Applying the Cube Model to Pediatric Psychology: Development of Research Competency Skills at the Doctoral Level

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Objectives This article considers the development of research competencies in professional psychology and how that movement might be applied to training in pediatric psychology. The field of pediatric psychology has a short but rich history, and experts have identified critical competencies. However, pediatric psychology has not yet detailed a set of research-based competencies. Methods This article initially reviews the competency initiative in professional psychology, including the cube model as it relates to research training. Next, we review and adapt the knowledge-based/foundational and applied/functional research competencies proposed by health psychology into a cube model for pediatric psychology. We focus especially on graduate-level training but allude to its application throughout professional development. Results We present the cube model as it is currently being applied to the development of a systematic research competency evaluation for graduate training at our medical/clinical psychology doctoral program at the University of Alabama at Birmingham. Based on the review and synthesis of the literature on research competency in professional psychology we propose future initiatives to develop these competencies for the field of pediatric psychology. Conclusions The cube model can be successfully applied to the development of research training competencies in pediatric psychology. Future research should address the development, implementation, and assessment of the research competencies for training and career development of future pediatric psychologists.

Key words assessment; professional and training issues; research design and methods.

The publication of Logan Wright’s (1967) seminal article, “The Pediatric Psychologist: A Role Model,” played a pivotal role in the conceptualization of pediatric psychology as a multifaceted and integrated field of science and clinical practice. Pediatric psychology addresses a range of physical and psychological development, health, and illness issues affecting children, adolescents, and their families, with an emphasis on evidence-based methods (Steele & Aylward, 2009). Although the field has developed a clear identity grounded in the broad foundations of clinical psychology, it remains relatively young. Not surprisingly, formal initiatives to develop and implement training standards, particularly within the domain of research, are lagging.

Early recommendations on training clinical child and pediatric psychologists appeared in the late 1980s (Roberts et al., 1998) and were expanded in the late 1990s (La Greca & Hughes, 1999), but it was not until the Society of Pediatric Psychology (SPP) convened a task force in 2003 that specific and detailed directives for training pediatric psychologists emerged. The 2003 task force, composed of recognized leaders in the field of pediatric psychology, developed and published guidelines that
provided a blueprint for programmatic competency-based skills deemed necessary to be recognized as a pediatric psychologist (Spirito et al., 2003). The document identified 12 domains of training: lifespan development; lifespan psychopathology; child, adolescent, and family assessment; intervention strategies; research; professional, ethical, and legal issues; diversity; role of multiple disciplines in service delivery; prevention; family support; and health promotion; social issues affecting children, adolescents, and families; consultation and liaison roles; and disease process and medical management. The 2003 guidelines offer an excellent framework for structuring training program curricula to support the professional development of pediatric psychologists, but more detailed guidelines focused on research competencies are urgently needed. Such guidelines would advance the scientific field of pediatric psychology and influence clinical practice.

Since the 2003 SPP task force guidelines were developed, there has been a broader pedagogical shift in the field of professional psychology toward identifying core professional competencies as a basis for defining and measuring trainee learning outcomes (Nelson, 2007). Within several subspecialties of clinical psychology, training councils and professional societies have developed frameworks to define and assess competencies expected of psychologists at various stages of training (Rodolfa, Rehm, Bent, Nelson, & Ritchie, 2005). The subfield of health psychology, for example, has expended considerable effort to identify both general and specific research competencies for appropriate entry into the workforce (Masters, France, & Thorn, 2009). Pediatric psychology has not yet articulated such competencies or benchmarks.

This article was developed to consider research competencies the field of pediatric psychology might adopt. We focus on research competency given the importance of research to inform the highly specialized nature and demands of pediatric psychology settings (Brown & Roberts, 2000; Drotor, 2000), and the urgent need in the field to train future generations of pediatric psychology researchers (Brown & Roberts 2000). Our goal is to expand on Spirito et al.’s (2003) blueprint for guidelines of research training and offer an initial set of competencies that might be used to assess and verify training in pediatric psychology research competency. To do so, we first review the competency initiative that has emerged prominently in professional psychology, including the “cube model” of competency (Rodolfa et al., 2005), as it relates specifically to research training. Next, we examine published research competencies outlined in related subfields, with a focus on work in health psychology (France et al., 2008). Last, we adapt existing health psychology competencies and the cube model as a framework for addressing research skill development in pediatric psychology training. The focus of this article is on research skill development at the graduate level, and we use our PhD program in Medical/Clinical psychology at the University of Alabama at Birmingham (UAB) as a model, although we believe this initial work could easily be extended to undergraduate training, as well as to postdoctoral and junior faculty training.

**Competency Initiative in Professional Psychology**

The field of clinical psychology, including its regulatory and accrediting bodies, is moving away from an activity-based model of training to one that is competency based (Roberts, Borden, Christiansen, & Lopez, 2005). Professional psychologists define competency as the “habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served” (Epstein & Hundert, 2002, p. 226). Competencies are generally conceptualized as elements or components of competence and consist of discrete knowledge, skills, and attitudes (Kaslow, 2004). Competence implies broad performance at an acceptable level and presumes integration of multiple individual competencies.

The first widely accepted model of competencies for psychological education and training programs was developed by the National Council of Schools and Program of Professional Psychology (NCSPP) (Fouad et al., 2009; Peterson, Peterson, Abrams, & Stricker, 1997). The NCSPP model identified and defined six core competency areas, including research, that were considered relevant to the training and practice of psychology. Under this model, program curricula were designed to develop competencies based on foundations of scientific and practical knowledge and skills, as well as attitudes, values, and ethical behaviors appropriate to the practice of psychology. Later models, similar to the first, emerged through the work of the Council of Chairs of Training Councils (CCTC)/Association of Directors of Psychology Training Clinics (ADPTC) and Practicum Competencies in 2001 (Hatcher & Lassiter, 2007).

In 2002, a major event that thrust the competency agenda to the forefront was held in Scottsdale, Arizona. That meeting, called the Competencies Conference: Future Directions in Education and Credentialing (Kaslow, 2004), focused on clarifying issues related to the identification of foundational and functional
competencies, education and training related to these competencies, and their assessment (Roberts et al., 2005). Among the influential results of the conference was the development of the “cube model” to capture the intersection of foundational and functional competencies in a fashion that took into account developmental stages of training (Rodolfa et al., 2005).

The original 2005 version of the cube model was operationalized further in 2009 by the Assessment of Competency Benchmarks Workgroup (Fouad et al., 2009). That group defined training competencies, along with the component knowledge, skills, attitudes, and knowledge concepts expected of trainees from all stages of training (i.e., readiness for practicum, readiness for internship, and readiness for entry into practice). Both Fouad et al.’s (2009) benchmark document and the related tool kit identifying assessment strategies by Kaslow and colleagues (2009) serve as “living documents” (McCutchcheon, 2009) upon which subspecialties such as pediatric psychology and training programs, such as ours at UAB, can build.

**Cube Model of Competency**

The “cube model” is a conceptual model of core competency areas in psychology (Rodolfa et al., 2005). Now considered a standard way to conceptualize competency in professional psychology, the cube model has been adopted as a theoretical basis for defining competency in a range of subfields, including health psychology. Rodolfa et al. (2005) proposed 12 core competencies that were conceptualized as either foundational or functional competencies. Foundational competencies (on the x-axis) referred to the knowledge, skills, attitudes, and values that underlie the functions a psychologist is expected to perform (e.g., understanding of ethics, awareness and understanding of individual and cultural diversity issues, and knowledge of the scientific foundations of psychology). Knowledge and skills in the foundational domains provide the groundwork for psychologists to subsequently acquire functional competency. Foundational competencies are primarily taught in graduate school and during internship, although psychologists continue to expand their knowledge base as changes in the field occur. Functional competencies (on the y-axis) encompassed the major applied functions that a psychologist is expected to perform on a day-to-day basis, each of which requires reflective integration of foundational competencies in problem identification (e.g., assessment, intervention, consultation, and research). The z-axis represented the continuum of training or stages of professional development from graduate training, internship, postdoctoral experiences, entry into the workforce, and culminating in advanced and lifelong learning stages. Conceptually, the cube model assumes that the development of competencies overlaps across developmental stages. In other words, development of one competency relies on and supports development of other competencies. For example, the development of scientific knowledge at the doctoral level overlaps with competency development in assessment, evidence-based intervention, individual/cultural diversity, interpersonal communication, and other domains.

**Research Competency as Outlined in the Cube Model**

Rodolfa et al.’s (2005) cube model’s core foundational competency relevant to research was “scientific knowledge and methods” (i.e., understanding research, research methodology, techniques of data collection and analyses, biological and cognitive-affective bases of behavior, and lifespan human development). Their cube model’s core functional competency relevant to research was “research evaluation” (i.e., generation of research that contributes to the professional knowledge base and/or evaluates the effectiveness of various professional activities). Both of these foundational and functional competencies have been further refined to focus on preparing for health-service practice (Fouad et al., 2009). Specifically, Fouad and colleagues (2009) proposed defining measurable and behavioral anchors that would demonstrate competency at each training level. As an example, a behavioral anchor for readiness for research practicum at the graduate level might be completion of a detailed scientific literature critique. A behavioral anchor at a somewhat more advanced level may include an evaluation of study methodology and scientific basis of findings. In general, behavioral anchors indicate increasing levels of independence at successive developmental levels.

**Application of the Cube Model for Research Competencies in Pediatric Psychology**

The development of training models and lists of core competencies in clinical child and pediatric psychology offer strong foundations for establishing competency-based training in pediatric psychology (e.g., La Greca & Hughes, 1999; Roberts et al., 1998; Spirito et al., 2003). In considering how to apply the cube model to research training in pediatric psychology across all levels of training, we felt it best to integrate the foundational and functional competencies outlined by Rodolfa et al. (2005) and Fouad.
et al. (2009) with the more specific knowledge-based and applied competencies developed for clinical health psychology (France et al., 2008; Masters et al., 2009). We selected health psychology to build from because it shares mutual priorities, research topics, and clinical populations with pediatric psychology. A set of research competencies for pediatric psychology are adapted from health psychology and modeled in cube form in Figure 1, with more specific descriptions in Table I.

**Knowledge-based/Foundational Competencies**

Development of research competency during pediatric psychology graduate training is accomplished through coursework, didactic experiences, clinical and research practice, and mentoring. Additional training opportunities focusing on scientific writing, research ethics, and advanced statistical methods as they apply to frequently used designs in pediatric psychology (e.g., longitudinal research, randomized clinical trials, clinical research, etc.) should be included (Drotar, Palermo, & Landis, 2003). The goal of these varied but integrated experiences is to help achieve appropriate knowledge-based/foundational and applied/functional competencies that will help students to develop a research identity in pediatric psychology and begin the transition to internship and a career in pediatric psychology.

For this article, we have adapted the five knowledge-based/foundational research competencies developed for health psychology for use in training graduate-level pediatric psychology trainees. First, trainees need to gain knowledge regarding the effects of sociocultural populations and contextual factors, and especially the dynamic interplay of various populations and context on health behavior and outcomes. Consistent with ecological theory (Bronfenbrenner, 1977), the focus on contextual settings and influences is critical to pediatric psychology, and training should include understanding the family, the school setting, peer relationships, and broader community and socio-cultural contexts. In order to understand and work with the multiple levels of influence on children and families, students need training on how to consider and account for these factors in the research context. For instance, there may be cultural barriers that influence participation in research or that affect outcome variables like psychological adjustment and coping to illness.

The second proposed knowledge-based/foundational competency considers the role of developmental issues in pediatric psychology research training. While an understanding of developmental issues is important for all psychologists, this issue is paramount for pediatric psychologists. Age-related and/or developmental issues may affect strategies for coping with diseases and should be considered in most research designs and statistical
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<th>Foundational/knowledge-based competencies</th>
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<td>The graduate-level pediatric psychologist will have knowledge of (1) Dynamic interactions between sociocultural and contextual factors (e.g., gender, ethnicity, culture, family, community, etc.) on health behavior and health outcomes.</td>
<td>(1) Understand cultural factors at the individual, familial, and societal level that affect pediatric chronic illness conditions, disease symptoms, complications, and medical management. (2) Understand sociocultural factors that affect health promotion, illness prevention, and disease progression. (3) Understand sociocultural factors that might discourage or prevent participation in research and how to circumvent these.</td>
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<td>(2) Causal pathways between contextual, psychosocial, biological, and developmental phenomena as they relate to health promotion, illness prevention, and disease progression.</td>
<td>(1) Familiarity with all levels of influence on child and family functioning. (2) Familiarity with normal and abnormal development in cognitive, emotional, behavioral, and physical domains. (3) Understand potential interactions across influences and how to account for these in research design.</td>
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<td>(3) Scientific foundations and methods of psychological research, including various types of research design, data collection techniques, and data analysis, as well as knowledge of evidence-based treatment.</td>
<td>(1) Knowledge of scientific foundations/methods of psychology as well as the foundations and methods of related disciplines as they apply to pediatric psychology. (2) Familiarity with research designs particularly relevant to pediatric psychology (e.g., longitudinal, randomized clinical trials, structural equation modeling, and single-case design) and program evaluation designs.</td>
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<td>(4) Integration of theory, research, and practice across psychology and related disciplines (e.g., epidemiology, physiology, pediatrics, and education) and strengths and pitfalls of interdisciplinary collaborative research.</td>
<td>(3) Familiarity with evidence-based practice.</td>
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<td>(5) Legal–ethical issues relating to interdisciplinary research with children and families.</td>
<td>(1) Knowledge foundations and methods of related disciplines as they apply to pediatric psychology. (2) Utilize clinical experiences to inform research hypotheses and design.</td>
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**Functional/applied competencies**

The graduate-level pediatric psychologist will be able to:

(1) Apply sound research design methodologies to address contextual, psychosocial, biological, and developmental processes as they relate to health promotion, illness prevention, and disease progression.

(2) Select, apply, and interpret data-analytic strategies that are best suited to the diverse research questions and levels of analysis characteristic of pediatric psychology.

(3) Accurately and efficiently communicate research findings in a manner that is consistent with the highest standards within the profession.

(1) Knowledge and ability to utilize single-subject, cross-sectional, and longitudinal designs within pediatric populations.

(2) Apply appropriate methodologies.

(3) Apply knowledge of pediatric chronic illness/injury condition, symptoms, complications, and disease prevention/management to methodological decisions.

(1) Specialized statistical training focusing on broad statistical knowledge, consultation, and analysis rather than simple mastery of methods.

(1) Interpreting and dissemination research findings to other psychologists, medical teams, the broad scientific community, and the lay community public through manuscripts, posters, oral presentations, and interviews with the mass media.

(continued)
analyses. Competency also should be honed in understanding the risk and protective factors relevant to health promotion, disease progression, and prevention research relevant to children and youth development.

The third knowledge-based/foundational competency asserts that trainees should have an understanding of scientific knowledge and methods. This knowledge, which should include understanding research methodology, data collection techniques, and data analyses, must be developed quickly during graduate training, but then maintained, improved, and honed as pediatric psychologists continue along their career paths during fellowship, entry level positions, and throughout their careers (Drotar et al., 2003).

Learning complex research design strategies such as prospective longitudinal studies and randomized controlled trials typically requires a lengthy commitment. Nonetheless, these methodologies are particularly important for pediatric psychologists as they apply to understanding critical child health processes such as coping and adjustment (e.g., paternal coping with childhood cancer), or executive function abilities (e.g., youth with traumatic brain injury) that may change over time, and to understanding which intervention strategies are efficacious to treat particular pediatric psychology problems (e.g., adherence difficulty to diabetic or postsolid organ transplant regimens; strategies to train children to reduce pediatric injury risk). Thus, graduate students, interns, and postdoctoral fellows should be exposed to studies utilizing prospective longitudinal designs and to randomized clinical trials. Pediatric psychologists entering the workforce would be expected to have greater proficiency in conceptualization, design, and implementation, and would usually have participated in such studies. More advanced pediatric psychologists would continue to hone these research skills and have the ability to independently design and conduct such investigations.

The fourth knowledge-based/foundational competency asserts that trainees should have knowledge of interdisciplinary systems, particularly the integration of theory, research, and practice across psychology and related disciplines. In addition to psychological science, trainees need working knowledge of basic concepts from epidemiology, physiology, pediatrics, public health, and potentially other disciplines, along with understanding of scientific foundations, methods of education, and developmental learning processes. Trainees’ ability to integrate concepts and methodologies across disciplines is critical to the development of sound scientific research in pediatric psychology. In addition, knowledge of the roles and potential research contributions of various allied health disciplines, as well as educational science and theory, are important. Effective collaboration is a key component in pediatric research and may involve work with medical providers, school personnel, and others.

While undergraduate training might focus on exposure to interdisciplinary teams and shadowing experiences to understand better the roles of various team members, graduate training should offer the opportunity for greater focus in the domain of interdisciplinary systems. This focus should include understanding of the pediatric psychology literature through reading scholarly journals, and becoming familiar with pediatric organizations and societies, including awareness of advocacy efforts. Pediatric psychologists entering the workforce should become involved in training pediatric residents and other professionals, and might participate on select hospital committees. More advanced pediatric psychologists may seek opportunities to actively

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<th>Foundational/knowledge-based competencies</th>
<th>Research training focus</th>
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<td>(4) Participate in and lead multidisciplinary research teams to investigate aspects of chronic illness from a variety of perspectives</td>
<td>(1) Understand and is familiar with language used by other disciplines</td>
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<td>(5) Work toward translation of research findings into evidence-based practice and policy</td>
<td>(2) Targeted clinical practice to obtain clinical experiences to develop and refine research questions</td>
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<td>(3) Demonstrate respect for other disciplines and their research methodologies while maintaining rigorous standards</td>
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<td>(4) Understand research role and expected contribution (i.e., principal investigator, co-investigator, consultant, and program evaluator)</td>
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<td>(1) Integrate research and practice to facilitate skill development in program development, evaluation, and intervention research</td>
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<td>(2) Apply research findings in clinical-care settings</td>
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contribute on committees that develop practice guidelines for pediatricians (e.g., Psychosocial Committee of the AAP) and work to enhance pediatricians’ understanding of the roles and skills of pediatric psychologists in the changing healthcare field (Spirito et al., 2003).

The fifth and final knowledge-based/foundational competency requires trainees to be aware of the potential legal and ethical issues involved when designing pediatric research studies (e.g., end of life issues, transplant, genetic counseling, domestic violence in the family, child abuse and neglect, and working with special populations).

**Applied/Functional Competencies**

The knowledge-based/foundational competencies are tied to the development of applied/functional competencies as the trainee gains practical exposure through participation in mentored research and clinical training. Most PhD programs expose students to all phases of a research project (e.g., developing hypotheses, writing proposals, submitting for IRB approval, data collection, data analyses, presenting results at scientific meetings, and publishing findings). Also critical are exposure to skills in reviewing journal articles, writing and reviewing grant proposals, and critiquing and evaluating research. Training programs need breadth and depth of resources and should not be limited to one theoretical perspective or methodology. Thus, we have adapted the five applied/functional research competencies for health psychology, specifically for use in training graduate-level pediatric psychology trainees.

First, trainees need to be able to select and apply sound research design to investigate contextual, psychosocial, biological, and developmental processes as they relate to issues of health promotion, illness and injury prevention, and disease progression. This requires the trainee to design studies using high-quality methodology and evidence-based treatment and practices. For example, the ability to conduct experimentally controlled single-subject research design is important to pediatric psychology training because of the low incidence of certain diseases or conditions. In addition, trainees need to be familiar with assessment issues such as selecting psychometrically sound measures that have been used in the scientific literature and are appropriate for the population.

Second, trainees must have the ability to select, apply, and interpret data analysis strategies appropriate to the diverse research questions and levels of analysis encountered in pediatric psychology. Expertise in selecting and implementing descriptive, correlational, and experimental research designs is important. Additionally, training in longitudinal data analysis, including structural equation modeling, is important considering the developmental component involved in much pediatric psychology research.

Third, trainees need to accurately communicate findings through written or oral formats. This includes publication in peer-reviewed journals, poster and paper presentations at local and national conferences, as well as presentations within the local community (e.g., grand rounds, psychology colloquium, school/community presentations, etc.). Expectations at this level will vary by level of training. For example, undergraduate students might be expected to author or co-author and present a poster at a local or regional conference from a study they assist with, while graduate students and postdoctoral fellows might be expected to publish peer-reviewed manuscripts, as well as to present work at national and/or international conferences.

Fourth, consistent with the prior competency, trainees should learn skills necessary for participating in various roles on multidisciplinary research teams (e.g., collaborator, consultant, and principal investigator). Trainees need to recognize the value in all levels of involvement and demonstrate the requisite “humility of a scientist” (Masters et al., 2009). Furthermore, as most pediatric psychology research requires working knowledge of the language and measurements of other disciplines (e.g., medicine, endocrinology, and radiation oncology) trainees must become well-versed in the technical language and conventions of other health-oriented disciplines.

Finally, trainees should be exposed to the process of translating research findings into evidence-based practice and policy. For example, the well-known research on neuropsychological deficits following cranial radiation therapy in pediatric brain tumor survivors has resulted in standardized neuropsychological screening prior to beginning radiation therapy for all patients at Children’s of Alabama in Birmingham, Alabama. While policymaking itself would likely not be an expected competency until early faculty training level, graduate students, interns, and postdoctoral fellows should be exposed to the process.

We view these proposed knowledge-based/functional and applied competencies to grow directly from those outlined in the 2003 Task Force (Spirito et al., 2003). In fact, that Task Force report concludes by explaining how they had expanded upon and built from earlier reports in the 1980s and 1990s. We claim here to extend the field another decade by merging what has been developed in pediatric psychology with the changes in the broader fields of clinical psychology and health psychology. We believe that the competencies we draft above provide the initial take on the research competencies contemporary pediatric psychologists should gain, both during training.
and throughout their professional development. This initial outline might be honed and finalized by an appropriate group of experts in the field over the coming years.

**Our Application of Research Competencies and Benchmarks at UAB**

As the field has moved toward competency-based training, many psychology graduate programs have explored ways to incorporate assessment of competencies, including research competencies, into their training curricula. At our Medical/Clinical Psychology PhD Program at UAB, we are in the process of developing a competency-based student evaluation form based on the health psychology work published by France and colleagues (France et al., 2008; Masters et al., 2009). We anticipate that this form will be completed for each student's research practicum experience to evaluate student progress toward internship-ready research competency (See Table II for sample sections of the form that is in development).

This form is particularly helpful in a training program like ours where pediatric psychology students do not necessarily follow a strict mentorship model, but rather seek research (and clinical) training in multiple different departments and hospital settings. Students training in pediatric psychology have research mentors in the UAB Departments of Psychology (College of Arts and Sciences), Pediatrics (School of Medicine and Children’s Hospital), Adolescent Psychiatry (School of Medicine), Health Behavior (School of Public Health), Civitan International Research Center, Sparks Clinics, and Glenwood, Inc. (a private practice facility in the community focused on autism and developmental disabilities), among others. Given the breadth of student training, a broad research competency form is extremely helpful for at least three reasons. First, it helps supervisors and mentors understand students’ progress and preparation in research as they move through the program toward internship. Second, it helps students themselves by offering feedback on progress toward their degree and the opportunity to seek remedial assistance when needed. Third, it documents students’ progress and allows the program to meet accreditation requirements and protecting us in very rare cases of student failure that might lead toward dismissal from the program. We believe this form could be adapted and used in both large and small pediatric psychology training programs, regardless of whether there is a primary mentor, multiple supervisors, single or multiple training sites, and/or a formal pediatric track/focus. Additionally, the identified competencies may be applied to other psychology subspecialties such as clinical child or health psychology.

As shown in Table II, the form includes two sections. Students complete the first section themselves, by listing completed and in-progress coursework and relevant pediatric clinical experiences. This portion is completed prior to beginning of the research practicum and helps supervisors understand students’ training background. In our program, it is common for supervisors to accept previously unfamiliar students for training. The first page allows the student and supervisor to formulate individualized research training goals together. The second section of the form is completed at the end of the practicum. It includes rating scales to identify and rate the student’s competency for each specified subgoal. Subgoals include competency indicators rated as “Achieved” (A), “Emerging” (E), “Not Observed” (NO), or “Not Applicable” (N/A). Ratings are shared with the student and are used to monitor student progress, plan for remediation if needed, and to reward high-quality work.

In our program, individual competency evaluations are used most frequently by the students’ mentorship committee (typically consisting of three faculty members) to work with individual students to develop an individualized training plan. The research training aspect of this plan, based in the scientist–practitioner model, focuses on integrating research and practice through sequential training experiences. It provides the student with experiences necessary to develop knowledge-based/foundational and applied/functional competencies and to prepare students for internship and careers consistent with their training goals.

For example, a student with a focus in pediatric hematology–oncology and a career goal combining clinical practice and research in a children’s hospital university setting would take the prescribed coursework in the program plus specialty child and/or developmental elective courses. The student would seek and obtain focused research practicum experiences in pediatric oncology. Clinical experiences in consultation, assessment, and intervention would broaden the trainee’s understanding of the oncology disease process, symptoms, complications, and medical management. Research training for this example student would include identifying critical research needs within pediatric oncology and defining and refining research questions (e.g., physical activity patterns in childhood cancer survivors). They also would have opportunities for collaborative research with oncologists and pediatricians, participate in multiple research studies using various research designs, and obtain close faculty mentorship during completion of a student-driven MA thesis and PhD dissertation. Emphasis in research training would include development of specialized knowledge, experience with interdisciplinary collaboration, and exposure to a
Table II  UAB Pediatric Psychology Evaluation Form

**UAB MEDICAL/CLINICAL PSYCHOLOGY PROGRAM**  
Research Evaluation Form  
(PY 797-______)  (#Credit hours_______)

| Name: ____________________________ | Semester: ☐ Fall ☐ Spring ☐ Summer |
| Lab/Training Site: ____________________________ | Supervisor: ____________________________ |

This evaluation is a reflection of the professional knowledge, skills, and attitudes assessed in the context of this specific practicum and will be combined with additional evaluations for the use by the student’s Graduate Student Committee to determine the overall progress and competency of the student.

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<td>PY 740 Adult Personality &amp; Psychopathology.....</td>
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(continued)
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**KNOWLEDGE-BASED COMPETENCIES**

I. Knowledge of scientific theory, related to dynamic interactions between sociocultural populations and contextual factors

**Sub-goals**

1a. Demonstrates understanding of scientific theory and its implications to pediatric psychology research. 


II. Knowledge of causal pathways between contextual, psychosocial, biological, and developmental phenomena as it relates to health promotion, injury prevention, and disease progression

**Sub-goals**

2a. Demonstrates understanding of relevant basic developmental and physiological functioning, and their implications for research program.

2b. Demonstrates understanding of pediatric chronic illness or injury conditions, symptoms, complications, and disease management relevant to the research program.

2c. Understand potential interactions across influences and how to account for them in research design.

**APPLIED COMPETENCIES**

I. Apply sound research design methodologies to address contextual, psychosocial, biological, and developmental processes as they relate to health promotion, illness/injury prevention, and disease progression

**Sub-goals**

1a. Understands and applies appropriate research methodology to research questions.

1b. Understands and applies knowledge of pediatric chronic illness/injury condition, symptoms, complications, and disease prevention/management to methodological decisions.

1c. Understands and applies developmental processes as they relate to methodological decisions.

1d. Understands and appropriately utilizes cross-sectional, longitudinal, and single subject designs.
range of methodologies, including intervention and prevention research (Drotar et al., 2003). By the time the student graduates, he or she would have extensive opportunities and experiences to develop all desired research-based competencies and would be a strong candidate for pediatric psychology internship placements, postdoctoral training, and ultimately the desired career in pediatric psychology research and practice.

Conclusions and New Directions

Pediatric psychology is a young and blossoming subfield. This article lays a foundation for pediatric psychologists to join together, following the lead of clinical and health psychologists, and specifies knowledge-based/foundational and applied/functional research competencies that we believe necessary for adequate pediatric psychology training. Concurrent to development of research competencies, we should also move to articulate benchmarks for broad competency acquisition specific to training at each stage of the education, training, and credentialing sequence. We hope this article initiates and inspires those efforts.

In creating competencies and benchmarks for pediatric psychology, attention should focus on how competencies might be achieved (e.g., single courses, sequential courses, supervised experiences, etc.) and assessed along the training continuum (i.e., at undergraduate level, through doctoral training, internship, postdoctoral fellowship, entry into the workforce, and ongoing professional development). Due to the unique populations studied and served by pediatric psychologists’ work, new and specific ways to teach and assess competency may be needed.

So, what is the next step? We recommend both short- and long-term solutions. In the long term, formation of a Society of Pediatric Psychology Task Force to build upon the recommendations of the 2003 Task Force and create a set of recommended competencies for pediatric psychology training is an appealing option. The Task Force could be modeled closely after the 2003 group and might include some of the same members. Although creation of such a Task Force would involve some expense (both financial and temporal), we view it to be the best way for the field to work together to move toward development of guidelines to most effectively train future generations of pediatric psychologists.

Of course, development of a Task Force, and ultimately creation of consensus competency guidelines, is not a process that will occur quickly and therefore does not address immediate training issues. In the interim, we suggest initiation of professional dialog, perhaps beginning with a survey of training directors in pediatric psychology programs to address at least four questions.

First, how should competency (including research competency) in pediatric psychology be developed and prioritized? Second, how will benchmarks from Fouad and colleagues (2009) be refined to fit pediatric psychology? As an example, graduate training programs typically structure curricula with planned and prerequisite coursework so that students take courses in sequence, building more advanced coursework on top of basic foundation courses. This strategy assumes that the courses build on each other to help the student develop research competence. However, a competency-based model is based on an individual student’s development, and consequently coursework would have to be tailored to optimize the student’s development.

Third, how will pediatric psychology competencies be assessed, and who will be responsible for the evaluations? In addition to obvious assessment strategies (e.g., grades at the end of coursework), regular evaluations assessing students’ progress are needed. Such evaluations will allow supervising faculty to intervene quickly if students progress inadequately (Kaslow et al., 2007). Although measures of research competency in pediatric psychology are yet to be completed and psychometrically tested and validated, the plan of obtaining assessment of competencies by the students supervising research pediatric psychologist in collaboration with the student’s mentoring committee and his or her interdisciplinary team provides for a more thorough evaluation of research skills because it includes the perspective of multiple mentors. Belar (2009) aptly concludes that “psychology needs to be a leader in advancing the culture of competence. We need to promote the education and training of our own professionals, and we need to apply our knowledge and skills to the measurement of behavior fundamental to the health system” (p. S65). The field of pediatric psychology has unique opportunities to adapt and model the assessment of selected knowledge-based and applied competencies that will ensure practice based on science among its developing professionals.

Lastly, how will competencies among related sub-specialties differ and parallel each other? Pediatric psychologists must consider the uniqueness of our research field, as well as the similarities to clinical psychology, health psychology, and clinical child psychology, in order to develop innovative techniques to assess competency across the span of a career, develop valid and reliable competency assessments, and ultimately improve training, practice, and research in our field (Roberts et al., 2005).

In conclusion, the field of pediatric psychology is at an exciting juncture. We look forward to collaborating with
others to push the field forward and to develop, implement, and assess research competencies for training and career development of future pediatric psychologists.

Conflicts of interest: None declared.

References


