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Tactile-visual crosses modal transfer after an extended period of Congenital Blindness

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Access to health care may vary across countries, communities, and individuals, influenced by social and economic conditions as well as health policies. Providing health care services means "the timely use of personal health services to achieve the best possible health outcomes". Factors to consider in terms of healthcare access include financial limitations (such as insurance coverage), geographic barriers (such as additional transportation costs, the possibility to take paid time off of work to use such services), and personal limitations (lack of ability to communicate with healthcare providers, poor health literacy, low income). Limitations to health care services affect negatively the use of medical services, the efficacy of treatments, and overall outcome (well-being, mortality rates).

PURPOSE

In underdeveloped villages of India, infants with congenital cataracts often do not undergo cataract surgery due to socioeconomic reasons. Consistent with a strict interpretation of the critical period, if congenital cataracts are treated within a few months of birth it leads to a near normal development of vision but after age 6 or 7 years there should be little or no improvement. The experiments below show that vision can be regained after the critical period. The objective of Experiment 1 is to assess the development of the tactile-visual link compared to intra-modal tactile and visual object recognition while Experiment 2 assesses precision of the tactile-visual link.

OPTHAMOLOGY

Subjects were between 8 and 15 years old. In Experiment one object were used to assess tactile-to-tactile, tactile-to-visual, visual-to-tactile, and visual-to-visual transfer in three patients. In Experiment two, objects of a specific length, aspect ratio, or curvature ratio were used to assess the precision of tactile-to-visual transfer in three other patients and four normally sighted control subjects.

In Experiment 1, tactile-to-visual transfer accuracy pre-operatively was about 20% and improved to above 50% during one week. In Experiment 2 the patients had a preoperative error range of 23-51%. There was a 25% improvement on post operation day 1 and by the day 4 there was a 50% improvement in the number of errors.

We have demonstrated that the link between touch and vision strengthened significantly after the classic critical period.

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