

Lu and Sperling [Vis. Res., **35**, 2697 (1995)] proposed that human visual motion perception is served by three separate motion systems: A first-order system that responds to moving luminance patterns; a second-order system that responds to moving modulations of *feature types*-- stimuli in which the expected luminance is the same everywhere but an area of higher contrast or of flicker moves; and a third-order system that computes the motion of *marked* location in a "saliency map," that is, a neural representation of visual space in which the locations of important visual features ("figure") are marked and "ground" is unmarked. Subsequently, there have been some strongly confirmatory reports: different gain control mechanisms for first- and second-order motion, selective impairment of first- versus second-motions, e.g., isoluminant chromatic motion. Various procedures have successfully discriminated between second- and third-order motion (when first-order motion is excluded): dual tasks, second-order reversed phi, motion competition, and selective adaptation. Meanwhile, eight apparent contradictions to the three-systems theory have been proposed. A review and re-analysis here of the new evidence, pro- and con-, resolves the challenges and yields a more clearly defined and significantly strengthened theory.