Department of Psychology, Neuroscience & Behaviour

DEBRIEFING INFORMATION

Auditory–tactile simultaneity perception in adults with typically developed vision

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SECTION A - OVERVIEW

Question: Is the finding that patients with congenital cataracts have normal visuotactile simultaneity perception but abnormal audiovisual simultaneity perception more likely due to the cross-modal hypothesis or faster-than-normal auditory processing?

Theory: Infants born with cataracts experience permanent deficits of their visual systems, and its interactions with other modalities, despite vision being restored within the first year of life (see Maurer, 2017 for review). Specifically, patients treated for bilateral congenital cataracts have demonstrated normal simultaneity perception for vision and touch (visuotactile) but abnormal simultaneity perception for vision and audition (audiovisual; Chen et al., 2017). Given that both of those modality pairings involve vision (the modality that experienced the deficit), the present study aims to examine two possible hypotheses to explain this difference. First, during normal development, audition is believed to be calibrated by vision. Thus, it was proposed that abnormal audiovisual simultaneity perception may result from the failure of vision to calibrate audition (whereas touch calibrates vision in normal development thus sparing visuotactile simultaneity perception). Alternatively, it is possible vision is normal for both cases, but the absence of vision in early life has resulted in the development of faster-than-normal processing speeds for audition, leading to the abnormal audioviisual but not visuotactile simultaneity perception observed. By testing audiotactile interactions, we hope to provide support to one or the other hypothesis.

Hypothesis: If audiotactile simultaneity perception is normal, the first hypothesis that vision failed to calibrate audition is supported. If audiotactile simultaneity perception is abnormal, the alternative hypothesis is more likely to be supported in that the deficit is related to the processing speeds of the auditory modality.

SECTION B – DETAILS

Independent Variables (I.V.): Presentation of the tap and beep as simultaneous or at different temporal delays

Dependent Variable (D.V.): If the tap and beep are simultaneous or not

Experimental Design: Repeated Measures Design

Statistics & Analyses: Calculation of proportion of simultaneous responses at each temporal parameter for each individual and group. Extract more advanced parameters of simultaneity perception (e.g., temporal simultaneity window and point of subjective simultaneity, etc.) using computational modelling. Comparing group results between those with normal vision and those treated for bilateral congenital cataracts using t-tests and Analysis of Variance (ANOVA).

SECTION C: NOTES & REFERENCES

We would like to thank you for your participation in our study. Please do **not** share this information with any other students who may be potential participants in this study. Knowing the details before participating may influence their performance and/or the results.

If you are interested in learning more about this topic, you are encouraged to look up the following reference:

Chen, Y.-C., Lewis, T. L., Shore, D. I., & Maurer, D. (2017). Early binocular input is critical for development of audiovisual but not visuotactile simultaneity perception. Current Biology, 27(4), 583–589. https://doi.org/10.1016/j.cub.2017.01.009

Occelli, V., Spence, C., & Zampini, M. (2011). Audiotactile interactions in temporal perception. *Psychonomic Bulletin & Review, 18*(3), 429–454. https://doi.org/10.3758/s13423-011-0070-4

Occelli, V., Spence, C., & Zampini, M. (2013). Auditory, tactile, and audiotactile information processing following visual deprivation. *Psychological Bulletin*, *139*(1), 189–212. https://doi.org/10.1037/a0028416

Maurer, D. (2017). Critical periods re-examined: Evidence from children treated for dense cataracts. Cognitive Development, 42, 27–36. https://doi.org/10.1016/j.cogdev.2017.02.006

Questions about the Study: If you have questions or need more information about the study itself, please contact either the student or faculty investigator stated at the top of page 1.

If you have concerns or questions about your rights as a participant or about the way the study is conducted, please contact:

McMaster Research Ethics Board Secretariat
Telephone: (905) 525-9140 ext. 23142

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