

# The Role of Early Experience in Judging the Temporal Order of Visual Events: Insights from Late-Sighted Children

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## Abstract

One of the cornerstones of sensory cognition is the ability to infer cause-and-effect relationships between entities in our sensory environment—a skill that depends on accurately perceiving the temporal order of events. Here, we asked whether early sensory input is critical for developing this proficiency in the visual domain by studying children born blind who gained sight late in childhood. Several years post-surgery, these late-sighted children performed on par with typically-sighted controls in determining the sequence in which two visual events occurred. However, this ability was not evident immediately after surgery but emerged over a protracted developmental period, underscoring the importance of subsequent visual experience. Our findings demonstrate that the neural resources necessary for this foundational aspect of sensory cognition remain accessible beyond infancy, offering fundamental insights into the role of early experience in sensory and cognitive development as well as practical guidance for clinical rehabilitation following sensory deprivation.