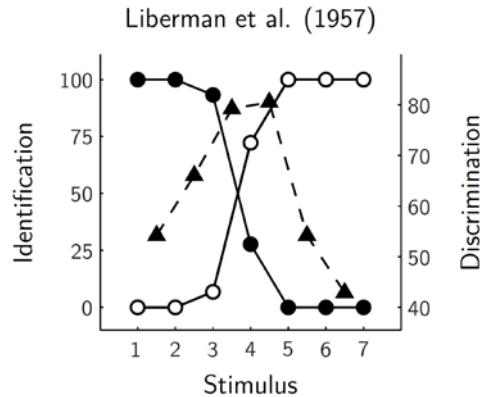


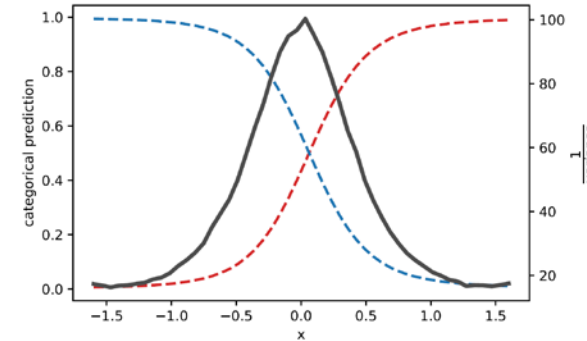
Categorical perception: Continuum of stimuli between two category prototypes – Discrete perception (here '4' vs '9')



In human
and other animals



along the continuum:
 identification ● ○
 (which category?)
 and
 discrimination ▲ —
 (same/different?)



In artificial
neural networks

Classification with deep neural networks: Insights from theoretical neuroscience

Contact: jean-pierre.nadal@phys.ens.fr **Jean-Pierre Nadal** (CNRS & EHESS) & Laurent Bonnasse-Gahot (EHESS)
LPENS - team Theoretical neuroscience and biophysics - Biophysics & Statistical Physics axes

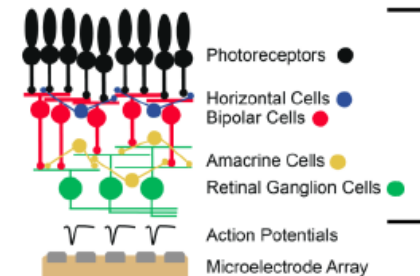
LPENS team **Theoretical neuroscience and biophysics**, other topics in neuroscience (**do not hesitate to contact us!**):
 Vincent Hakim (learning in the cerebellum; neural dynamics: synchronization, phase waves...),
 Rava da Silveira (neural coding of vision)

Stimulus ————— Brain representation



$$\hat{s} = f_{\text{decoding}}(\mathbf{r})$$

Neural systems are “complex”:
 - N very large
 - Noisy (spontaneous activity)
 - Non-linear (neural responses) and heterogeneous (cell types)



$$f_{\text{encoding}}(s)$$

Still, we can make sense of the world around us... how?