

Reduced Tactile Modulation of Visual Event Perception during Development

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We examined developmental changes in the interactions between vision and touch by measuring visual fission and fusion illusions induced by taps. The fission illusion refers to a single flash perceived as two flashes when paired with two taps, whereas the fusion illusion refers to two flashes perceived as one when paired with a single tap. Right-handed children (7, 9, and 11 years of age) and adults were tested. One or two flashes were presented either in the center or 10° in the periphery (equally often on the left or right) on a computer monitor, while zero, one, or two taps were presented on the right index finger. Participants were instructed to report the number of perceived flashes, while ignoring the taps. Children aged 7 and 9 years reported both illusions more often than adults ($ps < .005$). Across age groups, the fission illusion was larger when the flash was presented in the periphery than in the center ($p < .005$), whereas the opposite was true for the fusion illusion ($p < .001$). Further analyses, based on signal detection theory, demonstrated lower sensitivity (d') for children than adults when discriminating one versus two flashes ($ps < .001$). The larger fusion illusion in children was also associated with a criterion shift ($ps < .05$). Regarding the center–periphery differences, only the larger fission illusion in the periphery was attributable to lower sensitivity in the periphery ($p < .001$), and both fission and fusion illusions were associated with a criterion shift ($ps < .01$). These results demonstrate an age-related decrease in the influence of touch on vision. The signal detection results also suggest that the fission illusion is better than the fusion illusion as a measure to examine the perceptual development of visuotactile integration.