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**Title:**

# Bayesian cognitive and statistical modeling applied to Signal Detection Theory and the Mirror Effect in a perceptual task.

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**Submitting for:**
52nd Annual Meeting of the Society for Mathematical Psychology

**Keywords:**
Signal detection theory; Bayesian modeling; Perception; Recognition memory; Mirror effect.

**Abstract (250 words):**

The mirror effect is a well-established empirical result in recognition memory. It shows that, when comparing subjects' responses between classes of stimuli that are differentially recognized, there are systematic differences between the identification of both targets and lure stimuli, as measured by hit and false alarm rates in signal detection theory (the implied order of the signal and noise distributions involved is what gives this pattern its name). Since the mirror effect has been predominantly tested for recognition memory tasks, most attempts to explain the observed pattern of response involves theorizing about high-level processes engaged in the study phase. To test the generalizability of this pattern to other domains where signal detection theory has been applied, we designed a perceptual task with two levels of discriminability which were defined by manipulating an optical illusion. After conducting a step by step replication of the mean-performance based analysis reported in the literature, we present evidence of the mirror effect outside recognition memory. We then developed a more detailed model based analysis, using signal detection theory and hierarchical Bayesian methods to assess the existence of the mirror effect at both the group and individual level.