STUDENT FORUM

# The Scientist-Practitioner Gap and Graduate Education

## Integrating Perspectives and Looking Forward

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*The scientist-practitioner gap has long been a debated topic in clinical psychology. In this article, we review the history of the Boulder model for graduate training and the division that has developed between researchers and clinicians. Next, we suggest possible ways of addressing the concerns of both sides. Finally, we provide recommendations for what graduate students can do now during their training to help minimize the gap in their future professional practice.*

Since it was first formally proposed over 50 years ago at the Boulder conference (Raimy, 1950), the successful integration of science and practice in clinical psychology has been difficult to realize in graduate education. Those affiliated most strongly with either the "science" or "practice" camps have engaged in a heated and often acrimonious debate of the issues, which, not surprisingly, has failed to resolve the conflict (Stricker, 1997). Much has been written about what has been called the "scientist-practitioner gap" in the wake of the Boulder Conference; however, little discussion has considered the perspectives of graduate students on these issues. Understanding the diversity of thinking on this topic, we do not suggest that we speak for all graduate students. Nevertheless, we believe that our opinions may help to shed some light on potential ways to minimize the problem, starting at the graduate level.

We come from different viewpoints regarding the scientist-practitioner debate, representing both the more science-based (BG) and practice-oriented (MS) perspectives in contemporary psychology. Our goal is to understand the various perspectives on the scientist-practitioner gap and outline possible ways of bridging the gap at the time of graduate training, in an effort to constrain a division later in the professional domain. First, however, we want to make it clear that we are approaching this topic with the underlying assumption that the scientific method is the primary "way of knowing" in clinical psychology, which may be contrary to more post-modern conceptualizations of what constitutes knowledge (e.g., intuition, personal experience, etc.). In this context, we briefly set the historical context for the division between the science and practice elements of the profession, review the compelling arguments on both sides of the issue, outline suggested remedies and approaches to integration, and provide some practical recommendations for how graduate students can succeed in meeting these goals.

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### The Boulder Model

On August 20, 1949 the Boulder Conference on Graduate Education in Clinical Psychology convened with the goal of articulating a model of graduate training for the field (Raimy, 1950). The education paradigm eventually endorsed by the conferees involved the training of students to be both scientists and practitioners of psychology. In other words, graduates of clinical psychology programs would be expected to obtain knowledge of the science of psychology upon which clinical application would be practiced and conduct original scientific research. However, the implementation of the model proved more difficult than was expected and problems immediately arose in the period following the committee's recommendations. Within a decade of the conference, the content of graduate clinical training programs shifted to the side of science, with an emphasis on research training at the minimization or even exclusion of clinical experience and practice (Stricker, 1997).

In reaction to this trend, the professional school movement emerged and eventually led to the Vail Conference on graduate training, establishing a new "scholar-professional" model (Korman, 1976). Professional schools of psychology attempted to fill the vacuum in training produced by the more research-based programs and began educating professionals who were interested in being practitioners only (Peterson, 1991). Therefore, after 1949, more programs began to emphasize either research or practice, each at the expense of the other training (Stricker & Trierweiler, 1995). Although an integration of science and practice was boldly called for by the Boulder model, the subsequent years have ultimately brought us separate training paradigms in the form of Ph.D. and Psy.D. programs that educate career researchers or clinicians, respectively, all too often within the confines of separate institutions and cultures.

### On Practice from a Scientist Perspective

The Boulder model emphasized the application of science to the practice of clinical psychology. In its broadest sense, a scientific approach involves gathering empirical evidence in a systematic way that will either support or disconfirm *a priori* hypotheses. Furthermore, research involves designing procedures that identify the lawful relations among observations (Kazdin, 1998). Ultimately, applying the scientific method produces findings that provide confirmatory or disconformatory evidence for clinical insights, explains observations based on empirical evidence, and permits transmission of information between professionals (Beutler, Williams, Wakefield, & Entwistle, 1995). Without a solid scientific framework from which to practice, psychologists are much more likely to journey down blind alleys or fool themselves into believing in causal relationships that are illusory (Chapman & Chapman, 1967). Unless continuously asking questions like "What do you mean?" and "How do you know?," psychologists may find themselves being more akin to soothsayers than professional therapists (Meehl, 1993).

The wealth of clinical research over the last few decades, particularly in the area of psychotherapy outcome, has produced important information that can help direct clinical practice. Although some still argue for the so-called "dodo bird" conclusion regarding treatment efficacy by suggesting that different forms of psychotherapy appear to work equally well (Wampold et al., 1997), increasing evidence has pointed in the direction of specific interventions working better for specific problems (Chambless & Ollendick, 2001; Crits-Christoph, 1997; Herbert, 2000). For example, forms of cognitive-behavior therapy have consistently been shown to demonstrate superior efficacy over other treatments for certain anxiety disorders (Seligman, 1994). Based on this growing empirical knowledge base, the Division of Clinical Psychology of the American Psychological Association created a task force in 1995 to establish guidelines for defining efficacious treatments and to provide a list of treatments meeting these criteria (Task Force on Promotion and Dissemination of Psychological Procedures, 1995). How successful the task force's recommendations will eventually be in informing clinical practice remains to be seen.

One of the major reasons for basing assessment and treatment planning on findings from empirical research is the variety of problems associated with relying on clinical experience as the sole guide. Paul Meehl (1993) states: "It is absurd, as well as arrogant, to pretend that acquiring a Ph.D. somehow immunizes me from the errors of sampling, perception, recording, retention, retrieval, and inference to which the human mind is suspect" (p. 728). The biases and distortions that Meehl mentions are common to all clinicians and researchers, and require a constant effort to be aware of their existence and impact on day-to-day judgments. There exist numerous potential biases in clinical decision making: (1) availability heuristics limit our approaches to new problems based on past experiences of success or failure; (2) representativeness biases often result in the stereotyping of clients with certain salient disorders or symptoms (e.g., a clinician's preconceived notions about a diagnosis of Borderline Personality Disorder may unduly bias his/her perceptions of the client); (3) anchoring effects occur when certain initial information results in disregarding contradictory findings that may come later; (4) biased search strategies produce a pattern of seeking only information that will confirm our pet theories and anchored beliefs; (5) hindsight biases involve *post hoc* reasoning to explain events in order to confirm our preconceived notions; and (6) feelings of overconfidence result when some of the aforementioned cognitive heuristics and biases lead us to perceive a certainty in our decisions that is unfounded (Nezu & Nezu, 1989; Tversky & Kahneman, 1974). Unfortunately, this is only a partial list, and research indicates that simply being knowledgeable about the influence of these biases and heuristics does not necessarily prevent their influence on decision making (Arkes, 1981).

Regrettably, the minimal use of empirically supported treatments and the lack of understanding of cognitive biases can contribute to the widespread use of non-scientific approaches to clinical decision making. In an acceptance speech for the David Shakow Award for early career contributions in clinical psychology, Scott Lilienfeld chose to address the issue of pseudoscience in clinical psychology. Although noting that it is nothing new, Lilienfeld (1998) warned that pseudoscience "poses an increasingly major threat to both the welfare of the general public and the integrity and reputation of our profession" (p. 3). Lilienfeld indicates several characteristics of pseudoscience based on the work of Bunge (1994): *ad hoc*

and *post hoc* reasoning to escape falsification, overemphasis on seeking confirmatory evidence, lack of self-correction, reliance on testimonial evidence, misuse of scientific jargon, and ignorance of known scientific principles.

It must be pointed out that the issue is not only with the validity of certain questionable treatments being practiced, but also the way in which these approaches are often being marketed and promoted. For example, researchers and clinicians have questioned the practices of proponents of the newer array of treatments for Posttraumatic Stress Disorder called "power therapies," including Eye Movement Desensitization and Reprocessing (EMDR; Herbert et al., 2000) and Thought Field Therapy (TFT; Gaudiano & Herbert, 2000). Both EMDR and TFT have been promoted as "breakthrough" treatments, initially based on the clinical experience of certain practitioners and without corresponding empirical evidence to provide probative support for the claims. Often these initial claims have failed to be supported after being tested in controlled studies. For example, a recently published meta-analysis concluded that there is no reliable evidence that the "bilateral stimulation" specific to EMDR is responsible for any significant treatment gains (Davidson & Parker, 2001). Without a scientific approach to practice that involves careful weighing of clinical insights against empirical verification and extant research findings, along with a humble respect and attention to the cognitive heuristics and biases that taint our experience, pseudoscientific practices are likely to continue unabated and keep clinical psychology from being fully respected by other fields and trusted by the public.

### On Science from a Practitioner Perspective

The rigorously experimental and controlled nature of psychological research has done much to further knowledge in clinical psychology, yet many argue that it has often failed to adequately address practitioners' needs. Rychlak (1998) attributes this occurrence to the "one-way" communication between researchers and practitioners. He notes that discovering the "truth" of psychological phenomena has traditionally been seen as the domain of the researcher. Once the discovery is made, clinicians are informed that they should passively accept the results presented from the research community. Rarely does this communication of findings work in reverse.

Nowhere is the unidirectional flow of information more evident than when considering the history of efficacy research. In deeming approaches to psychotherapy efficacious, researchers often rely on highly manualized treatments, specific measures of symptomatology, and exclusion criteria that reduce the confounding effects of comorbidity. Many have questioned how the classic efficacy study can produce information that will be readily transported to the reality of clinical practice. For example, Howard, Moras, Brill, Martinovich, & Lutz (1996) argue that the idiographic context of therapy and the nonrandom nature of clinical work place serious limitations on generalizing from efficacy research.

Seligman (1995) does a concise job of explaining the problems inherent with efficacy research. First, efficacy research is of a fixed duration. This is not always true for actual clinical experience in that patients can be seen from a few weeks to even years, depending on various factors (e.g., theoretical orientation, finances, and problem severity). Second, practitioners are able to correct and change their assessment or techniques mid-therapy if needed. Most controlled studies do not allow for that kind of freedom on the part of the therapist. Third, clients seeking help on their own can actively choose the type of therapy in which they become involved. This motivation and personal interest may be beneficial in its own right and substantially add to the effectiveness of therapy. Fourth, patients seeking therapy often experience multiple diagnoses, which is reflected in the high rates of comorbidity among various Axis I and II disorders (Millon, Blaney, & Davis, 1999). Classic efficacy research usually strictly limits or excludes participants with comorbid diagnoses. Fifth, psychotherapy is concerned with the overall functioning of a client, including the person's own perception of his/her well-being, instead of discrete aspects of functioning. Efficacy research tends to view "well-being" in terms of frequency or severity of specific symptoms.

Because of these limits of classic efficacy research, there has been a burgeoning interest in conducting and funding "effectiveness" research that examines psychotherapy outcomes in real world conditions (Norquist, Lebowitz, & Hyman, 1999). However, Jacobson and Christensen (1996) argue that questions about the effectiveness of psychotherapy can be and have been addressed by efficacy research, contrary to Seligman's (1995) assertions. Therefore, efficacy and effectiveness research can more accurately be viewed as residing along a continuum rather than as an either-or classification. Efficacy studies that retain controlled conditions while balancing effectiveness concerns, such as external validity, may provide the best solution to using either design exclusively (Clarke, 1995).

The problems with traditional efficacy research and the subsequent questionable generalizability of results to clinical settings is not the only "pet peeve" of the clinician. It seems that a common viewpoint exists in the research community that clinical work is not adequately "scientific," which creates tension between the groups. In addition, the emphasis of research on statistical rather than clinical significance and the practice of generalizing results to the broader population based

on calculations of the "average" research subject are important factors that explain the failure of some clinicians to apply the findings of traditional science to their practice (Barlow, Hayes, & Nelson, 1984). When applied to the scientist-practitioner debate, "science" can sometimes be too narrowly defined. Beutler, Williams, Wakefield, and Entwistle (1995) point out that case studies, usually considered to be unscientific, can be a very important aspect of the scientific process. According to these authors, case studies can facilitate the two-way communication between clinicians and researchers by raising new questions and influencing the further development of psychological research. Secondly, Elliot and Morrow-Bradley (1994) propose that case studies are the perfect medium to present the specifics of how current research can be tested and applied to practice. Finally, case studies can aid in determining the benefits of a treatment for the specific and not just the "average" client.

The previous points are included in Davison and Lazarus's (1995) discussion of the importance of case studies in psychological science. First, case studies can cast doubt upon the usefulness of various theories by acting as disconfirming evidence, which is just as important as supporting research. Also, as previously discussed, case studies can serve as a valuable guide to future research and extend current techniques into other areas of applied psychology. Furthermore, case studies may point to specific areas of theory or research that can be problematic when implemented in practical situations. Finally, case studies can provide acceptable scientific evidence if carried out as a single-subject experimental design (Kazdin, 1998). When used in such a manner, single-subject studies are not simply interesting anecdotes with little utility, but an acceptable form of science in which clinicians can contribute to the understanding of the effectiveness of psychotherapy. In other words, even though case studies do no provide probative scientific data without further replication and extension, they can help to guide future research and provide insights into the difficulties of applying nomothetic findings ideographically.

### Integrating Perspectives

It is evident when reviewing the common arguments and counter-arguments that relevant points are being made by those on both sides of the scientist-practitioner discussion. Most clinical psychologists will even agree that each side of the debate provides compelling arguments and that, ideally, the field needs to balance science and practice concerns. Controversy arises in the integration of these two apparently disparate perspectives. Often, it is argued that the task of integration is difficult, if not impossible, because science and practice concerns are based on fundamentally different paradigms. However, Stricker (1997) argues that whereas theoretical orientations such as psychoanalysis and behaviorism may be incommensurable, science and practice can be viewed merely as different components of the same broad paradigm. In other words, science and practice are commensurable when paradigms are understood as not only representing shared knowledge but also as an agreed upon mode of knowing, or epistemological framework. In Stricker's view of clinical psychology, science is a way of knowing and practice is the application of knowledge developed through scientific investigation. In this way, both science and practice are speaking the same agreed upon language, yet simply serving different functions.

Stricker and Trierweiler (1995) propose the development of the "local clinical scientist" as a model of bridging the gap between science and practice. In their model, the clinician deals with the client's problems in the office similar to the way a scientist investigates research hypotheses in the lab. Both the clinician and the scientist share the attitudes of skepticism, curiosity, and critical thinking. Also, the clinician would draw from the appropriate empirical literature as a basis for problem solving. However, Stricker and Trierweiler argue that the clinician must solve the problem in the local context, rather than in the general and public domain of the typical scientist. For the clinician, the unique information of the client must be considered and incorporated with the extant data. Then, the clinician's ideas can be tested through the collection of evidence that will confirm or disconfirm the original hypotheses. In this way, both nomothetic and idiographic information can be integrated in a scientific fashion.

Although we recognize that the conceptualization of the local clinical scientist has a commonsense appeal, using the model with a specific client can be difficult without further guidance. Therefore, we will present a model of clinical decision making that, in our view, provides one plausible attempt at realizing a scientific approach to clinical practice. Nezu and Nezu (1989) propose a problem-solving approach to clinical decisions in behavior therapy, with the goal of integrating nomothetic and idiographic concerns. They divide the therapeutic process into four stages: screening and problem identification, problem analysis and selection of focal target areas, treatment design, and treatment implementation and evaluation. At each stage, a general problem-solving strategy is used, providing a scientific approach that is designed to reduce the cognitive biases and heuristics of the clinician. Problem solving involves several steps: (1) problem orientation, which includes a recognition of the clinician's worldview and assumptions brought to the process; (2) problem definition and formulation, which includes the identification of specific problem areas and goals of the problem-solving process; (3) generation of alternatives, which includes brainstorming possible solutions while deferring evaluation of their merits; (4) deci-

sion making, which includes the evaluation of alternatives by weighing their relative cost and likelihood of success (i.e., their utility), and (5) solution implementation and verification, which includes the evaluation of actual and predicted consequences of solutions. Nezu and Nezu assert that taking the aforementioned approach will serve to minimize the judgmental errors made by the clinician in the decision-making process.

Persons (1991) states that clinical case formulations of assessment and treatment, such as the problem-solving approach, can help bridge the scientist-practitioner gap. However, Herbert and Mueser (1991) assert that the notion that individualized case formulations can more accurately blend science and practice than manualized treatment is, at heart, an empirical question. Furthermore, they point out that the limited outcome research that exists investigating the difference in efficacy between individualized and standardized treatments has resulted in equivocal findings. More research in this area is necessary before summarily endorsing individualized case formulations as the most effective way to bridge the scientist-practitioner gap. However, we do see considerable merit in employing a more scientific approach to case formulation, and would strongly encourage future researchers to test this hypothesis thoroughly.

### Recommendations for Graduate Students

Rice (1997) has examined the gap between professional and scholarly practices within the field of psychology. He states that we must recognize that this split has been a result of various competing social, political, and economic forces. He sees this as a trend that is extremely difficult, if not impossible, to reverse. With this we would agree; and this is why the task of reconciling the ideals of science and practice is appropriately placed on the individual in training. Programs educating clinical psychologists, while never abandoning the scientist-practitioner model, must place more emphasis on personal responsibility in this area. Students endeavoring to become practitioners must understand that their work should be guided by the scientific method and that their experiences can do much to influence the types of research that will be conducted. Similarly, students interested primarily in research should always keep in mind that there is a practical side to research and that questions of applicability to clinical work will always be asked and eventually will need to be answered.

With an emphasis on the individual, we make several practical recommendations to help students in clinical graduate programs develop a scientist-practitioner mindset. First, supplementary training may be necessary to learn information that is not part of the graduate curriculum. We recommend that students take specific courses on critical thinking and philosophy of science if offered by their universities. We also encourage graduate programs to develop seminars or courses on critical thinking in clinical psychology[1]. However, if such courses are not available, students can still read works on the topic of philosophy of science by various authors. We recommend the reading of scientific classics, such as Thomas Kuhn's (1962) *The Structure of Scientific Revolutions* and Karl Popper's (1959) *Logic of Scientific Discovery*. An excellent primer on philosophy of science is Anthony O'Hear's (1989) *An Introduction to Philosophy of Science*. We also highly recommend that every present and future psychologist read Keith Stanovich's (2001) *How to Think Straight about Psychology*, which teaches critical thinking skills in evaluating psychological claims. Finally, reading contemporary classics, including Michael Shermer's (1997) *Why People Believe Weird Things* and Carl Sagan's (1996) *The Demon-Haunted World*, will help to improve critical thinking skills and scientific reasoning for controversial topics in general.

Next, we recommend that students begin practicing the scientist-practitioner approach in their clinical experiences. One of the major criticisms of scientist-practitioner training is that it results in students acting as "scientists" in the lab and "practitioners" in the clinic, without the appropriate integration of these roles (Barlow et al., 1984). Therefore, learning and utilizing scientific case formulation methods, such as the Nezu and Nezu (1989) problem-solving approach to clinical decision making, will help students develop the skills needed to be scientific practitioners. Carefully assessing the problems of the client, utilizing the extant literature as a guide to conceptualize the case, and implementing and evaluating proposed solutions in concrete ways while monitoring potential cognitive biases are all skills that need to be developed through practice. One benefit of being in training is that students can take advantage of supervision that, if utilized properly, can help reduce personal biases and provide a different perspective to minimize any mental set when conceptualizing a problem. Concerning supervision, we encourage students who have a choice in supervisors to seek out professionals with whom they feel they can truly dialogue—i.e., supervisors who will pose challenging questions and foster critical thinking skills, rather than being so theoretically focused as to exclude other perspectives that may be relevant to the discussion. In this way, students can learn to successfully use clinical experience for hypothesis generation and testing.

Furthermore, we encourage students to experiment with single-subject designs and present their results at conferences or in publications, especially newsletters[2]. In general, we encourage those who plan on being practitioners not only to conduct single-subject research but also to become involved in larger research projects at some level. Research training and experience will make practitioners more healthy and skeptical

consumers of research literature in the future. Conversely, those interested mostly in research should practice applying empirical findings to their individual clinical cases to grapple with the problems faced by practitioners daily. This clinical experience can also serve as a useful tool for hypothesis generation for future research projects.

Finally, it is important for graduate students interested primarily in either research or practice to read each other's literature. Beutler et al. (1995) present results from a national survey suggesting that practitioners read research literature at a higher rate than they are given credit for, but that researchers tend not to read clinical writings. To help alleviate this problem, students interested in research are encouraged to consider publishing their results in more practice-oriented journals. In addition, writing summary results of literature findings in outlets such as newsletters would be helpful to disseminate findings more quickly to practitioners. Furthermore, many journal editors are quite willing to publish single-case designs, which can be a way for practice-oriented students to introduce topics for future research. For example, the journal *Behavior Therapy* has a "Case Study and Clinical Replication Series" section in each issue[3].

## Conclusion

In this article, we addressed the problem of the "scientist-practitioner gap" and its relationship to clinical psychology graduate training. We reaffirm the Boulder model as the preferred approach to training in clinical psychology but acknowledge that it often has been incorrectly implemented in many graduate programs. Therefore, we shift the responsibility back to the graduate student, who represents the future of the profession. By reviewing some of the arguments by scientists and practitioners, and by following some of the recommendations in this article, we believe that students can start to develop a scientific understanding of clinical psychology and skills for successfully practicing in clinical settings. If students adopt an understanding of science and practice as two components of a single paradigm, we are hopeful that the scientist-practitioner gap can be minimized in the future.

## Footnotes

1. Resources for professors interested in designing critical thinking courses in psychology can be found at www.pseudoscience.org/course-resources.htm, including sample syllabi.
2. Kazdin's (1998) *Research Design in Clinical Psychology* and Barlow et al.'s (1984) *The Scientist Practitioner* provide more information on how to conduct case study and single-subject research.
3. Readers interested in suggestions for integrated scientist-practitioner graduate training at the programmatic level are referred to Drabick and Goldfried (2000), who recommend possible content areas for course projects, clinical case conferences, and colloquia.

## References


Arkes, H. R. (1981). Impediments to accurate clinical judgment and possible ways to minimize their impact. *Journal of Consulting and Clinical Psychology, 49,* 323-330.

Barlow, D. H., Hayes, S. C., & Nelson, R. O. (1984). *The scientist practitioner: Research and accountability in clinical and educational settings.* New York: Pergamon Press.

Beutler, L. E., Williams, R. E., Wakefield, P. J., & Entwistle, S. R. (1995). Bridging scientist and practitioner perspectives in clinical psychology. *American Psychologist, 50,* 984-994.

Bunge, M. (1984). What is pseudoscience? *Skeptical Inquirer, 9,* 36-46.

Chambless, D. L., & Ollendick, T. H. (2001). Empirically supported psychological interventions: Controversies and evidence. *Annual Review of Psychology, 52,* 685-716.

Chapman, L. J., & Chapman, J. P. (1967). Genesis of popular but erroneous psychodiagnostic observations. *Journal of Abnormal Psychology, 72,* 193-204.

Clarke, G. N. (1995). Improving the transition from basic efficacy research to effectiveness studies: Methodological issues and procedures. *Journal of Consulting and Clinical Psychology, 63,* 718-725.

Crits-Christoph, P. (1997). Limitations of the dodo bird verdict and the role of clinical trials in psychotherapy research: Comment on Wampold et al. (1997). *Psychological Bulletin, 122,* 216-220.

Davidson, P. R., Parker, K. C. H. (2001). Eye movement desensitization and reprocessing (EMDR): A meta-analysis. *Journal of Consulting and Clinical Psychology, 69,* 305-316.

Davison, G. C., & Lazarus, A. A. (1995). The dialectics of science and practice. In S. C. Hayes, V. M. Follette, T. Risley, R. D. Dawes, & K. Grady (Eds.), *Scientific standards of psychological practice: Issues and recommendations* (pp. 95-120). Reno, NV: Context Press.

Drabick, D. A. G., & Goldfried, M. R. (2000). Training the scientist-practitioner for the 21st century: Putting the bloom back on the rose. *Journal of Clinical Psychology, 56,* 327-340.

Elliot, R. & Morrow-Bradley, G. (1994). Developing a working marriage between psychotherapists and psychotherapy researchers: Identifying shared purposes. In P. F. Talley, H. H. Strupp, & S. F. Butler (Eds.) *Psychotherapy research and practice: Bridging the gap* (pp. 124-142), New York: Basic Books.

Gaudiano, B. A., & Herbert, J. D. (2000). Tapping our problems away? A critical analysis of thought field therapy. *Skeptical Inquirer, 24*(4), 29-33, 36.

Herbert, J. D. (2000). Defining empirically supported treatments: Pitfalls and possible solutions, *The Behavior Therapist, 23*(6), 113-122.

Herbert, J. D., Lilienfeld, S. O., Lohr, J. M., Montgomery, R. W., O'Donohue, W. T., Rosen, G. M., & Tolin, D. F. (2000). Science and pseudoscience in the development of eye movement desensitization and reprocessing: Implications for clinical psychology. *Clinical Psychology Review, 20*, 945-971.

Herbert, J. D., & Mueser, K. T. (1991). The proof is in the pudding: A commentary on Persons. *American Psychologist, 46*, 1347-1348.

Howard, K. I., Moras, K., Brill, P. L., & Martinovich, Z., & Lutz. (1996). Evaluation of psychotherapy: Efficacy, effectiveness and patient progress. *American Psychologist, 51*, 1059-1064.

Jacobson, N. S., & Christensen, A. (1996). Studying the effectiveness of psychotherapy: How well can clinical trials do the job? *American Psychologist, 51*, 1031-1039.

Kazdin, A. E. (1998). *Research design in clinical psychology (3rd ed.).* Boston: Allyn and Bacon.

Korman, M. (Ed.). (1976). *Levels and patterns of professional training in psychology.* Washington, DC: American Psychological Association.

Kuhn, T. S. (1962). *The structure of scientific revolutions* (2nd ed.). Chicago: University of Chicago Press.

Lilienfeld, S. O. (1998). Pseudoscience in contemporary clinical psychology: What it is and what we can do about it. *The Clinical Psychologist, 51*(4), 3-9.

Meehl, P. E. (1993). Philosophy of science: Help or hindrance? *Psychological Reports, 72*, 1063-1075.

Millon, T., Blaney, P. H., & Davis, R. D. (Eds.). (1999). *Oxford textbook of psychopathology.* New York: Oxford University Press.

Nezu, A. M., & Nezu, C. M. (Eds.) (1989). *Clinical decision making in behavior therapy: A problem-solving perspective*. Champaign, IL: Research Press.

Norquist, G., Lebowitz, B., & Hyman, S. (1999). Expanding the frontier of treatment research. *Prevention & Treatment, 2*, Article 0001a. Available on the World Wide Web: http://journals.apa.org/prevention/volume2/pre0020001a.html

O'Hear, A. (1989). *An introduction to the philosophy of science*. New York: Oxford University Press.

Persons, J. A. (1991). Psychotherapy outcome studies do not accurately represent current models of psychotherapy: A proposed remedy. *American Psychologist, 46*, 99-106.

Peterson, D. R. (1991). Connection and disconnection of research and practice in the education of professional psychologists. *American Psychologist, 46*, 422-429.

Popper, K. R. (1959). *The logic of scientific discovery.* New York: Basic Books.

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

Rice, C. E. (1997). The scientist-practitioner split and the future of psychology. *American Psychologist, 52*, 1173-1181.

Rychlak, J. F. (1998). How Boulder biases have limited possible theoretical contributions to psychotherapy. *Clinical Psychology: Science and Practice, 5*, 233-241.

Sagan, C. (1996). *The demon-haunted world: Science as a candle in the dark.* New York: Ballantine Books.

Seligman, M. (1994). *What you can change and what you can't.* New York: Knopf.

Seligman, M. (1995). The effectiveness of psychotherapy: The *Consumer Reports* study. *American Psychologist, 50*, 965-974.

Shermer, M. (1997). *Why people believe weird things: Pseudoscience, superstition, and other confusions of our time.* New York: W. H. Freeman and Company.

Stanovich, K. E. (2001). *How to think straight about psychology* (6th ed.). Boston: Allyn & Bacon.

Stricker, G. (1997). Are science and practice commensurable? *American Psychologist, 52*, 442-448.

Stricker, G., & Trierweiler, S. J. (1995). The local clinical scientist: A bridge between science and practice. *American Psychologist, 50*, 995-1002.

Task Force on Promotion and Dissemination of Psychological Procedures (1995). Training in and dissemination of empirically-validated psychological treatments. *The Clinical Psychologist, 48*(1), 2-23.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185*, 1124-1131.

Wampold, B. E., Mondin, G. W., Moody, M., Stich, F., Benson, K., & Ahn, H. (1997). A meta-analysis of outcome studies comparing bona fide psychotherapies: Empirically, "all must have prizes." *Psychological Bulletin, 122*, 203-215.