Hypercolumns

2mm x 2mm x 2mm

Figure 10.25
A cortical module.
Two visual pathways

- Two visual processing streams for different visual percepts:
  - “What” (ventral stream) - object recognition
    main input from “slow and detailed” parvo system
  - “Where” (dorsal stream) - spatial perception
    main input from “quick and dirty” magno system

![Brain diagram showing visual pathways](image-url)
Brain’s memory system

![Brain's Memory System Diagram]

**FIGURE 10.22** Network of structures underlying the ability to remember and learn. Shown here are the major structures involved in memory. The hippocampal system (including the hippocampus and surrounding entorhinal cortex), shown in purple, plays a critical role in declarative and episodic memory. The amygdala, shown in deep blue, is important for emotional memory. The striatum, shown in green, has been implicated in procedural/implicit memory. Regions of the dorsolateral prefrontal cortex, shown in red, are involved in working memory, whereas ventromedial prefrontal regions, shown in orange, have been implicated in encoding and retrieval. The left parietal cortex, also shown in yellow, has been suggested to play a role in retrieval. Finally, memory for perceptual information relies on sensory cortices, such as inferior temporal regions, shown in brown, whereas motor memory relies on motor regions, such as primary motor cortex, shown in tan. © 2011 Cengage Learning.
Aphasias

• **Broca aphasia**
  – Speech production difficulties

• **Wernicke aphasia**
  – Speech comprehension difficulties

• **Transduction aphasia**
  – Fluency and repetition problems
A conceptualization of how lateral and medial prefrontal regions exert executive control, from stimulus input to response output, via a cascade of control, using the Stroop task as an example.

According to this model, the first step in the cascade occurs when posterior regions of DLPFC (represented by 1) bias activity toward posterior regions of cortex involved in the processing of color (represented by the circle with a c) and away from word reading (represented by the circle with a w). Next, middle regions of DLPFC (represented by 2) bias processing to the representations that are most task-relevant, such as a specific color (e.g., green, denoted by $C_g$) rather than a specific word (e.g., blue, denoted by $W_b$). Posterior regions of the dorsal anterior cingulate cortex (ACC) (denoted by 3) aid in selecting which information should guide the responses; in this case, the response linked to green ($R_g$) rather than the response linked to blue ($R_b$). Because all conflict must be resolved before a response is emitted, this region becomes more highly activated if control has not been effectively exerted by the DLPFC. Finally, more anterior regions of the dorsal ACC (denoted by 4) are involved in helping to evaluate whether a response was correct. If the response was not correct, it sends a signal back to DLPFC to increase control. Source: Banich, M. T. (2009). Executive Function: The search for an integrated account. Current Directions in Psychological Science, 18, Fig. 2, pg. 92.