# X265 Modeling of the perceptual dynamics of the perception of body motion

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Dynamic phenomena of perceptual organization and multi-stable perception have been studied extensively since the time of Gestalt psychology, typically with low-level vision. Recent work demonstrates multi-stability and adaptation for high-level body motion perception. We have developed a neurodynamical model that reproduces multi-stability and adaptation in body motion perception. Our model consists of hierarchies of neural detectors that analyze the silhouette and the shading features of body motion stimuli, which are encoded as temporal sequences of patterns by a dynamic neural field (Fig 1A). Its multi-stable dynamics accounts for spontaneous perceptual switching. In addition, its neurons are adaptive, accounting for high-level after-effects. Further details of the implementation are discussed in [2].We showed elsewhere that the model reproduces the perceptual multi-stability of body motion perception and its dependence on shading cues [2]. Here we show additional simulations reproducing the following experimental results: (i) High-level after-effects and the time course of adaptation (Figure 1B). For a bistable stimulus the probability of seeing the percept shown during adaptation decays with the duration of the adaptor, with a time constant that is similar to the one found in experiments [1]. (ii) Exploiting a novel stimulus (inset Figure 1A) that for which perception can be biased towards one of the two perceptual alternatives, we find the time for the first perceptual switch in the region where both percepts are equally stable. By adjusting 2 parameters, we could match the observed behavior to the psychophysically measured switching times (Figure 1C). A physiologically-inspired hierarchical ('deep') neural model for body motion perception reproduces a multitude of effects that characterize the dynamics of body motion perception. The model makes concrete predictions about the behavior of single cells in body motion-sensitive areas.

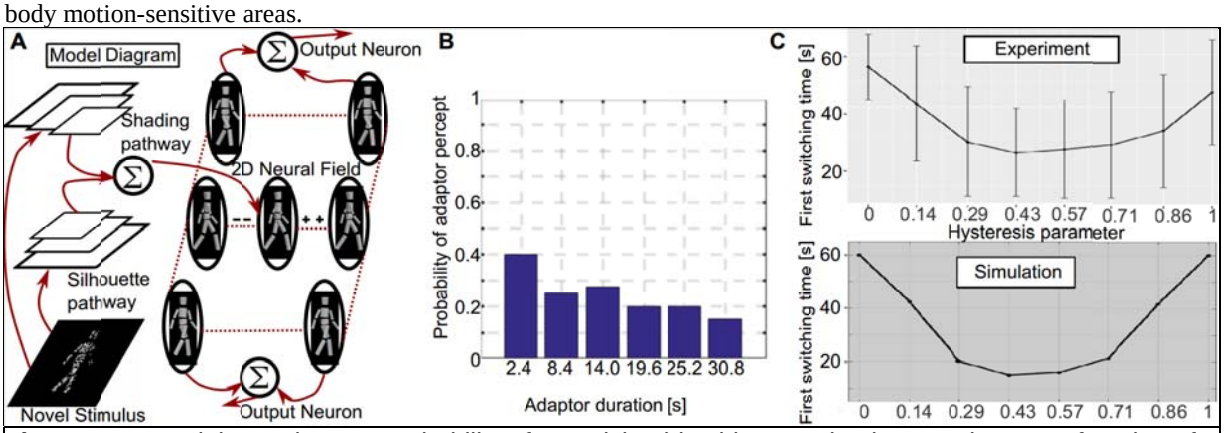


**Figure 1. A.** Model overview. **B.** Probability of perceiving bistable test stimulus as adaptor as function of adaptor duration. **C.** Time to first perceptual switch as function of biasing parameter that controls preference for the two alternative percepts. Top panel: experimental data. Bottom panel: model simulation.

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**References**

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2. Fedorov L., Vangeneugden J., Giese M. **Neural model for the influence of shading on the multistability of the perception of body motion.** *IJCCI/NCTA Neural Computation Theory and Applications 8th Conf. Proceedings.* 2016 69-76.