Block Practical: Connectionist models and cognitive processes

Part 4: **Replicating a Model**

Olivia Guest

Why replicate?

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- A pillar of science: if studies do not replicate, then what?
- Pedagogical: learn from "better"/published research!
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- Why start from scratch?

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- By reading up: papers usually provide neither equations nor code
- By being patient: programming takes time, running code takes time, etc.
- If you get stuck you can always ask the original authors!

Replication: The bigger picture

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- What assumptions is the model making, what assumptions is the theory making?
- Are implementation details important to the model, to the theory?
- Does the model uniquely support a specific theory?

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- What mechanism(s) is the model proposing?
- What are the model's predictions?
- Can the model account for data it has not seen?
- How well does the model compare to other accounts?

Tyler et al. (2000)

Conceptual Structure and the Structure of Concepts: A Distributed Account of Category-Specific Deficits

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- Model for semantic memory after neurodegenation

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Conceptual Structure and the Structure of Concepts: A Distributed Account of Category-Specific Deficits

- Model for semantic memory after neurodegenation
- Patients have category-specific deficit: animals $<$ artifacts
- features of living vs non-living things differ $\rightarrow$
  their representations differ $\rightarrow$
  their preservation after neurodegenation differs

Tyler et al. (2000)

Example of patient's ability to draw common items

(a) Nonliving things*

a1.

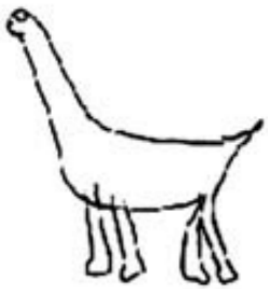
a2.

a3.

a4.

a5.

(b) Living things†



b1.

b2.

b3.

b4.

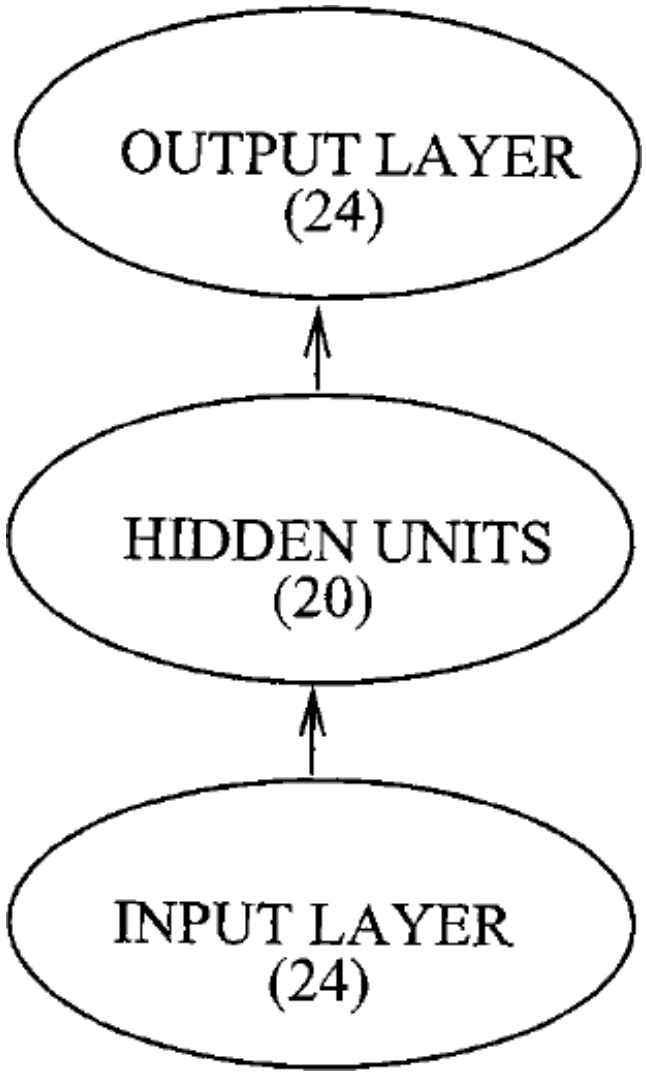
b5.

*a1. anchor; a2. bus; a3. chisel; a4. helicopter; a5. windmill
†b1. camel; b2. crocodile; b3. duck; b4. penguin; b5. zebra

Tyler et al. (2000)

To replicate we need...

- The architecture: connectivity, widths of each layer, etc.



Tyler et al. (2000)

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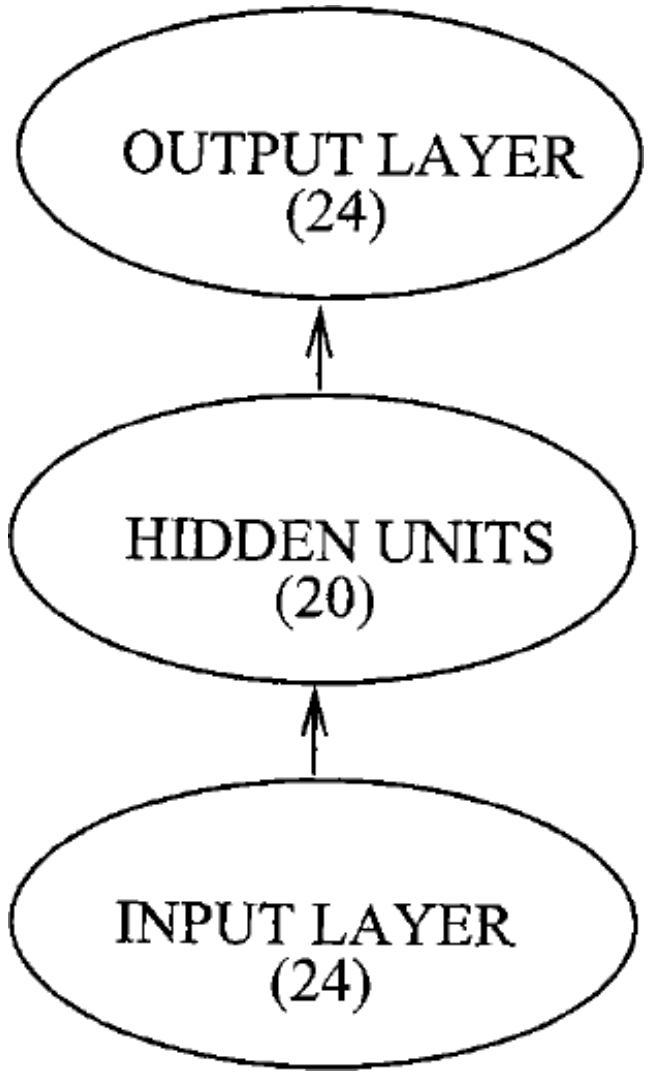

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To replicate we need...

- The architecture: connectivity, widths of each layer, etc.
- The learning algorithm: epoch size, momentum, learning rate, etc.
- The environment: input and target patterns!