lack of incidents over a period spanning decades as evidence of safe prescribing. Tompkins and Johnson (2016) argue that a lack of published incidents cannot be considered evidence of safety. Prescribing psychologists also highlight studies demonstrating side-by-side curricular comparisons, which they conclude demonstrate substantially equivalent training in certain areas they deem most relevant to safe prescribing practices (Muse & McGrath, 2010). Heiby (2010) argues that methodological

design choices render this approach RxP-biased. Finally, prescribing psychologists highlight opinion surveys whereby physicians have consistently rated the prescriptive ability and safety of prescribing psychologists favorably (Linda & McGrath, 2017; Linda, 2016; Shearer et al., 2012). The limitation of these studies is that the opinion of colleagues can be influenced by colleague bias. This is perhaps best explained by Dr. Glenn Ally, a licensed Medical Psychologist in Louisiana, who quotes some of his close physician colleagues who have stated: “well, we don’t mind if you do it, [be]cause we know you, but we don’t know about those other people out there” (Nebraska Psychological Association, 2017, 15:45).

To make matters more complicated, because each licensed professional takes their own unique board exam (nurses, physicians, prescribing psychologists), and because general physicians and family nurse practitioners take no exams to test their specific knowledge in psychiatric medications, there has been no way to compare more direct psychiatric prescriptive knowledge of each provider, side-by-side. By administering one uniform brief examination, to each professional group and stipulating the same time constraints for each, this is the first study to attempt to demonstrate actual psychiatric prescriptive competency between the various training models.

In addition, no study to date has compared the prescriptive knowledge of all psychologists - both those with and those without post-doctoral psychopharmacological training. Doing so helps to inform whether the post-doctoral training can be indicated as the variable most likely to have affected psychologists’ prescriptive knowledge. Some commentators, for example, have lamented that the only difference between prescribing psychologists and other professionals (general psychologists, nurses, physicians, etc.) is

“one or two classes” (Walker, 2002). By comparing the two psychologists side-by-side (with and without postdoctoral training), the influence of the postdoctoral training might be more readily apparent.

Applied Findings

As discussed above, only a few studies have been published attempting to quantitatively measure whether prescribing psychologists are appropriately trained to ‘actually’ prescribe safely. While curricular comparisons suggest the training is similar, and opinion surveys suggest that physicians who work with prescribing psychologists endorse their skills, no study has essentially said: ‘prove it.’ The benefit to either outcome in such a case is (1) either prescribing psychologists are able to demonstrate that their training results in scores similar to their prescribing colleagues, or (2) results indicating a lack of competency would suggest that RxP training programs should reevaluate and revise their training programs. Either outcome for this study would have yielded usable data for the future of RxP training.

Here, as was predicted by the Muse and McGrath (2010) curriculum study as well as the Linda and McGrath (2018) and Shearer and colleagues (2012) physician-opinion studies, prescribing psychologists demonstrated a statistically similar level of competency as psychiatrists, general physicians, and psychiatric nurses. They scored higher than both psychiatric nurses and general physicians, and significantly higher than non-psychiatric nurses (e.g., family nurse practitioners).

Two of these prescriber-groups, in particular, are worthy of additional discussion. As cited previously, research consistently affirms that non-mental health providers write

anywhere from 80 to 90 percent of psychotropic prescriptions (Balestra, 2019; DeLeon et al., 2014; DeLeon & Wiggins, 1996; Mark et al., 2009). In other words, family physicians and family nurse practitioners are writing the most psychotropic prescriptions in the U.S., yet they scored the lowest of all prescriber groups—an average of 51 and 43, respectively—on a test designed to measure their competence in this area. In contrast, it is commonly argued that prescribing psychologists—who scored an average of 62, second only to psychiatrists who scored an average of 67—are not competent enough to prescribe. Arguments that prescribing psychologists are not trained well enough to safely prescribe should be re-evaluated. Arguments that psychologists wishing to prescribe should attend nursing school instead of a postdoctoral psychopharmacology program, should also be re-evaluated in light of these findings, as both psychiatric nurses and family nurses scored lower than the psychologists who attended RxP training.

Finally, no study to date had undertaken a side-by-side comparison of psychologists themselves, both with and without postdoctoral training in psychopharmacology. To demonstrate that it is (or is not) the specific postdoctoral training that contributes to a prescribing psychologists' overall prescriptive competence, both groups had to be included in this study. Said another way, while most general psychologists have exposure to some clinical psychopharmacology by nature of their doctoral training, is it the PhD/PsyD training, or the postdoctoral training that produces the scores seen in this study? Based on the significant difference between psychologists with the extra training versus those without, this study demonstrates that prescribing psychologists' high scores are most likely due to their postdoctoral training.

Limitations

No study is perfect; and this one is no exception. While a significant amount of time and effort went toward thinking through and attempting to account for the limitations of this study, there are still several issues that should be noted when considering the results (and generalizability). Each is addressed separately, starting with those issues of more general important limitations to the study.

Robustness of Examination

Every effort was made to include topics that most providers might encounter, whether they are a family practitioner asked to handle one aspect of psychiatric medications, or whether they are a psychiatrist responsible for all psychiatric care. As such, questions ranged from general adult psychiatry to pediatrics to geriatrics to substance abuse. However, a twenty-five question examination is in no way adequate to measure competence to practice. This study was less concerned with competence for licensure purposes (the board exams, nursing exams, and psychology exams serve that purpose), than it was with comparing general differences in competence between prescriber-types.

In addition, this study was faced with balancing the need for a sufficient number of test questions, with the practical limitation that participants were busy providers. Overall, given that no prescribers got every question right, and the lowest scores were on par with chance (4 possible answers to each question = 25%, and the lowest score was

approximately a quarter of the points possible), the lack of depth of the exam, while notable, was mitigated for as best it could be.

The Competency “Blur” & Time-In-Practice Differences

The purpose of this study was to capture differences in competency-based on training models (medical school, nursing school, and postdoctoral prescriptive training). Two limitations arise in this attempt. First, there is likely no way to fully tease apart what one learns didactically and what one learns from experience. Therefore, it is likely that many participants relied on their experience more than their training, while many relied on their training more than their experience. For example, Psychologist Dr. Floyd Jennings’ familiarity with clinical psychopharmacology might be superior to a recent psychiatric nurse graduate or psychiatrist, as Dr. Jennings has been prescribing for over three decades. The way to tease apart this “blur” would be testing each participant only after their didactic coursework, before they have the opportunity to increase their knowledge in the field, or factor in years of practice as a co-variate with a larger sample.

Second, if the blur between training and hands-on practical experience were to disadvantage any of the groups, it would most likely be to the disadvantage of prescribing psychologists, who have historically had the least amount of time to practice in this capacity. Only the U.S. military, Guam, and five states permit psychologists to fully utilize their training. Further, this is the youngest group in terms of prescriptive scope expansion. Random follow-up queries indicated that while some prescribing psychologists managed medication for the majority of their practice, most did not, and some had never even obtained the license or certification to do so. Attempts to measure

competence between prescribers of each group with the same amount of experience is suggested in the Future Directions section, below.

Knowledge vs. Quality of Care

Knowledge in and of itself does not necessarily correlate with overall quality of care, or overall competence as a provider. Recall Epstein's (2007) definition of competence as "the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individuals and communities being served" (p. 387). While this study focused on knowledge and technical skills, it is quite possible for a knowledgeable or technically skilled provider to still miss the mark in the grander purview of overall patient care.

Similarly, while this study only measured competence via knowledge and technical skills, the unique nuances between a provider's professional identity should not be dismissed. Physicians and psychiatrists, who learn first and foremost through a medical model, view patient care through one lens. Nurses, who follow a similar model, still view patient care through a slightly different lens—one that is unique to nurses. For more on comparison of lenses and patient-care differences see Engel (1981) and Gunn and Blount (2009).

As such, prescribing psychologists are first and foremost psychologists, whose foundational training (often through a process-based approach) is quite different from that of the medical model. While this study did not take into account any of these differences, that silence should not be interpreted to mean those differences are not just as

important as knowledge and technical skills. Those differences may prove to be even more important.

Examinee Attentiveness

There is no way to know for certain that participants in this study attended to the questions adequately, or if they were simply motivated by the chance to win a gift card. However, given that participants were permitted to spend up to thirty minutes completing the exam, and that average times between groups consistently range from fifteen to twenty minutes, there is reason to believe that most participants did attend to the questions, and put forth adequate effort. Wording was manipulated so that online cheating was not an option, however guidelines and directions suggested by Beck (2014) and Fask and colleagues (2014) were also considered.

Selection Bias

Regarding both descriptive data and hypothesis testing, this study could have been affected by some selection bias. All participants necessarily were technology- and computer-savvy. Also, some participants may have guessed the nature of the study, which may have had a rippling effect on the type of provider that participated. In other words, if a proponent or opponent of RxP guessed that the study might ultimately demonstrate competency or non-competency, they may have invited specific providers to participate in the study in an effort to skew results. However this tendency could skew in either direction. In addition care was taken to not advertise this study as RxP related, given the controversial nature of the topic, in both directions.

Statistical Assumptions

Finally, while the final data was determined to be normally distributed, the assumption of homogeneity of variance was not met for this data. This was addressed by using Welch's F and Games-Howell post hoc comparisons, followed by Glass's Δ to calculate effect sizes for all relevant post hoc pairwise comparisons. Therefore this statistical limitation was largely addressed, satisfactorily.

Future Directions

One of the most difficult aspects of this particular study was recruiting busy professionals to participate. While this study did not require that participants be licensed (only educated), most future RxP related studies should consider designs that account for student-only participants who have (a) completed program requirements, but (b) not practiced outside of their educational setting. This undertaking is currently unlikely because the education of most clinical psychopharmacology postdoctoral master's degree programs are housed in free-standing professional schools or private schools. If these programs were incorporated into state, public, and nonprofit universities, researchers from within that university (assuming a medical school affiliation were attached), would have access to medical students, nursing students, and prescribing psychologist students to examine prior to their gaining clinical prescriptive experience. This would help to normalize the amount of variance between each disciplines' amount of time in practice, ultimately reducing advantages and disadvantages between groups.

As an example, the new program at Idaho State University might be the ideal place to compare the exam outcomes of the new psychopharmacology program against exam scores of students from the Idaho State University School of Nursing and the possible future affiliation with the proposed Idaho College of Osteopathic Medicine. This puts Idaho State University in a unique position to have access to newly minted graduates of all three training models: prescribing psychology, advanced practice nursing, and possibly physician residents.

In addition to the above, studies that span departmental models are in a better position to publish information regarding minimum competency to prescribe psychiatric medications. For example, as discussed, psychiatrists take board exams, as do nurses; prescribing psychologists take examinations stipulated by the American Psychological Association; and family physicians, family nurses, gynecologists, etc., take no examination testing the depth at which they understand psychopharmacology. Given that psychiatric practice has generally been accepted as an advanced specialty field, researchers working together from within interdisciplinary academic programs are best suited to jointly re-evaluate whether the current method for establishing minimum practice standards in psychotropics, is or is not acceptable. And if it is not, such an interdisciplinary team is best suited to make recommendations regarding uniform testing of content knowledge across all domains (psychiatry, general medicine, nursing, physician assistant specialists, and prescribing psychology) in such a way as to respect scope-of-practice overlap and antitrust laws.

Future studies that follow a similar model to this should also collect data on participant years of practice. For example, post-study queries indicated that some

participants had practiced many years, and some had not formally practiced at all. As noted in the limitations of the study, prescribing psychologists with over a decade of experience prescribing, and over two decades of experience in advanced psychiatric evaluation might perform better than a new graduate of medical school. This is not to discredit the training of a new medical school graduate, or psychiatric nurse graduate; instead it highlights the nuance between what one learns didactically and what one learns practically. Future studies should incorporate years of experience as a possible confounding predictor variable in performance.

As noted in the limitations section above, a prescriber's performance on a short examination should not be considered an indication of their overall ability to care for a patient, holistically. To measure the latter, a study vastly different in design from this one, would have to be constructed. No study to date has systematically (either qualitatively or quantitatively) examined patient-perceptions of quality of care. First, finding patients willing to participate in such a study (and providers willing to invite their patients to do so) would be quite the undertaking. Second, determining how one measures—quantitatively—a patient's overall quality of care would be challenging. However, a study examining this aspect of prescribing psychology versus other prescriber training approaches would help illuminate one of the most important aspects of this field: how patients feel about it.

Similarly, as noted previously, while the medical model generally takes an “action-based” approach to treatment, and the psychological model takes a “process-based” approach, no study to date has evaluated whether one approach results in better overall outcomes. Some studies have examined how process-based approaches lead to

better medication compliance than action-based approaches, however, given psychology's reverse approach to the medical model (learning psycho-social models first, then biological models), the introduction of psychologist-prescribers paves the way for more research on the outcome differences of these two approaches.

As noted by Tompkins and Johnson (2016), studies demonstrating what psychologists think of prescriptive psychology, and whether psychologists and psychology students would or would not seek out prescriptive training, fall short of making any substantial claims in the literature. As more states have passed RxP legislation, the time is nearing for follow-up studies to compare not only how many psychologists and psychology students “would” seek out training, but how many “have.” It seems quite the conundrum to present research that psychologists are on the fence about the training, when so much political hostility—from both sides—surrounds it.

Finally, as noted by McGrath (2020), prescribing psychologists do not seek a broad or expansive scope of practice, but instead seek a scope that is narrow and more restrictive than other prescribing professionals. While psychiatrists, by nature of their full medical school training, may be able to swiftly and differentially diagnose stomach pain as anxiety versus any host of other gastrointestinal issues, prescribing psychologists neither seek nor desire this level of breadth in scope. To date, no study has set out to quantitatively measure the extent to which prescribing psychologists as opposed to other psychiatric prescribers collaborate with other specialties. Prescribing psychologist training models are designed to provide psychologists with the clinical skills needed to know when to properly refer and seek consultation. For example, the Massachusetts Child Psychiatry Access Project (2020) makes specialized consultation in child

psychiatry available to primary care providers across Massachusetts. Programs like this, aimed at increasing collaboration between psychiatric providers and primary care providers, can also act as additional clinical supports (along with clinical preceptors, etc.) for prescribing psychologists. Studies examining (a) the availability of such collaborative programs from state-to-state as well as (b) their utility supporting the mission of prescribing psychology and increased access to care, is an area ripe for further study.

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Appendix A – Examination Questions

1. Look at the following. Which medications can be safely used in combination with monoamine oxidase inhibitors (MAOIs)?

- Escitalopram
- Amitriptyline
- Meperidine
- Desvenlafaxine
- Bupropion
- Other:

2. Mr. Smith is 26-year-old man with a history of involuntary eye blinking and snorting. He comes to the office because he is distressed about increasing frequency of these tics over the past six months. Mr. Smith says the episodes currently occur numerous times during the day. Medical history includes development of eye blinking at 12 years of age and development of snorting at 16 years of age. Psychotherapy and exercises initially reduced the frequency of these episodes. Because the patient is embarrassed by his tics, his performance at work has decreased and he now declines most invitations to social gatherings. Which of the following medications is the most appropriate therapy for this patient?

- Carbamazepine
- Fluvoxamine
- Methylphenidate
- Risperidone
- Venlafaxine
- Other:

3. All of the following antidepressants suppress rapid eye movement (REM) sleep EXCEPT for one. Please select that one.

- Bupropion
- Paroxetine
- Nortriptyline
- Fluoxetine
- Venlafaxine
- Other:

4. All of the following drugs are associated with drug-induced depression EXCEPT for which of the following?

- Alprazolam
- α -Interferon
- Propranolol
- Varenicline
- Depot-medroxyprogesterone acetate
- Other:

5. Which of the drugs below is contraindicated in patients who have a history of allergy to tricyclic antidepressants (TCAs)?

- Carbamazepine
- Mirtazapine
- Trifluoperazine
- Lamotrigine
- Olanzapine
- Other:

6. Jan is a 50-year-old woman who has been treated with sertraline for major depressive disorder for more than two years. She comes to the office because she has had weakness, cold intolerance, constipation, and weight gain during the past six months. Physical examination shows dry, coarse skin as well as bradycardia, hypothermia, and swelling of the hands and feet. Which of the following laboratory studies is the most appropriate to determine Jan's diagnosis?

- Liver function testing
- Measurement of serum electrolyte levels
- Measurement of serum estrogen level
- Measurement of serum sertraline level
- Measurement of serum thyroid-stimulating hormone level
- Other:

7. All of the following statements are true regarding the use of clonidine in children EXCEPT for which?

- Clonidine is useful in the pharmacologic treatment of Tourette syndrome in children
- Sedation is most frequent and troublesome side effect of clonidine
- Personal history of cardiovascular disease is contraindication for starting clonidine
- Clonidine should be titrated gradually, and dose can be increased every 2 to 3 days
- Clonidine has a long half-life, and it is administered orally once or twice a day
- Other:

8. Mark, a 28-year-old man comes to the office because he has had severe restlessness, anxiety, and generalized myalgia during the past three days. Mark also tells you that he has not slept for the past two days. Physical examination shows dilation of the pupils, excessive lacrimation, diaphoresis, and piloerection. The most likely cause of Mark's condition is withdrawal of which of the following substances?

- Cocaine
- Inhalants
- Methamphetamines
- Modafinil
- Opioids
- Other:

9. Max, age 7, has been diagnosed with separation anxiety disorder. He has partially responded to the Coping Cat cognitive behavioral therapy program. Which of the following oral medications should be added?

- Sertraline 25 mg daily
- Fluoxetine 20 mg daily
- Paroxetine 10 mg daily
- Venlafaxine ER 37.5 mg daily
- None of the above
- Other:

10. Of the following medications, which has the strongest evidence for the management of aggression and self-injurious behavior in children with autism spectrum disorders?

- Methylphenidate
- Naltrexone
- Clonidine
- Lithium
- Fluoxetine
- Other:

11. Howard is a 72-year-old man whom you have diagnosed with major depressive disorder (MDD). You start him on citalopram 10 mg, to which he responds fairly well. Which of the following electrolyte abnormalities is a rare but dangerous side effect associated with citalopram therapy?

- Hypocalcemia
- Hyponatremia
- Hypernatremia
- Hypercalcemia
- Hypokalemia
- Other:

12. Janet is a 55-year-old woman who comes to the office because she has a 20-year history of repetitive actions and is tired of wasting time by repeating these actions. The patient says she repeatedly checks the doors in her house to make sure they are locked, washes her hands several times per hour, and checks her electrical appliances three times each morning before she leaves for work. Medical history includes second-degree atrioventricular block. Which of the following medications is the most appropriate initial therapy for this patient's psychiatric disorder?

- Clomipramine
- Clonazepam
- Methylphenidate
- Quetiapine
- Sertraline
- Other:

13. Regarding the treatment of sundowning, which of the following is not recommended?

- Light therapy
- Benzodiazepines
- Structured activity program
- Antipsychotics
- Melatonin
- Other:

14. Of the following possible side effects, which side effects associated with trazodone limits its usefulness in the management of behavioral problems in the geriatric population?

- Worsen cognition
- Excessive sedation
- Cardiac Arrhythmias
- Orthostatic hypotension
- All of the above
- Other:

15. All of the following physiologic changes in the elderly alter drug pharmacokinetics and increase the susceptibility to adverse effects of medications EXCEPT for which one?

- Decreased glomerular filtration rate
- Decreased hepatic blood flow
- Reduced liver size
- Increased splanchnic blood flow
- Reduced first-pass metabolism
- Other:

16. Samuel, a 35-year-old man with bipolar disorder, most recent episode mixed, comes to the clinic for routine follow-up examination. His condition has been difficult to control and has required treatment with multiple medications during the past two years. Samuel says his mood has been stable with his current regimen, but for the past three months, he has had tremor primarily affecting his hands. Which of the following medications is the most likely cause of this patient's tremor?

- Carbamazepine
- Gabapentin
- Lamotrigine
- Lithium carbonate
- Topiramate
- Other:

17. Of the following antidepressants, which has FAVORABLE effect on weight loss and little or no sexual side effect?

- Mirtazapine
- Fluoxetine
- Bupropion
- Nortriptyline
- Paroxetine
- Other:

18. All of the following are side effects of carbamazepine EXCEPT for which one?

- Benign pruritic rash
- Ataxia
- Hepatitis
- Nephrogenic diabetes insipidus
- Blurred vision
- Other:

19. A patient complains of the unwanted sexual side effects from his SSRI. Which can be used to help treat the sexual side effects?

- Cyproheptadine
- Amantadine
- Buspirone
- Mianserin
- All of the above
- Other:

20. All of the following drugs can cause withdrawal syndrome EXCEPT for which one?

- Propranolol
- Clonidine
- Fluoxetine
- Paroxetine
- Venlafaxine
- Other:

21. Which of the following is proven to be efficacious in the treatment of Tourette disorder?

- Methylphenidate
- Pimozide
- Clonazepam
- Propranolol
- Atomoxetine
- Other:

22. Jenny, a 10-year-old girl, is diagnosed with ADHD. She has no significant medical history. However, her family history is significant for prolong QT syndrome in her mother. You consider starting her on a stimulant. What is the next best step in the management of this patient?

- Order an electrocardiogram
- Order an echocardiogram
- Request a 24-hour Holter monitoring
- Consult a pediatric cardiologist
- Start bupropion instead of a stimulant
- Other:

23. Regarding childhood anxiety disorder, which of the following is the first-line pharmacotherapy option?

- Sertraline
- Lorazepam
- Imipramine
- Modafanil
- Venlafaxine
- Other:

24. All of the following SSRIs are FDA-approved treatment for obsessive-compulsive disorder (OCD) EXCEPT for which one?

- Fluoxetine
- Fluvoxamine
- Sertraline
- Citalopram
- None of the above
- Other:

25. Kelly is a 16-year-old Caucasian female who was diagnosed with bipolar affective disorder, and started on a mood stabilizer about 6 months ago. During the follow-up visit, Kelly complained about menstrual irregularities and weight gain. On examination, she has hirsutism and acne. She is not on any other medications. You suspect polycystic ovarian syndrome (PCOS). Which of the following mood stabilizers have been associated with the development of PCOS?

- Lithium
- Valproic acid
- Aripiprazole
- Ziprasidone
- None of the above
- Other:

1. Amitriptyline
2. Risperidone
3. Bupropion
4. Alprazolam
5. Carbamazepine
6. Measurement of serum thyroid-stimulating hormone level
7. Clonidine has a long half-life, and it is administered orally once or twice a day
8. Opioids
9. Sertraline 25 mg daily
10. Methylphenidate
11. Hyponatremia
12. Sertraline
13. Benzodiazepines
14. All of the above
15. Increased splanchnic blood flow
16. Lithium carbonate
17. Bupropion
18. Nephrogenic diabetes insipidus
19. All of the above
20. Fluoxetine
21. Pimozide
22. Order an electrocardiogram
23. Sertraline
24. Citalopram
25. Valproic acid

Appendix B – Consent & Instructions

CONSENT FORM

WHAT IS THE PURPOSE OF THIS RESEARCH?

This research seeks to briefly measure the psychiatric prescriptive knowledge of professionals trained in different prescriber training programs in an effort to help guide the direction of future training programs.

WHAT CAN I EXPECT IF I TAKE PART IN THIS RESEARCH?

You will be asked to answer 25 short multiple choice questions.
This survey will likely take you 30 minutes (or less) to complete.
This survey can be completed entirely online.
You will not be contacted after the conclusion of the study.

WHAT SHOULD I KNOW ABOUT THE RESEARCH STUDY?

Whether or not you take part is up to you.
Your participation is completely voluntary.
You can choose not to take part.
You can agree to take part and later change your mind.
Your decision will not be held against you.
Your refusal to participate will not result in any consequences or any loss of benefits.
You can ask all the questions you want before you decide.

WHOM CAN I TALK TO?

If you have questions, concerns, or complaints, or think the research has negatively affected you, talk to the primary researcher by emailing rrc432@g.harvard.edu or calling (781) 392-7319.

I IDENTIFY AS A...

- Psychiatrist (M.D. or D.O.)
- Non-Psychiatrist Physician (M.D. or D.O.)
- Psychiatric Mental Health Nurse Practitioner (M.S.N. or D.N.P.)
- Family or Non-Psychiatric Nurse Practitioner (M.S.N. or D.N.P.)
- Non-RxP-Trained Psychologist (Ph.D., Psy.D., or Ed.D.)
- RxP-Trained Psychologist (Doctoral Degree + M.S.C.P. or similar)

DATE OF AGREEMENT (TODAY'S DATE)

TIME OF AGREEMENT (CURRENT TIME)

INSTRUCTIONS

Complete as many of the below questions as you can, within thirty minutes. Answer based on what clinical research and “best practices” would indicate. If there is more than one right answer, pick THE BEST. If you feel like there is no best, then enter a comment, and your answer will be reviewed by a panel of practicing psychiatrists to determine whether your answer is acceptable.

All of the questions DO have a “correct” answer, so try not to use the “other” box, unless you feel you must.

Scores of 70% or greater will be entered into a drawing to win gift-cards of \$100 (or donations to your preferred charity).

Appendix C – Debriefing

DEBRIEF:

Your responses have been recorded.

Please feel free to invite your colleagues to participate (if they have completed their graduate training program). You should receive an email informing you of your score soon. If you included comments, it may take longer to review your answers. Thank you for participating.

Appendix D – Write-In Answer Review

Question	Participant	Answer	Reviewer 1	Reviewer 2	Reviewer 3	RESULT
1	#1	"Seroquel"	NO	NO	NO	NO
1	#7	"None of the Above"	YES	YES	YES	YES
1	#10	"My first choice is bupropion but there are studies show combined use of TCAs (not clomipramine) and MAOIs is safe if done correctly"	YES	NO	NO	NO
1	#27	"not sure if any of the options are safe"	YES	YES	NO	YES
1	#35	"None"	YES	YES	YES	YES
1	#52	"None"	YES	YES	YES	YES
1	#53	"None"	YES	YES	YES	YES
2	#2	"Guanfacine ER (Intuniv)"	NO	YES	NO	NO
2	#7	"Pimozide"	NO	NO	NO	NO
2	#38	"Habit reversal training, tetrabenazine"	NO	NO	NO	NO
3	#31	"all can suppress rem"	NO	NO	NO	NO
4	#1	"All are associated with drug induced depression"	YES	YES	NO	YES
4	#11	"Testosterone gel"	NO	YES	NO	NO
4	#31	"All can generate drug induced depression"	YES	YES	NO	YES
4	#38	"They all can?"	YES	YES	NO	YES
5	#20	"None of the above"	NO	NO	NO	NO
6	#33	"Liver function testing"	NO	NO	NO	NO
7	#31	"All are true"	NO	NO	NO	NO
10	#6	"Risperidone"	NO	YES	YES	YES
10	#19	"Risperidone"	NO	YES	YES	YES
10	#38	"Risperdal"	NO	YES	YES	YES
10	#42	"Risperidone"	NO	YES	YES	YES
10	#44	"Risperdal, abilify"	NO	YES	YES	YES
10	#45	"Risperdal, Ability"	NO	YES	YES	YES
19	#39	"Wellbutrin"	NO	NO	YES	NO
20	#31	"All can"	NO	NO	NO	NO