

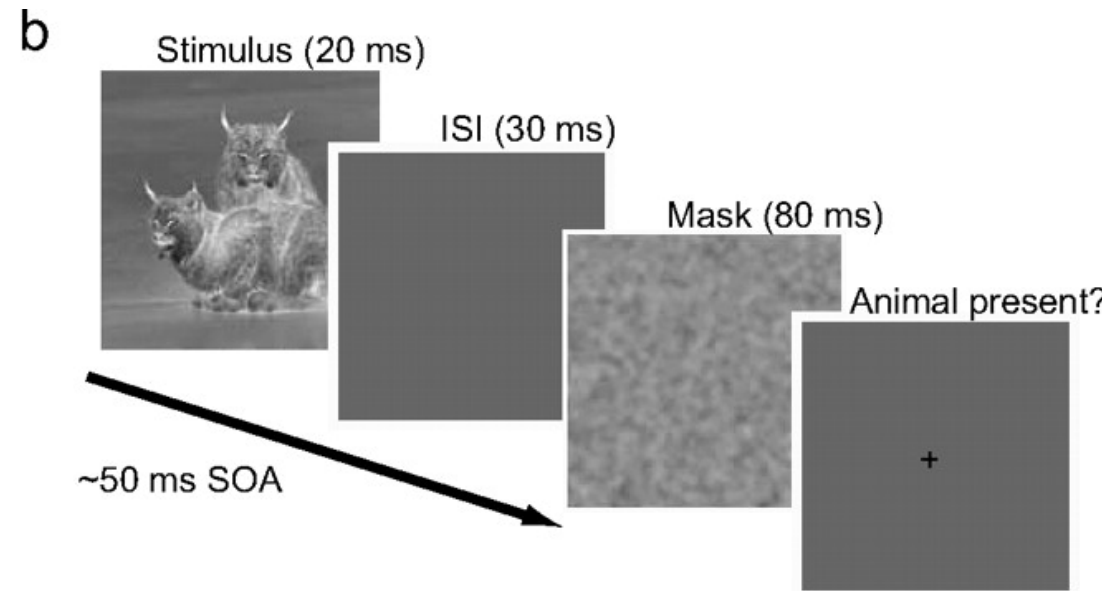
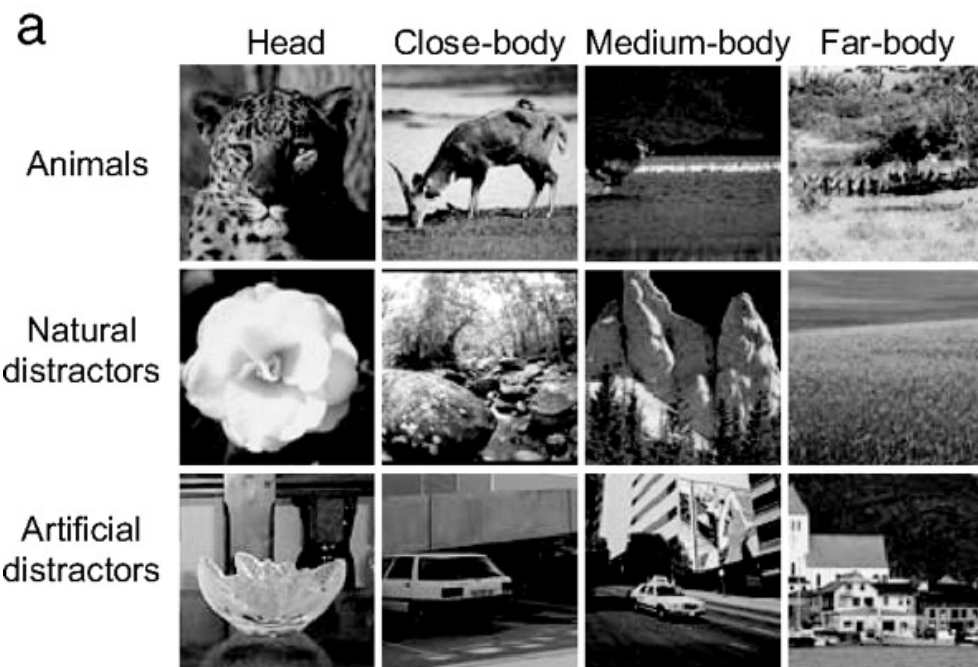
Object Recognition in Temporal Cortex

Computational Models of Neural Systems

Lecture 8.2

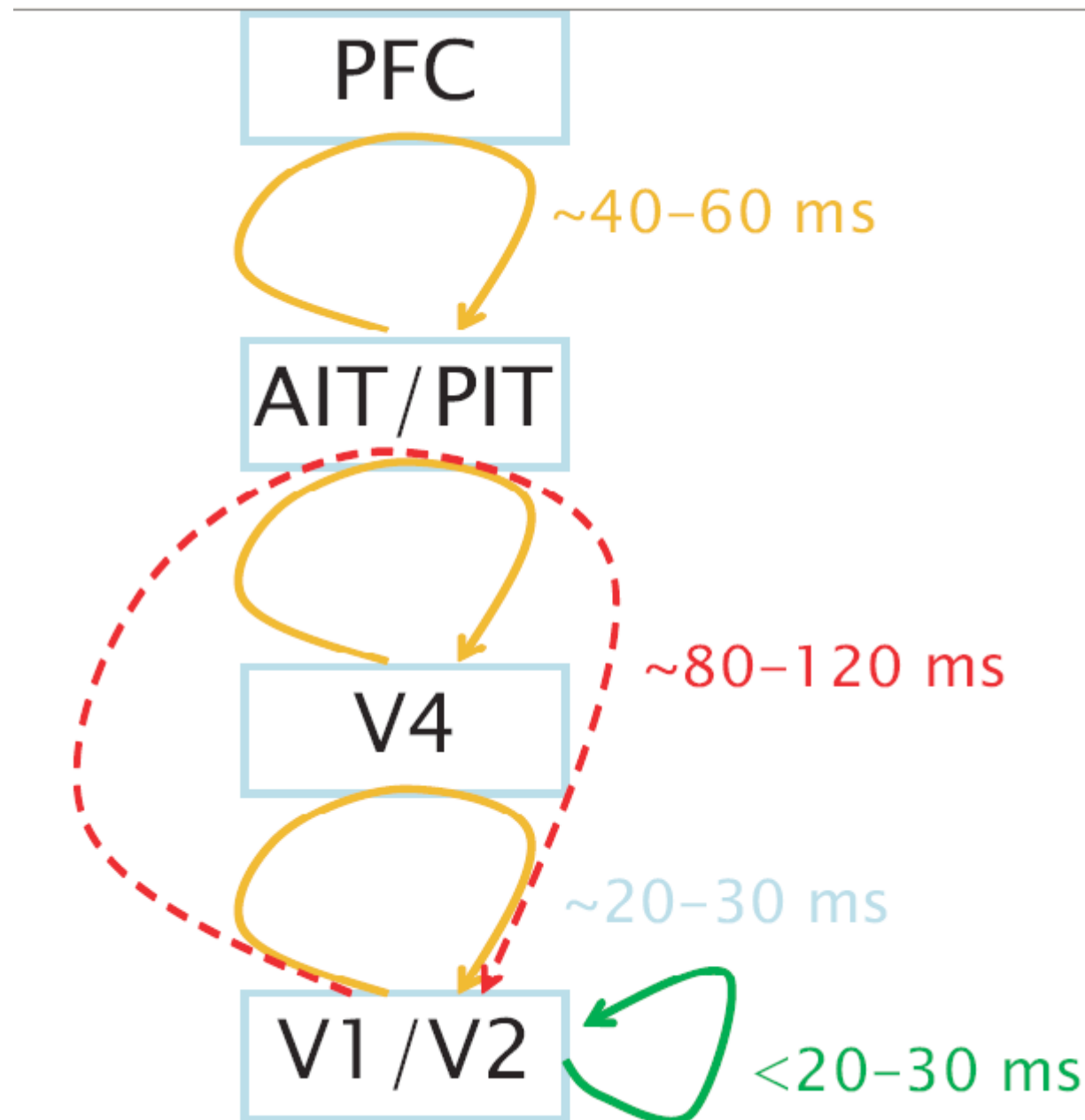
David S. Touretzky
December, 2023

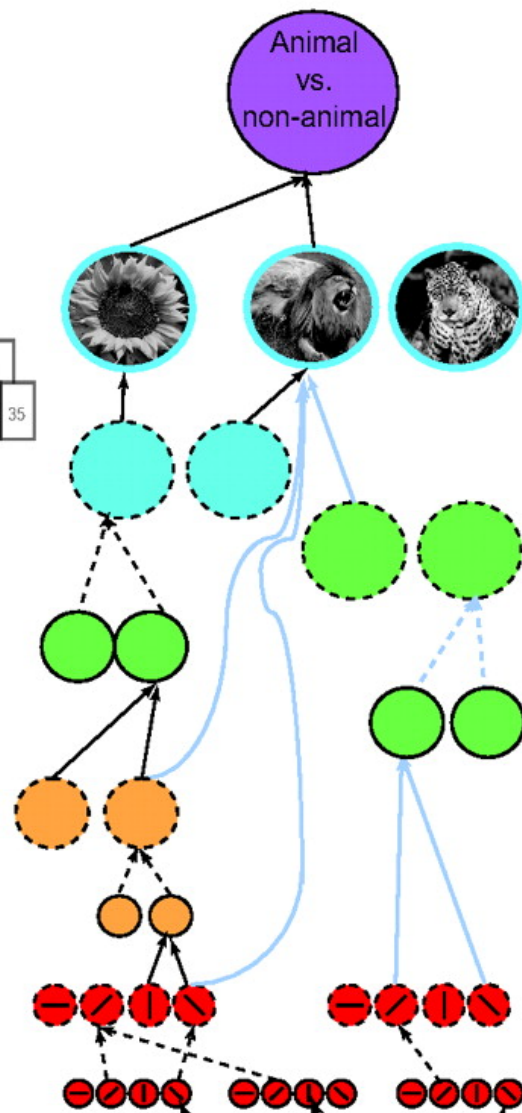
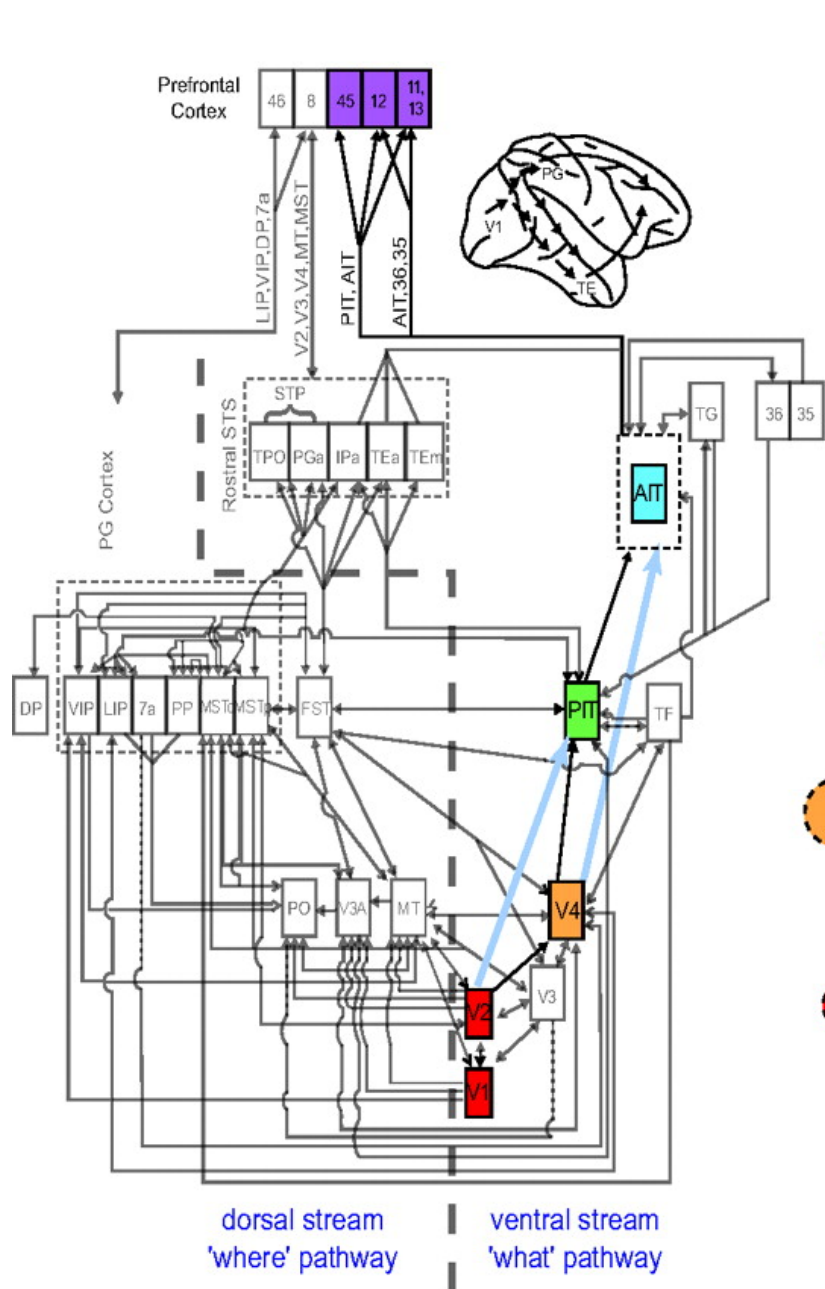
From Serre, Oliva, & Poggio (2007)



SOA = Stimulus Onset Asynchrony

Timing of Feedback Loops: Monkeys & Humans



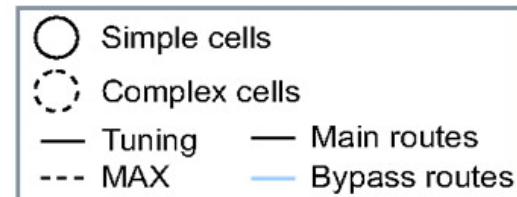


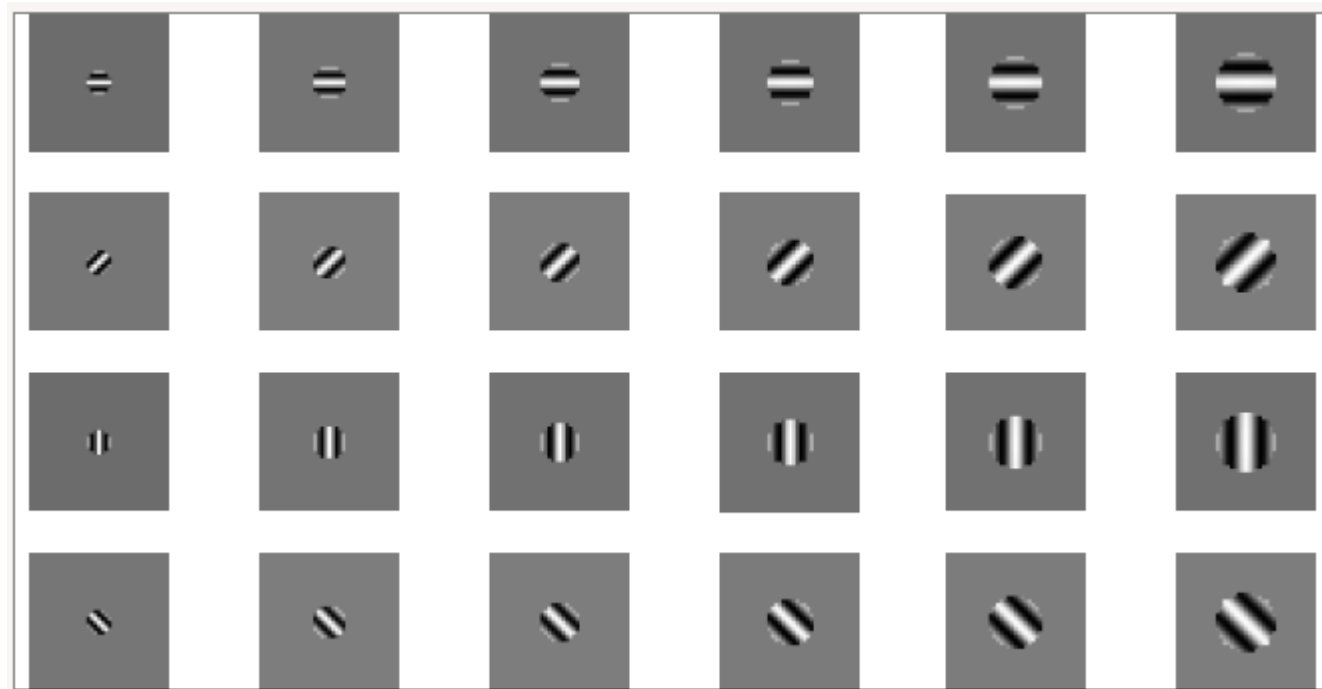
Model layers	RF sizes	Num. units	
classification units		10^0	Supervised task-dependent learning
S4	 7°	10^2	
C3	 7°	10^3	
C2b	 7°	10^3	
S3	 $1.2^\circ - 3.2^\circ$	10^4	
S2b	 $0.9^\circ - 4.4^\circ$	10^7	
C2	 $1.1^\circ - 3.0^\circ$	10^5	
S2	 $0.6^\circ - 2.4^\circ$	10^7	
C1	 $0.4^\circ - 1.6^\circ$	10^4	
S1	 $0.2^\circ - 1.1^\circ$	10^6	

Unsupervised task-independent learning

Increase in complexity (number of subunits), RF size and invariance

Serre, Oliva, & Poggio
PNAS, 2007



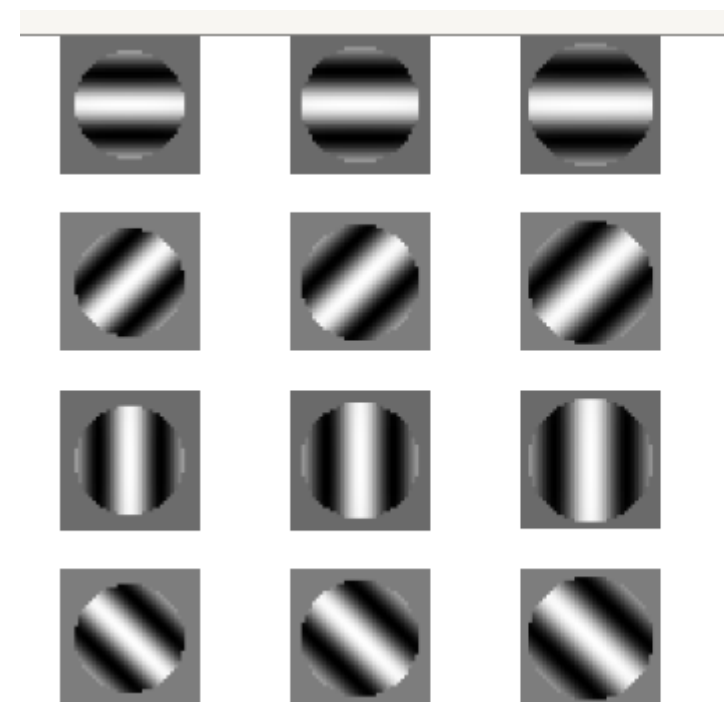
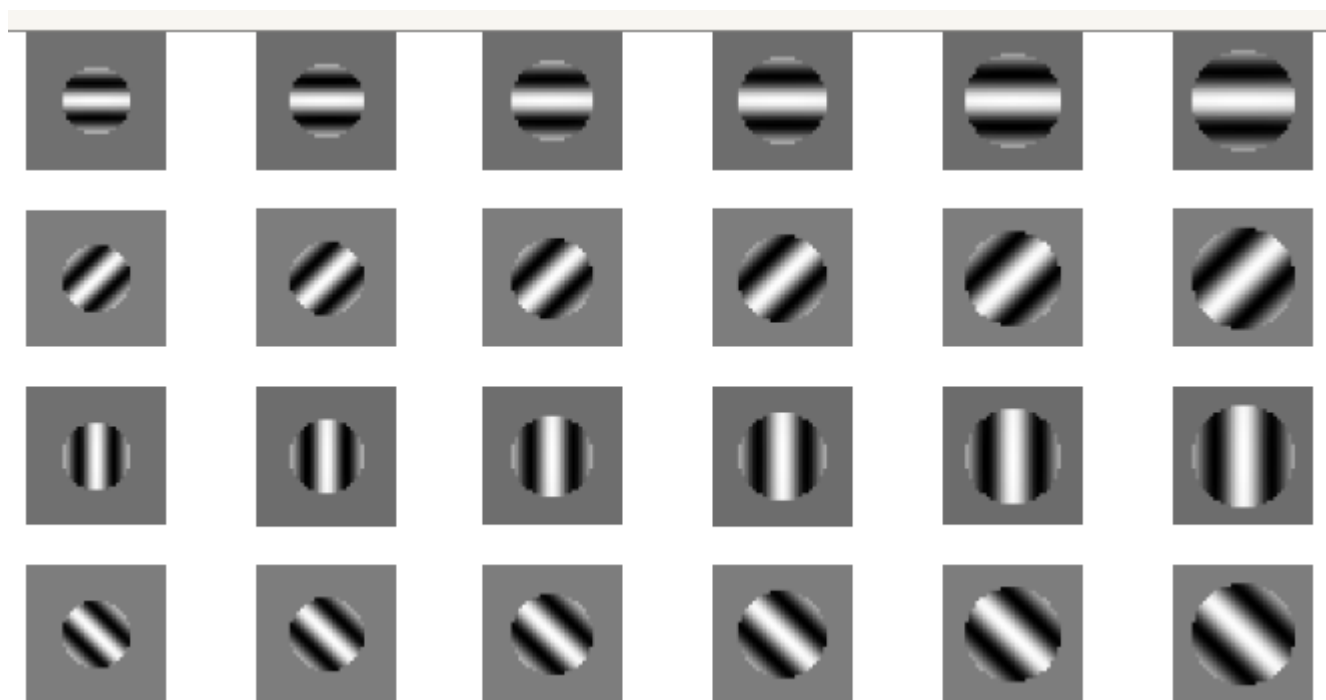


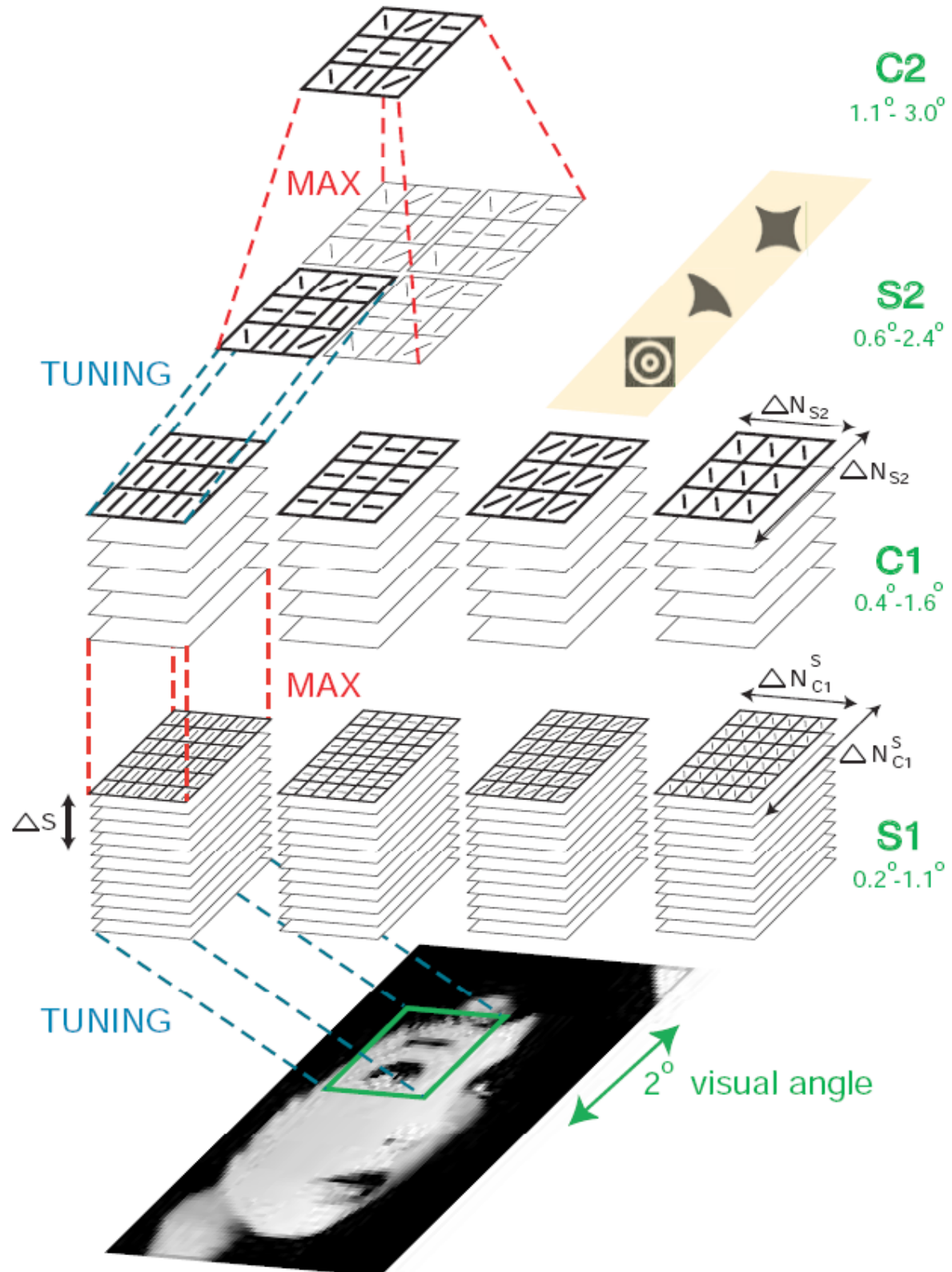
S1 Units

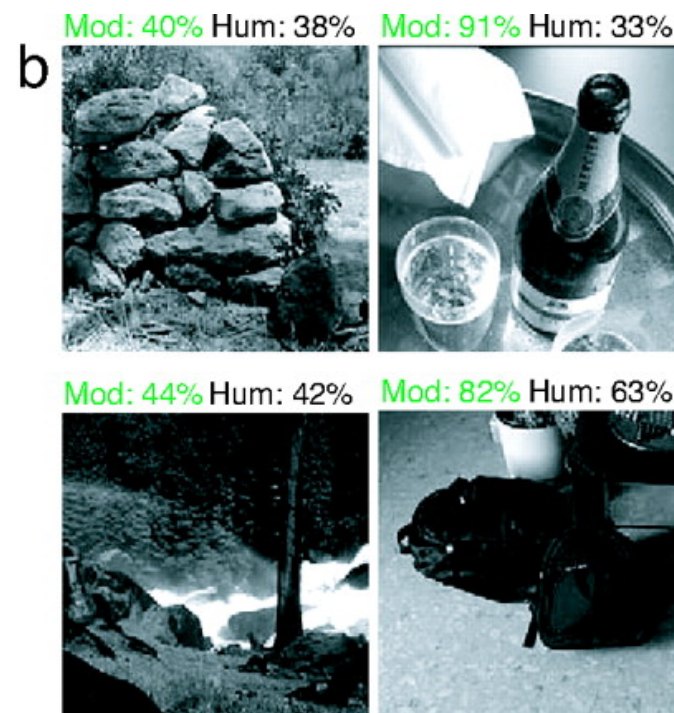
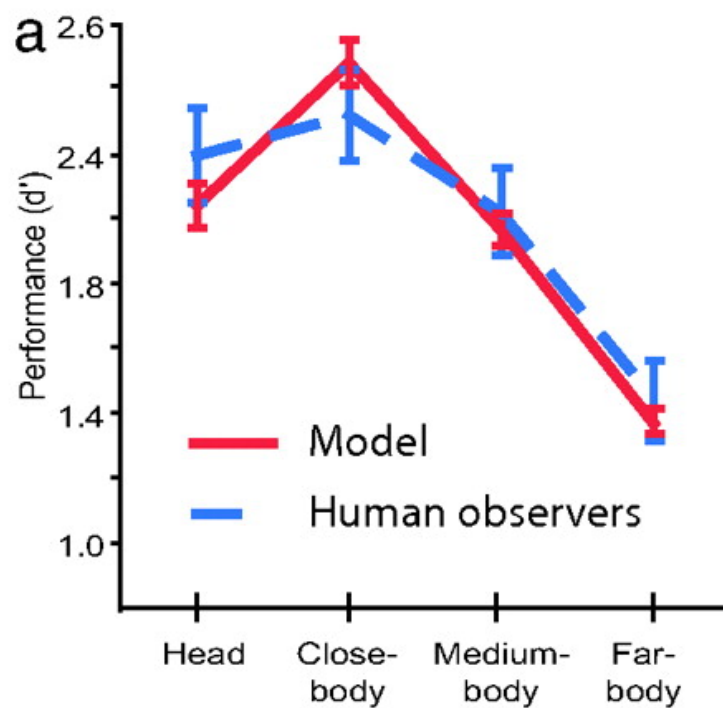
2 phases (1 shown)

4 orientations

17 sizes (15 shown)







c Mod: 22% Hum: 21% Mod: 0% Hum: 21%



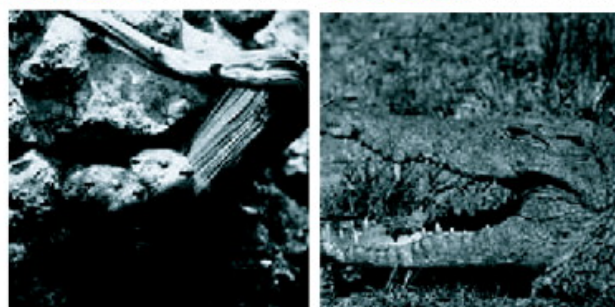
d Mod: 20% Hum: 75% Mod: 100% Hum: 25%



e Mod: 100% Hum: 96% Mod: 91% Hum: 83%



Mod: 33% Hum: 21% Mod: 0% Hum: 29%



Mod: 10% Hum: 71% Mod: 100% Hum: 29%



Mod: 100% Hum: 96% Mod: 100% Hum: 91%



Recognition Under Rotation

