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Fetal Face and Sound Recognition as Early Indicators of Emerging Consciousness

Background

While human neonates orient to faces and voices, the origins of social perception remain unclear. This project investigates the prenatal origins of the social (face/voice) preference compared with non-social (image/sound) stimuli. The fetuses will be followed up in the neonatal stage to examine their postnatal reactions to the "social" versus non-social stimuli seen and heard prenatally. The assertion that there is an innate preference for social stimuli, including the human face and voice, has been based on findings that neonates preferentially orient toward face-like patterns and show sensitivity to human speech, suggesting built-in mechanisms that guide early attention to and preference for social stimuli. However, this has not been tested following individuals from the prenatal to the postnatal stage of development. This study is particularly timely as it addresses several emerging challenges in developmental science.

Aims and Methods

This project offers a novel, methodology to investigate the transition of fetal to neonatal development. The goal is to determine whether fetal visual attention is modulated by congruent auditory input, shedding light on the origins of audio-visual integration. Such integration provides the groundwork for an adaptable pathway model of audio-visual integration, laying the foundations for the emergence of conscious awareness. The goal is to determine whether fetal visual attention is modulated by congruent auditory input, thereby shedding light on the origins of audio-visual integration, a foundational mechanism often proposed as a prerequisite for the emergence of conscious perceptual experience.

Relevance

The significance and timeliness of the current proposal is based on research showing that the prenatal to postnatal period is foundational to brain development. It addresses the question of

fundamental architecture development of the brain, allowing for the identification of when the brain is most sensitive to internal (maternal) and external (social environment the neonate is born into) impacts. Additionally, it is argued that experience-dependent information storage is the basis of important human abilities such as memory and learning, flexibility, adaptation and individual differences in their social and cognitive development. These adaptive cognitive functions are influenced by maternal mental health at different stages of fetal and neonatal development.

Training

The project will provide training on prenatal and postnatal assessments. Prenatally training will be provided on fetal ultrasound assessment, the fetal coding system and using the OBSERVER software to code fetal movements. Postnatal assessment training will be provided for home visits and video analysis. Furthermore, training for self-report measures will be provided.

Suitable for

PhD and MSc by Research students.

References

- Khan, Y. T., Tsompanidis, A., Radecki, M. A., Allison, C., Lai, M. C., Bethlehem, R. A., & Baron-Cohen, S. (2026). Mapping brain growth and sex differences across prenatal to postnatal development. *Scientific Reports*, 16:3843. <https://doi.org/10.1038/s41598-025-33981-w> Pre-submission
- Reissland, N., Wood, R., Einbeck, J. & Lane, A. (2020). The effects of maternal mental health and prenatal attachment on fetal reactions to face-like light stimulation. *Early Human Development* 151 105227 <https://doi.org/10.1016/j.earlhumdev.2020.105227>.
- Reissland, N. (2026). Can we talk about fetal consciousness? *Acta Paediatrica* <https://doi.org/10.1111/apa.705220>