on the *size* and *function* of the brain. While similar research in humans is limited, there is still some literature presented on imaging data as well as the role of birth order and family size on subsequent intellectual development.

Chapter 3 leads to the real platform of the book. In particular, Dr. Wexler begins to emphasize the impact of social interaction on brain development. More specifically, he suggests that social interactions are essentially an extension of the more easily parsed sensory stimulation discussed previously. This chapter suggests that humans have such a prolonged childhood in order to specifically allow increased social influence on the development of brain structure and function. It relies upon the broadest range of supporting evidence, including the work of Harlow, Luria, Vygotsky, and Freud, and does an impressive job of distilling this research to support his premise.

In the second half of the book, Dr. Wexler discusses the impact of reduced plasticity on human behavior. In particular, he argues that since an adult no longer has the neuroplasticity necessary to absorb new and/or conflicting information, he/she will make every effort possible to change their world to conform to their "increasingly inflexible inner world." Literature regarding priming is provided as support regarding a predisposed way of perceiving one's world, and research supporting cognitive differences amongst cultures is further provided as evidence regarding one's approach to understanding their environment. Dr. Wexler then uses immigration and bereavement as examples of what happens when one's world changes so much that it no longer matches an internal neurological structure and cognitive expectations. This is perhaps the most interesting concept within the book. Unfortunately, while the text does an elegant job of incorporating an incredibly diverse amount of literature, it does not entirely make the link between brain maturation (and loss of plasticity) with adult "rigidity." Furthermore, evidence ostensibly supporting this premise is occasionally conflicting. For example, Dr. Wexler provides some compelling examples of immigrants detailing their own struggles as they encounter a new culture. However, these portrayals are written by adolescents, who presumably are still neurologically plastic.

Finally, in the last chapter of the book, Dr. Wexler discusses the difficulties that will arise when two cultures collide. He argues conflict is unavoidable because exposure to diametrically different cultures will "create an uncomfortable dissonance between internal and external realities." Therefore, while individuals will be fascinated with another culture, they will also attempt to fit it into their own personal belief system. When this cannot be done, conflict will ensue. The book suggests that this conflict parallels that of an individual's approach to contradictory information. That is, a country will first attempt to ignore the differences. When this is not possible it will then devalue and distort the offending culture. Ultimately, it will attempt to either coerce the other culture into assimilation or employ military forces in order to eventually dominate the new culture. As supporting evidence, Dr. Wexler uses the Crusades and other political examples of attempts to dominate other cultures and subsume them into their own. He presents a fascinating argument that is well supported by historical documents. However, it seems to discount mankind's drive for power and a desire to dominate others regardless of their similarities or differences. It would have been interesting to know how Dr. Wexler would account for these tendencies within his proposed model.

Although there is room to expand on the theories presented, overall this is a thought-provoking and thoroughly educational text. In the end one is reasonably convinced that the question is not really one of nature versus nurture. Rather the reader is able to appreciate Dr. Wexler's thesis that the neurological, psychological, and social development of each person represents a mechanism of nature *via* nurture. In short, this is a fascinating book that will make the reader reconsider some of their own assumptions about the role of society on the structural development of the brain. Because it covers such a diverse range of research it would make an excellent textbook for graduate level students. However, all neuropsychologists, regardless of how plastic their brain may be, may want to challenge their preconceived notions and consider integrating this book's theories into their own internal neurological structure and cognitive expectations.

Estrogen: Protective or destructive to neurons?

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The Effects of Estrogen on Brain Function. Natalie L. Rasgon (Ed.). 2006. Baltimore, MD: The Johns Hopkins University Press, 167 pp., $49.95 (HB).

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The Effects of Estrogen on Brain Function, edited by Natalie L. Rasgon, is a collection of chapters about estrogen written by experts from different scientific disciplines. The research and controversies surrounding cognitive and neurophysiological changes related to hormone replacement therapy, especially within the context of Alzheimer's disease,

are a primary focus. Apparent discrepancies arising from animal models suggesting beneficial effects of estrogen on cognitive performance paired with increased risk of Alzheimer's disease in postmenopausal women are addressed, and relevant literature from basic science research on estrogen neuroprotective and neurodegenerative effects at the cellular level to epidemiological studies in humans are discussed. Related research in neuroimaging and psychiatry are also included. However, one does not need an in-depth understanding of these diverse disciplines in order to come away from the book with a comprehensive understanding of the science and theoretical models involved. Although little time is spent on neuropsychological issues, the book should be of interest to anyone who does clinical assessment or research involving women. The effects of estrogen on cognitive performance are complex, as this book makes clear, and the information contained within this volume is relevant to the field of neuropsychology.

Chapter 1, "Preclinical Data Relating to Estrogen's Effects on Cognitive Performance" by Robert B. Gibbs, nicely summarizes preclinical data relating to estrogen and progesterone effects in the brain and on cognitive performance. Estrogen-mediated effects in the hippocampus and on cholinergic and serotonergic systems are described and well-summarized. Research using rodent models, in which ovariectomized animals were given estrogen replacement, resulted in improved cognitive performance compared to untreated ovariectomized animals; these studies are well described and create a basis for discussions in later chapters of the cognitive effects of estrogen in humans. Dose-dependent and time-dependent effects are also revealed, and the potential relevance to human hormone replacement studies is explained.

In Chapter 2, "Short-lived Effects of Hormone Therapy on Cognitive Function," Eva Hogervorst discusses human epidemiological studies, especially the Women's Health Initiative Memory Study (WHIMS), which investigated hormone replacement therapy and cognitive decline in elderly women. As the WHIMS data failed to support previous findings of improved cognitive performance following hormone therapy, Hogervorst lays out various potential reasons for the discrepant findings. Much time is spent discussing potential confounds in prior studies, a discussion that is interesting from an experimental design point of view. Various alternative treatment regimens also are described, such as selective estrogen receptor modulators and phytoestrogens.

Structural and functional brain imaging data related to the effects of estrogen are addressed in Chapter 3, "Clinical Data From Structural and Functional Brain Imaging on Estrogen's Effects in The Central Nervous System," by Daniel G.S. Silverman, Cheri L. Geist, and Natalie L. Rasgon. This chapter begins with brief, clear descriptions of various PET and MRI procedures, and then outlines findings from glucose metabolism (FDG), cerebral blood flow (O-15 water), volumetric, and functional MRI studies in healthy premenopausal women, healthy elderly women, and women with Alzheimer's disease. Unfortunately, very little research has been done in this area, and the chapter's brevity is a reflection of this lack of research. Research into differences in brain activation during the different phases of the menstrual cycle are also described, as these differences are possibly due to differences in hormone levels.

Psychiatric issues related to estrogen and hormone replacement therapy are included and discussed in Chapter 4, "Clinical Data on Estrogen's Effects on Mood," by Natalie L. Rasgon, Laurel N. Zappert, and Katherine E. Williams. Estrogen affects serotonin receptor expression, and therefore mood, and can be used in conjunction with serotonin reuptake inhibitors in the treatment of mood disorders. As women who have a history of major depressive disorder may experience clinical mood symptoms, adjunctive treatment with hormones like estradiol are helpful.

Chapter 5, "Preclinical Efforts to Develop Effective Neuroserms for the Brain," by Roberta Diaz Brinton and Liquin Zhao, and Chapter 6, Basic and Clinical Data on the Effects of Serms on Cognition by Kristine Yaffe, Pauline M. Maki and Peter J Schmidt, discuss research on the development and effects of NeuroSERMs (selective estrogen receptor modulators). NeuroSERMs are alternatives for estrogen therapy that are currently being developed. As estrogen appears to have protective effects on healthy neurons and deleterious effects on damaged neurons, some research groups are investigating estrogen alternatives that may have desired advantageous effects on the aging female brain without the deleterious effects outside the brain.

The Effects of Estrogen on Brain Function is well-written and well-edited. For anyone interested in understanding the complexities of estrogen actions in the brain or the potential risks and benefits of estrogen therapy, this book is a good place to start. The book is not long—only six chapters—and is a relatively fast read. A basic understanding of biology and neuroscience are necessary; beyond that, the authors explain the intricacies well.

Can we develop a "Dream Catcher Test?": A Novel Approach to the Study of Consciousness

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Inner Presence: Consciousness as a Biological Phenomenon, by Antti Revonsuo. 2006. Cambridge, Massachusetts, MIT Press, 473 pp., $55.00 (HB).