Integrating Research Into Clinical Internship Training Bridging the Science/Practice Gap in Pediatric Psychology

Elizabeth L. McQuaid,[1,2] PhD, and Anthony Spirito,[1,3] PhD, ABPP
[1]*Brown Clinical Psychology Training Consortium, Alpert Medical School, Brown University,* [2]*Bradley/Hasbro Children's Research Center, RI Hospital, and* [3]*Department of Psychiatry and Human Behavior, Alpert Medical School, Brown University*

Correspondence should be addressed to Elizabeth L. McQuaid, PhD, Director, Brown Clinical Psychology Training Consortium, Box G-BH, Providence, RI, 02912, USA. E-mail: elizabeth_mcquaid@brown.edu

Received June 12, 2011; revisions received December 6, 2011; accepted December 7, 2011

Existing literature highlights a critical gap between science and practice in clinical psychology. The internship year is a ''capstone experience''; training in methods of scientific evaluation should be integrated with the development of advanced clinical competencies. We provide a rationale for continued exposure to research during the clinical internship year, including, (a) critical examination and integration of the literature regarding evidence-based treatment and assessment, (b) participation in faculty-based and independent research, and (c) orientation to the science and strategy of grantsmanship. Participation in research provides exposure to new empirical models and can foster the development of applied research questions. Orientation to grantsmanship can yield an initial sense of the ''business of science.'' Internship provides an important opportunity to examine the challenges to integrating the clinical evidence base into professional practice; for that reason, providing research exposure on internship is an important strategy in training the next generation of pediatric psychologists.

Key words empirically supported treatments; internship; training.

For most graduate students in pediatric psychology, the internship year is viewed as a time of intensive clinical training. Prior years of graduate training emphasize the integration of relevant coursework, skill building in research methods and their application, and foundations of clinical training. On internship, however, the clinical training emphasis may become all-consuming. There are important conceptual and practical reasons, however, that research training should continue during the clinical internship year, in order to foster the integration of science and practice in the next generation of pediatric psychologists, to maintain the professional identity of psychologists as behavioral scientists, and to prepare graduate students more effectively for careers involving research and independent investigation. In the present article, we provide a rationale for the necessity of integrating research training into the clinical internship year, and present some key strategies for how this might be accomplished in the context of a year traditionally focused on intensive clinical training in pediatric psychology.

A Rationale for Research Emphasis on Internship

Over the past several decades, three primary models of training have emerged within the field of clinical psychology; the Scientist–Practitioner, or ''Boulder'' model (Routh, 2000), the Practitioner-Scholar model (Murray, 2000) and the Clinical Science model (McFall, 1991). Two of these models, the Scientist–Practitioner model and the Clinical Science model, emphasize the importance of training in research methods and their applications, as well as clinical skill development. In the traditional Scientist–Practitioner model, training emphasizes methods of clinical service delivery and research design and implementation; ideally, these training processes are integrated

Journal of Pediatric Psychology 37(2) pp. 149–157, 2012
doi:10.1093/jpepsy/jsr114
Advance Access publication January 28, 2012
Journal of Pediatric Psychology vol. 37 no. 2 © The Author 2012. Published by Oxford University Press on behalf of the Society of Pediatric Psychology.
All rights reserved. For permissions, please e-mail: journals.permissions@oup.com.

and iterative (Routh, 2000). The Clinical Science approach arose out of recognition that clinical practices often diverged from research findings, and hence placed primary emphasis upon the application of knowledge in ways consistent with scientific evidence (McFall, 1991). Within both of these frameworks, however, there is a reciprocal relationship between clinical work and applied research; interventions should be chosen based on their empirical support, and clinical experiences should serve to stimulate new theories and intervention development. The Practitioner–Scholar model emphasizes clinical training, although with attention to empirical evidence (Murray, 2000). Across all three models, APA-accredited programs are required to provide training such that graduate students understand the value of science for practice, as well as the value of practice for science (Commission on Accreditation, 2008).

A consistent body of evidence has indicated that these training models have yet to result in a field of professionals who consistently (or even commonly) utilize research evidence in their clinical practice, an issue that has engendered considerable debate in the community of psychologists as a whole (e.g., Mischel, 2009; Price, 2009). The existing literature indicates that many psychologists use assessment approaches that are not standardized and/or have limited empirical support (Hunsley, Lee, & Wood, 2003), and that clinicians report that they rely heavily on clinical experiences and intuition in treatment selection (e.g., Lucock, Hall, & Noble, 2006; Silver, 2001; Stewart & Chambless, 2007). Some have argued that this reliance on clinical knowledge and intuition over empirical evidence puts the field, as a whole, in jeopardy (Baker, McFall, & Shoham, 2009) and is at clear odds with our purported integrative training models.

The gap between science and clinical practice is an important dilemma in the field of clinical psychology as a whole. There are, however, some encouraging trends. Early initiatives on the importance of empirically supported approaches (Chambless & Hollon, 1998) galvanized the research field to set standard criteria for evaluating treatment outcomes across studies, in order to inform the broader community about effective treatments. A related movement in the broader health care field advocates for the documentation and use of evidence-based practice, defined as providing health care based on the an integration of best available evidence with practitioner expertise, patient need, and overall context (Buysse & Wesley, 2006).

Pediatric psychology, as a specialty area, has also made some important progress. A decade ago, Drotar and Lemanek (2001) noted the critical gap between the research findings from empirically supported treatments, and the implementation of these findings into the clinical practice of pediatric psychology. Over the past decade, emphasis on advancing the literature in empirically supported treatments and assessments through Special Issues in the *Journal of Pediatric Psychology* is an encouraging, and necessary, trend. An increase in the literature base, however, may or may not indicate changes in actual clinical practice and training methods. Systematic data do not exist regarding whether pediatric psychologists consistently implement empirically supported assessments and treatments into practice more or less frequently than other disciplines. There is indication that some APA approved pediatric psychology internships do offer a research emphasis, which may facilitate greater attention to the integration of science and practice. Analysis of the Association of Psychology Postdoctoral and Internship Centers (APPIC) internship programs that have a primary ''pediatric'' emphasis indicate that 24 sites (of 87) offer research experience as a ''major'' option, although how this experience is defined is at the discretion of the internship.

Some have argued that new methods of clinical psychology training are necessary to ensure the scientific rigor of our training programs (e.g., Baker et al., 2009; Barlow, Hayes, & Nelson, 1992). Some of these methods have emphasized changes in graduate training as a whole, including the recent development of a new accreditation system to emphasize the Clinical Science approach (Baker et al., 2009). Clinical internship training has been largely neglected, and even ignored, in this debate. We argue, however, that the clinical internship year is a critical turning point that provides the ideal opportunity for the integration of advanced critical thinking skills and substantial knowledge of the scientific method into the clinical training of pediatric psychologists. In fact, to pay insufficient attention to science on internship runs the risk of perpetuating a training system that widens the gap between empirical evidence and practice in behavioral science. In the sections that follow, we provide some strategies that may be used to integrate an emphasis on research into the internship year in pediatric psychology, including increased attention to the empirical basis of assessment and treatment, integration of research experiences into the training year, and an orientation to grantsmanship. An overview of these strategies is presented in Table 1.

Evidence-Based Practices in Didactics, Supervision, and Clinical Experiences

Ideally, clinical internships should provide a ''capstone'' experience in clinical training for graduate students.

Table I. *A Continuum of Research Training Options, Content and Goals for Predoctoral Internships*

Options	Content	Goals
Clinical rotations	Use of empirically supported assessments	Improve critical thinking skills
	Use of empirically supported treatments	Integrate science into practice on a more consistent basis
Seminars	Provide literature regarding empirically supported assessments and treatments	Increase knowledge base Improve science of clinical practice
	Provide overview of grantsmanship	Increase knowledge of granstmanship strategies; funding opportunities; integration of clinical and research career paths
Review manuscripts with mentor	Clinical treatment and assessment articles	Increase science knowledge base
Participation in mentor's clinical research	Serve as independent evaluator Serve as therapist in an RCT	Integrate research quality procedures in clinical practice
Elective		Increase likelihood of becoming independent investigator
Mandatory (with/without protected time)	Conduct QI or program evaluation projects	Develop diverse skill set to be competitive in a range of careers
Grant writing	Apply for Funding, including Internal Grants, postdoctoral fellowship grants (e.g., F32); K awards or K00/99	Improve grant writing skills Increase likelihood of becoming independent investigator
Research-funded internship slots	50% of clinical training is on clinical research of mentor; 50% from broad exposure to clinical populations	Increase exposure to grant-funded research; enhance likelihood of becoming independent investigator

Early graduate school training has generally emphasized the *accumulation* of knowledge in both areas of clinical intervention and research design. Later years of graduate training stress the *application* of this knowledge through actual practice; implementing assessment tools and conducting clinical interventions, and executing research projects under close faculty mentorship. Internship provides a unique context for the *integration* of skills in scientific inquiry with the application of clinical skills across patient populations. To provide this capstone clinical experience, interns should be challenged to utilize their critical thinking skills to evaluate the empirical evidence to support the assessment methods and treatments that they implement with patients; doing so will provide opportunities to address the integration of scientific knowledge into actual clinical practice.

An initial and necessary step is to encourage the use of evidence-based assessments and treatments within clinical rotations. Within pediatric psychology, we have made substantial headway in synthesizing the literature on existing evidence-based assessment and treatment approaches since the initial series on empirically supported treatments (ESTs) in the *Journal of Pediatric Psychology* appeared over a decade ago. In 2008, a series on evidence-based assessments in pediatric psychology outlined the empirical base of standard assessment tools in areas such as adherence (Quittner, Modi, Lemanek, Levers-Landis, & Rapoff, 2008), pain (Cohen et al., 2008), child adjustment (Holmbeck et al., 2008), family (Alderfer et al., 2008), and several others. Recent articles provide useful systematic reviews of the extant literature in areas such as family-based psychosocial interventions in cancer (Meyler, Guerin, Kiernan, & Breatnach, 2010), psychological interventions for needle-related pain and distress (Uman, Chambers, McGrath, & Kisely, 2008), and adherence to treatment in chronic illness in general (Kahana, Drotar, & Frazier, 2008). In short, the evidence base in pediatric psychology is emerging and available; it behooves us to make it accessible to our interns on the front lines, and incorporate it into our training efforts in a systematic manner.

Providing the literature base of empirically supported assessment tools and intervention methods is an initial, critical step; however, integrating knowledge of the literature into actual selection of assessment tools and intervention approaches must also be modeled and encouraged. Internship is a year in which the gap between the existing literature and its application in the real world setting can become painfully apparent. Given that most pediatric psychology internship sites cannot provide ''pure culture'' treatment populations, trainees may be on the front lines of attempting to apply standardized interventions to broader, heterogeneous treatment populations with higher acuity and greater chronicity. The controlled, elegant intervention models learned in graduate school and reflected in the literature may require adaptation for use in settings such as

a busy consultation/liaison service or a broad outpatient child behavioral health clinic. Individual and group supervision experiences can play a critical role in addressing modifications necessary in patient care. Which assessment methods should be used to identify the relevant treatment targets? What interventions have empirical support for the identified symptom? What are the benefits and limitations of applying this treatment approach in this circumstance, with this patient and family? Modifications to empirically supported treatments might include emphasizing core skills in the context of a broad and comprehensive protocol due to ''real world'' attendance patterns and potential early termination. With this approach, even the most difficult families to retain in regular treatment will likely have been exposed to a minimum of 1–2 core therapeutic skills, even if they terminate prematurely. Modular protocols may be especially useful because they allow clinicians to more flexibly account for individual patient needs. The learning experiences garnered from attempting to bridge the gap between the established literature and real-world practice may provide not only important training opportunities but also generate discussion for future interventions.

One innovative strategy is to make the science-practice gap an explicit focus of didactic training on internship. The University of Illinois–Chicago internship provides an interactive seminar that challenges interns to consider their scientific knowledge, the literature base regarding treatment efficacy and effectiveness, and the disadvantaged client base they serve in the urban setting of their training program (Atkins & Frazier, 2011). Another example is a new series in Health Psychology, ''Translating Science to Practice: Clinical Grand Rounds,'' that will provide case examples of the application of evidence-based treatments to actual clinical cases; examples from this literature could be used as a starting point for discussion in a structured didactic format. Recent research has shown that inclusion of case examples in overviews of empirically supported treatments enhances the interest and engagement of clinicians in the information (Stewart & Chambless, 2010). These findings suggest that an internship case conference format or didactic format that includes: (a) a literature overview of the clinical problem, (b) information regarding the evidence base of suggested treatment approaches, and (c) actual clinical information that illustrates the complexity of adapting the evidence-based intervention to a real person or family is likely to be well-received by trainees. Approaches such as these have the potential to promote the ongoing development of critical thinking skills in concert with the consolidation of clinical skills during the internship year.

Research Experience During the Internship Year

In addition to ongoing consideration of the evidence base, internships can provide research experiences that foster the integration of research and clinical practice, including participation in ongoing clinical research projects, and opportunities for the development of skills that will lead trainees toward independent investigation. Integrating actual research experiences into internship training provides the message to trainees that empirical evaluation of clinical methods is an important expectation of clinical work. A range of models is available; including internships that have a mentored research component for all interns, with protected time for work within the mentor's lab on clinically relevant projects (e.g., Brown Clinical Psychology Training Consortium, Children's Hospital of Philadelphia, Cincinnati Children's Hospital Medical Center, University of Illinois/Chicago). Other programs may encourage involvement in research, but primarily for interns who have completed their dissertations (Children's National Medical Center).

We have argued previously that having an identified research mentor during internship has the potential to enhance research productivity and continuity from graduate school, through internship, and to postdoctoral fellowship (Spirito et al., 2007). Importantly, research mentors on internship can serve as important role models. Given that most pediatric psychology internships occur in busy medical settings, the majority of mentors are likely to be involved in research regarding adaptation to chronic illness, predictors of disease management, and psychosocial treatment development for pediatric clinical populations; areas of direct relevance for trainees in our field. A research mentor can facilitate intern exposure to faculty research, such as through collaborating on manuscript reviews in applied areas, facilitating exposure to actual clinical trials through participation as a therapist, or providing access to existing databases to address circumscribed research questions. Research mentors can also coauthor review articles or chapters with interns in a specific area of focus. Internships with limited access to funded research projects can involve trainees in other types of research including program evaluation, quality improvement research, single case design series, and extracting research data from existing clinical records.

Our internship has a formalized Research Placement component, which includes matching an incoming trainee to a primary research mentor for the internship year and providing approximately four hours a week of protected time. Admittedly, this evolved in a system with a broad

range of funded research; additionally, as a result of this emphasis our internship tends to draw applicants with strong academic interests. Consistent with a competency-based model, goals for the research placement are discussed and operationalized by the research supervisor and intern at the start of the year. To help ensure realistic goals, the pediatric psychology track coordinator who is responsible for the overall clinical and research training of the interns must sign off on the research goals before they are implemented. For interns who have not completed their dissertation, mentors may allow dissertation completion to be incorporated into the research placement goals, or reduce the number of goals in order to maximize the possibility of completion of both the dissertation and research goals. For interns who wish to write an F32 application, the preparation of the application becomes a central goal for the first half of the year, and may delay the achievement of other goals, such as analyses of existing databases or manuscript development. Research goals are evaluated midyear and, based on progress, revised as necessary. The key to successful completion of a research placement is to set realistic goals that are in keeping with the experience level, interest, and career goals of the intern. Interns with a strong initial publication record may be encouraged to submit an F32 fellowship application. Others, who may have very limited experience in submitting manuscripts for publication, could focus on circumscribed goals such as identification of a research question in a mentor's database and data analysis in the first half of the year, and submission of a poster presentation plus manuscript preparation in the second half of the year.

One barrier to implementing research training during internship may be the lack of protected time. The Brown internship research placement experience evolved from an initial framework that simply encouraged interns to pursue research opportunities during internship without a fixed structure. Within that framework, only a small fraction of interns were able to successfully achieve research goals while managing their clinical responsibilities. By creating a small portion of protected time for research, intern productivity and satisfaction with the research experience increased substantially. The time for the research placement is negotiated in advance to minimize conflicts with fixed clinical training experiences, such as multidisciplinary team meetings or circumscribed hours for particular clinics. It takes time to promote the notion within a training program that protected research time is no different than protected time for a clinical experience. Consequently, whenever possible, interns are encouraged to leave their clinical site for their research placement in order to minimize disruption due to clinical demands, such as phone calls or the pressure to schedule clinical appointments.

We recognize that some might argue that reducing clinical training by any proportion, even four hours weekly, may be ill-advised, given that internship may be one of the trainee's last years of supervised clinical training. Nonetheless, if applied clinical research training helps sharpen critical thinking skills, which admittedly is an empirical question, then this experience might also serve to enhance clinical decision making skills and improve clinical care. Additionally, creating ''protected time'' may be challenging in systems where service demands on interns and supervisors are high. In such busy clinical settings, tailoring the research experiences toward program evaluation such as quality improvement (e.g. Lynch-Jordan, Kashikar-Zuck, Crosby, Lopez, Smolyansky et al., 2010), cost effectiveness, and methods of enhancing client retention could be emphasized to be in keeping with the overall clinical service mission of the organization.

It may be feasible, within some systems, to create internship slots that are supported in part by research funding (Spirito et al., 2007). These experiences need to be structured to meet the clinical training requirements of a standard internship, but may provide more concentrated clinical training in a particular specialty area. For such slots in our program, a portion of the intern's time (up to 50% maximum), is spent working on the research team of a faculty member, typically in the context of clinical research protocols such as treatment development projects or a randomized, controlled trials enrolling ''real'' patients using state of the art assessment and treatment protocols. Examples include implementing weight control interventions with disadvantaged youth, or conducting HIV prevention interventions with adolescents as part of a randomized trial. The remaining clinical time is spent in a range of experiences identical to the other interns in our program. In this way, the internship experience truly represents a Clinical Science model, with active and stimulating interplay between research and clinical service delivery.

Internships can also provide opportunities for small, independent research projects under faculty supervision. The Brown internship, for example, sponsors internal grants so that trainees can apply for ''seed money'' for small pilot projects and archival data analysis. Internship grants have specific application criteria, such as a justification regarding how the resulting findings will be used as pilot data for future applications. Additionally, there is a stipulation that the research cannot reasonably be funded by another source within the mentor's lab, thus enhancing opportunities for trainees with junior faculty as mentors. Trainees are advised to consider small, self-contained

projects such as brief qualitative studies, analyses of existing data using new coding systems or approaches, or brief feasibility studies to serve as pilot data for future grant proposals. Applications are reviewed by a minimum of two faculty members to ensure they represent projects of scientific value that are likely to enhance the career development of the trainee. Budgetary recommendations have varied over the years, with awards ranging from $500–$2500. Over the past several years, we have awarded from 2–7 awards annually; approximately 20% of our large internship class applies for the awards.

There are some clear challenges to implementing small, independent investigations during the tight timeframe of the clinical internship year. For new studies, designing an original protocol, meeting IRB deadlines, and implementing data collection in a new environment is time consuming and difficult to accomplish in the relatively brief span of an internship year. When successful, however, these projects may generate data for presentations, manuscripts, and preliminary data for future grant proposals. A brief survey completed by recipients of these awards in recent years indicates that in some cases the internship research grant was able to take the trainee's research in a new direction that ultimately resulted in a grant funded project. For smaller internships considering this process, a relatively small annual investment could result in both increased research emphasis for the program and enhanced opportunities for the trainees.

Exposure to the Science and Strategy of Granstmanship

The timing of the intensive clinical training received on internship, often the last or penultimate year of graduate school, is oriented to move the trainee one giant leap closer to independent practice. Although many trainees elect to do further postdoctoral training, and most states require supervised postdoctoral clinical hours, for some students the internship year is the last critical year as a ''trainee'' prior to applying for positions. The completion of the dissertation is the parallel course of training for preparation for research as an independent investigator. Having completed a dissertation is a necessary, but not sufficient experience to prepare graduate students who are interested in pursuing research to write their own grants. In other words, many graduate students complete their training without adequate preparation for the ''business of science'' (Belar, 2008). By providing exposure to grantsmanship, internship sites can move beyond espousing the Scientist–Practitioner or Clinical Science model to preparing interns to engage in the process of securing grant funding, a key component in maintaining the science foundation of a career in an academic medical center.

For programs that seek to prepare trainees for careers in academic medical centers or universities, orientation and exposure to the process of granstmanship can be an important emphasis in internship training. Typical interns have had very little, if any, experience with the process of writing and submitting a grant application; however, providing exposure during a seminar or workshop can be highly useful for trainees who may soon be in academic settings with requirements for ongoing research productivity. Due to the universal requirement of dissertation research, all interns have had experience with the scientific elements of writing a grant application, such as conceptualizing a research idea, evaluating the scientific alternatives to choose an appropriate methodology, and selecting the appropriate statistical tests. What remains much less clear are the strategic and logistical elements of (a) interacting with the funding agency, (b) presenting the proposal in a compelling and less comprehensive manner than a dissertation proposal, (c) selecting the appropriate funding mechanism, and (d) understanding the overall grant review process.

Seminars on grantsmanship topics can serve to demystify the elements of applying for and obtaining funding. Exposure to funding options (private, federal, industry) as well as funding mechanisms is a good place to start. An overview of grant mechanism (R03s, R21s, R01s, Ks, private funding) can also be provided; using examples of abstracts of funded faculty members or in relevant research areas can help illustrate the scope and function of each type of project. Providing a practical overview of the *timeline* involved is highly useful, including the steps of writing a grant application, preparing all the supporting documentation, such as budgets and human subjects information, actual grant submission, assignment to review panel (for NIH or other federal projects), peer review, and ultimately funding. At its most ambitious, the grantsmanship seminar can span a longer period of time and review each component of a grant application, as well as other grant related issues such as responding to reviews in a resubmission.

Fellowship Grant Applications

Writing a grant application during what is arguably the most intensive clinical year of graduate training is challenging. For highly motivated, research-oriented interns who have completed their dissertations, writing an NIH Individual (F32) research fellowship application to fund

their postdoctoral fellowship may be an option. An F32 postdoctoral research fellowship provide applicants with relevant training experiences, salary support for one to three years, and the opportunity to conduct a small research project that can serve as building block for the trainee's growing research program. One could argue that the most appropriate year to be writing an F32 application is the internship year, because it can result in a funded postdoctoral fellowship upon completion of the internship. For some trainees, however, planning an F32 to be completed after internship might be another viable option. Important prerequisites to this model include a capable mentor who is willing to invest in the application process and the overall fellowship experience, and an institution that has the infrastructure to support and manage individual postdoctoral fellowship awards. Features that may not be necessary but facilitate the process include additional comentors who can read drafts and provide feedback, examples of prior funded projects to give trainees a sense of scope and presentation style, and existing seminars and training opportunities that provide a cohesive experience for the fellowship.

We have used a number of strategies to support interns interested in submitting an F32 fellowship application. As noted earlier, general grantsmanship seminars are integrated into the overall internship didactics, in order to provide trainees with an overview of the grant review process, the funding mechanisms appropriate for different levels of investigators, and the pros and cons of a research career. A seminar regarding the F32 fellowship experience is presented early in the training year. This seminar provides an overview of the application process, the pros and cons of applying for and receiving the award, and the differences between this type of postdoctoral experience and other postdoctoral experiences. This seminar is followed by optional meetings for trainees who have decided to submit an application for review. In the smaller, optional meetings, recipients and mentors of prior F32 awards meet with the trainees to provide additional guidance regarding the content of the application, as well as strategic and practical advice regarding the submission process.

Trainees who receive F32 awards note the benefits, and costs, to receiving these awards. F32 awardees have more protected research time relative to many other postdoctoral fellows in clinical psychology; they must, however, execute a small research project on a relatively tight timeline with limited resources. When successful, however, F32 awards can be an early step in establishing independent investigator status. Regardless of outcome, trainees who have written F32 applications describe the experience of crafting the research question with the mentor and writing the research proposal and training plan as a highly useful training experience. What is often unexpected, but no less useful, is encountering and managing all of the other unanticipated logistics of submitting a grant, such as budget limits affecting design decisions, and working with research administration to approve and submit the proposal. Embarking on this process start to finish demystifies the grant application process for trainees, and regardless of the outcome of the submission, they have learned the ''script'' for their next grant submission.

In our program, 12 child clinical/pediatric psychology interns applied for F32s between 2001 and 2011; six were funded on their first submission.

Conclusion

Integrating a research emphasis on a year-long internship is a lofty goal; the challenges of making systemic changes to a training program, pressures of service delivery, limited resources, and requirements to achieve competency across a broad range of clinical areas can all pose challenges to this goal. It is, however, consistent with our core identity as psychologists; it is the scientific nature of our training that distinguishes us among mental health professionals (Bray, 2010; Eby, Chin, Rollock, Schwartz, & Worrell, 2011; Peterson, 2003). Additionally, promoting research on internship may continue the process of providing trainees in pediatric psychology with a broad skill set that can enhance their overall productivity and flexibility in competitive medical academic environments. Internship provides the ideal opportunity to model the importance of and challenges to integrating the clinical evidence base into clinical practice; providing research opportunities on internship should be an important feature of pediatric psychology training.

Although adding training in clinical research and grant writing is time consuming and may require some significant restructuring for many internships, such training also benefits the faculty at academic medical centers. By adding another member to the research team to generate new ideas and perspectives, faculty research can benefit in new and unanticipated ways. For example, an intern may bring a particular skill set, such as expertise in physiological assessment or genetics, which can be integrated into an existing faculty member's research program. Faculty members with active research programs will have had a year-long experience with a potential candidate for a postdoctoral fellowship position, giving both the mentor and trainee ample time to evaluate common interests and fit.

We have presented a case that integrating research training into the clinical internship year will enhance the science of pediatric psychology practice, and help prepare interns for a range of different career options. We acknowledge that our own internship typically selects for academically oriented applicants; however, the combination of selection and emphasis on research yields a high proportion of interns who ultimately attain academic positions. Approximately 64% of our graduates from 2005 to 2008 are currently in academic positions (university or medical school based); an additional 8% are in other types of research positions (research associate or project director), with the remainder as staff psychologists (16%) or completing fellowships (12%). There are, however, no systematic, experimental data available to support the notion that promoting research on internship truly does increase the probability that interns will use more evidence-based approaches in assessment and treatment, have more productive academic careers, or more strongly embrace Clinical Science or Scientist–Practitioner philosophies. Future research is needed to evaluate actual usage of evidence-based assessments and treatments on pediatric psychology internships, to document novel approaches training programs are using to promote the integration of science and practice, and to determine whether integrating and emphasis on research during the internship truly does promote more effective overall training and enhanced clinical care.

Funding

This work was supported by K24 HD058794, National Institutes of Health/Eunice Kennedy Shriver National Institute of Children's Health and Human Development (NICHD) (to E.L.M.).

Conflicts of interest: None declared.

References

Alderfer, M., Fiese, B., Gold, J., Cutuli, J., Holmbeck, G., Goldbeck, L., . . . Patterson, J. (2008). Evidence-based assessment in pediatric psychology: Family measures. *Journal of Pediatric Psychology, 33*, 1046–1061.

Atkins, M. S., & Frazier, S. L. (2011). *Research training on internships: Clinical science meets community*. Washington, DC: Paper presented at the Academy of Psychological Science Annual Meeting.

Baker, T. B., McFall, R. M., & Shoham, V. (2009). Current status and future prospects of clinical psychology. *Psychological Science in the Public Interest, 9*, 67–103.

Barlow, D. H., Hayes, S. C., & Nelson, R. O. (1992). *The scientist practitioner: Research and accountability in clinical and educational settings*. Boston: Allyn & Bacon.

Belar, C. D. (2008). Changing educational needs of psychologists: Do we need more medical knowledge, basic science and more psychological science? *Journal of Clinical Psychology in Medical Settings, 15*, 12–17.

Bray, J. H. (2010). The future of psychology science and practice. *American Psychologist, 65*, 355–369.

Buysse, V., & Wesley, P. W. (2006). Evidence-based practice: How did it emerge and what does it really mean for the early childhood field? *Zero to Three, 27*, 50–55.

Chambless, D. L., & Hollon, S. D. (1998). Defining empirically supported therapies. *Journal of Consulting and Clinical Psychology, 66*, 7–18.

Cohen, L., Lemanek, K., Blount, R., Dahlquist, L., Lim, C., Palermo, T., . . . Weiss, K. E. (2008). Evidence-based assessment of pediatric pain. *Journal of Pediatric Psychology, 33*, 939–955.

Commission on Accreditation. (2008). *Guidelines and principles for accreditation of programs in professional psychology*. Washington, DC: American Psychological Association.

Drotar, D., & Lemanek, K. (2001). Steps toward a clinically relevant science of interventions in pediatric settings: Introduction to the special issue. *Journal of Pediatric Psychology, 26*, 385–394.

Eby, M., Chin, J., Rollock, D., Schwartz, J., & Worrell, F. (2011). Professional psychology training in the era of a thousand flowers: Dilemmas and debates for the future. *Training and Education in Professional Psychology, 5*, 57–68.

Holmbeck, G., Thill, A., Bachanas, P., Garber, J., Miller, K., Abad, M., . . . Zukerman, J. (2008). Evidence-based assessment in pediatric psychology: Measures of psychosocial adjustment and psychopathology. *Journal of Pediatric Psychology, 33*, 958–980.

Hunsley, J., Lee, C. M., & Wood, J. (2003). Controversial and questionable assessment techniques. In S. O. Lilienfeld, S. J. Lynee, & J. Lohr (Eds.), *Science and pseudoscience in clinical psychology* (pp. 39–76). New York: Guilford.

Kahana, S., Drotar, D., & Frazier, T. (2008). Meta-analysis of psychological interventions to promote adherence to treatment in pediatric chronic

health conditions. *Journal of Pediatric Psychology, 33*, 590–611.

Lucock, M. P., Hall, P., & Noble, R. (2006). A survey of influences on the practice of psychotherapists and clinical psychologists in the UK. *Clinical Psychology & Psychotherapy, 13*, 123–130.

Lynch-Jordan, A. M., Kashikar-Zuck, S., Crosby, L. E., Lopez, W. L., Smolyansky, B. H., Parkins, I. S., . . . Powers, S. W. (2010). Applying quality improvement methods to implement a measurement system for chronic pain-related disability. *Journal of Pediatric Psychology, 35*, 32–41.

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

Meyler, E., Guerin, S., Kiernan, G., & Breatnach, F. (2010). Review of family-based psychosocial interventions for childhood cancer. *Journal of Pediatric Psychology, 35*, 1116–1132.

Mischel, W. (2009). Connecting clinical practice to scientific progress. *Psychological Science in the Public Interest, 9*, i–ii.

Murray, B. (2000). The degree that almost wasn't: The PsyD comes of age. *Monitor on Psychology, 31*, 52.

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

Price, M. (2009). Disputing a slam against psychology. *American Psychological Association Monitor, 40*, 16.

Quittner, A., Modi, A., Lemanek, K., Levers-Landis, C., & Rapoff, M. (2008). Evidence-based assessment of adherence to medical treatments in pediatric psychology. *Journal of Pediatric Psychology, 33*, 916–936.

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

Silver, R. J. (2001). Practicing professional psychology. *American Psychologist, 56*, 1008–1014.

Spirito, A., McQuaid, E. L., Nash, J., Tremont, G., Francis, G., Weinstock, L., & Andover, M. (2007). What is the role of clinical internships in training clinical scientists? *Clinical Science Newsletter of the Society for the Science of Clinical Psychology,* pp. 2–4.

Stewart, R. E., & Chambless, D. L. (2007). Does psychotherapy research inform treatment decisions in private practice? *Journal of Clinical Psychology, 63*, 267–281.

Uman, L., Chambers, C., McGrath, P., & Kisely, S. (2008). A systematic review of randomized controlled trials examining psychological interventions for needle-related procedural pain and distress in children and adolescents: An abbreviated Cochrane review. *Journal of Pediatric Psychology, 33*, 842–854.