

## ARTICLES

# Throwing while looking through prisms. II. Specificity and storage of multiple gaze-throw calibrations

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Human subjects threw balls of clay at a visual target while looking through wedge prism spectacles. In studies of short-term adjustment, subjects threw in the direction of their prism-bent gaze, missing the target to that side. Within 10-30 throws, they gradually adapted with a wider gaze-throw angle and hit the target.

Immediately after removal of the prisms the wide gaze-throw angle persisted and throws missed the target to the opposite side, the so-called 'negative after effect'. Repeated throws were required to adapt back to the normal gaze-throw angle and hit the target. The adaptation was specific both to the body parts trained and the type of throw trained: training with the right hand did not generalize to throwing with the left; overhand training seldom generalized to underhand throwing. In a study of long-term adjustment, two subjects threw with the same hand (right) and the same type of throw (overhand) alternately, with and without prisms, over a period of 6 weeks. They gradually learned to hit the target on the first throw, with and without prisms. The two gaze-throw calibrations (prism and no-prism) were retained for > 27 months. The long-term adjustment was shown to consist of a coordinated

relationship of eye-in- head, head-on-trunk and trunk-on-arm angles.