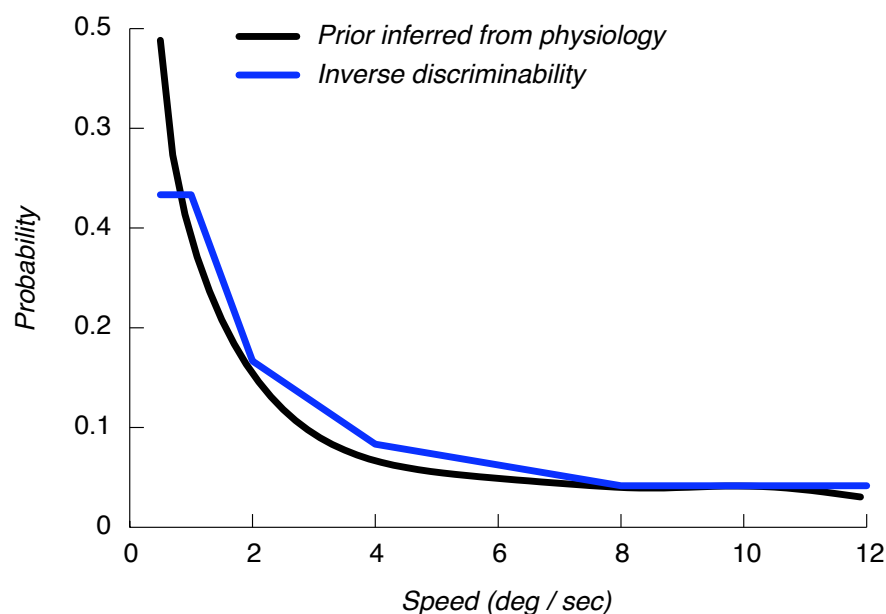


Orientation distributions and discriminability. Comparison of orientation priors measured from image databases and computed from human perceptual data. Blue curves show inverse orientation discrimination thresholds, averaged across four human subjects (Girshick et al., 2009). They have been normalized to be probability distributions. Black curves show histogram density estimates of orientation measured from two different image databases. Left: the “van Hateren” database (van Hateren et al., 1998). Right: the “Kyoto” data base (Doi et al., 2003). Neither database included photographs of carpentered environments.



Inferring priors on speed under the efficient coding hypothesis. Comparison of prior distributions on speed, as inferred from human perceptual judgements (blue) and macaque single-cell electrophysiological recordings (black). The blue curve shows inverse discrimination thresholds averaged across two subjects in a speed discrimination task (Stocker et al., 2006). The black curve shows the normalized root Fisher information of a population of neurons recorded in Macaque visual area MT. For each cell, responses were obtained (one at a time) to sinusoidal gratings moving at a broad range of different test speeds. Fisher information was computed assuming independent Poisson noise and parametric fits to the measured speed tuning curves. Under these assumptions, the Fisher information is an analytical function of the set of tuning curves (Dayan & Abbott 2001). Although the two predictions are derived from very different types of data, and obtained in different species, they are in close agreement.