

## **Multimodal synchrony in early environments: How does caregivers' use of movement and touch support language learning?**

**Rana Abu-Zhaya**\*

*Division of Psychology and Language Sciences, University College London, London, United Kingdom*

\*Corresponding Author E-mail: rana.abuzhaya@ucl.ac.uk

### **ABSTRACT**

Infants' early learning environments are replete with speech and non-speech sounds, textures, human and non-human movement, and physical contact. These various modes of stimulation afford the infant with a diversity of cues that differ in many features (e.g., their informativeness and attention-grabbing functions), and are either attended to, processed, and used for learning, or ignored. Some events are naturally multimodal, while others are *created* to include cues that are conceptually linked and temporally synchronized. Events that are naturally multimodal are all around us and are an important part of the input that infants receive. One such example is audio-visual speech that is accessible to infants through face-to-face interactions: Producing speech requires moving our articulators, and such movements are visible and provide the infant with multimodal information about the speech signal. That said, we can manipulate features of audio-visual speech to create specific multimodal packages, e.g., raising eyebrows to emphasize the beginning of a phrase, or modulating the pitch to emphasize a particular word. Crucially, our social communication capacities allow us to create *novel multimodal events* when we interact with infants. One such example is caregivers' use of *object motion* to depict the meaning of the verb 'jump', or caregivers' use of their own bodies to provide touch cues in synchrony with speech. Such events stimulate multiple infant senses at the same time and provide a temporally synchronized package of congruent cues that might facilitate the processes of breaking through the speech stream and meaning making. The work I will present explores these various dynamics of social communication capacities and how they are used during play interactions with infants. I will present data from various studies that explore multimodal synchrony via movement of objects and bodies, and how might such synchrony aid infants in early language learning.

**Keywords:** early learning environments, language input, tactile cues, dyadic interactions