# Epilepsy and Cognition

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EPILEPSY BOARD REVIEW MANUAL

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Statement of Editorial Purpose

The Epilepsy Board Review Manual is a study guide for trainees and practicing physicians preparing for board examinations in epilepsy. Each manual reviews a topic essential to the current management of patients with epilepsy.

Note from the Publisher

This publication has been developed without involvement of or review by the American Board of Psychiatry and Neurology.

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INTRODUCTION

Cognitive function in patients with epilepsy is determined by a multitude of interacting variables. These include other neurologic disease or injury that may have caused the occurrence of seizures, such as perinatal trauma, developmental abnormalities, brain tumors, stroke, systemic lupus erythematosus, and traumatic brain injury. Such conditions carry their own risk of cognitive abnormality, which must be considered. However, most cases of epilepsy are of unknown cause and lack such obvious primary sources of brain dysfunction. In all cases, regardless of epilepsy etiology, seizures can transiently disrupt neural networks leading to brief cognitive and sensorimotor dysfunction.\(^1\)\(^-\)\(^3\)

Epileptiform activity can also have chronic effects on functioning associated with permanent structural changes in the brain.\(^4\) For many with epilepsy, particularly those with well-controlled seizures on antiepileptic drugs (AEDs), the chronic cognitive effect of seizures will be mild. At the other end of the spectrum, however, there are individuals with profound impairment of cognitive abilities, ranging from isolated deficits related to the region of the seizure focus to global disability resulting from widespread changes in brain structure and function. Additionally, treatments for epilepsy carry their own associated risk of cognitive dysfunction, including the side effects of AEDs,\(^5\) neurosurgical intervention,\(^6\) and some implantable devices (eg, vagal nerve stimulator).\(^7\) Interventions for epilepsy hold the promise of improving cognition by optimizing seizure control. Overall, this review seeks to explain the interplay of variables contributing to cognitive performance in patients with epilepsy, while providing a framework for understanding the complexity of these interactions by exploring them in terms of epilepsy syndrome, etiology, and other significant disease-specific variables (eg, age of seizure onset, seizure frequency, epilepsy duration).

CAUSES AND MECHANISMS OF COGNITIVE DYSFUNCTION ASSOCIATED WITH EPILEPSY

Structural lesions are common in patients with epilepsy, often representing the etiology of the epilepsy (eg, tumors, dysplasia). Sometimes lesions such as hippocampal atrophy in temporal lobe epilepsy (TLE) reflect the chronic effect of epileptiform activity upon the brain.\(^8\)\(^,\)\(^9\) Some patients also have structural lesions from prior surgical intervention. Structural lesions can disrupt both local and global