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Outcomes in Neuroscience Education: Modular Theory and Network Theory 1

Thomas Romanchek

Since the late 1700s, various physicists, electrophysiologists, biologists, and, eventually, neuroscientists have set out to create a faithful, functional understanding of the nervous system and its many components. Early physiologists related physically observable behavioral abnormalities to damage or dysregulation of specific tissues of the brain; these findings promoted an increasingly modular view of brain function. This theory held that the brain was organized into discernible parts or “modules” that correlated to particular regulatory and functional tasks (Blackmore, 2013). As a consequence, modular theory has been at the heart of research and scientific investigation in the field of neuroscience for centuries. The advent and introduction of more sophisticated brain imaging and stimulatory technologies such as fMRI and TEM, along with the development of more precise methodology for experimental lesion induction and neuron inhibition, have cast doubt on traditional modular theory (Badcock et al., 2019). Instead, new findings support a more unified, network-based theory of neural organization and function (Sporns & Betzel, 2016). Despite our growing understanding of the more accurate nature of a network approach to brain study, many universities and classrooms still rely on either a predominantly or exclusively modular approach to neuroscience education. It is the goal of this article to inform the reader about the current state of debate between modular and network brain theories of brain organization and function, to elucidate the profound bias in education - particularly undergraduate education - toward the use and exploration of modular theory, and an examination of the benefits of readapting neuroscience education to give either commensurable or greater coverage of the alternative network theory in neural organization and function.

The Differences between ADHD Brains vs. Non ADHD Brains 3

Julia Gainski

There are several different approaches to understanding the differences between ADHD brains and non ADHD brains. Through the analysis of brain imaging, MRI scans, as well as more techniques used, researchers are able to identify which regions in particular have comparable differences to a person without ADHD. The article explains various techniques used and extensively covers the different studies conducted and their corresponding results. All of the studies found that certain regions such as caudate nucleus, putamen, nucleus accumbens, amygdala, and hippocampus illustrate the biggest differences in brain volume. A key point that was addressed within the article is that there needs to be a greater push for putting emphasis on mental health and the importance of staying positive in the midst of these difficulties. It is crucial that those who have disorders such as ADHD, make lifestyle changes that are best suited to them in order to manage the disorder in the most efficient way.

Therapeutic techniques for Neural Regeneration in the Central Nervous System 6

Chloe Kim

Neural regeneration is a rising topic in the field of clinical neuroscience. Although several practical restrictions hinder neural regeneration in central nervous systems, researchers are actively working to develop different ways to promote CNS regeneration in order to aid the population suffering from CNS disease or injury. In this article, diverse approaches that are proposed to enhance CNS regeneration will be listed and reviewed.

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Language Acquisition Device and the Origin of Language <i>Briana Sobecks</i>	9
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The origin of language in humans has been a subject of considerable debate in psychology. Noam Chomsky was a pioneer of the Language Acquisition Device theory, in which he states that humans have an innate ability to learn language. Language is a highly complex faculty, and since even small children can grasp its principles, Chomsky argues that they must be born with the ability to process and produce language. Since children are able to compose unique, grammatically correct sentences, their faculty goes beyond what could be achieved by replicating learned behavior. Top cognitive psychologists, including Michael Tomasello and John Macnamara, posit that language ability in children mirrors other learned behaviors. Children interpret statistical information to form grammatically correct sentences, adjusting their speech patterns using corrections from their parents. There is compelling evidence for both theories, but more work must be done to fully understand the development of this incredible human ability.

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