1. With advances in scanning techniques, the internal structures of the brain are becoming better known, such as the hippocampus and the amygdala (this is the plural of amagdalae, since there are two). The limbic system, of which the amygdala are a part, is featured more comprehensively in our film *The Emotional Brain: An Introduction to Affective Neuroscience.*

2. Unfortunately, almost everyone knows somebody who has had a brain injury. The discussion of Broca’s patient and Phineas Gage may evoke comments about grandparents who have had strokes or even about the lobotomy of Rosemary Kennedy. You can use these examples to discuss the specificity of the functions of brain regions. Strokes can have very different results depending on the region of the brain that is affected. The lobotomy was meant to “calm” emotionality, but had dire results for people like John Kennedy’s sister.

3. Phineas Gage has a roadside monument in Cavendish, Vermont bearing his story. His actual skull, a life mask of Gage, and the 13-pound spike are kept in Boston’s Warren Anatomical Museum. Legend has it that he used the spike as a walking stick after the accident. To see a photo of Gage after the accident, follow the link to [www.npr.org/templates/story/story.php?storyId=122810679](http://www.npr.org/templates/story/story.php?storyId=122810679).

4. The EEG apparatus looks scary, but is completely harmless. (Students may confuse the term EEG with EKG, electrocardiogram, which tracks cardiac function.) The resulting ERP’s are widely used in studies of attention and language development as shown in another film in this series, *Human Brain Development: Nature and Nurture.* ERP’s record the activity of neuron groups, not individual ones. They can also show the difference in activation between certain brain regions caused by a perceptual or intellectual activity. (The EEG subject has to stay very still, thus the measurement of motoric activities with EEG is not possible.)

5. PET scans and MRI scans are used to examine other systems of the body beyond the brain. Your students will probably have at least heard the terms and some may have experienced one or the other. The machines are enormously expensive to purchase and operate (over $1 million), but have wonderfully increased our knowledge, benefiting both clinical and research endeavors. There are numerous career opportunities for young people in the ever-growing field of medical imaging. (CT scans were not mentioned in this film. CT stands for Computerized Tomography and they utilize enhanced X Ray images.)

6. Mirror neurons are a fascinating subject in and of themselves. PBS has a 14-minute segment on them available at [http://www.pbs.org/wgbh/nova/sciencenow/3204/01.html](http://www.pbs.org/wgbh/nova/sciencenow/3204/01.html). Researchers at UCLA are studying the neurons’ connection to autism. Dr. V.S. Ramachandran, now at the University of California, San Diego, has written a very interesting article linking mirror neurons to the leap in evolution that enabled humans to develop language. It can be found at: [www.edge.org/3rd_culture/ramachandran/ramachandran_p1.html](http://www.edge.org/3rd_culture/ramachandran/ramachandran_p1.html).

Other related sites:

- Susan Bookheimer: [http://faculty.neuroscience.ucla.edu/institution/personnel?personnel_id=9716](http://faculty.neuroscience.ucla.edu/institution/personnel?personnel_id=9716)
- Thorough Brain Atlas: [www.med.harvard.edu/AANLIB/home.html](http://www.med.harvard.edu/AANLIB/home.html)
  - This is a wonderful site where you can choose topics by type (social, psychological, neurological, cellular, or molecular) and by your level of familiarity (beginning, intermediate, or advanced).
- Phineas Gage: [www.deakin.edu.au/hmnbs/psychology/gagepage](http://www.deakin.edu.au/hmnbs/psychology/gagepage)
- Brain imaging: [www.roadsideamerica.com/story/10858](http://www.roadsideamerica.com/story/10858)
  - Wonderful computer-enhanced images of the brain, including those that show development and the ravages of Alzheimer’s Disease and methamphetamine use.
Related Films Also Available from Davidson Films

This is one of four films in Davidson Films’ “Neuroscience” series. The other titles are:

- **Human Brain Development: Nature and Nurture** (2007) 30 Minutes
- **Making Sense of Sensory Information** (2008) 30 Minutes
- **The Emotional Brain: An Introduction to Affective Neuroscience** (2009) 33 Minutes