Growing the Brain: A New Perspective on Child Psychiatry

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Over the past several decades, new technologies have supported scientific advances in knowledge regarding the biological etiologies of mental disorders in childhood. Concurrently, developmental research has revealed the essential function of the caregiving relationship in modulating risk factors from both heredity and the environment. As a result, the role of the child psychiatrist is challenged to transform her traditional role as diagnostician and clinician using a standard set of interventions designed to treat specific disorders and adopt a new role. The new role requires her to take a more comprehensive view of childhood symptoms and their etiologies, one that gives the caregiving environment a more central position and one that focuses on restoring healthy function rather than eliminating specific symptoms.

A brief literature review will therefore emphasize (1) the caregiving relationship—the importance from the point of view of healthy development and what happens when things go wrong; (2) the stress regulation system and the therapeutic aim of strengthening it ("growing the brain"); and (3) the de-emphasis of categorical diagnoses, in order to shift the focus of attention away from psychopathology to adaptive function and healthy well-being.

After the literature review, interventions designed to support the caregiving relationship, grow regulatory capacities, and enhance developmental competency and function will be discussed and illustrated with brief clinical examples. The chapter will end with some thoughts about the future of child psychiatry.

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13.1 The Caregiving Relationship

13.1.1 Factors Promoting Protection in the Caregiving Relationship

Even a rudimentary study of human development impresses the reader with the enormous importance of the early caregiving environment on the developing child [1, 2]. The caregiving environment provides developmental scaffolding and a degree of modulation of both internal and external stressors [3].

Babies are born prepared to be protected, nurtured, and enjoyed by a "good enough" caregiver. The appearance of an infant—with a disproportionately large head; large, expressive eyes; and the ability to cry—easily attracts the attention of an adult, especially a parent. At birth the infant is attracted to mother's smell, including the scent of amniotic fluid; infants are soothed when crying, by their mother's odor, which organizes the infant's behavior for nursing [4].

Corticobulbar pathways are sufficiently developed at birth to allow newborns to signal caregivers with vocalizations and grimaces and to gaze and smile; neural regulation of muscles prepares the newborn for social cueing of caregivers with gestures and facial expressions [5, p. 34]. The infant learns the mother's voice and can learn simple rhymes and narratives in the womb ([6]; see also Part 1 Chap. 3). Melodies that the fetus has heard in utero can be recognized by the infant after birth [7, p. 4]. Infants begin learning speech in utero. In elegant studies, infants' vocalizations have been shown to constitute "protocommunication" that generates vocal responses in the caregiver and creates a parent-infant dialogue that figures prominently in the growing infant-caregiver relationship [8, 9].

Similarly, parents are primed to protect, nurture, and enjoy infants. There appear to be neural circuits connected with parental tasks and behaviors that include thalamus, insula, dorsolateral prefrontal cortex, medial prefrontal cortex, anterior cingulate cortex, and orbitofrontal cortex overlapping with circuits involved in reward and empathic processes [10, p. 5]. When first-time mothers listen to their own but not another baby's cries, increased activity is observed in several brain regions such as the insula, amygdala, cingulate, striatum, midbrain, and orbitofrontal cortex [11, p. 3].

13.1.2 Moderating Effects of Caregiving Relationship

We know that the foundation of health and well-being begins in infancy [3]. We also know that health problems result from a combination of genes and the environment—both the present environment and the past, as the environment interacts with genes to cause epigenetic changes that can affect both physical and mental health. What is becoming increasingly clear is that the caregiving relationship can provide a moderating effect on both genetic vulnerability and destructive features in the environment [3, p. 4–5; 12–14]. When the caregiving relationship fails to protect the

infant, this moderating effect does not function, with serious consequences for the developing stress regulation system.

Adverse events in the environment influence brain development at different stages, affecting different functions according to the sensitivity to disruption of the developing nervous system. The brain develops most rapidly early in life, making it particularly vulnerable to environmental challenges in early infancy. Development occurs in a sequential fashion, the lower parts of the brain developing first and the higher and more complex parts of the brain developing last. Simple regulatory functions (respiration, heart rate, blood pressure, temperature) are mediated by lower parts of the brain such as the brain stem and diencephalon. Adverse events occurring early in fetal growth can disrupt these basic regulatory systems. More complex functions (language and symbolic thinking) are mediated by the cerebral cortex, which doesn't fully come online until about 1 year of life. Adverse events occurring at this time can disrupt language and other cognitive function, but earlier interference with regulatory capacity can cause a cascade effect in which higher-level functions are compromised due in part to underlying regulatory issues.

Maltreatment in the caregiving relationship can initiate multiple neurobiological reactions that affect the developing brain. In a recent review, Teicher et al. note that 180 original reports show an association between childhood maltreatment and alterations in brain structure, function, connectivity, or network architecture [15, p. 17]. Domestic violence is another major adverse circumstance even if the child is not the direct victim, since witnessing violence is associated with specific changes in the visual parts of the brain and visual pathways [15, p. 655–656]. Some studies show larger amygdala volumes in individuals experiencing caregiver neglect [15, p. 656]. Teicher et al. hypothesize that the left amygdala may be particularly vulnerable to early abandonment or disrupted attachment, whereas the right amygdala may be more vulnerable to physical, sexual, or emotional abuse [15, p. 656]. The conclusion that psychosocial deprivation accounts for the smaller head circumference and other adverse developmental findings of infants who experienced at least 6 months of institutional care in Romanian orphanages (during the second part of the twentieth century) is documented in numerous papers [2, 15, 16, p. 769].

13.1.3 Regulation

The intricacies of the moderating effect of the caregiver on the infant's stress regulation are demonstrated by observations of face-to-face infant-caregiver interactions, particularly when using the still face paradigm [17]. The caregiver's empathic reactions to the infant's intentional and affective signals are communicated by facial expression, gestures, and vocalizations of the caregiver. When the caregiver is neglectful or empathically absent, such as in the extreme case of the Romanian orphanages but also in highly dysfunctional families, or when the caregiver is depressed, such as in postpartum depression, this crucial moderating effect is compromised or lost [18–20].

A major contribution toward the understanding of self-regulation came from Tronick's work demonstrating that self-regulation is developed through reciprocal interactions between infant and caregiver—"mutual regulation" [21]. Tronick built on the observations of Sander, who identified the establishment of the infant's first accomplishment in self-organization, diurnal rhythm, as emerging from the predictable rhythms of the caregiving routine of feeding, bathing, and diaper changing [22]. Analyzing split screen videotapes of infants and mothers in face-to-face communication, Tronick showed that infant self-regulation occurred simultaneously with an interactive process of match, mismatch, and repair with the caregiver. Tronick elaborated this model in observations of depressed mothers, where he noted that infants had to spend more time in self-regulation because their mothers were preoccupied with their own regulatory needs and unavailable for mutual regulatory responses [21].

Tronick's perturbation of the *Still-Face* in the Face-to-Face situation has become perhaps the most important recent scientific paradigm in the study of early development ([17, pp. 11–12, 323–338]; see Part 1 Chap. 2). In this paradigm, mothers are told to (1) play with their infants as they would at home in the face-to-face situation; (2) at a signal, make a "Still Face," in other words, assume an impassive, unresponsive face, for 2 min; and (3), at a second signal, resume play with their infants. During the still face part of the paradigm, the infants typically attempt to elicit their mothers' attention with gestures and vocalizations. When this fails, they show distress and make attempts at self-regulation.

The Still Face experiment highlights the centrality of the infant-caregiver relationship in the development of self-regulation. In a typical family situation, a responsive caregiver will comfort the baby when the baby is distressed but also leave the baby the space to self-comfort when he initiates a "break" from the interaction. Both infant and caregiver do a dance of up and down—pleasurable excitement and calm—as they "play" together. They can sense what the other is feeling and what the other does or does not want to do, the other's "intentionality," and they respect these communications.

An illustration of an intervention focused on regulation: Whereas the skills of other pediatric specialists—occupational therapists in particular—have an explicit target of regulation, the child psychiatrist can also make important contributions. The first is to make observations about the regulatory competency of the child both from the history and from observation. The second is in parent guidance, helping the parent create expectations for the child and scaffold the child's accomplishments. The third is in the implicit realm and has to do with "matching" the child's vocal and action turns in a way that supports the child's regulatory function.

13.1.4 Categorical Diagnoses

Categorical diagnoses have been a persistent challenge and frustration for this author, a practicing child psychiatrist with more than four decades of clinical experience. That is because one categorical diagnosis or even two never seem to capture

the individual child being evaluated. One major problem in using a psychiatric nosology such as DSM V is that of comorbidity. It has been estimated that comorbidity rates in psychiatry are as high as 50% [23, p. 2]. Half of individuals who meet diagnostic criteria for one psychiatric disorder meet diagnostic criteria for a second disorder at the same time, and half of those diagnosed with two disorders meet criteria for a third [23, p. 2]. Although dimensional models such as internalizing (anxious and depressive symptoms) and externalizing (aggressive, delinquent, and hyperactive-impulsive symptoms) are frequently used in studies of childhood psychiatric disorders, clinicians are taught to use the DSM or another categorical system, ICD, and third-party payment systems require categorical diagnoses.

Additional studies suggest that the liability for many disorders is influenced by the same genetic factors, suggesting the value of a "transdiagnostic approach" to psychiatric disorders [23, 24, p. 4]. The longitudinal Dunedin study suggested the existence of a "p factor" that begins with genetic liability, the genes enhancing risk for any and all disorders rather than any single disorder [23, p. 6]. This is also consistent with the thoughts that psychopathology is dimensional [25]. The value of such an approach is validated by the author's clinical experience suggesting that children with many different diagnoses may benefit from the same basic therapeutic approach—a thoughtful and empathic psychodynamic psychotherapy that respects the child's agency, supports the parents, and involves the school.

13.2 Interventions

13.2.1 Caregiving Environment: The Parent Consultation Model and Mini Course in Infant Mental Health

Two examples of how a child psychiatrist has addressed the need to support the caregiving relationship are the Parent Consultation Model and the Infant Parent Mental Health Mini course, named "Protect, Nurture, and Enjoy," for the three tasks of the parent or caregiver.

13.2.2 Parent Consultation Method: Child Psychiatrist as Parents' Consultant

This method of evaluating children with psychiatric symptoms emerged from the author's work in early development with infant research colleagues particularly Elisabeth Fivaz-Depeursinge [26] and Downing [27] and also from her earlier work as a consultant to surgeons. It includes a "parent consultation" in three sessions [28]. The first session is with the parents alone to hear their concerns about their child, to obtain a history of the child and family, and to generate consultation questions for the clinician as the parents' consultant. The second meeting is with the whole family for a play (or talk with older children) session, designed to gather data to answer the parents' questions. These are almost always pleasant meetings, which

the consultant directs and does not allow anyone to feel put on the spot. The consultant videotapes these family sessions, since infant research has demonstrated the value of observational data, especially with videotape. In between this meeting and the final meeting, the consultant analyzes the tape to come up with impressions that address the parents' questions. Then, in the final meeting with the parents alone again, the consultant refers to these questions and addresses them one by one, offering her impressions and illustrating what she thinks with short clips of videotape from the family meeting. The final step is helping the parents brainstorm what they want to do. In the author's extensive experience with this method, parents have chosen many options. One option is to go home and try out some of the ideas they have come up with together. Another is to request an extended parent consultation with more observation of the video and more brainstorming about how to change family patterns. Another is to begin a psychotherapy with the consultant or with someone else who takes their insurance or who lives closer to them, for example. The method gives parents a lot of freedom to make choices.

What the author has found over the many years of using this method is that it is rarely necessary to see the identified problem child alone in order to answer the parents' questions and, in those cases in which it is important, that visit can follow naturally from new questions that arise in the third parent meeting. One advantage of this approach is that it is not focused on psychopathology but instead on development—where the child and family are in terms of their desired developmental trajectory and how to help them get closer to where they want to be. Another is that the consultant does not immediately begin to make an individual connection with a child who may not become her patient. A third advantage is that the consultant is free to make many important observations of the child in the context in which he or she lives—the way the child and the family express affect and communicate with language and in non-verbal ways, the way the family manages transitions and sets boundaries and maintains them, etc. These observations are in addition to the typical ones a child psychiatrist makes about the child's behavior and the content of the child's speech or symbolic play.

13.2.3 Example of Parent Consultation Method

Older parents with a 5-year-old daughter, adopted at age 22 months, consulted the child psychiatrist because of the child's temper tantrums. They asked what caused the tantrums and what to do to stop them. With sophisticated professionals, they knew all the ins and outs of the adoption process and had attended multiple adoption seminars. In the family meeting, the child chose the puppet of a turtle to play with, the father chose a black-and-white dog puppet, and the mother chose a brown puppy puppet. In the play, the two dog puppets kept tapping on the turtle's shell, asking it to "come out and play." The girl anxiously kept poking the turtle's head and legs back into the shell, when one or the other popped out. Finally, she had a full-fledged tantrum, screaming and kicking, until her parents carried her out to the car.

When the parents returned for the final meeting, they brought up the tantrum and their sense that their daughter had low frustration tolerance demonstrated by her inability to manipulate the turtle puppet. Viewing the video with the consultant, however, they could not avoid the observation of the turtle's efforts to avoid the controlling intrusions of the two dogs. The consultant noted what she saw as an apparent urgency to make a connection expressed by the two dogs in the play and wondered about separation or loss in the parents' lives. She inquired about what events had occurred in their lives when they were the age of their daughter, 5 years old. The father said, "When I was 5-yo my family moved. We had a dog who kept running away back to the old neighborhood, and we had to give him away to a neighbor in that neighborhood, because he couldn't get used to the new home." The mother looked at her husband in astonishment. "When I was 5, she said, 'we had a dog, and when we moved my parents thought we couldn't keep the dog in the new home, so we gave him to a neighbor in the old neighborhood, but he kept running away from that family to our new home in the next city and barking at the door to be let in. My parents finally agreed to keep him in our new house." Neither parent had been aware of the other parent's story about the family dog that could not adjust to the new home. Although the parents had become familiar with the multiple reactions common to adoptive parents through their seminars and readings, the visual image of them with their daughter suddenly confronted them with the shared unconscious fear that their little daughter would not "bond" to them and become "adjusted to her new home." The consultant pointed out the turtle's self-protective response to the tapping on her shell, and the parents appreciated the turtle's need for a more graded and respectful approach to making a connection. They understood that it was their insecurity about their bond with their daughter that led them to behave in an intrusive way. The answer to their question was that the child was having tantrums partly in response to their over control and that she needed them to become more respectful of her sensitivity to intrusion. In other words, her parents' own emotional needs sometimes led them to overlook their child's regulatory needs.

13.2.4 "Protect, Nurture, and Enjoy": Intensive Infant Parent Mental Health Mini Course (PNE)

In the course of her career, the author's interest in prevention has become a primary concern. Believing that the most cost-effective way to support the infant-caregiver relationship was to train professional and paraprofessional caregivers about infant mental health, the author and a team of infant mental health specialists collaborated with a team from a nursing school to develop a curriculum to teach nursing students in North India.[1] The curriculum includes knowledge about current developmental research and multiple instructional videotapes, as well as clinical demonstrations in

[1] [1]American team members collaborating in giving workshops and designing PNE include Ginger Gregory, Alayne Stieglitz, Elizabeth Levey, Anna Baumgartel, and Abishek Bala; Indian collaborators are Neena Lyall and Himanshu Lyall.

the wards and villages. “Protect, Nurture, and Enjoy” (“PNE”) is named for the three main tasks of an infant caregiver.

The clinical demonstration piece of the PNE consists primarily of the Newborn Behavioral Observation (“NBO”), a tool developed by Nugent to support and strengthen the infant-parent relationship.[2] In addition to the NBO, the clinical piece of the PNE includes a discussion of the mother’s pregnancy and delivery and an exploration of the support system available to her in her family and community. Finally, the PNE emphasizes the value of music and song, for example, asking new parents to sing to their babies. This addition to the training introduced culture in the context of the tunes, rhythms, and words a particular culture uses to welcome an infant into the world. The addition of songs strengthened the goal of individualizing the PNE to fit the specific group of caregiver participants. Evaluations of the students following the course demonstrated good apprehension of the basic principles and of the information given in the course.

The PNE is now a part of the curriculum of the School of Nursing of the Christian Hospital of Kasganj and has also been given at two institutions serving high-risk populations in Lima, Peru, and Grenada. The course is continually evolving, through updating the study guide and bibliography to make the course current and giving the training in different institutions and different countries and to different caregiver groups. The PNE training also emphasizes the self-care of the caregivers, especially in the case of parents who mistreat or neglect their infants. Reflective supervision groups may be helpful in supporting the caregivers as they face these stressful clinical situations.

13.3 Concluding Remarks

As a result of an explosion of new knowledge in the field of developmental psychology, especially research exploring the caregiving relationship and the stress regulation system, and also as a result of questions about the validity of categorical diagnoses, the role of the child psychiatrist is challenged to transform her role. In this chapter, the author has attempted to describe the pivotal features of developmental theory that have affected her clinical thinking and practice. Consequent to this new knowledge, she has decided that it is essential to take a more comprehensive view of childhood symptoms and their etiologies, rather than performing as an expert diagnostician. In her clinical thinking and practice, she now gives the caregiving environment a more central position, attends carefully to the need to develop regulatory competencies, and focuses on restoring healthy function rather than on eliminating specific symptoms. The chapter offers clinical examples to illustrate the

[2] The Newborn Behavioral Observations (NBO), an adaptation of the assessment tool NBAS, developed by Brazelton and Nugent [29]. The aim of the NBO is to demonstrate to parents the particular competencies and sensitivities of their new infant, in that way promoting a responsive and supportive caregiving relationship.

shift in emphasis and the different clinical interventions resulting from these new perspectives.

It is the author's opinion that the mental health needs of the world's children require the child psychiatrist to take a step back from the role of clinician working one on one with a child and function instead as a teacher and as the leader of a team of other clinicians who will focus on specific areas of function—educational (teachers and special educators); regulatory (occupational therapists); making meaning of self and other—parent consultants; and psychotherapists. Such a role will be perceived as a loss by many who chose child psychiatry because they want to do psychotherapy. However, it is true that in order to fill this more comprehensive role, child psychiatrists must understand the way individuals make sense of their experience and of themselves in relationships. That understanding is central to the role of teacher and consultant in child mental health. In fact, the author believes that it is essential to be well trained in psychotherapy and even to maintain a small practice in order to adequately fulfill these roles. A skilled teacher and consultant uses an awareness of the way human beings make meaning as a fulcrum of this important work.

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