INFANTS INTEGRATE LOCAL MOTION

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PURPOSE: It is not yet clear whether infants integrate component motions into coherent pattern motion. Though infants track moving plaids in the pattern direction (Manny & Fern, 1990), this may be due to tracking the "nodes" of plaid intersections rather than to true integration of the components. Here, we tested infant motion integration using component gratings that were spatially separated, and thus did not contain trackable intersections. METHODS: The *control* stimulus was a field of evenly spaced moving grating patches (2°x4°, 0.8 cpd, 80% contrast, 6°/sec). Every patch moved in one of four directions (72°, -72°, 108° or 252°). The *integration* stimulus consisted of grating patches, but two directions (72°/-72° or 108°/252°) were presented in an alternating checkerboard pattern. When integrated, pattern motion for these paired component motions was 0° (right) or 180° (left) at 20°/sec. Using a directional (left vs. right) eye movement technique, we compared infants' ability to track horizontal pattern motion in the integration stimulus to their ability to track the horizontal component of oblique motion in the control stimulus. Integration was computed as the difference in percent correct for integration and control conditions. For integration to occur requires the summation area of integrative motion mechanisms to be relatively large compared to the distribution of the grating patches. RESULTS: Data from 2-, 3-, 4- & 5-month-olds revealed significant integration at all but the oldest age. Integration *decreased* consistently and significantly with age (17%, 19%, 12% & 2%, $p<0.03$). Adults did not show significant integration. CONCLUSIONS: By 2 months of age infants integrate local motion signals into coherent global motion. Given that motion integration is subserved by area MT, this suggests that human MT is functional by 2 months of age. The decrease in integration with age implies a reduction in the size of motion summation areas over the course of development.

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