The future of psychotherapy for mentally ill children and adolescents

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Objective: Given striking advances in translational developmental neuroscience and its convergence with developmental psychopathology and developmental epidemiology, it is now clear that mental illnesses are best thought of as neurodevelopmental disorders. This simple fact has enormous implications for the nature and organization of psychotherapy for mentally ill children, adolescents and adults. Method: This article reviews the ‘trajectory’ of psychosocial interventions in pediatric psychiatry, and makes some general predictions about where this field is heading over the next several decades. Results: Driven largely by scientific advances in molecular, cellular and systems neuroscience, psychotherapy in the future will focus less on personal narratives and more on the developing brain. In place of disorders as intervention targets, modularized psychosocial treatment components derived from current cognitive-behavior therapies will target corresponding central nervous system (CNS) information processes and their functional behavioral consequences. Either preventive or rehabilitative, the goal of psychotherapy will be to promote development along typical developmental trajectories. In place of guilds, psychotherapy will be organized professionally much as physical therapy is organized today. As with other forms of increasingly personalized health care, internet-based delivery of psychotherapy will become commonplace. Conclusion: Informed by the new field of translational developmental neuroscience, psychotherapy in the future will take aim at the developing brain in a service delivery model that closely resembles the place and role of psychosocial interventions in the rest of medicine. Getting there will be, as they say, interesting. Keywords: Psychotherapy, CBT, behavior therapy, cognitive therapy, brain development, development, neuroscience, physical therapy, internet, psychopharmacology.

‘To ask if consilience can be gained in the innermost domains of the circles, such that sound judgment will flow easily from one discipline to another, is equivalent to asking whether, in the gathering of disciplines, specialists can ever reach agreement on a common body of abstract principles and evidentiary proof. I think they can.’ E.O. Wilson

Epidemiological data from a variety of sources reveals that the great majority of mentally ill adults were first mentally ill as children (Kessler et al., 2005) At the same time, recent advances in translational developmental neuroscience have shown that mental illness can be referenced directly to the developing central nervous system (CNS) and its interactions with the environment (Nelson et al., 2002). Accordingly, it will not be long before efforts to prevent and treat mental illness will begin in childhood using interventions that directly target key neurodevelopmental processes that drive trajectories of development relevant to the origins of mental illness.

With this in mind, my goal in celebrating the 50th anniversary of the Journal of Child Psychiatry and Psychology is not to conduct a critical review of psychosocial interventions in pediatric psychiatry.1 Such a review would inventory current treatments using a stages-of-treatment approach; discuss the need for studies of mechanisms; emphasize the importance of personalized interventions designed to maximize the probability of remission; evaluate guidelines for methodological rigor and as pointers to gaps in the literature; recommend dissemination studies and practical clinical trials; and provide a lengthy discussion of how health care economics will drive the organization and delivery of services. Since the field has no shortage of manuscripts and books covering these topics, I chose instead to reflect on the broad outlook for psychosocial treatments and the scientific developments that will drive them over the next few decades.

Interestingly, the first paper on psychosocial treatment published in the Journal was a study of...
massed practice for tics based in the tenets and practices of experimental psychology (Walton, 1961). Subsequently, however, the Journal has not had a major emphasis on studies of psychosocial treatments. Of approximately 2600 articles published since the Journal’s inception in 1961, only 62 articles were identified on a Medline search for either CBT or psychotherapy and, of these, only six were controlled trials. Thankfully, the papers in this extraordinary special edition of the Journal indicate how far the field has moved toward a firm scientific platform on which to develop and test psychosocial treatments, and how far we still have to go: I have no doubt that as the field matures treatment research in the Journal will follow suit.

Looking back

Three rather general observations might help us to consider the future in the context of what has come before.

First, 40 years of empirical work in developmental psychopathology and developmental epidemiology have led to hundreds of named treatment manuals that address almost every DSM-IV disorder and, within disorders, particular domains of psychopathology (Costello, Egger, & Angold, 2005; Costello, Foley, & Angold, 2006). On the positive side, progress in understanding the presentation of mental illness led directly to substantial progress in developing evidence-based treatments. In 1986, when I first began working out how to implement a developmentally sensitive cognitive-behavioral intervention for youth with obsessive-compulsive disorder (OCD), the general belief was that children with OCD were untreatable. Now the great majority of patients can be helped significantly with brief cognitive-behavioral therapy (CBT) either alone or in combination with medication (J. March & Benton, 2007; POTS, 2004). The challenge these days isn’t knowing what to do, but rather insuring access to the best of evidence-based CBT (Burns, 2003). On the negative side, the tendency for schools of therapy and, within schools, researchers to become parochial and inbred has led to the disastrous isolation from science of some areas of inquiry, particularly psychoanalysis, and has spawned crass commercialism in others, viz., eye movement desensitization and reprocessing (EMDR) and like franchised treatments. More importantly, it continues to make it difficult if not impossible for patients, providers and payers to know how to allocate resources to evidence-based practices (EBP) for which our patients pay a high price.

Second, as illustrated in T.M. Luhrmann’s Of Two Minds: The Growing Disorder in American Psychiatry (Luhrman, 2000), a small but vocal chunk of the field is still mired in the idea that embracing evidence-based practice means condoning mindless, heartless, cookbook medicine that devalues the doctor–patient relationship or even worse the essential humanity of our patients. Underlying this attitude is the split between traditional narrative-oriented psychotherapists and those who advance a disease management approach akin to that used in other areas of medicine. The simple truth is that psychiatry as a field (irrespective of approach or discipline) is irreversibly moving toward an evidence-based platform for assessing and treating mentally ill patients and this platform includes encouraging healthy relationships as a core organizing principle (APA, 2006; Hamilton, 2001, 2005b). In turn, a healthy doctor–patient relationship directly depends on competent care. As in all areas of medicine, our patients mostly want us to tell them what is wrong, what to do to suffer less, and to listen and to speak with kindness and respect.

Third, we know all too little about which treatments work for which patients with which treatment targets or, put simply, we are a long way from reaching the goal of personalized medicine, namely a world without mental illness. Most of what we know involves the application of multi-component treatment manuals in the initial treatment of narrowly-defined disorders in clinical trials that are poorly configured to test mechanisms of treatment response (mediation) and are far too small to segment treatment response (moderation). We are just beginning to learn how to combine treatments along the pathway from initial treatment through recovery. In particular, we know next to nothing about how to manage partial response, treatment resistance, optimal duration of treatment, or how to discontinue treatment. Our best short-term single modality treatments, whether drug or psychosocial, yield a 60% response rate, with combined treatment performing slightly better. While some studies suggest that longer duration treatment improves outcomes (TADS, 2007), fewer patients reach remission or recover fully than respond, illustrating the fact that we desperately need improved treatments if we are make progress toward a world without mental illness. We also need to know how to personalize treatments so that patients who stand to benefit from a treatment will get it and those who will be harmed by it will get a different hopefully equally effective treatment. Thus, while we have made substantial progress, what is left to learn dwarfs what we now know. The good news is that for the first time it is possible to glimpse the end of the road (NAMHC, 2008).

Change drivers

Before making predictions regarding the future, let us turn to three of the most important change drivers that will determine how we come to think about psychosocial treatments for mentally ill patients going forward.
The traditional ‘disease management’ medical model

It will be some time before a unifying body of scientific evidence concerning the etiopathogenesis and treatment of mental illness leads to a reconfigured services delivery system for mentally ill children, adolescents and adults. Nevertheless, it was clear by the late 1970s that a biopsychosocially-oriented disease management model is as powerful a change driver in psychiatry as it is in other areas of medicine. Specifically, three features of the disease management model – the concept of disease and diagnosis, the concept of etiology and treatment, and the nature of the doctor–patient relationship – come into play in clinical psychiatry just as they do in medicine more generally (Ludwig & Othmer, 1977). Though the boundaries are blurring (Kraemer, 2007), psychologists still tend to think dimensionally, advocate for psychosocial treatments and believe that the environment drives psychopathology, while psychiatrists tend to think categorically, advocate for medicines, and believe that biology drives illness. On the practice side, psychology as a discipline (discounting for the moment an activist minority that wants psychology prescribing privileges) remains ambivalent about evidence-based practice in a disease management framework while still embracing EBP as essential to the scientist-practitioner model (APA, 2006). At the same time, psychiatry as a discipline isn’t about to give up its guild privilege to write (some would say all too many (Zito, 2007)) prescriptions.

Despite these conundrums, most practitioners readily accept the idea that mental illness from a phenomenological point of view falls on overlapping dimensions of psychopathology, distress and impairment. Clinicians acknowledge that at some point on a composited dimension they must make a treat or don’t treat decision. The point at which this happens can be represented as a ‘cut score,’ which for all practical purposes is indistinguishable from the point at which a clinician makes a categorical diagnosis. Importantly, at the cutting edge of the interventional practices, the split between dimensional and categorical approaches has given way to a careful functional analysis of behavior that matches up nicely with information-processing models of psychopathology drawn from systems neuroscience.

There is every reason to believe that progress in translational developmental neuroscience will deliver novel biological targets for child-focused psychosocial interventions (NAMHC, 2008). Progress already has been made in understanding the neurobiological mechanisms that underlie response to psychosocial treatment in adults (Mayberg, 2007; Stein, 2008). On the other hand, a deeper understanding of the basic process of neurodevelopment and their relationship to mental illness (Levitt, 2005) will be necessary before we fully understand how psychosocial treatments favorably alter neurodevelopmental trajectories whether at the synapse or at the systems level. Identical in form if not in content to other areas in medicine, this is the traditional medical model in action, one in which psychosocial treatments alone or in combination with medication will play a prominent and irreplaceable role.

Evidence-based medicine (EBM)

At the 2005 annual meeting of the American Academy of Child and Adolescent Psychiatry (AACAP), participants (including both psychologists and psychiatrists) attending the Research Forum argued that pediatric psychiatry would benefit from a principled commitment to follow other areas of medicine in adopting evidence-based practice as the preferred heuristic (March et al., 2004a, 2004b). While the term EBP was chosen instead of evidence-based medicine (EBM) to reflect the interdisciplinary and collaborative nature of the field, there are real disagreements about what constitutes an evidence-based treatment. In the most common approach promoted by academic psychologists (APA, 2008) and also used by the Institute of Medicine (IOM, 2007), expert reviewers using rigorous and tough criteria determine whether a treatment is empirically supported or not. (I’ve always found it a bit odd that a discipline that usually prefers dimensions to categories takes a rigidly categorical view of what treatments can be called evidence-based.) Relative few treatments make it, which may be why the clinician-friendly American Psychological Association statement on EBP (APA, 2006) sounds a lot like the other approach, the Oxford/McMaster version of evidence-based medicine (Sackett, Richardson, Rosenberg, & Haynes, 2000), which explicitly acknowledges a hierarchy of evidence and allows for the incorporation of doctor and patient preferences in the application of the research literature to patient care decisions (Guyatt & Rennie, 2002; Hamilton, 2005a). Evidence-based practice or evidence-based medicine, it is clear to most observers that the twin goals of (1) improving outcomes by reducing heterogeneity of practice through adoption of evidence-based ‘best’ practices and (2) providing an easy way to ‘keep up’ with rapid changes in science are essential to ensuring that patients receive the best possible care. Thus, as better evidence arrives, the movement toward EBM/EBP as the foundational heuristic for teaching, clinical care and research will continue to strengthen (see, for example, Chrisman, Enderlin, Landry, Colvin, & DeJohn, 2007; March, Chrisman et al., 2005a). To move the field toward fully embracing EBP will require greater understanding of what EBP is (and is not), educating mental health professionals in EBP skills, access to EBP resources, and a commitment to apply EBP to the conceptualization and design of research protocols and practice guidelines (March et al., 2007).

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The psychotherapy horse race is over: cognitive-behavior therapy wins

With the emergence of a rich literature on developmental psychopathology in the early 1980s and its continued elaboration since (Rutter & Sroufe, 2000), psychosocial treatment research rapidly moved away from non-specific metacognitive interventions toward sophisticated problem-focused cognitive-behavioral therapies based in part in functional analysis of behavior (Kazdin, 1993; Kendall & Panichelli-Mindel, 1995). Accordingly, we now have evidence-based CBT manuals covering the full range of childhood-onset mental disorders (Hibbs & Jensen, 2005). By emphasizing response- as well as antecedent-focused approaches to the top-down regulation of emotion (Blackledge & Hayes, 2001; Hofmann & Asmundson, 2008), acceptance-based approaches including Acceptance and Commitment Therapy (ACT; Hayes, Luoma, Bond, Masuda, & Lillis, 2006), mindfulness (Allen, Chambers, & Knight, 2006), and dialectal behavior therapy (Shearin & Linehan, 1994) have added a new emphasis (after cognitive therapy (CT) and behavioral therapy (BT)) to the basic framework of cognitive-behavioral therapy (Lau & McMain, 2005). Accordingly, the tripartite model that has long dominated CBT – thinking, feeling, and behavior, social and otherwise – is now reasonably complete and resonates beautifully with recent developments in cognitive, affective, and social neuroscience (Izard, Fine, Mostow, Trentacosta, & Campbell, 2002; Stein, 2008). There are simply no serious contenders other than CBT and no prospect that any will emerge. The best of the alternatives, interpersonal psychotherapy (Mufson et al., 2004), which many consider a variant of CBT despite its Sullivanian origins, is so far behind that it cannot even be considered a close competitor. On the other hand, interpersonal therapy (IPT) beneficially points the field toward a greater emphasis on interpersonal targets, such as family conflict, parental mental illness, peer relationships and the child’s experiences in school, that are known to affect outcome or are important outcomes in their own right. Lastly, the field is moving away from manual-based (disorder focused) CBT toward a more individualized (broader) conceptualization of CBT that accounts for comorbidity and that is personalized to the needs of patients (Chorpita, Becker, & Daleiden, 2007; Piacentini, 2008). Thus, while some may disagree (see, for example, Gabbard & Westen, 2003; Westen, Novotny, & Thompson-Brenner, 2004), it is highly likely that the basic outline for psychosocial interventions in 2030 can be found in today’s CBT.

Translational developmental neuroscience

The fact that mental illness has its origins in the interaction between biology and experience early in life has enormous implications for the nature and organization of psychosocial treatments. The neurodevelopmental processes that go awry in mental illness likely involve time-sensitive modulation in gene expression, cellular interactions, circuit formation and function, and behavior, all interacting alongside environmental experience to produce typical or atypical developmental trajectories. For example, attention deficit/hyperactivity disorder (ADHD) has recently been reframed as a disorder of cortical maturation (Shaw, Eckstrand et al., 2007a), which may be ameliorated by treatment with a psychostimulant (Castellanos et al., 2002). Adolescents who carry the ApoE4 variant that confers an increased risk for Alzheimer’s disease have thinner entorhinal cortices, suggesting that processes leading to overt Alzheimer’s disease in late life already may be active during childhood (Shaw, Lerch et al., 2007b). While there are arguably no ‘mouse models’ for human disease (Insel, 2007), mice lacking the gene encoding the serotonin1A receptor develop anxiety-like behaviors in adulthood, unless the 1A receptor is briefly ‘turned on’ in the early post-natal period (Gross et al., 2002). It isn’t all genetic. Allelic variation in the serotonin transporter produces vulnerability to depression in the presence of early life trauma in a dose-dependent fashion, showing that environmental events powerfully interact with genetic risk to determine who becomes mentally ill. Interestingly, environmental factors also may block or boost gene expression for good or for harm via DNA methylation, histone modification or RNA silencing (Kaffman & Meaney, 2007; Sah, 2006).

As yet, we know very little about how psychosocial interventions for mental illness modify early developmental trajectories at a biological level of analysis. Psychosocial treatments presumably work because they use over-learning strategies to provide corrective information so that patients who do not ‘get it’ in the course of daily living can ‘get it’ via remedial instruction (Foa & Kozak, 1986). Recent advances in dyslexia provide a developmentally sound framework for understanding how the treatment of disordered phonological processing with a psychosocial intervention (intensive tutoring) works directly on the brain by elaborating compensatory neurocircuitry (Shaywitz, Gruen, & Shaywitz, 2007; Shaywitz & Shaywitz, 2005). Genetic programming of glucocorticoid mediated stress reactivity in posttraumatic stress syndrome (PTSD) (Seckl & Meaney, 2006) and the epigenetic amelioration of reactivity by maternal licking and grooming in mice (Kaffman & Meaney, 2007) may offer a partial explanation for the powerful and long-lasting impact of interventions for severely stressed new mothers on distal child outcomes (Leckman & Mayes, 2007; Ols, Sadler, & Kitzman, 2007). Taken together, these examples highlight the fact that the processes that drive developmental trajectories unquestionably reflect complex interactions among genetic, epigenetic and environmental risk and protective factors. In turn,
these processes inevitably will become the targets for psychosocial interventions that aim to restore normal developmental process or to initiate compensatory processes that return a patient to a functional neurodevelopmental trajectory (Casey, Nigg, & Durston, 2007; Fossella & Casey, 2006; Levitt, 2005).

**Looking forward**

Given rapid progress in science, what can we reasonably expect of psychosocial treatments several decades from now?

First, psychiatry will move to a unified cognitive-behavioral intervention model that is housed within neurosciences medicine. The framework for this already has been laid in the development of cognitive-behavioral treatments for virtually all mental disorders in patients of all ages except the very young (Piacentini, 2008). Whether the term CBT survives is unimportant. What is important is that the basic outlines for modular interventions based in the functional analysis of behavior and targeting CNS information processes located on trajectories of development are already in place and will serve as the basis for the psychosocial interventions of the future. Using sophisticated risk/benefit prediction equations, psychosocial interventions will be optimized at the person level in a developmentally sensitive fashion. More often than not, interventions will be streamed over the internet for reasons of uniformity and standardization, ease of delivery, and cost-effectiveness (Clarke et al., 2005; Jerome et al., 2000). Don’t believe it: peruse the Journal of Medical Internet Research (http://www.jmir.org/index), which is currently getting over 50,000 hits per day. Only the most complex and difficult patients will receive their treatment from a live practitioner, but those who do will have providers who understand the processes involved in using the doctor–patient relationship to provide remedial instruction. Other psychotherapies, if they survive at all, will do so outside neurosciences medicine.

Second, progress in translational developmental neuroscience will aid in the development, refinement and personalization of psychosocial treatments. Categorical diagnoses will endure through DSM-V at a minimum, but eventually the field will move beyond the current DSM approach to a nosology based on intermediate phenotypes (reflecting CNS information processes) and linked circuit models of psychopathology much like computer software running on computer hardware. (Information processing models for psychosocial treatment of anxiety were put forward two decades ago (Foa & Kozak, 1986); systems neuroscience is only now catching up (Mayberg, 2007; Stein, 2008).) Differential diagnosis and differential therapeutics will then become something like a game of pickup sticks. With intermediate phenotypes as the sticks, the mental health professional will identify the targets of treatment (the sticks) using computer administered assessment technologies, pair them with target-specific treatments – say, cognitive and exposure-based interventions targeting failures in extinction and extinction retrieval for the anxious patient (Anderson & Insel, 2006) – and sequence these interventions appropriately (pick up the sticks in the proper order). This process will be greatly facilitated through parallel work in model animal systems and in real human children, viz. effects on the acquisition of skills and competencies that may impact experience-dependent neural plasticity, a process readily amenable to research in rodent, primate and human model systems. To this end, Pat Levitt, a developmental neuroscientist at Vanderbilt, and I recently chaired a NIMH National Advisory Mental Health Council (NAMHC) workgroup that called for the creation of a new field, translational developmental neuroscience (NAMHC, 2008). Following the workgroup’s recommendations, we should see the development of trajectory-based assessment tools that cross levels of analysis and experimental platforms, rapid translation of findings from basic and translational science into treatment targets and biomarkers of treatment response, application of systems neuroscience to better understand how intermediate phenotypes are constructively modified by psychosocial and drug treatments, and research infrastructure development as well as training opportunities designed to increase the capacity of the field to speed the translation of basic neurodevelopmental findings into clinical research and eventually into practice.

Third, because most mental illnesses have their origins in childhood, it follows that the prevention of mental illness will necessitate early identification and treatment of mentally ill youth as well as early life prevention—intervention strategies. Selective prevention strategies target subgroups of the general population that are determined to be at risk but as yet show no signs of illness. Genetic and epigenetic risk factors are a particularly good example of risk factors open to selective prevention strategies. It now appears that allelic variation and environmental risk factors are themselves of modest effect while the interaction between the two is a powerful determinant of who becomes mentally ill (see, for example, Caspi et al., 2003; Jaffee et al., 2005). Thus, selective prevention strategies will focus not only on psychosocial interventions for at-risk youngsters but also will emphasize preventive environmental manipulations based on known gene x environment interactions. As exemplified by interventions designed to prevent a first psychotic episode in adolescents and young adults prior to the onset of schizophrenia (McGlashan et al., 2007), indicated prevention interventions identify individuals who are experiencing warning or early signs of illness but who are not diagnosable and target them with special programs. The development
of comprehensive empirically grounded models of pathogenesis can only offer improved targets for prevention and treatment approaches to mental illness across the life span.

Fourth, to speed the translation of findings from translational neuroscience to the clinic and to gather the information necessary to segment treatment response at the level of the individual, it will be necessary to construct very large community-based practical clinical trials (PCT) networks (March, Silva et al., 2005b). One such network, the NIMH-funded Child and Adolescent Psychiatry Trials Network (CAPTN; March et al., 2004), is now fully operational though still a work in progress. By partnering basic, translational and clinical scientists with clinical practices, the NIH Roadmap is intended to further the development of translational research networks (Zerhouni, 2003) via Clinical and Translational Science Awards (CTSAs) to academic medical centers (Zerhouni, 2007). Similar initiatives are under way in Europe and in Asia. To date, neurosciences medicine is poorly represented in the CTSAs. As participation increases, it will be important to insure that the roadmap process is sufficiently flexible to allow (1) biomarker identification and validation germane to psychosocial as well as pharmacological interventions and (2) participation by behavioral scientists from disciplines, like psychology, that at this juncture are poorly served by the roadmap. Viable translational research networks of necessity must address the concerns and needs of clinicians, patients and families, the National Institutes of Health (NIH), industry, and government. Because consortia-based networks are difficult to establish (DeVeaux-Giess et al., 2006; March et al., in press), building the network infrastructure needed to support translational developmental neuroscience will require both leadership and significant resources on the part of the NIMH (NAMHC, 2008).

Fifth, as the guild wars between psychology and psychiatry finally come to an end, combining a medication with an evidence-based psychosocial intervention will become the default treatment in psychiatry as it is in the rest of medicine. By way of example, the treatment of the anxious child can be thought of as partially analogous to the treatment of juvenile-onset diabetes, with the caveat that the target organ, the brain in the case of anxiety, requires psychosocial interventions of much greater complexity. Both conditions rely on medications, insulin in diabetes and in anxiety, typically, a serotonin reuptake inhibitor. Each also involves an evidence-based psychosocial intervention that works in part by biasing the somatic substrate of the disorder toward more normal function. In diabetes, the psychosocial treatment of choice is diet and exercise, and in anxiety, exposure-based CBT. Where appropriate, a psychosocial intervention will precede the somatic treatment, with medications reserved for those who do not respond. Either way, the days of unopposed polypharmacy almost certainly will cease. Depending on the presence of risk and protective factors, not every patient will have the same outcome. Bright youngsters from well-adjusted two-parent families typically do better with either diabetes or anxiety than those beset with tremendous psychosocial adversity. Thus, besides being an indication for combined treatment, adversity when present appropriately becomes a target for intervention, at least in part to increase compliance with treatment for the primary illness. Lastly, physicians caring for mentally ill patients will routinely incorporate empirically supported modular psychosocial interventions as part of pharmacological management of mental illness.

Sixth, with translational developmental neuroscience as the unifying perspective, neurosciences medicine will explode in size and complexity (Insel & Scolnick, 2006). Cardiology, the largest subspecialty in general internal medicine, itself has six subspecialties, and the heart is a relatively simple organ compared to, say, the thalamus or the amygdala much less the pre-frontal cortex and their interconnections. Thus, by 2030 it is safe to predict that a medical student entering medical school will on entry or shortly after have to decide between neurosciences medicine and the rest of medicine, with neurosciences medicine being as large and complex as the rest of medicine combined. Within neurosciences medicine, psychiatry will no longer be a monolithic medical specialty, but will have differentiated into specialties that in today’s terminology we might think of as ‘therapeutic areas,’ such as psychosis, mood and anxiety disorders, disruptive behaviors, or habit disorders that share underlying neural circuitry. In any case, whether existing academic departments disappear, merge, or remain intact is less important than the fact that students interested in neurosciences medicine will face a far richer if very different mental health care landscape in which they have much more to offer their patients than is the case today. As shown by the link between schizophrenia, cancer biology and neuroimmunology (Canakry, Li, Nakai, Sei, & Weinberger, 2007), neurosciences medicine also will become more not less integrated with other areas of medicine. This process is already well advanced in health psychology (Keefe & Blumenthal, 2004), c.f. the integration of cognitive-behavior therapy for depression in adolescents with inflammatory bowel disease (Szegethy et al., 2007) under the assumption that the two illnesses are linked (Bousvaros et al., 2006). Delightfully, scientific progress will substantially reduce if not end stigma by squarely locating mental illness at the heart of neuroscience medicine which it self will be fully integrated into the whole of medicine (Insel & Scolnick, 2006).

Seventh, the reconceptualization of mental illnesses as lifespan neurodevelopmental disorders will force pediatric and adult researchers to come
together within defined therapeutic areas based on common clinical and scientific interests. One can already see this happening with the move toward early intervention in schizophrenia (Greenstein et al., 2006; Lewis & Levitt, 2002) now vividly facilitated by identification of a reliable prodromal end-ophenotype (Cannon et al., 2008). On the other hand, because treatments for children are not necessarily the same as treatments for adults, some treatments necessarily will be developed for pediatric use, while others might be for both pediatric and adult use, and still others for use in adults only. The key point is that the process of psychosocial treatment development for mentally ill youth will no longer be a too little too late add-on to a program of research targeted primarily at adults (DeVeaugh-Geiss et al., 2006).

Lastly, we need look no further than the discipline of physical therapy (physiotherapy outside North America) to see how psychosocial treatments will be organized. In the future, modular psychosocial interventions will be administered by health professionals working within interdisciplinary teams much as we see today in the relationship between physicians and physical therapists in orthopedic and rheumatology clinics. While holding principles in common, physical therapy for the elbow is not the same as physical therapy (PT) for the knee. Likewise, CBT will target patient-specific sets of dysregulated CNS information process thereby solving the problem of blending treatments for multiple disorders. Many will see the analogy to physical therapy as less scientific, less interesting, and to be blunt, less prestigious. This unfortunate misperception will end with the recognition that the treatment of a brain illness is intrinsically more demanding than the treatment of a musculoskeletal disorder. From the point of view of organizing a professional discipline, the PT model has a lot to offer. As with our current mental health disciplines, PT has advanced degree programs, a rich research tradition, a small number of very expensive specialists and academics, and a larger number of less expensive bachelors- and masters-level providers, who do the bulk of the work. Physical therapy as a discipline struggles with issues of professional identity, evidence-based practice, specialization, cultural competence, educational standards and recertification (Curtis, 2002). Physical therapy to its credit does not have to worry about the panoply of voices claiming ownership that are present in psychosocial treatment providers for mentally ill patients. Psychiatrists claim psychotherapy as a birthright and insist on training residents in psychotherapy despite the fact that such training is poorly conceived and conducted. With a few exceptions, psychologists rightly enough have priority for empirically supported psychosocial treatments but it is not clear that academic much less professional psychology can lead the transformation to an evidence-based practice model within neurosciences medicine. Much of the actual therapy is done by social workers, who themselves are struggling to find a way into the world of evidence-based practices (McNeill, 2006). While it is impossible to predict at this juncture how the disciplines that currently develop, test and conduct psychosocial interventions will come together under a single professional umbrella, merge they must, as progress in science and the exigencies of health care economics will allow no other option. In the short run, it is likely that we will see the reorganization of departments of psychiatry, including merging with neurology under the broad frame of neuroscience medicine. With the ascendancy of neurosciences medicine, the merger of psychiatry and some elements of psychology will follow and from this ground will emerge a new discipline for providers of psychosocial treatments. The mere fact that psychology prescribing privileges are an area of hot contention (Lavoie & Barone, 2006) is itself evidence that psychology and psychiatry are coming together within an explicitly medical framework (Carson, 2000) despite concerns over professional identity and independence on both sides (Bush, 2002). As this process unfolds, it will be critically important to attract outstanding young people into the field (for a prescient example, see Martin et al., 2007). It will also be necessary to allow for retraining opportunities so that established clinicians and researchers can find a 'home' in neurosciences medicine and within neurosciences medicine a discipline devoted to evidence-based psychosocial treatment.

**Conclusion**

As translational developmental neuroscience drives psychiatry toward a unified place on the field of neurosciences medicine, modular psychosocial intervention closely resembling today’s CBT but targeting CNS information process rather than illnesses will be located within a disciplinary framework similar that now occupied by physical therapy. For this to happen, psychosocial interventions will need to be (1) coupled to the CNS via molecular, cellular and systems neuroscience, (2) elaborated within in a stages-of-treatment framework that extends from prevention to recovery, (3) personalized for specific targets for individual patients, (4) streamed where possible over the internet and disseminated to specialty practice settings where necessary, and (5) organized within a unitary professional framework that makes conceptual sense and works for policy makers, providers and patients.

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Psychosocial interventions will be:

- trajectory noted from fetal to end-of-life development;
- coupled to the CNS via molecular, cellular and systems neuroscience;
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- personalized for specific targets for individual patients;
- streamed over the internet and employed in specialty practice settings where necessary;
- organized within a unitary professional framework.

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