Research has shown that grasp locations typically fall close to or across an object’s center of mass (COM1–4), with participants adjusting their grasp locations to coincide with small changes in COM location1. When reaching out to grasp an object, participants take advantage of visual cues to object symmetry to better determine the object’s COM when selecting these locations2.

The purpose of this research was to examine the influence of COM location (Experiment 1) and variations in surface characteristics (Experiment 2a, 2b) on grasp and fixation positions.

Orientation of COM was the largest influence on both grasp and fixation locations.

Grasping trapezoidal objects. Changes in COM distance has less influence on grasp position than fixation locations.

Changes in object shape and changes in the orientation of the object’s COM is the largest mediator in grasp and gaze position. Changes in COM distance has less influence on grasp position than fixation locations.

Attention to the local elements making up the shapes (as opposed to global processing) is biasing grasp positions. Rightward biases are observed when objects are made up of many small parts (Experiment 2a). Grasp positions are biased towards the center of the ‘larger’ shape (Experiment 2b).

Changes in object shape and changes in the local elements within a shape can differentially affect fixation and grasp locations when picking up an object.

Fixations to objects with COM distances of 1cm and 1.5cm were significantly different than fixations to objects with COM distances of 0.5cm.

The orientation of the object’s COM is the largest mediator in grasp and gaze position. Changes in COM distance has less influence on grasp position than fixation locations.

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