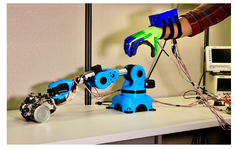
PRESENTER:
Raymond R. MacNeil

Pantomime Grasps are Influenced by the Ventral Visual Stream Late in the Reach Trajectory

Background

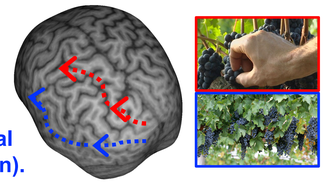
- **Pantomime grasps** are pretend actions used in gesture, virtual reality, and telerobotics.

- They are slower and more effortful than natural grasps, which could be explained by greater input from from both the visual streams.

Fast, illusion immune dorsal stream (action).

Slow, illusion susceptible ventral stream (perception).

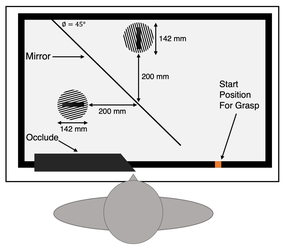


- We used a graspable version of the tilt illusion to see **WHEN** the ventral stream had an influence.

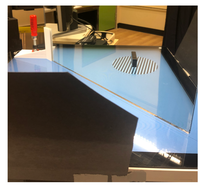
Methods

- We used a mirror and shutter goggles to control the view of the display. Behind the mirror was either a real tilted bar (natural grasp) or thin air (pantomime).

Schematic of the experiment workstation (bird's eye view.)

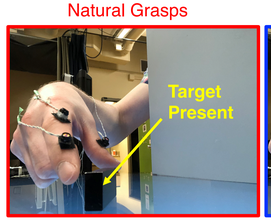


Participant's view of virtual target / illusion.

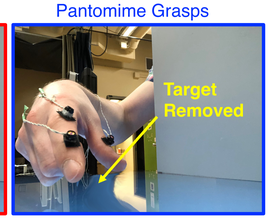


View from behind the mirror.

Natural Grasps



Pantomime Grasps



When during the reach will pantomime grasps be influenced by the tilt illusion?

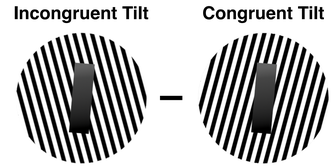
Only late! Pantomime grasps do not express the illusion until just before 'contact'.

Indicates that **early phase governed by dorsal stream** (initiation of visually guided action), while **late phase governed by ventral stream** (the experienced illusion).

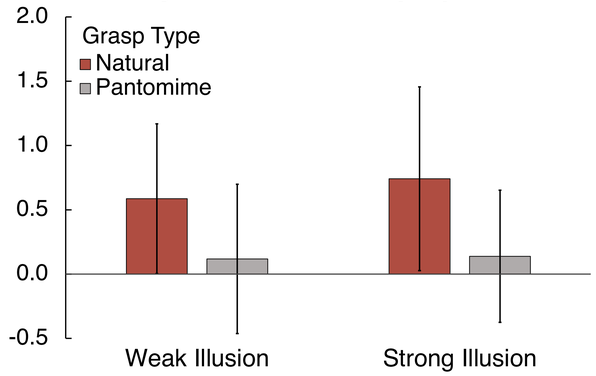
Abstract # 1396

Quantifying The Illusion's Effect

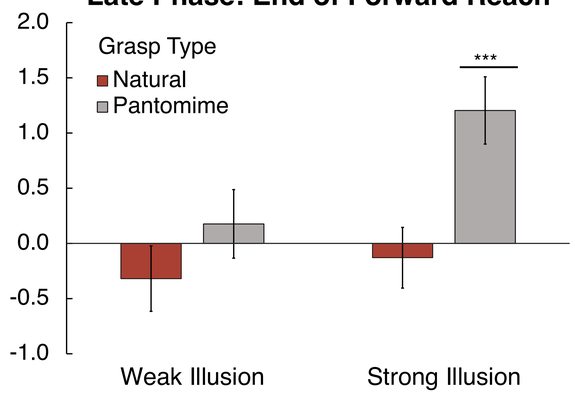
Illusion magnitude was measured as the difference in grip angle when the target bar has an incongruent tilt with the surround versus when the target bar has a congruent tilt.



Early Phase: Peak Grip Aperture



Late Phase: End of Forward Reach

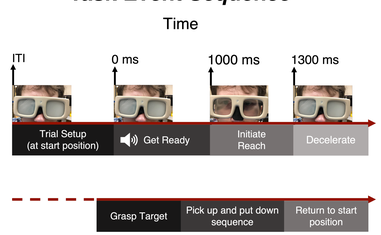


Magnitude of Illusion (Deg.)

*** $p = .001$

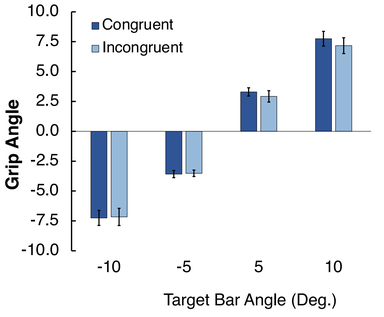
Methods Cont'd

Task Event Sequence

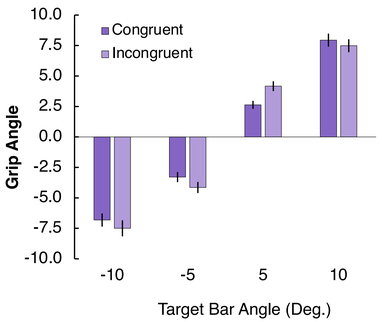


Supplementary Results

Response At End of Forward Reach for Natural Grasps



Response At End of Forward Reach for Pantomime Grasps



Note: Background inducing context was tilted at either 15° or -15° relative to the central target bar.

Raymond R. MacNeil, Robert L. Whitwell, James T. Enns

NSERC CRSNG

UBC Vision LAB