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Editor-in-Chief

Numerous variables can affect the patient's brain structure and function between visits, and could influence his or her mental status

## Your patient's brain is different at every visit

Unlike other organs in the human body, the brain is constantly changing. The main driver for this ongoing re-engineering across various neural circuits is “experiential neuroplasticity,” which creates billions of new synapses and dendrite spines as well as new connections. And as the brain reinvents itself from day to day, the mind evolves as well.

The neurobiologic re-sculpting of the brain's complex innards continuously encodes memories of what we learn and experience during waking hours, including all that we see, hear, feel, think, contemplate, plan, and decide. However, in addition to the ongoing intrinsic neuroplasticity that records life's experiences within neural circuits, there are many extrinsic factors that can further modify the brain and the “psyche” it generates via electrical, neurochemical, and physiological mechanisms. That's why every patient a psychiatrist sees at follow-up visits will have a brain that will be different from the previous encounter.

Consider the following factors that can modify a patient's brain (for better or worse) between sessions:

- **Psychotherapy** that the patient received at the last session will biologically modify his or her brain. Creating new insights and understanding of one's behavior and “connecting the

dots” of the past and present emotions and reactions are all associated with neuroplastic changes within the brain.

- **Mood or psychotic episodes.**

Depressive, manic, or psychotic episodes are associated with neuroinflammation, oxidative stress, and apoptotic effects, which can disrupt the brain's cytoarchitecture. That's why psychiatrists must inquire about such episodes between visits and document the possible effects on the patient's mental status.

- **Psychotropic medications** all bind

to one or more brain receptors to exert therapeutic or adverse effects, both of which are associated with changes in neurotransmitter pathways. A key component of every follow-up visit is to gauge the risks and benefits of the pharmacotherapy prescribed at the prior visit.

- **Nonpsychiatric prescription medications** are often associated with iatrogenic effects on the brain apart from their intended target organs. These iatrogenic effects include anxiety, depression, mania, psychosis, and cognitive changes. That's why during each visit, the physician or nurse practitioner must review all prescription medications and consider their potential effects on the patient's mental status.

- **Over-the-counter drugs** and supplements may exert neurologic effects via histaminergic, muscarinic, glutamatergic, adrenergic, or serotonergic effects—all of which can alter brain chemistry and contribute to mental

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## From the Editor

continued from page 6

status changes. They can also inhibit or induce cytochrome enzymes and induce adverse effects or loss of efficacy of the primary psychotropic medication the patient takes.

- **Medical illness**, even as simple as an upper respiratory viral infection, can alter brain function due to illness-induced physiological aberrations, including pain and peripheral inflammation, with neurologic consequences. Common metabolic disorders such as diabetes, hyperlipidemia, and hypertension can exert mental status changes.

- **Alcohol and drugs of abuse** alter brain structure and function and can induce psychological and cognitive changes. Inquiring about the amount and frequency of alcohol and recreational drug use must be done in detail at every visit.

- **Stressful events**. It is almost impossible for a psychiatric patient not to encounter stressful life events between visits. Coping with any mental disorder can be quite stressful and challenging due to its social, vocational, or personal consequences. Stress increases cortisol, which is associated with deleterious inflammatory effects on the brain. Persistent stress can lead to hippocampal atrophy because of the abundance of glucocorticoid receptors in the hippocampus. Inquiry about stressors must be part of every psychiatric follow-up visit. Multiple psychological, physiological, and behavioral effects are well known to be generated by stress, especially in individuals already impaired by mental illness.

- **Diet**. What a patient eats (or avoids eating) can affect the brain. High-fat diets can be inflammatory, while a diet rich in fruits, vegetables, and nuts can be neuroprotective. The microbiota and the enteric brain—both in the gastrointestinal tract—have been reported to influence mood and behavior. (For more on this, see “Gut microbiota and

its implications for psychiatry: A review of 3 studies” on page 40 and “It takes guts to be mentally ill: Microbiota and psychopathology,” From the Editor, CURRENT PSYCHIATRY, September 2018, p. 4-6.)

- **Obesity** is associated with brain atrophy as well as depression. Weight should be assessed at every visit and coupled with counseling about diet and exercise.

- **Exercise**, or the lack of it, can alter the brain in good or bad ways. Many studies have shown that regular exercise can induce hippocampal neurogenesis and sharpen memory and cognition. On the other hand, a sedentary lifestyle can be detrimental to the heart, bones, and brain, with an elevation in cerebrovascular and cardiovascular risks, both of which can progressively alter brain structure and function.

- **Concussion, contusions, and traumatic brain injury** obviously can activate the microglia and trigger neurologic sequelae and mental repercussions. At every visit, patients should be asked if they have experienced a mild or severe head injury, whether it is accidental or sports-related.

- **Dehydration**, especially on the day of the visit, can alter mental status in subtle ways. Cerebral ventricular volume has been shown to change with dehydration. Asking a patient about daily fluid intake should be a standard question, especially for older patients, who may experience hypotension and mental status changes due to hypovolemia.

- **Sleep**, whether too much or too little, is associated with brain effects and can impact cognition and behavior. Asking patients about sleep is important because it can affect the brain, and also can be a symptom of unresolved psychiatric disorders. Chronic sleep disorders are associated with neuroinflammation.

continued on page 10

Perhaps patients could complete a checklist to monitor for these variables, either online on the day of their appointment or while in the waiting room

continued from page 8

• **Menstrual cycle.** Various neurotransmitters fluctuate during a woman's menstrual cycle. Her cognition becomes sharper around ovulation, and that may influence her mental status and perhaps the neuroplasticity of her brain.

• **Pregnancy** and its major hormone changes can change brain structure and function. Estrogen, progesterone, and prolactin have different structural effects on the brain that can help the future mother care for her dependent baby. Asking about missed periods and pregnancy during childbearing years can be useful during psychiatric encounters.

In summary, numerous variables can affect the patient's brain between visits, influencing his or her mental status. The ever-changing brain can be challenging to assess, especially in brief 15- to 20-minute follow-up sessions that have become more common

in psychiatry. Perhaps patients should help their psychiatrists or nurse practitioners by completing a checklist with all the above variables, either online on the day of their appointment or on a form in the waiting room immediately prior to the visit. This might also increase patients' awareness of the importance of participating in monitoring themselves.

And finally, let's not forget that the psychiatrist's brain also changes continuously due to his or her own daily experiences, stresses, diet, lifestyle, medical illness, or medications. Thus, at every psychiatric session, the brains of *both* patient and psychiatrist are very different from the previous encounter!



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