Chapter 3
Effects of Experience on Brain Development

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The classic “nature–nurture” debate continues to stimulate research in human behavior. This chapter explores how experience (nurture) can modulate brain architecture and brain function. These cases illustrate how childhood experiences can have lifelong effects on behavior and well-being.

At the end of this chapter, the reader will be able to

1. Discuss the role of early experience on normal brain development
2. Identify early adverse effects of deprivation
3. Determine some common deficits which result from early deprivation
4. Describe resilience and differences in innate ability

**Case Vignette 3.1.1 Peter Magellan**

As the Chief Resident in a pediatrics outpatient office, you pause outside a patient’s room to read the chart. You learn that inside the room there is a concerned couple and their adopted son. Having been unable to conceive naturally, the Magellans adopted a foreign-born child, Peter. They were assured at the time of adoption that Peter was 2 years old and had a normal gestation. He was born at term and is without congenital defect. Mr. and Mrs. Magellan have been waiting quietly in the exam room with their newly adopted son.

Good morning Mr. and Mrs. Magellan. My name is Dr. Sam and I will be working with you today. What brings you in? You notice Mr. Magellan remains quiet as his wife begins nervously.

Mrs. Magellan: Well, Doctor, we’re very concerned because we adopted Peter four weeks ago and it seems that he just doesn’t act like the other kids his age at the playground. We thought that maybe he was closed off just because of the change
in location and language, and that it would probably pass, but . . . I don’t know now. The social worker told us there may be some differences, but we just didn’t anticipate this. He looks really small and he weighs less than the other kids too. Is this normal?

You notice that Peter has been quiet and still, sitting stiffly in a chair by himself, clutching a dirty looking teddy bear. He does not appear to have any interaction with his new parents. His eyes do not meet yours even when you approach him at his level. He appears frail and withdrawn. You see on the chart that Peter weighs 22 pounds and is 31 inches tall.

Mrs. Magellan: What’s wrong with him?

You tell the parents that although Peter falls below the fifth percentile on the CDC growth chart for boys, this is not by itself a sign of a medical problem. You obtain more information on Peter’s development. He uses one-syllable words and gestures to communicate. Although he uses the toilet, he cannot manage his clothing. He also is unable to climb down the stairs and must be carried. The Magellans bought a quantity of toys for 2-year-olds, but Peter does not show any interest in the puzzles or blocks.

Mrs. Magellan describes the adoption: Well, I read about how many orphans there were without proper care in Romania and we decided it would be best to try to save at least one of them. We looked at hundreds of babies and toddlers online and just fell in love with Peter’s little cheeks. The orphanage in Romania seemed like a reputable place. There were so many babies to choose from . . . maybe we should not have gone to Romania or we should have used a different agency. She looks at Peter. Doctor, is there anything we can do that may make Peter more normal?

Please proceed with the problem-based approach!

Case Vignette 3.1.2 Continuation

The Denver Developmental Screening Test showed that, for a 2-year-old, Peter has significant areas of deficit including fine motor control, gross motor control, personal social skills, and language skills. Physical exam was negative for any abnor-