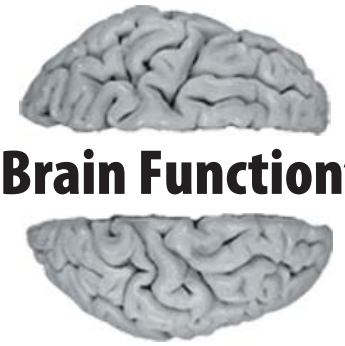
Case Teaching Notes for "Split My Brain: A Case Study of Seizure Disorder and Brain Function"



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INTRODUCTION / BACKGROUND

This case study is intended to reinforce student learning of basic brain physiology, introduce the idea of the brain's plasticity, and give students an idea of the complexity of neurological disorders. The case was written for an introductory psychology course but could be adapted for any course that covers brain anatomy, neurological disorders, or rehabilitation therapies. The language and terminology in the case is suitable for first- or second-year undergraduates. This case will be easier for students if they have some basic background in brain anatomy, including the structure of neurons and the hemispheres of the cerebral cortex. It is not necessary, however, for them to be informed about all the structures of the brain.

This two-part case is designed to be used with small groups in which students work together to find information and discuss the questions presented in each part of the case. Whole-class discussion can also be incorporated, most easily at the end of Part II where groups can be asked to share the questions they have about the surgery and their decisions about Jerrod's treatment. Between two and four class sessions are needed for the case, depending on how much class time is devoted to group work and whether students have access to supplementary research materials (such as materials on the Internet). Part I of the case can also be used on its own, and so I have structured the Teaching Notes in blocks that relate to each part separately.

PART I—Jerrod and Jump

Objectives

In completing this case, students will work toward the following objectives:

- understand the basics of neuron activity in the brain,
- understand the symptoms of epilepsy, and
- learn about basic tests used to view brain structures and activity.

Blocks of Analysis

Detailed case analysis is provided in a separate file that is password-protected. To access this information, go to the detailed case analysis. You will be prompted for a username and password. If you have not yet registered with us, you can see whether you are eligible for an account by reviewing our password policy and then apply online or write to answerkey@sciencecases.org.

Classroom Management

Because this case study is fairly complex and involves research, it is most appropriate as a small-group assignment. Before being presented with the case, students read material about neurons and basic brain structure. Because I use this in an introductory course, I also lecture briefly on these topics to clarify terms and information. Sometimes I also lead a review activity in which small groups must identify the brain structures associated with particular functions. Afterward students take a short quiz on the basic concepts. The case then becomes a summary assignment that allows students to go beyond the basics of brain anatomy.

I introduce Part I by explaining that the situation portrayed is based on the experiences of real people. The assignment could be presented during the same class as a short quiz or at the end of a class session devoted primarily to lecture. There should be at least 20 minutes remaining in the class for students to form groups and then read the assignment and discuss how they will complete it. Part I requires that students create a family medical portfolio for Jerrod. I give students about 30 minutes at the start of the next class session to put together all the information they've found, with the understanding that they will have done any needed research beforehand as homework. The Part I record is due at the end of this time frame, and then Part II is given to the groups.

If an instructor is just using Part I, he or she can lead a class discussion or have each group present some part of their information record to the class. If the next part of the case will be used, an instructor may choose to postpone a general class discussion until the end of Part II and instead address the assigned questions from the end of Part I. In addition, instructors may want to ask students how the diagnosis might affect Jerrod's life (academically, socially, etc.) or what they think of treatment options available. If Part I is used as a stand-alone case, students could also investigate the resources available at local schools, hospitals, or community agencies for children with cognitive or neurological disorders. Role-playing exercises could also be incorporated, such as having students role-play the doctor explaining how neurons function to the parents. Students could also write a follow-up paper reflecting on how having a child with such a diagnosis might affect the parents' lives.

PART II—A Difficult Decision

Objectives

In completing this part of the case, students will work toward the following objectives:

- learn to use the Internet to research a rare neurological disorder,
- obtain knowledge of basic brain anatomy and functional theories of the brain, and
- gain awareness of brain "plasticity."

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Classroom Management

If Part II is assigned on the timeline outlined above, students would read the case at the end of the second class period, research the questions at the end as homework, and put together the information for their family record on day three in their small groups.

After students turn in the assignment, I lead the class in a discussion in which groups first share what expectations they have for Jerrod's abilities after the surgery. It might be helpful to have a diagram of the brain projected during this discussion to more easily reference the structures and areas affected by the surgery.

Students can then generate a list of questions they want answered before agreeing to this kind of surgery. Groups can then go back to the information they collected and see if they have answers to any of the questions posed by the other groups. It may be helpful for instructors to review some sources on the success rates of such surgeries, such as Vining et al., (1997), Kossoff et al., (2003), and the Johns Hopkins' medical websites listed under References.

Finally, I poll the groups on their decisions about Jerrod and the surgery. Each group must give reasons to support their decision. This discussion may be extended into another class session, especially if the suggested final film is shown. If both parts of the case are used, a follow-up activity could be to have each student write a paper reflecting on how such an experience might affect them as parents or on what they believe would be the most important things for us to learn about the brain.

As an ending activity for this case, I like to show a segment of The Secret Life of the Brain (Grubin 2001) about a child much like the boy in the case who has undergone a hemispherectomy. The film includes interviews with the boy, his parents, and his therapist and is an effective illustration of several issues related to the case. It shows the reasons why people resort to such drastic surgeries, the opportunities for learning more about the brain such cases present, and the surprising ability of the brain to adjust to such damage.

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