

What are the mechanisms of spatial attention underlying precue validity effects? We answer this question within the framework of a perceptual template model (Lu & Doshier, 1998; Doshier & Lu, 1999) and an external noise plus attention paradigm for orientation judgments in 2 to 8 location displays. Attentional mechanisms correspond to behavioral signatures: External noise exclusion produces cuing effects in high external noise and stimulus enhancement produces cuing effects in noiseless displays. We found that external noise exclusion was the primary mechanism of cue validity effects, with large effects in high-noise displays. Stimulus enhancement coexisted as a secondary mechanism in noiseless displays for a subset of observers and display conditions. Contrast threshold ratio tests ruled out attentionally mediated changes in gain control. The ratio rules were also shown to hold for a stochastic PTM model. Effects were equivalent for four-alternative (Experiment 1) and two-alternative (Experiment 2) orientation identification. Precues allow observers to reduce noise and focus on the target in the precued location. External noise exclusion was more important in larger displays. Previous results are reclassified and understood within the external noise framework.