

Block Practical: Connectionist models and cognitive processes

Part 4: **Replicating a Model**

Olivia Guest

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- ▶ Pedagogical: learn from “better” /published research!
- ▶ Augment: make model explain, predict more!
- ▶ 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!

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- ▶ 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 models 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 neurodegeneration
- ▶ Patients with otherwise healthy cognition, have a category-specific deficit (animals < artifacts)
- ▶ Authors propose:
features of living vs non-living things differ →
their representations differ →
their preservation after neurodegeneration differs

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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.

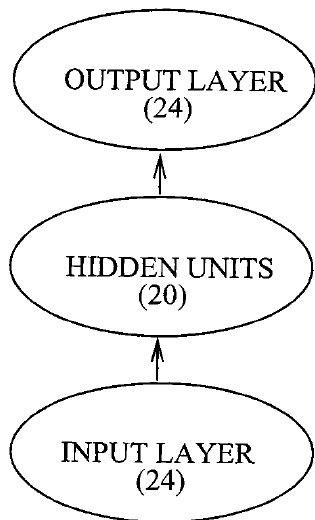
*a1. anchor; a2. bus; a3. chisel; a4. helicopter; a5. windmill

†b1. camel; b2. crocodile; b3. duck; b4. penguin; b5. zebra

Tyler et al. (2000)

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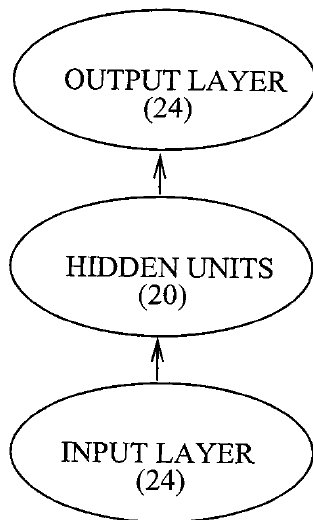
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- ▶ The learning algorithm: epoch size, momentum, learning rate, etc.



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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!

