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- Friday, December 10, 1999

Vision After Monocular vs Binocular Deprivation During Early Infancy

Making and Breaking Rules: Vision after Monocular versus Binocular Deprivation during Early Infancy Children treated for congenital cataract provide the opportunity to study the effects of visual deprivation in humans. A cataract is an opacity of the natural lens of the eye and, if dense and central, prevents all patterned input to the retina. The cataract is treated by surgically removing the natural lens of the eye and replacing it with an optical correction to restore nearly normal visual input. It is well known that pattern deprivation during early infancy compromises visual development. Numerous studies support the general principle that vision is worse if the deprivation was monocular rather than binocular, unless monocular deprivation was followed by extensive occlusion of the non-deprived eye. The usual explanation is that monocular deprivation affects visual development not only by depriving cortical neurons of patterned visual input, but also by uneven competition for cortical connections between the deprived and non-deprived eyes. Extensive occlusion of the non-deprived eye reduces that uneven competition so that the effects of monocular deprivation are comparable to those of binocular deprivation. However, most previous studies examined spatial vision, with tests beginning weeks to years after the deprivation ended. Conversely, by testing the spatial vision of infants immediately after deprivation ended and by testing an aspect of vision known to be mediated by higher cortical centres, we have discovered exceptions to this general principle. The talk will focus on those exceptions.

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