

## (Fake) hands and cup-noodles: Evidence for dorsal system involvement in ‘offline’ perception

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In the present study, participants (N = 14) estimated distances between Styrofoam cup-noodles and either their own hand (egocentric distance judgment) or a fake hand (allocentric distance judgment) at stimulus offset, or after a delay of 5 s. When the cup-noodle and hand were visible for 1500 ms, distance estimates were always strongly related to the actual target distance, although estimates involving the own hand were more accurate. At a stimulus duration of 12 ms, participants displayed a relatively preserved ability to estimate the distance between the cup-noodles and their own hand, but not the fake hand. This suggests that distinct visual thresholds exist for the perception of egocentric and allocentric distances. Remarkably, the relatively preserved ability to report egocentric distances was observed even when the estimates were made after a 5 s response delay.

Milner and Goodale’s (1995) influential perception-action model proposes that the dorsal visual system rapidly processes egocentric visual information to control ‘online’ action, while the ventral system requires more time to process allocentric information to determine object identity. Under the assumption that the dorsal system is indeed responsible for fast exploitation of egocentric information, the specific relative integrity of egocentric distance judgments at 12 ms stimulus durations and 5 s response delays that is reported here may imply that the dorsal system is also involved in egocentric distance perception—and remains functional after an extensive delay.

We speculate that rather than principally supporting a specific behavioral function (i.e., ‘online’ action), the dorsal system is principally involved in the rapid detection of egocentric information, which can be used to inform both ‘online’ and ‘offline’ action as well as perception (see also de Wit, van der Kamp, & Masters, 2012; van der Kamp, Savelsbergh, & Rosengren, 2001). Previous evidence from psychophysics, cognitive neuroscience, and neuropsychology exists that can be interpreted in support of this contention.

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