PDP Models

How They Work

- General flow during learning in a neural network:

    1. Network responds to stimulus and produces a response

    2. Information about correct response is provided (see below)

    3. Network modifies responding to match correct response (typically by adjusting weights, often in a trial and error fashion, i.e. more or less randomly)

- An **error signal** is generated that reflects the difference between actual activity of each output unit and the correct activity, which helps indicate how weights should be changed to allow the output signal to match the correct signal

- This signal is sent back through the circuit (via **back-propagation**)

- The entire process repeats until error signal = 0

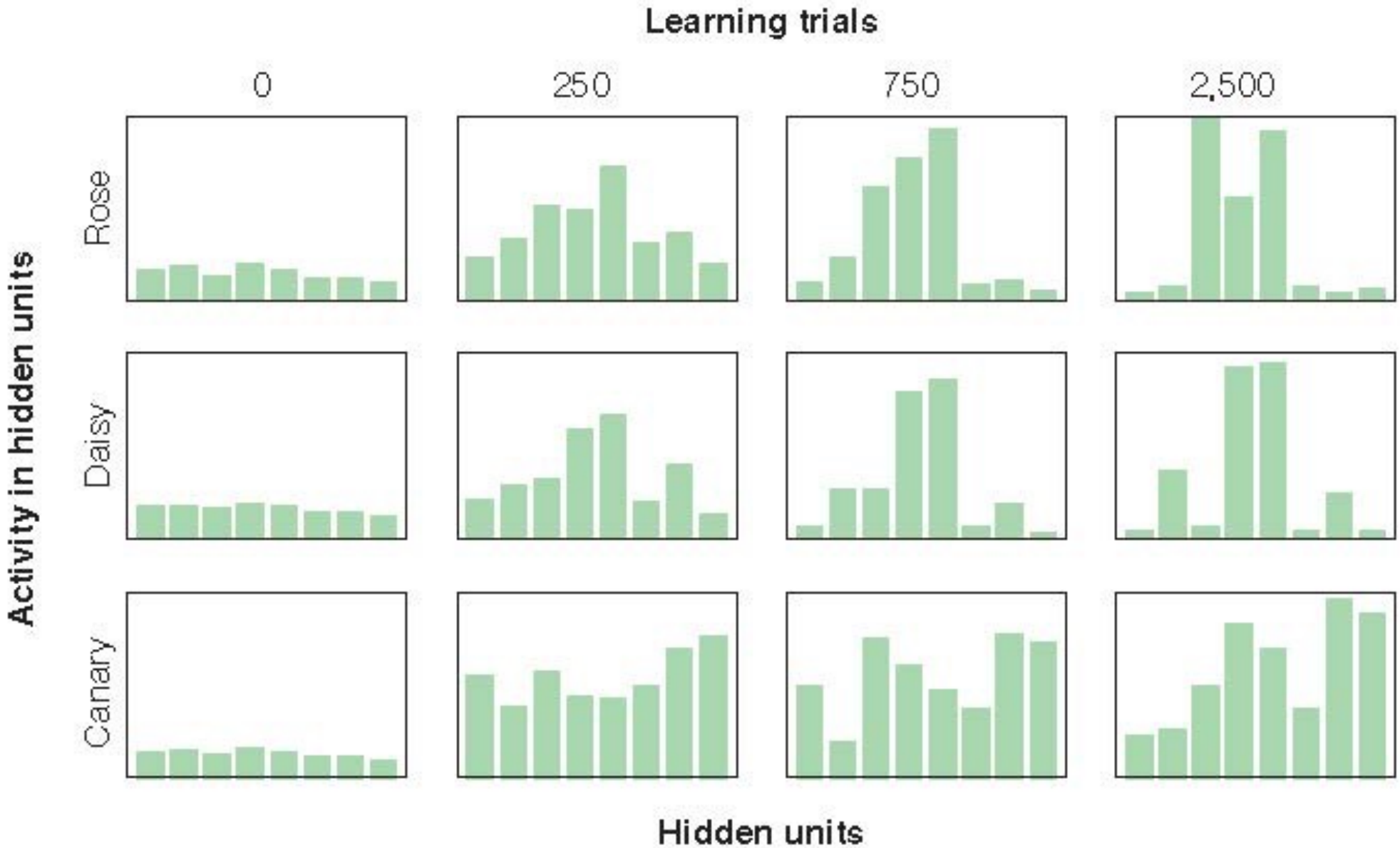

Figure 9.19 Learning in a connectionist network. Bars represent activity in the eight representation units. Notice how the pattern of activation changes as learning progresses. *(Source: Adapted from J. L. McClelland & T. T. Rogers, The parallel-distributed processing approach to semantic cognition,* Nature Reviews Neuroscience, *4, 310–320, 2003.)*

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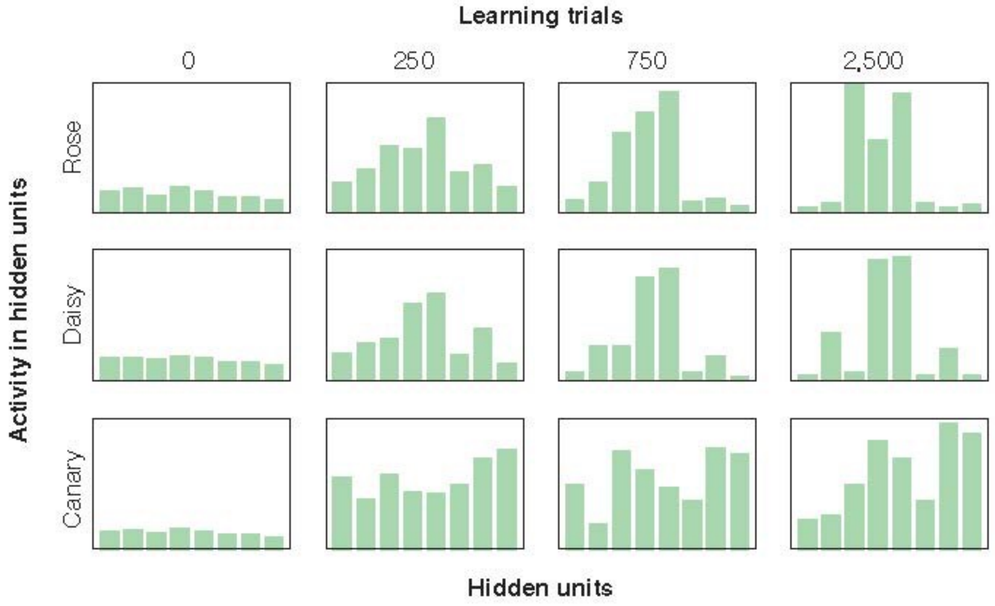

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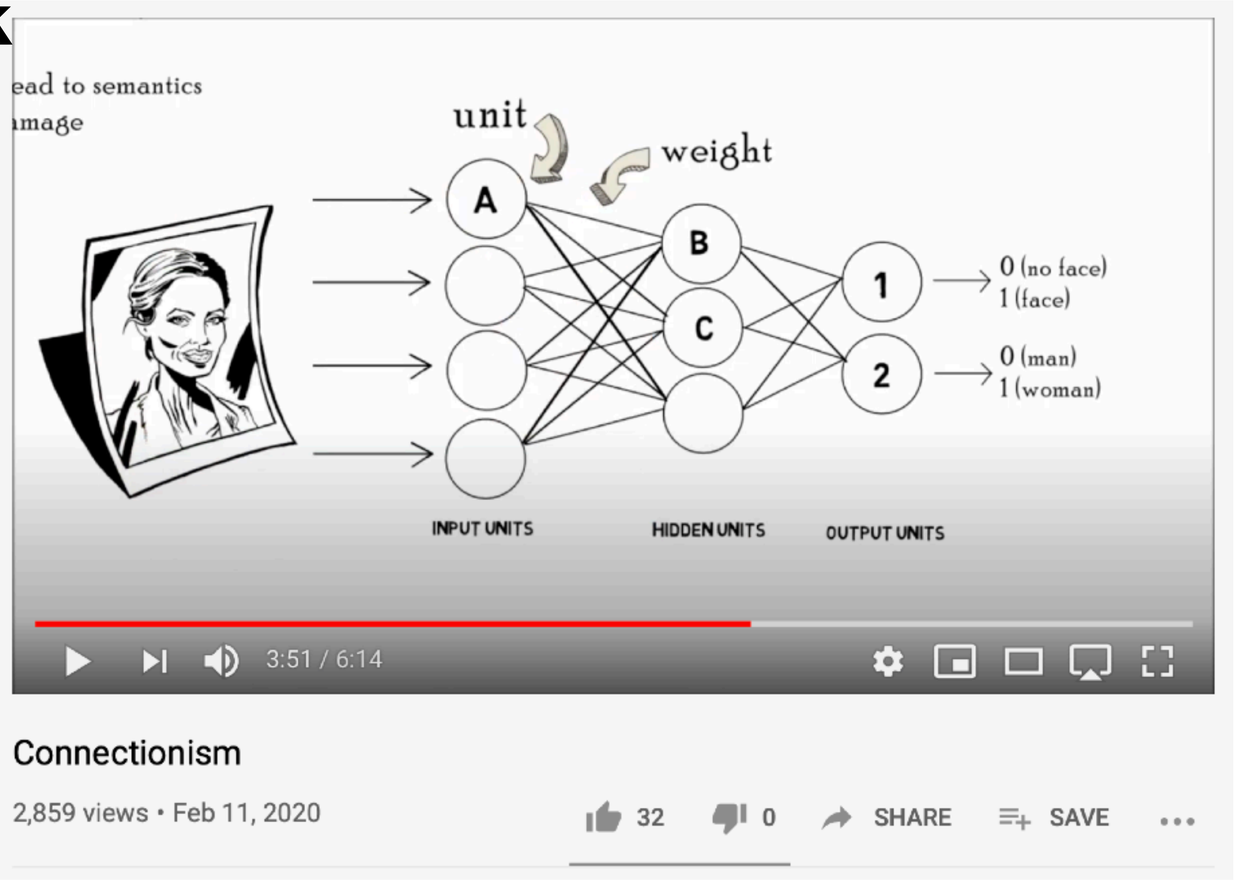

https://www.youtube.com/watch?v=ITwpDxx0UBE

- The beginning and end of this video frames PDP models in terms of what they contribute to discussions about philosophy of mind. While fascinating, that isn't the focus of our course so don't worry too much about that stuff (unless you want to!)