
Evidence-Based Practice in Psychology: Implications for Research and Research Training

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In this article, the author discusses the implications of evidence-based practice (EBP) for research and research training in clinical psychology. It is argued that EBP provides a useful framework for addressing some heretofore ignored problems in clinical research. Advancing evidence-based psychological practice will require educators to inject significant new content into research, design, and methodology courses and to further integrate research and practicum training. The author believes this to be an exciting opportunity for the field, not only because it will further psychologists' integration into the interdisciplinary health care and research environment, but also because it will provide new tools to educate students for capable, not just competent professional activity. © 2007 Wiley Periodicals, Inc. *J Clin Psychol* 63: 685–694, 2007.

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In recent years, the notion that psychologists deliver “health care” rather than just “mental health care” has taken hold in our field. Along with this identification as a health care discipline comes a set of responsibilities to provide patients with clinical services that have been shown through research to be effective for addressing patient problems. The fundamental goal of the evidence-based practice movement (EBP) is to effect a cultural change within health care whereby practitioners will make “conscious, explicit, and judicious” use of current best evidence in clinical practice with individual patients (Mayer, 2004; Straus, Richardson, Glasziou, & Haynes, 2005). The contemporary emphasis on EBP is quite strong within other health care disciplines, where it has permeated the culture of education, practice, and research, and where it is seen as furnishing at least a partial answer to a fundamental call for accountability and continuous quality

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improvement in the overall system of health care delivery in the United States (Institute of Medicine, 2001).

Most psychologists understand that EBP refers to a process by which best evidence is used intentionally in making decisions about patient care. Psychologists are most familiar with the construct of best evidence in the context of the empirically supported treatment movement, but some may mistakenly believe that EBP and empirically supported treatment (EST) are synonymous. As other articles in this series make clear, they are not; EBP is a much broader concept that refers to knowledge and action in the three essential elements of patient encounters: (a) the best evidence guiding a clinical decision (*the best evidence domain*), (b) the clinical expertise of the health care professional to diagnose and treat the patient's problems (*the clinical expertise domain*), and (c) the unique preferences, concerns and expectations that the patient brings to the health care setting (*the client domain*). These three elements are often referred to as the *three pillars* of EBP. Even a brief consideration of the many variables and mechanisms involved in the three pillars will lead the clinical psychologist to an obvious conclusion: EBP not only provides a framework for conceptualizing clinical problems, but also suggests a research agenda whereby patterns of wellness and illness are investigated with an eye toward how best practices are potentially mediated by unique aspects of practitioner expertise. In addition, how key patient characteristics influence treatment acceptability and help define what role the patient plays in the health care relationship are highlighted.

This is not a new agenda, but is quite similar to the agenda set forth by Gordon Paul in 1969 in his now-famous ultimate clinical question, "What treatment, by whom, is most effective for this individual, with that specific problem, under which set of circumstances, and how does it come about?" (Paul, 1967, 1969, p. 44). In asking this question, Paul's goal was to draw attention to variables that needed to be described, measured, or controlled for firm evidence to accumulate across studies of psychotherapy. The agenda for evidence-based psychological practice is similar, though broader, encompassing assessment as well as treatment, psychological healthcare policy as well as clinical procedure, and populations as well as individuals. As such, expanding the scope of evidence-based psychological practice provides an opportunity for psychologists to build conceptual and methodological bridges with their colleagues in medicine, nursing, pharmacy, health professions, and public health.

Although its status as a health care delivery process is typically emphasized, EBP, initially referred to as *evidence-based medicine*, evolved at McMaster University as a pedagogical strategy for teaching students and practitioners how to incorporate research results into the process of patient care (McCabe, 2006; Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). As professional psychology begins to seriously consider the relevance of EBP for broad aspects of practice (Davidson & Spring, 2006), we will have to grapple with some obvious implications for (a) how we conduct practice-based research, and (b) how we educate and train our students, the next cadre of clinical researchers, to develop the knowledge, skills, and expertise to contribute to the evidence base. In this article, I discuss some of these implications with an eye toward viewing the EBP movement as an opportunity to begin to answer some of our most difficult research questions, and to begin to address some of our most vexing and persistent problems in education and training.

Practice-Based Research

From a research perspective, EBP provides a framework for investigating heretofore neglected aspects of "rubber-meets-the-road" practice. That is, confronting gaps in the

evidence base from an EBP perspective draws attention to key client variables (e.g., preferences for one treatment over another, ability/willingness to adhere to treatment, credibility of treatment rationales, demographic and socioeconomic variables that enhance or impede health care access or that contribute to attitudes about treatment acceptability) and dimensions of clinical expertise (e.g., the ability to deliver the appropriate EST for the patient's problem, the ability to adapt treatments to unique clients, the ability to deliver assessments appropriate to decision-making, the ability to communicate effectively with patient) that deserve empirical study. Practitioners face these gaps because our dominant research paradigms tend to yield data about homogeneous majority groups receiving standard treatment in optimal settings.

Thus far, most of what constitutes evidence-based psychological practice is in the area of empirically supported treatment (Chambless, 1995; Chambless et al., 1998). Currently, there are several psychological therapies with well-established efficacy for treatment of a variety of psychological problems (American Psychological Association [APA] Division 12 Dissemination Subcommittee of the Committee on Science and Practice). Continued expansion of this list to include new therapies and clinical problems, and demonstrating the portability of well-controlled efficacy studies to real world problems (effectiveness) is continuing apace (Chambless & Ollendick, 2001).

A parallel expansion of the evidence base for psychological assessment procedures is needed. More research is needed regarding the diagnostic utility of assessment tools in predicting at-risk status, in helping select which treatment is indicated, or in predicting treatment response. Even in areas where the evidence for the clinical utility of assessment procedures is strong (e.g., in surgical epilepsy, where the results of presurgical evaluation of verbal memory strongly predict which patients will develop postsurgical neuropsychological morbidity; Chelune, 1995) the best available evidence has not yet caused the majority of clinicians to modify their assessment approach accordingly.

A full instantiation of EBP in psychology will require an expansion of systematic research efforts that will provide us with more information about the clinical expertise and patient domains. This represents a real opportunity to broaden the scope of EBP in psychology. How do psychological practitioners with varying levels of expertise decide which of a number of alternative treatments to utilize in the clinic? What factors make clinically efficacious treatments acceptable to patients? How does cultural diversity interact with treatment acceptability? To apply best evidence to individual clinical problems seamlessly, we need to develop a research agenda that allows us to retrieve and analyze answers to these kinds of questions. This is a daunting task, and one that seems intractable from the point of view of our exclusive reliance on quantitative research methods and controlled experiments. Perhaps this is an area in which increased knowledge of qualitative research methods (see below) would be beneficial for the field. This is an area to which practicing scientist-practitioners can provide critical information by adopting a data-driven approach to practice that incorporates measurement and reporting of assessment and treatment outcomes for purposes of further addressing effectiveness questions.

Implications for Education and Training

In a recent survey on training in ESTs, Woody, Weisz, and McLean (2005) reported that, although many doctoral training programs provided didactic dissemination of EST-related information, actual supervised training in ESTs had declined compared to a similar survey conducted in 1993. The overall conclusion was that the field had a long way to go in insuring that our students have sufficient skill and experience to practice EST in their professional lives. The authors cited several obstacles to training in ESTs, including

(a) uncertainty about what it means to train students in EBP; (b) insufficient time to provide specific training in multiple ESTs given other training priorities, including research; (c) within-program shortages of trained supervisors needed to provide a truly broad EST training experience; and (d) philosophic opposition to what some perceive as an overly rigid, manualized approach to treatment that reduces professional psychological practice to technician status. It seems obvious to me that most of these barriers imply a method of training in which competency in ESTs is built one treatment at a time, thus requiring large investments of time and faculty effort to the cause. Although it is true that students need practical training in a variety of clinical methods, one key issue is whether a goal of graduate education is to train students to competency in a critical number of ESTs, or whether the goal is to train them in broader principles of evidence-based practice that will enable them to easily adapt to novel demands for new competencies after attaining their PhD (educating for capability rather than competency; Fraser & Greenhalgh, 2001).

There is evidence that clinical psychology training directors are ready for this development. In the Woody et al. (2005) survey, some clinical training directors indicated that current practice reflects an underemphasis on broad principles of evidence-based practice in favor of learning particular procedures on a treatment-by-treatment basis. Some of the issues related to the ability of programs to provide appropriate training would be addressed if we adopted a more general principles approach. Although not particularly on point in the context of this article, it is my view that developing competencies in ESTs for research and professional practice is the joint and cumulative responsibility of doctoral programs, internships, and postdoctoral programs that work together to provide a continuum of training in knowledge and skills in EBPP.

Training in EBPP will require graduate training programs to include new content in research training curricula so that students are ready to understand and apply basic principles of EBPP in their everyday professional lives. Primary needs include training in (a) epidemiology, (b) clinical trials methodology, (c) qualitative research methods and measurement, (d) how to conduct and appraise systematic reviews and meta-analyses, and (e) in building skills in informatics and electronic database searching necessary to find best available evidence relevant to the problems that students will encounter in their research and clinical work. Such content could be introduced in a basic research methods course, could be taught separately in a course on EBPP, or could be infused in the curriculum through a combination of didactic, practicum, and research experiences (for additional ideas on infusion of EBPP into the curriculum, see Dillillo & McChargue, this issue). Achieving true infusion and integration will require that all program faculty is committed to the concept of EBPP, that all will have received some basic education in EBPP themselves, and that EBPP concepts are represented throughout the curriculum. The faculty development implications of advancing EBPP are not trivial. In the short run, an effective strategy may be to partner with colleagues in medicine, health professions, nursing, and public health to provide interdisciplinary instruction and mentoring in basic principles of EBP.

Epidemiology

Many problems important to psychologists (e.g., whether a clinical assessment tool is effective in identifying at-risk patients, whether a treatment protocol is effective in reducing psychological distress or disability in a defined population) can be conceptualized and described in epidemiological terms. For example, the strength of a treatment effect can be described with reference to the concept of "number needed to treat" (the number

of patients who would need to be treated to produce one additional favorable outcome), or “number needed to harm” (the number of patients who would need to be treated to prevent one additional unfavorable outcome), or, more generally, in terms of relative or absolute risk reduction. Knowledge of basic aspects of diagnostic test performance (e.g., sensitivity, specificity, positive and negative predictive value) so critical to psychological practice can also be enhanced by forging links between these concepts and corresponding concepts in epidemiology (e.g., positive and negative likelihood ratios). A broad grounding in epidemiological methods will promote further ways of understanding and inferring causality from observational and experimental data, will further an appreciation for preventative methods, and will provide much-needed appreciation for community- and population-based methods that will complement psychology’s traditional emphasis on individuals and small groups.

Clinical Trials Methodology

Although many graduate statistics and methodology courses cover such topics as case-control designs, cohort designs, and elements of randomized clinical trials (RCTs), classical methodology education in the Campbell and Stanley (1963) tradition needs to be supplemented with contemporary information relevant to clinical trials methodology. For example, training in standards for designing, conducting, and reporting clinical trials consistent with the CONSORT statement (Begg et al., 1996; Moher, Schulz, & Altman, 2001) is important so that reports of psychological clinical trials have appropriate consistency and transparency. Training in methods for reporting the size of treatment effects (going beyond statistical significance), allocating samples, specifying outcomes (relative and absolute risk reduction, number needed to treat and number needed to harm), and addressing the ethical issues of clinical trials are all critically needed if psychology is to develop a truly evidence-based practice. Building the ability to evaluate the results of extant trials critically is also crucial if psychological practitioners are to meaningfully apply the best evidence standard to their own clinical work and research.

Qualitative Research Methods and Measurement

Clinical psychologists trained in the scientist–practitioner tradition are almost exclusively focused on quantitative research methods, with an attendant emphasis on measurement precision, quantitative statistical analysis, and tightly controlled experimental design. This scientific tradition links us with our colleagues in the natural and social sciences, and represents our preferred “way of knowing” the world. In contrast, qualitative approaches to research seek to evaluate the quality, or essence of human experience using a fundamentally different methodological and analytic framework (Mays & Pope, 1995, 2000; Pope, Ziebland, & Mays, 2000). Many psychologists are familiar with at least some qualitative research methods exemplified, for example, in ethnography, sociometry, participant-observation, or content analysis of discourse. However, methods such as convergent interviewing, focus groups, and personal histories are generally foreign to most students in scientist–practitioner programs. As applied to health care, qualitative researchers may seek to evaluate the experiences of brain-injured patients in rehabilitative settings as a way of enhancing the design of the rehabilitation environment for purposes of maximizing recovery. They may investigate case dispositions in a child neurosurgery clinic by evaluating commonalities among physicians’ notes and clinical decisions. They may evaluate treatment acceptability by interviewing patients about their experiences in

treatment. It is important for psychologists to become more familiar with these methods because many systematic reviews in the EBP literature contain the results of qualitative studies (Thomas et al., 2004). Although qualitative research is generally incapable of establishing causative relationships among variables, they may be the only (and therefore the best) source of evidence for rare conditions and they may suggest associations worthy of future research. Reviews of this area as applied to healthcare can be found in Greenhalgh & Taylor (1997), Grypdonck (2006), Holloway (1997), and Leininger (1994).

Conducting Systematic Reviews and Meta-Analyses

The explosion of relevant medical and psychological literature has made it difficult for scientist-practitioners to have access to the best evidence at the single-study level while attending to multiple simultaneous demands for their time. For this reason, systematic reviews of the literature are becoming increasingly important as sources for state of the art information. Most graduate courses in research methodology and statistics devote little attention to conducting reviews or meta-analyses, although many programs now appear to be offering grant-writing courses or seminars. In these courses, an emphasis on design and critique of individual studies is commonplace, whereas development of skills in evaluating systematic reviews or meta-analyses is rare. If psychology is to become a key player in evidence-based-practice, the next cadre of scientist-practitioners will have to develop skills in conducting and evaluating these kinds of reviews. In programming needed education and training, it is important to distinguish between narrative reviews (the kind of review that is seen, for example, in *Psychological Bulletin*) and systematic reviews. Narrative reviews are conducted by knowledgeable persons who often conduct the review for advancing a particular theoretical conclusion. They therefore yield potentially biased conclusions because there is no consensually agreed-upon method for combining and weighting results from different studies. In contrast, systematic reviews and meta-analyses proceed according to specified methodological conventions in which the search method, the procedure for including and excluding studies, and the method for eventually calculating effect sizes or odds ratios are specified beforehand (e.g., fixed effects vs. random effects models), as are methods for determining statistical and clinical significance (Cook, Mulrow, & Haynes, 1997; Cook, Sackett & Spitzer, 1995; Quintana & Minami, 2006). Meta-analysis is a specific form of quantitative systematic review that aggregates the results of similar studies for purposes of generating more stable conclusions from pooled data than is possible at the individual-study level (Egger, Smith, & Phillips, 1997; Rosenthal & DiMatteo, 2001; Wolf, 1986). Recent techniques allow for the calculation of bias in published studies, allowing the reader to appraise whether the results of the analysis reflects an undistorted view of effect size (Stern, Egger, & Smith, 2001). Clinical psychologists need to know these basic concepts so that they can evaluate the relevance and quality of available evidence.

Informatics and Database Searching Skills

If a tree falls in the woods, and there is no one there to hear it, does it make a sound? This classical conundrum about the nature of reality seems relevant to the key issue of information access in evidence-based practice. If useful information about best evidence exists, but we do not or cannot access it, it cannot be brought to bear on clinical decision making (Slawson & Shaughnessy, 2005). For this reason, developing expertise in informatics and database searching is a critical step in making EBPP a reality. In my experience, most

psychologists, and students of psychology, search a limited number of databases (PubMed, U.S. National Library of Medicine, 1971; PsychLit, APA, 1967) with a single search term, and (at most) a single Boolean operator. It is not uncommon for a supervisor of a fledgling student to hear that, "there's nothing in the literature" about a topic the student is interested in researching. Most use very little of what is available, and many are completely unaware of many of the most important and useful resources available for EBPP. A detailed discussion of these resources is beyond my scope (see Hunt & McKibbin, 1997); nevertheless, it seems critical that some effort be devoted (either in faculty development seminars or in graduate education) to addressing database availability explicitly, including access strategies, search methodology, and approaches to information management (managing search results). A key first step in getting this accomplished may be to establish a close relationship with a librarian or library informatics specialist who can help translate educational and research needs into strategies for accessing needed information, and who can provide access to needed databases and other resources. It is not uncommon, particularly in larger institutions, for at least one member of the library staff to be particularly skilled in evidence-based medicine. There are a number of databases that are of particular relevance to EBPP, including CINAHL (nursing and allied health; Cinahl Information Systems, 1984), EMBASE (1974), The Cochrane Library (including the Cochrane Database of Systematic Reviews [CDSR]; Cochrane Library, 1999a), the Database of Abstracts of Reviews of Effects (DARE; Cochrane Library, 1999b), the Cochrane Central Register of Controlled Trials (CENTRAL; Cochrane Library, 1999c), and the ACP Journal Club (American College of Physicians, 1994), available on the Ovid (Ovid Technologies, New York, NY) search engine (for a more in-depth discussion, see Walker & London, this issue).

Obtaining access to these databases is only part of the story; the development of strategic searching skills designed to yield a manageable number of relevant search results is a key outcome goal of educational efforts that will be achieved only through actual practice in problem-based learning situations. Finally, development of a local or profession-wide resource that contains the answers to evidence-based queries (so-called, critically appraised topics or CATS) will enable students and their mentors to benefit from the evidence-based practice efforts of their colleagues. Other authors in this series have suggested ways of incorporating skill-building activities into practicum and other parts of the psychology curriculum (see Collins, Belar, & Leffingwell, this issue; DiLillo & McChargue, this issue).

The Way Forward

In this article, I have tried to highlight ways that the interdisciplinary trend toward evidence-based practice offers real opportunities to address some difficult research problems and to revitalize certain aspects of our graduate curricula. This brief analysis has likely raised more questions (e.g., How? When? By whom? In what way?) as far as the training implications are concerned, and has not dealt at all with criticisms that have been thoughtfully levied against the EBP approach to research and research training. One key issue in advancing EBP within psychology will be to pay attention to the key stage of the process by which knowledge (best evidence) is transformed into action and application. This, in my view, is the state of the process that is least understood from a psychological viewpoint. What are the principles by which best evidence can be modified to fit the individual case? What evidence is "good enough" to drive a clinical decision? What about those aspects of psychological health care (e.g., relationship, trust, identification, and modeling) that are implicitly important in the delivery of services, but that don't themselves

have large-scale independent empirical support? These (and others) are key questions we will need to grapple with as we implement an evidence base for clinical psychology and teach students how to access and use it.

With regard to pedagogy, I am convinced that the only way to go is to incorporate problem-based, real-time experiences throughout the curriculum in which students can learn to walk the EBPP walk. This is a significant undertaking with profound implications as far as faculty development is concerned. I am as skeptical of an Evidence-Based Practice Course as a way to develop the needed skills and capacities of our students as I am that a Cultural Diversity Course will somehow help build multicultural competencies. We will need to figure out how to incorporate the content, the concepts, and the techniques of evidence-based psychological practice at all levels of research and clinical training if we are to be truly successful in assimilating the EBPP way of thinking. We cannot do it all; faculty are generally not up to speed with all that is needed, and, for the practicing clinician, health care events proceed at a rapid pace. We can begin the process by equipping tomorrow's psychological practitioners with the tools necessary to implement EBPP into their everyday clinical practice. In addition, we can capitalize on the obvious opportunities to expand our multidisciplinary interdependence on other health professionals in nursing, medicine, pharmacy, and public health who are further down the EBPP road than we are. Providing faculty with needed support, and developing methods for educating and training tomorrow's psychologists in EBPP is critically needed in establishing an evidence base equal to the task of providing quality psychological health care for those that depend on us.

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