Cortical Dynamics of Form-Motion Interactions in V1, V2, MT and MST

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**Motion Integration and Segmentation**
- **Aperture problem**
- **Motion grouping: when should it be done?**
- **V1-V2-MT-MST network**

Form-Motion interactions are necessary to solve the problem.

**Motion Grouping Across Occluders**
- **V1-V2 Figure-Ground Separation**
- **Formotion Input = FACADE Output**
- **Motion Grouping of FORMOTION Inputs**
- **The Ambiguous X-Junction**

**V1-V2 Motion Grouping**

**Motion Grouping Across Occluders**
- **Chopsticks Motion Simulation**
- **Chopsticks Boundary Completion**

**Motion Grouping of Formotion Inputs**

**The Ambiguous X-Junction**
- **Form System**
- **How to bridge the ambiguous X-junction?**
- **Attention to one bar causes it to be perceived as an occluder.**

**Motion Grouping Across Occluders**

**The Role of MT-V1 Feedback**
- **Model based on FACADE and Formotion uses V1-V2-MT-MST loop to explain Motion grouping behind occluders.**

**Conclusions**
- **Motion-defined binary contours and kinesthetic boundaries.**
- **Motion grouping behind occluders.**
- **Separation in depth based on motion.**

**References**
- Anderson, B. and Barth, H. C. Motion-based mechanisms of illusory contour synthesis, Neuron, 24, 433-441.
- L.A. 2001 claim: “Contours implying convex, closed forms (good Gestalts) are given the ‘green light’ for motion integration, whereas contours implying open, concave forms trigger a veto that prevents motion binding.”

We explain the data using:
- **V1 V2 Figure-Ground Separation**
- **V2 MT Form-Motion Interaction**
- **MT MST Motion Grouping**

**Facade 3-D Boundaries and Surfaces**

**Chopsticks: Motion Separation in Depth**

**Closing Formotion Feedback Loop**

**Directional Grouping**

**Boundary Grouping**

**Motion Grouping Across Occluders**

**Conclusions**
- **Model based on FACADE and Formotion uses V1-V2-MT-MST loop to explain Motion grouping behind occluders.**
- **Separation in depth based on motion.**

Also can explain:
- Motion-defined binary contours and kinesthetic boundaries.
- Motion grouping behind occluders.
- Separation in depth based on motion.