

Training Graduate Level Pediatric Psychology Researchers at Case Western Reserve University:
Meeting the Needs, Challenges, and Options For the New Millennium

Dennis Drotar, Ph.D.
Tonya Palermo, Ph.D.
and
Carolyn E. Landis, Ph.D.

Case Western Reserve University
School of Medicine
and Rainbow Babies and Children's Hospital

Send all correspondence to the author at: Department of Pediatrics
Rainbow Babies & Children's Hospital
11100 Euclid Avenue
Cleveland, Ohio 44106-6038
e-mail: dxd3@po.cwru.edu

Abstract

Objective: To describe the challenges in training graduate level pediatric psychology researchers for successful careers and to discuss strategies for meeting identified challenges.

Methods: Experiences in training graduate students at Case Western Reserve University were reviewed to identify key challenges in research training and potential strategies to meet them.

Results: The following key challenges were identified: stimulating graduate students' career interest in pediatric psychology research, teaching students about the pragmatic challenges of conducting research in pediatric settings, specialized research design, and data analytic issues, helping students to develop essential research skills, developing opportunities for student research-related collaborations, helping students develop professional identities as researchers and developing and supporting their research careers beyond graduate school.

Conclusions: Useful strategies for meeting these challenges include involving an interdisciplinary faculty in research training, developing specialized training methods that focus on critical research skills such as writing and data analysis, peer support, and involvement with multiple mentors who are successful researchers. Pediatric psychologists should also develop opportunities for the next generation of researchers by facilitating research job options and leadership opportunities.

Key words: research training, mentoring, pediatric psychology

Training Graduate Level Pediatric Psychology Researchers For The Millennium:
Needs, Challenges, And Options

Research, which is a core activity of pediatric psychologists, spans a wide spectrum of topics and populations (Roberts, 1995). Surveys have documented that across a wide range of settings pediatric psychologists devote a significant percentage of their professional time to research and place a high value on this activity (Drotar, Sturm, Eckerle, & White, 1993). Moreover, research is critical to the continued development of the field of pediatric psychology (Drotar, 1997). Research advances that are developed by pediatric psychologists are especially important in so far as they form the basis for practice and teaching. One example is the series on empirically supported treatments that is published by the Journal of Pediatric Psychology.

The professional advancement of individual pediatric psychologists in academic settings also depends upon the quantity and quality of their research and scholarly accomplishments. Psychologists who achieve success and leadership roles in these settings are generally accomplished researchers. Moreover, research in pediatric psychology especially interdisciplinary research is important from a public health vantage point as it can extend the scientific knowledge base in ways that can significantly impact the health of children and families (National Advisory Mental Health Council, 1999; National Academy of Science, 1994). Finally, the future research agenda for the field of pediatric psychology involves the need to address some important but as yet unanswered questions. Some of these include: What are the most effective interventions for children with behavioral problems in primary care? What are the most effective interventions to promote adherence to treatment and illness management in pediatric chronic illness? What are effective strategies for prevention in important public health problems - injury, violence, obesity? What are the most effective strategies to assess relevant

health and mental health outcomes? What are the primary risk and protective factors that underlie the psychological and health outcomes of pediatric populations?

For these reasons, training issues (Brown & Roberts, 2000), including training the next generation of researchers have been identified as primary challenges for the future of pediatric psychology (Drotar, 1993, 1994) as well as for other disciplines (Center for Advancement of Health, 1999). Consequently, there is a continuing need to identify the critical issues that are involved in training researchers, the obstacles to such training, and research training models that will best equip the pediatric psychologist researchers of the future for successful careers.

Several authors have described the content of graduate, internship, and post-doctoral programs in pediatric psychology (LaGreca, Stone, Drotar, & Maddux 1988; LaGreca, Stone & Swales, 1989; Routh & LaGreca, 1990) and identified training programs whose graduates have frequently joined the ranks of the Society of Pediatric Psychology (SPP)(Routh, 1988). However, to our knowledge, no previous reports have articulated the specific challenges that are involved in training graduate students to conduct research in pediatric psychology or made specific recommendations to enhance the quality and impact of such training. A task force of the SPP has recently completed a comprehensive set of recommendations for training in pediatric psychology, but these do not focus specifically on graduate level research training (Spirito et al., in press).

The need for such a description also arises from several other sources. These include the highly specialized nature and demands of psychological research in pediatric settings, and potential future constraints on the career development of pediatric psychology researchers. For example, research with pediatric populations places special demands on pediatric psychologists to collaborate with physicians and other professionals and manage significant setting-based

constraints that influence study design and data collection (Drotar, 1989; Drotar, 2000c).

Research in pediatric psychology also requires students to develop specialized knowledge and experience with interdisciplinary collaboration as well as a range of methodologies (Drotar, 1994; 2000a), including intervention (Brown & Roberts, 2000; Drotar, 1997; Roberts, 1988) and prevention research (Roberts, 1991).

Over and beyond their need to learn specialized methodologies, the pediatric psychology researchers of the future need to learn to manage various threats to their career development. For example, pediatric psychologists in academic medical settings face increasing pressures to support their own salaries and research activities (Drotar, et. al., 1993; Williams & Kohout, 1999). Irrespective of their specific employment setting, in order to develop and sustain their careers, the pediatric psychology researchers of the future need to develop a complex set of skills that are necessary to sustain their scholarly productivity, including the ability to publish, conduct collaborative, interdisciplinary research, as well as obtain and successfully manage research grants (Brown, 2000; Drotar, 2000).

However, despite the need for comprehensive, skill-based research training with pediatric populations, such training is by no means routine in graduate training programs in pediatric psychology. In 1990, Routh and LaGreca found that only five universities of those surveyed had any specialized graduate training tracks in pediatric psychology. It was not clear which, if any, of these programs had specialized research training tracks in pediatric psychology.

Published writings on the professional development of pediatric psychologists have focused almost exclusively on clinical and/or professional training and have been largely silent about critical issues and potential options for the content and process of graduate research training in this field. To address this need, this manuscript defines key challenges in training

graduate students to conduct research with pediatric populations, describes how the graduate training psychology program in pediatric psychology at Case Western Reserve University (CWRU) has developed ways to meet these challenges, and considers general implications for training graduate level researchers in pediatric psychology to achieve success in the new millennium.

Description of the Evolution and Current Context of the Training Program at CWRU

At the outset it should be recognized that the present description of challenges is based mostly on the authors' experience in research training in one university-based program with very close ties to a large academic pediatric setting and has a track record of funding for research training (Drotar, 1998). However, this program evolved slowly and built on a series of incremental steps. In order to give readers a context in which to understand the present training model, the setting of the program is briefly described.

The pediatric psychology training program at CWRU is a scientist-practitioner program that provides an organized training sequence for students who have identified a career interest in pediatric populations. Pediatric psychology is a specialized track within the child clinical psychology program, which includes six students at any one point in time (see Drotar, 1998 for more detail). The program began in 1972 when the senior author took a position as a psychologist in a university affiliated pediatric hospital, Rainbow Babies and Children's Hospital. Initial training efforts began with undergraduates who volunteered to participate as research assistants on various projects and then graduate students who observed case conferences, consultation and clinical work in the setting, and then did year-long clinical placements in the pediatric hospital. Graduate level research training began with students doing masters or dissertation research projects with pediatric populations starting in 1976 and

continuing sporadically until 1987 when an institutional research training grant in pediatric psychology was awarded to CWRU. This provided funds, tuition stipends, and research-related costs for students (N=4) and facilitated the recruitment and program development. The program director's (D.D.) involvement and status within the department also evolved from peripheral adjunct faculty status to a faculty member who chairs dissertations, participates in departmental planning, and votes on relevant decisions.

Defining Features of the Research Training Program in Pediatric Psychology at CWRU

The definition of pediatric psychology that guides this training program is a very broad one that focuses on research and practice with pediatric populations in medical settings as well as the health, including prevention-based care, of children outside of medical settings (Roberts & McNeal, 1995). In accord with this definition, students have experiences in a range of hospital and community settings other than Rainbow Babies and Children's Hospital, including experience in primary care. The main features that differentiate the pediatric psychology training include the fact that students in the pediatric psychology track do more clinical training in pediatric settings and also have significant opportunities for additional research-related experiences with faculty (psychologists and pediatricians) in the department of pediatrics. In addition, students in the pediatric psychology program have the following didactic experiences: 1) the pediatric psychology seminar, ongoing throughout the course of the students' training and includes topics in specialized research methodology, consultation in pediatrics, and also regularly involves pediatric faculty as well as faculty from the university as guest lecturers; 2) the writer's workshop; and 3) data analytic seminars (Drotar, 2000b). These seminars are open to (but not required of) students in the clinical child psychology program who sometimes participate.

Seven Key Challenges in Training Researchers in Pediatric Psychology

Our collective experience as previous students and mentors who train graduate student researchers in pediatric psychology in the above program has identified seven key challenges: (1) stimulating students' career interest in pediatric psychology research; (2) teaching graduate students about research-related collaboration, medical settings, and pediatric populations; (3) training in specialized research design and data analytic methods that are relevant to pediatric populations; (4) developing opportunities for graduate student initiated research and collaborations in pediatric settings; (5) helping graduate students to develop critical research skills; (6) developing the professional identities of graduate students as pediatric psychology researchers; and (7) sustaining and supporting students' careers beyond graduate school. Each of these challenges and strategies to meet them are now described.

1) Stimulating Students' Career Interest in Pediatric Psychology Research

One of the primary challenges in training researchers in pediatric psychology is attracting talented students to this field. Opportunities for undergraduates to become knowledgeable about the field of pediatric psychology are especially important because this field is not routinely represented in departments of psychology, either in undergraduate courses or in the research interests of faculty who help shape the career interests of undergraduates.

How can pediatric psychologists meet the challenge of making their research known to undergraduates? We have used a number of strategies to meet this challenge such as guest lectures to undergraduates on relevant pediatric psychology topics, a course focusing on the needs of the hospitalized child, independent study research, volunteer experiences, and paid work on faculty and/or graduate student research. We have found that graduate students who are excited about their own research are among the best ambassadors to attract others into the field

of pediatric psychology. Graduate students who are specializing in pediatric psychology can serve as mentors for undergraduate students by giving seminars on relevant topics such as stress and coping, psychological aspects of chronic illness, and providing opportunities for undergraduates to participate in their research. These experiences have been very well received by undergraduates and also provide important opportunities for graduate students to supervise and organize the work of others (Drotar, 2000).

While some students develop an interest in pediatric psychology as undergraduates, this is by no means a universal entry point into this field, so that other methods of exposure to the field are important. For example, post-graduate research experiences that involve working closely with a pediatric psychologist and/or other professionals as a coordinator or research assistant can give students a realistic exposure to such critical research-related tasks as preparing abstracts and presentations, manuscripts for publication, and grant proposals. Finally, those graduate school students who are unfamiliar with pediatric psychology can also develop an interest in the field through didactic courses and/or by working on pediatric psychology research.

2) Teaching Graduate Students About Research-Related Collaboration, Medical Settings, and Pediatric Populations

Research in pediatric psychology inevitably requires collaboration with pediatric colleagues as well as with members of other professions (Drotar, 1993; 1995). Consequently, successful pediatric psychology researchers have generally learned to assume a wide range of collaborative roles (e.g., as consultant to pediatric colleagues who are conducting research, as principal investigator of research that involves pediatric colleagues, or as co-investigator in a research team). To be a successful collaborator, one needs to understand what is involved in

each of these potential roles as well as the perspectives of different professional colleagues, especially pediatricians, concerning research.

Another primary feature of research with pediatric populations is that it usually takes place outside of a laboratory setting in a hospital or clinic. For this reason, pediatric psychology researchers need to become thoroughly conversant with the advantages and constraints of data collection in pediatric settings and how these factors affect research design and implementation (Drotar et al., 2000). For this reason, students need to have "hands on" experience in collecting data in pediatric settings. In order to conduct research that is informed by clinical practice, students need to become knowledgeable about pediatric conditions, relevant symptoms, complications, and medical management. In this regard, graduate students can benefit from the comprehensive reviews of research and clinical issues in pediatric populations that are contained in the Handbook of Pediatric Psychology (Roberts, 1995) and Sourcebook of Pediatric Psychology (Olson, Mullins, Gillman, & Chaney, 1994).

One didactic approach that has proven to be particularly successful in our setting is to invite pediatricians who are research and/or clinical collaborators to give lectures to students in their area of expertise, which may involve a specialized area of pediatrics or population (e.g., pediatric oncology), or a broader focus, such as primary care. Experienced pediatric colleagues are highly credible mentors as their presentations often address such difficult questions as: What psychological issues are associated with particular pediatric conditions? What do pediatricians want most from a psychologist who works with this population? What are critical research needs with a specialized population? Such lectures not only inform graduate students concerning pediatricians' perspectives about psychological research needs, but also provide an excellent introduction to a pediatric population's clinical characteristics (e.g., symptoms, natural histories,

and clinical management). In addition to hearing from experienced pediatricians, students can also benefit from lectures and discussions from experienced pediatric psychologist researchers who describe their collaborative work with pediatric colleagues and specific roles in their current research collaborations.

While didactic presentations about consultation and collaboration are helpful, they need to be supplemented by clinical experiences in providing psychological consultation, assessment, and intervention, especially with populations that reflect students' primary research interests. Whenever it is feasible to do so, we have found that it can be advantageous to match students' research interest with a particular population (e.g., quality of life of children with cancer) with their experiences in clinical placements (e.g., clinical consultation in pediatric oncology). Such targeted clinical experiences not only help students to develop and refine their research questions as well as make them more clinically relevant, but also put them in close collegial contact with potential research collaborators.

3) Training in Specialized Research Design And Data Analytic Methods

The complex, ever-changing field of pediatric psychology research requires researchers to become conversant with a wide range of methods and design issues, some of which are not well represented in typical graduate curricula. A potential short list includes: 1) intervention research design (e.g., design and implementation of randomized, controlled clinical trials of interventions with pediatric populations); 2) program evaluation in pediatric settings; (3) specialized measurement issues with pediatric populations (e.g., adherence to treatment, pain, functional status, and quality of life) and new assessment methods (Quittner, 2000); and (4) specialized data analytic methods such as qualitative analysis and methods of analyzing data from prospective studies (e.g., growth curve analysis).

How can such specialized research training be best incorporated into a graduate training program? One option is to develop specialized courses and seminars that teach students about methods that are highly relevant (e.g., applied research methodology, data analytic methods). Because teaching about highly specialized data analytic methods can place a formidable burden on individual mentors and on programs, such specialized courses and seminars may be taught as a lecture series. A guest lecture or team teaching model also has the advantage of familiarizing students with experienced researchers in their setting and enhancing student opportunities for additional mentoring. For example, one of our research seminars on data analytic methods featured experienced researchers who presented practical issues in applying data analytic methods (e.g., qualitative analysis, growth curve analysis, factor analytic approaches, etc.) to their data. These lecturers were asked to address the following questions: When are these data analytic methods appropriate? What are the benefits and problems involved in using them? Can you provide illustrations of how these methods are used based on data from your research? The purpose of this course was to teach students about methods to enable them to use statistical consultation effectively rather than to facilitate their mastery of these methods. We have also found that additional methods-based courses in related fields, (e.g., epidemiology, anthropology) may also be very helpful to graduate students who are interested in a research career in pediatric psychology.

4) Developing Opportunities for Graduate Student Initiated Research and Research-Related Collaborations in Pediatric Settings

Knowledge and skill development in pediatric psychology research are best developed in the context of real-life projects. Consequently, it is critical that students are given ample opportunities to initiate and conduct their own research, as well as collaborate with faculty and

staff in pediatric settings. In our view, the success of such student-faculty collaboration depends in no small measure on the success of the match between faculty mentors and students. This match is facilitated in several ways. First, students apply to the pediatric psychology training program to work with a primary research mentor who is generally a pediatric psychologist. Prospective mentors and other faculty as well as current students interview applicants to determine whether there is a suitable fit between the students' interests and the program. Once students are admitted into the program, they work with a number of faculty (e.g., psychologists and pediatricians in the Department of Psychology and School of Medicine) who are their secondary mentors for research projects. To help them identify secondary mentors, students are given information about ongoing faculty research projects and their availability to students. The primary mentor also works with students to help them identify faculty who are a good match for their interests as well as a suitable research project.

Depending on student and faculty interest and experience, secondary faculty mentors might have any number of roles in student research ranging from a more narrow one (e.g., helping to recruit populations) to a more collaborative one that involves mutual planning of a new research project. As an example of the latter role, one student in our program became particularly interested in the impact of work-related stress on pediatric residents. She was helped to identify a pediatric faculty member with similar research interests and worked with her on a pilot study. Their collaboration led to the development of a master's thesis that documented the effects of call duty on residents' psychological distress (Berkoff & Rusin, 1991) and to a dissertation that described the effects of resident gender and personality style on health behaviors and psychological status (Berkoff & Drotar, 1994).

5) Helping Graduate Students to Develop Critical Research Skills: Examples of Methods

One of the core research training challenges is for mentors and programs to provide repeated opportunities for students to obtain supervised experience in skill-based learning in multiple areas that are critical to their subsequent career development (e.g., manuscript writing, data analysis, etc.) under supervision. While individual mentoring is critically important to facilitate the development of core research skills, in our experience it may not be sufficient to foster the extensive level of skill development that is needed for a successful research career. For this reason, other training experiences need to be developed that are designed to enhance students' scholarly writing and editing, their abilities to develop grant proposals, data analytic skills, and collaborative skills and knowledge.

Methods to Enhance Scholarly Writing and Editing. One method that has been a useful way to facilitate students' scholarly writing skills in our program is a writers' workshop seminar, which is structured as follows. First, students select a writing project (e.g., proposals for masters and dissertation research, review articles, research-based manuscripts) for which they want feedback. For each meeting, one or more students agree to make progress on their writing projects and distribute them to the instructor and classmates one week prior to the workshop meeting to allow sufficient time for review (Drotar, 2000b).

The core didactic method of the seminar is peer and instructor written and oral reviews of student writing projects, which are designed to provide honest and constructive comments to facilitate revisions. Free-ranging peer and instructor critiques may include specific suggestions for reworking and rephrasing text as well as strategies for conceptualizing research problems. Students then modify their manuscripts in response to critique and bring them back to the group for subsequent review until the projects are completed.

The writers' workshop seminar format has proven to be successful, not only in helping students to complete a diverse set of writing projects, but also to publish them (Drotar, 2000b). All students who have participated in this seminar have published at least one first-authored manuscript based on their research and/or review of research, and many have published repeatedly while in graduate school. The writers' workshop seminar has also helped facilitate students' abilities to provide critical written review to their colleagues as well as their mentors' manuscripts. Mentors' submissions of manuscripts to the writers' workshop "levels the playing field" by communicating the message that everyone's writing can benefit from critique. Students' skills as reviewers can also be enhanced by having them prepare written critiques of manuscripts and/or published work and compare them to colleagues and experienced reviewers.

Collaborative writing experiences with secondary mentors have provided another useful vehicle to enhance the development of student's writing skills, as well as an opportunity to experience different styles of writing and critique. Such mentorship experiences have facilitated successful publication of student research (e.g., Burgess et al., 1999; Levi, Drotar, Yeates, & Taylor, 1999). Students also receive training in preparing written critiques of research that has been submitted for publication.

Methods to Enhance Students' Abilities to Develop Grant Proposals. Graduate students who are interested in research careers need to develop their skills as writers of grant proposals as soon as possible in their careers (Brown, 2000). Toward this end, students in our program have been encouraged to submit proposals to local university-affiliated foundations as well as national sources such as individual predoctoral research training proposals to the National Institutes of Health (NIH).

The writers' workshop seminar described above as well as a formal course on grant writing have helped students refine their proposals. The grant writing course included didactic training in such issues as the process of submission and review at NIH and private foundations, what reviewers look for in different sections of the grant, how to respond to reviewers' critiques, or examples of successful and problematic grants. As part of the course, students have prepared grant proposals that are reviewed and discussed in class, and then submitted to various funders. Most of our students have been successful in achieving funding for their research for small grants through local foundations or the American Psychological Association, etc. Others have competed successfully for larger amounts of funding such as Individual National Research Service Awards from the NIH and a Lung Research Dissertation Grant from the American Lung Association. Students' success in achieving funding has not only provided direct incentives such as funds that are needed to cover relevant costs of data collection such as payment of travel costs or incentives for research participants, but has given students a valuable initial introduction to grantsmanship.

Methods To Enhance Data Analytic Skills. Students also benefit from repeated opportunities to practice their skills in data analysis. We have addressed this need by having students present data from their ongoing research to their peers and instructor as a work in progress and explore options for data reduction and analysis. In order to facilitate peers' understanding of their data, students have presented summaries and graphical representations of their data, which is followed by group discussion. We have also involved faculty with expertise in various data analytic methods in such workshops to provide didactic training and consultation to students who are interested in using these methods.

Another potentially valuable approach to enhancing students' data analytic skills is to give them supervised practice in analyzing data sets that have been gathered for pediatric populations. Given the constraints of data collection for masters and dissertation research, students rarely have opportunities to analyze data from prospective studies or from very large samples. Consequently, this has been a valuable training experience for some of our students that has led to publishable work (e.g., Burgess et al., 1999; Levi et al., 1999).

Methods to Enhance Research-Related Collaborative Skills and Knowledge. In our experience, students' research-related collaborative skills are best developed by repeated practice under supervision. For this reason, we have found that students can benefit from opportunities to participate in collaborative research projects with different faculty colleagues to help them experience and appreciate a range of mentors' and collaborators' work styles, personalities, and research experiences. In this regard, an approach that has been useful in teaching research-related collaboration is an apprenticeship model in which students are assigned to a research group led by a pediatric psychologist or pediatrician, who is either a primary or secondary mentor. Such experiences give students a revealing "behind the scenes" involvement in the process of planning and implementing research projects. As one example, we have involved students in an interdisciplinary research project led by a pediatric oncologist/ethicist and is designed to study the informed consent process in clinical trials in pediatric cancer research (Kodish, 1998). Students have learned about the progress and problems in data collection in this multisite study, helped to develop plans for data analysis and prepare presentations and manuscripts. Such experiences also give students the opportunity to learn first-hand about leadership and management of a research project and to observe the work of an interdisciplinary research team.

6) Developing the Professional Identities of Pediatric Psychology Researchers

One of the most significant training-related challenges is to help graduate students develop their professional identities as researchers. The field of pediatric psychology features exciting clinical opportunities for students, some of whom are initially drawn to this field because of their clinical interests. On the other hand, during graduate training and subsequently, clinical activities compete directly with research for students' time, energies, and professional development. The experience of early success in real-life clinical encounters with children and families, especially with supportive supervision, can be very rewarding to students. In contrast, some students may feel discouraged when they compare and contrast the more immediate rewards of their clinical work (e.g., having a “good session” with a client), to the demands and longer-term rewards of research, such as publications. Consequently, some students with talent for research may gravitate to clinical work and fail to devote sufficient time and energy toward developing their research skills and plans for research careers.

Our experience suggests that even for the most highly motivated and talented students, the development of a research career needs to be supported and nurtured over an extended period of time in multiple ways, especially individual mentorship by successful researchers, their involvement in multiple research projects with different research mentors, peer support for research activities, experiences in clinically relevant research, and involvement in conferences and scientific meetings.

Individual Mentorship by Successful Researchers. There is probably no substitute for individual mentorship in facilitating students' professional identities as researchers. To the extent that students see their mentors as actively engaged in and excited by research, they are more likely to want to emulate them. Pediatric psychology students are no exception. Moreover,

close individual mentorship is a primary vehicle to teach key research-related skills such as manuscript preparation, proposal writing, and data analysis.

Involvement in Multiple Research Projects with Multiple Mentors. We have found that giving students opportunities to become involved in multiple research projects beyond their master's and dissertation research also facilitates their professional identities as researchers and provides experience in the multiple possible roles as researchers. For this reason, students in our program are strongly encouraged and given opportunities to participate in as many research projects as their time, interests, and energies allow in collaboration with faculty pediatricians and/or psychologists (see previous section).

Peer Support for Research Activities. We have found that another key ingredient of developing the professional identities of pediatric psychology researchers is peer support, which serves many important functions (Brown, 1997): By working closely with their colleagues who share their interests, students experience support and mentoring from their peers who are going through the same training program, learning similar skills, and encountering similar challenges. Developing opportunities for interaction among graduate students who have different levels of experience and expertise concerning research also gives more senior students a chance to model skills (e.g., writing and presentation) as well as key research-related milestones, such as having a manuscript accepted for publication, for their more junior colleagues. Moreover, supportive peers are a receptive audience to whom students can present their ideas for research, data analysis, and manuscripts (Drotar, 2000b).

We have facilitated peer support for research activities through the pediatric psychology seminar, which is ongoing through the students' graduate career, by encouraging ongoing student review and critique of colleagues' work through the writers' workshop seminar (Drotar, 2000b),

by pairing more senior students up with more junior ones on projects, by having dedicated space, computer lab resources, and informal student-faculty gatherings.

Experiences in Clinically Relevant Research. A concerted focus on integrating research and practice in research training can help to underscore the clinical relevance of research to students and also facilitate their skills in program evaluation and intervention research. Formal course work and didactic training can be used to help students appreciate the difficult logistical problems involved in conducting clinically relevant research, including intervention in clinical settings (Drotar, et al., 2000a), the common threats to the validity of intervention research and ways of managing them, and methodological issues in program evaluation (Kelley, Nixon, & Bickman, 2000).

Engaging students in clinically relevant intervention research in pediatric and community settings can provide exciting as well as challenging training experiences. Examples of such research are the screening of economically disadvantaged mothers for depression in a primary care pediatric clinic (Needlman et al., 1999), outcomes of screening for behavioral problems in children seen by primary care pediatric practitioners (Riekert, Stancin, Palermo, & Drotar, 1999), and interventions for inner-city children with hard-to-control asthma (Walders, 2001).

Involvement in Scientific Meetings and Conferences. Students also benefit from the experience of presenting their data and having the opportunity to interact with students and faculty at conferences such as the Florida Conference on Child Health Psychology or the regional meetings such as the Great Lakes Society of Pediatric Psychology. Such meetings provide an excellent opportunity for students to meet faculty from other settings including those that share their research interests. Wherever possible, students' involvement in organizing

meetings can give them other opportunities to meet faculty, connect with others in the field and learn to participate in the professional culture of the field of pediatric psychology.

7) Developing and Sustaining Research Careers Beyond Graduate School

Clinical researchers, including pediatric psychology researchers, face extraordinary challenges in developing and sustaining their careers (Nathan, 1998). For this reason, students who are interested in research careers need to appreciate that graduate training is only the beginning of research training and the first link in a chain of experiences that includes other critical steps such as postdoctoral research training and research career development opportunities in their first job.

Postdoctoral Research Training. Beyond graduate training, another critical link in career development is research training at the post doctoral level. Such training is necessary to equip researchers to be competitive for research funding either as an independent researcher or a mentored scientist (Drotar, Palermo, & Ievers-Landis, in press). Consequently, all of our graduate students with strong research interests and talents have been strongly encouraged to pursue available postdoctoral research training opportunities and to carefully plan their research careers with an eye toward publishing their work and establishing a track record of research productivity.

Research Career Development Opportunities in the First Job. Based on experiences in training students, a critical link in the chain of pediatric psychology researchers' career development is the transition to the first job, which may make or break a budding research career for several reasons: One reason relates to the extraordinary and contradictory work-related demands, especially in medical settings (Drotar, 1991, 1993). In some settings, researchers are often expected to "hit the ground running" and develop a research program at the same time that

they may be expected to support a significant portion of their salary. This expectation has some obvious but highly undesirable consequences. For most junior-level researchers, clinical work may be their only short-term option to generate salary support. The paradox is that time and energy intensive demands of clinical work often preclude the time and energy concentration needed to develop a research career. One simply cannot manage a successful research career “on the side.” Consequently, in order to make a research career a realistic option, an informed, long-range professional career development plan needs to include a concentration on research as well as mentorship.

Students who are interested in careers in academic departments of psychology face a somewhat different set of challenges in the transition to their first job. For example, more protected research time is available for research and start-up monies for research are generally more available in such settings compared with academic health centers. On the other hand, teaching loads can be formidable, especially for new faculty who need to spend extensive time in course preparation, and consequently need to be negotiated to ensure sufficient time for research. Moreover, access to pediatric populations for research may be difficult depending on the physical proximity of medical settings to the university and local history of collaboration among faculty.

Irrespective of the specific job, students need to understand the critical importance of taking a position in a setting that has a strong mentoring and support program for career development in research. In this regard, one resource that can be used by pediatric psychologists to develop their research careers is the NIH-Sponsored Mentored Clinical Scientist Training program. This award is designed to promote research careers by providing salary support for

new faculty to develop a mentored career development plan focused on a specific area of clinical research.

Tensions and Obstacles in Implementing Research Training in Pediatric Psychology

The specific strategies that have been suggested thus far to meet the challenges of graduate level training for pediatric psychology researchers are not easy to implement. That is why they are challenges! The implementation of research training in ours and other programs is inevitably affected by various tensions and obstacles. Some of these are generic, that is, they involve each and every program. Others may be more or less of a barrier, depending on the specific characteristics of the setting. Some of these barriers are now described.

Patient Care Demands in Pediatric Settings

It may be difficult, if not impossible to develop and sustain any research-related collaborations, let alone graduate level research training, in settings that focus primarily on patient care. Research has become increasingly difficult to accomplish in some academic health centers based on mandates to increase direct patient contact hours in order to try to counter lower and lower reimbursement rates. These pressures can create significant disincentives for faculty to carve out time for research and research mentoring. We have tried to limit the impact of this barrier by making sure that mentorship responsibilities are shared by multiple faculty.

Tensions Surrounding Specialized Training

The model that we have described here involves a highly specialized program with an intensive research focus. Selection of a highly specialized program such as the one we have described is a tall order for many prospective students, most especially for those who have not been exposed to pediatric psychology. Our training program wouldn't be appropriate for students who haven't identified pediatric psychology as an interest.

Students' specialization in pediatric psychology research and practice also can serve to isolate them from their peers in the graduate program. We have tried to counter this barrier by offering the pediatric psychology seminar to all students and also by providing funding for students in the clinical child psychology program to facilitate their work in pediatric psychology.

Time Demands of Specialized Training

Another problem that relates to the issue of specialization described above involves the added time demands required by intensive research training. Given the structure of our graduate program, it has not been possible to replace courses or clinical experiences to accommodate the added time requirements of research training. This means that students have to be prepared to manage these requirements, which are strenuous. The availability of stipends from the training grant which obviates the need to obtain a job outside the program, and the expectation that students devote full time to the training program, including summers, has facilitated students' commitment to the program and its special demands.

Training-Related Demands on Faculty

The research intensive focus also places added demands on faculty, especially at the program director's level for mentorship and teaching in the seminar. To help manage these demands, we have found it helpful to involve faculty from multiple departments in the university, especially pediatrics, as well as practitioners in the community in some of the didactic teaching. Moreover, over the history of the program, we have expanded the number of primary and secondary faculty members.

Thoughts About Generalizable Principles of Program Development

Because the setting and the program of this program are by no means typical, the generalizability of some of the specific strategies described here may be limited. On the other

hand, based on our discussions with researchers and students in other programs and settings, we believe that the principles of research training and implications for the field of pediatric psychology described here may be generalizable as long as they are tailored to the resources and characteristics of individual programs.

Faculty Commitment and Leadership

One important series of questions concerns how to develop training programs that meet the various challenges in programs in different settings that have different levels of resources. Effective training programs of all sorts including pediatric psychology training begin and end with faculty interest, expertise, and leadership. For this reason, there needs to be at least a single faculty member with interest and knowledge of pediatric psychology and who can then stimulate interest among students, other faculty, and pediatricians in the community.

Developing Resources for Research and Training in Pediatric Psychology

Given the requirements of training in pediatric psychology described above, it is clear that program development is a team effort and develops gradually. One question is who should be on the team and how should they be engaged. We recommend a "cast the nets widely" approach that involves reaching out to faculty in different programs and areas, and also has the potential of allowing individual programs to capitalize on faculty and setting-based strengths that are specific to that program. Training programs depend upon the kind of collaborative relationships among faculty, whether in a large medical setting or in a community setting that take time to develop and sustain. Some practitioners and researchers find it very stimulating to have students involved in their work while others, especially those with very hectic professional lives, may find it prohibitive. For this reason, it is important to allow for and expect some changes in specific supervisors and mentors.

Recruiting Students with Interest and Talent

A final critical ingredient of this training program that is generalizable to others in pediatric psychology and other fields is, of course, the quality of the students. Talented students who are excited by the challenges of pediatric psychology will often help to create their own training opportunities and facilitate good will among their supervisors. Moreover, talented students are critical for the success of newly developing training programs as they create the good will on the part of supervisors to sustain their involvement. Consequently, we spend a great deal of time and energy on student recruitment and depend heavily on current students in this process.

Conclusions and Implications: Promoting a Leadership Agenda for Research Training

We recognize that the methods described here are not the only possible ways to meet the challenges of research training and invite others to describe methods that have worked in other settings. Moreover, data are very much needed to document the outcomes of various pediatric psychology research training programs (e.g., students' success in achieving jobs as researchers, research productivity, and job satisfaction).

The challenges of developing the careers of researchers in pediatric psychology will necessitate multifaceted strategies that transcend individual programs. For example, SPP's continuing efforts to promote and recognize the work of student researchers through research and dissertation awards have been very important, but may need to be expanded to include funding for junior level researchers. In addition, the "lessons learned" by successful researchers need to be described in multiple venues (e.g., panels at professional meetings or newsletters). The potential opportunities in the field of pediatric psychology for students at all levels need to be

made visible in courses, as well as publications that describe graduate programs (e.g., Sayette, Mayne, & Norcross, 1999).

Another pressing need concerns expansion of job options for students who wish to pursue careers as pediatric psychology researchers. Some students' interests in research careers may be dampened by what they perceive as a limited market for researchers in this field. For this reason, mentors need to not only inspire but support the next generation of researchers by helping to create as many viable professional options for them to develop as researchers as are possible.

We believe that the messages concerning the vision of the professional future of researchers in pediatric psychology that mentors provide their students may be very influential in their careers. Are we encouraging, pessimistic, or only lukewarm about the prospects for our students' research careers and their potential to become successful researchers? Talented but worried students who are concerned about their professional futures as pediatric psychologists, let alone as researchers, have posed penetrating questions to us such as the following: "Will there be a job for me?" "Can I really expect to find a job that will fit with my research and professional interests?" To our minds, the proper "answer" to such important questions is to pose an alternative set of questions and challenges to our students and ourselves. We might want to ask our students (and help them answer) the following questions: How can they, as future leaders, best shape the future direction of the field of pediatric psychology? How can they be best equipped by their mentors and training programs to use their talents to create their own research opportunities and professional niches? How can their research talents and training best address important public health problems? Our belief is that those mentors and training programs that are the most successful in helping students address these questions will be the ones that will shape the future of research training in pediatric psychology well into the new millennium. We

invite others to contribute descriptions of models of training pediatric psychology researchers that are successful in addressing these and other questions.

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References

- Berkoff, K., & Drotar, D. (1994). Coping styles and health-related behaviors in pediatric and internal medicine house staff: The role of personality styles, gender, and year of training. Journal of Developmental & Behavioral Pediatrics, 15, 162-169.
- Berkoff, K. & Rusin, W. (1991). Pediatric house staff: Psychological response to call duty. Journal of Developmental & Behavioral Pediatrics, 12, 6-10.
- Brown, A.L. (1997). Transforming schools into communities of thinking and learning about serious matters. American Psychologist, 52, 399-413.
- Brown, K.J., & Roberts, M.C. (2000). Future issues in pediatric psychology: Delphic Survey. Journal of Clinical Psychology in Medical Settings, 7, 5-16.
- Brown, R.T. (2000). The President's Message. The pediatric psychologist in the year 2010. Progress Notes. Newsletter of the Society of Pediatric Psychology, Division 54, American Psychological Association, 24, 1-2
- Burgess, E., Drotar, D., Taylor, H.G., Wade, S., Stancin, T., & Yeates, K.O. (1999). The family burden of injury interview (FBII): Reliability and validity studies. Journal of Pediatric Psychology, 24, 405-414.
- Center for Advancement of Health (1999). Cultivating capacity: Advancing NIH research training in the health-related behavioral and social sciences. Washington, D.C.: Author.
- Drotar, D. (1989). Psychological research in pediatric settings: Lessons from the field. Journal of Pediatric Psychology, 14, 67-74.
- Drotar, D., (1990). Coming of age: Critical challenges in the future of pediatric psychology. Journal of Pediatric Psychology, 15, 1-14.

Drotar, D. (1991). Shared dilemmas of research and practice in behavioral and developmental pediatrics. Introduction to the special issue on research methodology. Journal of Developmental & Behavioral Pediatrics, 13, 347-349.

Drotar, D. (1993). Influences on collaborative activities among psychologists and physicians: Implications for practice, research, and training. Journal of Pediatric Psychology, 18, 159-172.

Drotar, D. (1994). Psychological research with pediatric conditions. If we specialize, can we generalize? Journal of Pediatric Psychology, 19, 403-414.

Drotar, D. (1995). Consulting with pediatricians: Psychological perspectives. New York: Plenum Publishing Corp.

Drotar, D. (1997). Intervention research: Pushing back the frontiers of pediatric psychology. Journal of Pediatric Psychology, 22, 593-606.

Drotar, D. (1998). Training students for careers in medical settings: a graduate program in pediatric psychology. Professional Psychology: Research and Practice, 29, 402-404.

Drotar, D. (Ed.). (2000a). Handbook of research in pediatric and clinical child psychology. New York: Kluwer Academic/Plenum Publishers.

Drotar, D. (2000b) Training professional psychologists to write and publish. The utility of a writers' workshop seminar. Professional Psychology: Research and Practice, 31, 453-457.

Drotar, D. (2000c). Managing research in pediatric and child clinical psychology. In D. Drotar, (Ed.). Handbook of research methods in clinical child and pediatric psychology (pp.245-260). New York: Kluwer Academic/Plenum Publishers.

Drotar, D., Palermo, T., & Ievers-Landis, C. (in press). Commentary: On recommendations for the training of pediatric psychologists: Postdoctoral training. Journal of Pediatric Psychology.

Drotar, D., Sturm, L., Eckerle, D., & White, S. (1993). Pediatric psychologists' perceptions of their work settings. Journal of Pediatric Psychology, 18, 237-248.

Drotar, D., Timmons-Mitchell, J., Williams, L.L., Palermo, T.M., Levi, R., Robinson, J.R., Riekert, K.A., & Walders, N. (2000). Conducting research with children and adolescents in clinical and applied settings: Practical lessons from the field. In D. Drotar, (Ed.). Handbook of research methods in clinical child and pediatric psychology (pp.261-280). New York: Kluwer Academic/Plenum Publishers.

Kelley, D., Nixon, C.T., & Bickman, L. (2000). Evaluating mental health services for children and adolescents. In Drotar, D. (Ed). Handbook of research in pediatric and clinical child psychology: practical strategies and methods (pp.463-490). New York: Kluwer Academic/Plenum Publishers.

Kodish, E. (1998). Informed consent in the children's cancer group. Grant funded by National Cancer Institute.

LaGreca, A.M., Stone, W.L., Drotar, D., & Maddux, J.E. (1988). Training in pediatric psychology: Survey results and recommendations. Journal of Pediatric Psychology, 13, 121-139.

LaGreca, A.M., Stone, W.L., & Swales, T. (1989). Pediatric psychology training: An analysis of graduate, internship, and postdoctoral programs. Journal of Pediatric Psychology, 14, 103-116.

Levi, R.B., Drotar, D., Yeates, K.O., & Taylor, H.G. (1999). Post traumatic stress symptoms in children following orthopaedic or traumatic brain injury. Journal of Clinical Child Psychology, 28, 323-244.

National Advisory Mental Health Council (NAMHC) Behavioral Science Workshop (1999). Translating Behavioral Science into Action.

<http://www.nimh.nih.gov/council/bswsummary.cpm>

National Academy of Science (1994). Meeting the nations needs for biomedical and behavioral scientists. Washington, D.C.: National Academy Press.

Nathan, D.C. (1998). Clinical research: perceptions, reality and proposed solutions. Journal of the American Medical Association, 280, 1427-1431.

Needlman, R., Walders N., Kelley, S., Higgins, J., Sofranko, K. & Drotar.D. (In press). Impact of screening for maternal depression in a pediatric clinic: An exploratory study. Ambulatory Child Health, 5, 61-71.

Olson, R.A., Mullins, L.L., Gillaran, J.B., & Chaney, J.M. (1994). The sourcebook of pediatric psychology. Boston: Allyn & Bacon.

Quittner, A.L. (2000). Improving assessment in child clinical and pediatric psychology: Establishing links to process and functional outcomes. In Drotar, D.(Ed). Handbook of research in pediatric and clinical child psychology (pp. 119-144). New York: Kluwer Academic/Plenum Publishers.

Riekert, K.T., Stancin, T., Palermo, T.J. & Drotar, D. (1999). A psychological behavioral screening service: use, feasibility and impact in a primary care setting. Journal of Pediatric Psychology, 24, 405-414.

Roberts, M.C. (1988). Vale dictum: An editor's view of the field of pediatric psychology. Journal of Pediatric Psychology, 17, 785-805.

Roberts, M.C. (1991). Overview to prevention research: Where's the cat? Where's the cradle? In J.H. Johnson & S.B. Johnson (Eds.), Advances in child health psychology (pp. 95-114). Gainesville: University of Florida Press.

Roberts, M.C. (1995). Handbook of pediatric psychology. Second Edition. New York: Plenum Publishing Corp.

Roberts, M.C., & McNeal, R.E. (1995). Historical and conceptual foundations of pediatric psychology. In M.C. Roberts (Ed.), Handbook of pediatric psychology. Second Edition (pp. 3-18). New York: The Guilford Press.

Routh, D.K. (1988). A places-rated almanac for pediatric psychology. Journal of Pediatric Psychology, 13, 113-119.

Routh, D.K., & LaGreca, A.M. (1990). Current status of graduate training in pediatric psychology: Results of a survey. In P.R. Magrab & Wolhford (Eds.), Improving psychological services for children and adolescents with severe mental disorders: Clinical training in psychology, (pp 139-144), American Psychological Association, Washington, D.C.

Sayette, M.D., Mayne, T.J., & Norcross, J.C. (1999). Insider's guide to graduate programs in clinical and counseling psychology. 1998/1999 Edition. New York: Guilford Press.

Spirito, A., Brown, R.T., Angelo, E.D., Delameter, A., Rodrigue, J., & Siegel, L. (in press). Recommendations for the training of pediatric psychologists. Journal of Pediatric Psychology.

Walders, N. (2001). A randomized, controlled study of a problem-solving intervention for pediatric asthma. Unpublished Ph.D. dissertation. Case Western Reserve University, Cleveland, Ohio.

Williams, S., & Kohout, J.L. (1999) Psychologists in medical schools in 1997: Research brief. American Psychologist. 54, 272-276.