بسم الله الرحمن الرحیم

علوم شناختی

جلسه ۷ (الف)

سیستم‌های شناختی به‌عنوان سیستم‌های کارکردی

Cognitive Systems As Functional Systems

کاظم فولادی قلعه
دانشکده مهندسی، دانشکدگان فارابی
دانشگاه تهران

http://courses.fouladi.ir/cogsci

PART 1:
HISTORICL LANDMARKS

Chapter 3:
The Turn to the Brain

CAMBRIDGE
UNIVERSITY PRESS

Chapter 3.1: Cognitive systems as functional systems

Functional approach to cognition

- Cognitive science has long been dominated by a functional approach to cognitive systems

- This focuses on what different cognitive systems do and how they do it, rather than on physical details
  - E.g., the function of vision is to transform information from the retina into a representation of discrete visual objects

Functional approach to cognition

- The **brain** can be thought of as hardware that runs a wide variety of programs (software), like a computer

- Cognitive scientists can study different **cognitive processes** (the software) without focusing on how they are implemented in the **brain** (the hardware)

Multiple realizability

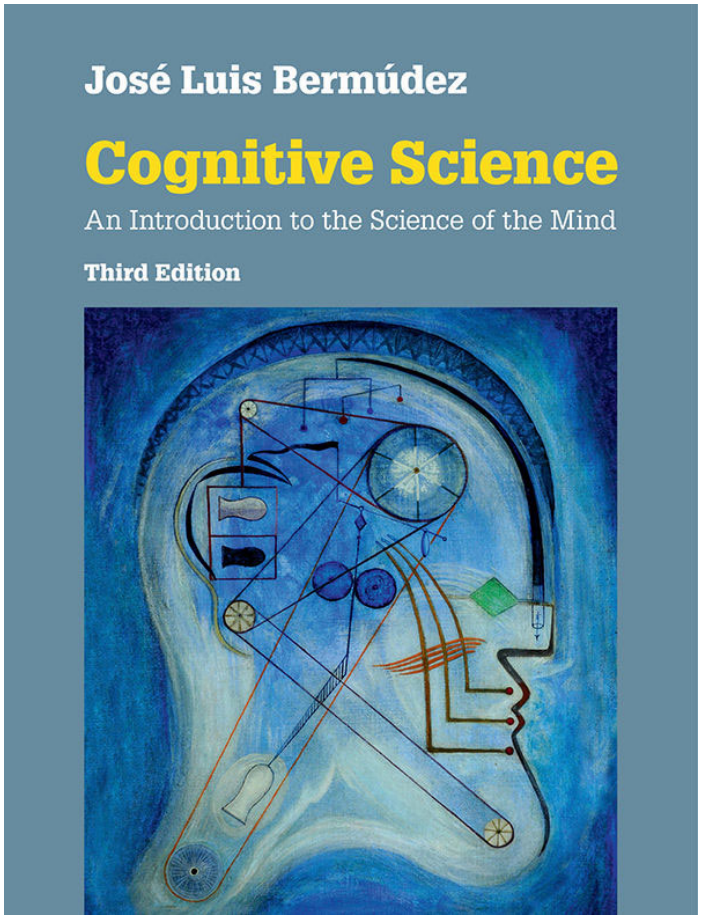
- Cognitive functions can be “realized” by different neural structures
  - Studying individual neural structures would not necessarily tell us anything about the function

- By analogy, the function of blood circulation can be realized by different types of hearts
  - e.g., human beings and hummingbirds have differently structured hearts that still perform the same basic function

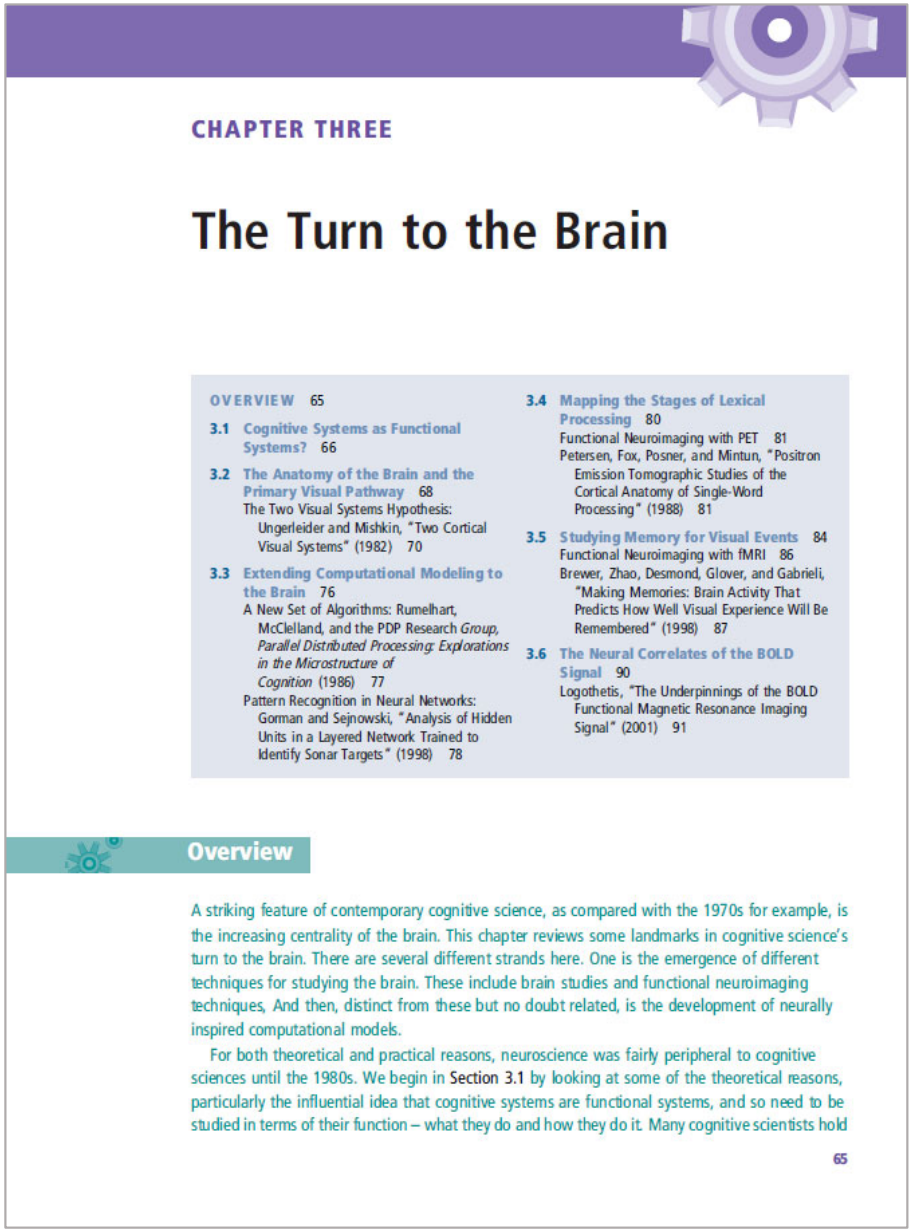
Turning away from functions

Recently, cognitive scientists have begun to focus more on how cognitive systems are implemented in **brains** and **nervous systems**

منبع اصلی



José Luis Bermúdez,
Cognitive Science:
An Introduction to the Science of the Mind,
3rd ed., Cambridge University Press, 2020.
Chapter 3 (Section 3.1)



CHAPTER THREE

The Turn to the Brain

Overview

A striking feature of contemporary cognitive science, as compared with the 1970s for example, is the increasing centrality of the brain. This chapter reviews some landmarks in cognitive science's turn to the brain. There are several different strands here. One is the emergence of different techniques for studying the brain. These include brain studies and functional neuroimaging techniques, And then, distinct from these but no doubt related, is the development of neurally inspired computational models.

For both theoretical and practical reasons, neuroscience was fairly peripheral to cognitive sciences until the 1980s. We begin in Section 3.1 by looking at some of the theoretical reasons, particularly the influential idea that cognitive systems are functional systems, and so need to be studied in terms of their function – what they do and how they do it. Many cognitive scientists hold

65