

ILLUSTRATIONS

FIGURES

- | | |
|---|----|
| 1.1. A simulated example of how an individual neuron responds to stimulation. | 6 |
| 1.2. An MRI scan of Lisa's brain, showing that her left hemisphere is mostly missing, replaced by cerebrospinal fluid. | 7 |
| 1.3. A computer motherboard with different parts labeled. | 8 |
| 1.4. The lobes of the brain, outlined on an image of the surface of my brain that was generated from MRI data. | 9 |
| 1.5. Can you infer cognitive function from areas of brain activation? | 21 |
| 2.1. Angelo Mosso's measurement of the pulsations in Bertino's brain. | 25 |
| 2.2. Dr. Marcus Raichle alongside one of the early positron emission tomography (PET) scanners at Washington University in St. Louis. | 29 |
| 2.3. The location of Wernicke's area (where researchers expected to find activity related to the processing of meaning) and the left prefrontal areas that Petersen and his colleagues found to be active during processing of meaning. | 34 |
| 2.4. Examples of the effects of spatial and temporal resolution on a photo. | 35 |

2.5. A figure from Kwong's landmark paper, showing that activity in the motor cortex (which controls hand movement) moved in concert with the subject making hand movements.	43
3.1. An example of how fMRI decoding works, using the analogy of the audience reaction to three different political candidates.	53
3.2. Figure from our 2007 paper, showing a puzzlingly high correlation between behavioral and neural loss aversion.	63
4.1. A reconstruction of the "receptive field" for a single voxel in Kay's 2008 study.	73
4.2. An illustration of image reconstruction using fMRI.	74
5.1. A photo of Tim Laumann and me, just after I emerged from about six hours of MRI scanning at Washington University.	97
7.1. Results from our 2007 study of gambling decisions, showing regions in the ventral striatum and ventromedial prefrontal cortex that responded to increasing gains and decreasing losses.	128
7.2. Results from Emily Falk's neural focus group study.	145
7.3. Results from the neural focus group study by Alex Genevsky and Brian Knutson.	147
9.1. An image of the 110-ton 10.5-tesla magnet as it was being installed at the Center for Magnetic Resonance Research (CMRR) at the University of Minnesota.	174

COLOR PLATES (*following page 112*)

1. Magnetic resonance imaging (MRI) can be used to measure many different aspects of brain tissue.
2. The cover image of *Science* from November 1, 1991, showing activation of the visual cortex as measured by Belliveau and colleagues.
3. A view of my brain from the bottom, showing areas of my brain that were active when I viewed faces.

4. One way to analyze connectivity in the brain is to look at how the activity of the entire brain is related to a particular location, or seed.
5. The image of brain activation in a dead salmon from Craig Bennett's 2009 poster.
6. The results from Adrian Owen's 2006 paper, showing the brain areas active while imagining playing tennis and imagining navigating one's house, in the vegetative patient and healthy controls.
7. A map showing brain areas in the left hemisphere whose activity was greater the first time subjects decided whether a word was abstract or concrete, compared with the second time.
8. Mapping networks in the brain.
9. Results from three meta-analyses performed using Neurosynth.
10. The areas found by Etkin and colleagues to show differences in brain structure related to mental illness that were common between different diagnoses.

