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Forging a head: how environmental elements influence the perception of a shape's facing direction

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Abstract

Human perceivers are very sensitive to which way others are facing, with head and eye gaze cues capturing attention (when directed at us), orienting attention (when directed elsewhere), and even influencing downstream judgments about others' social traits. But what causes us to see a shape as directed in the first place? Does the perception of a shape's facing direction depend mainly on its internal structure — or might it also be influenced by spatial context? In Experiment 1, observers briefly viewed a randomly oriented oval, and afterward used a circular slider to report which way they saw it as facing. A dot was always drawn near the oval — aligned with either its long or short symmetry axis. Observers were biased to see the oval as facing toward the dot, but this effect was much stronger when the dot was aligned with the oval's long (vs. short) symmetry axis, indicating that external elements interact with a shape's internal structure to determine its perceived facing direction. How automatic is this association between long-axis alignment and 'towardness'? In Experiment 2, participants saw the same displays, and now made speeded keypresses to indicate whether the oval's long or short axis was aligned with the dot. In one block of trials, they pressed an anterior (further forward) key to report long-axis alignment, and a posterior (further back) key to report short-axis alignment. In another block, they responded with opposite key-mappings. Participants responded faster in the block where an anterior key was paired with long-axis alignment and a posterior key with short-axis alignment, suggesting an automatic bias to see long-axis alignment as facing towards. We conclude that the perception of facing direction is driven by the interaction of internal structure and external context, in a way which indicates the particular salience of long symmetry axes.