

# Language acquisition: The negotiated collision of sensation, action, and the need to be social

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## Thesis – part 1

**Sensation, action, and social participation** may be weakly coupled at birth, but they rapidly become co-dependent in a dynamic that spans the life of the individual. Their co-dependency is essential to the emergence of perception, the acquisition of motor skills, and social agency in meaningful linguistic communication.

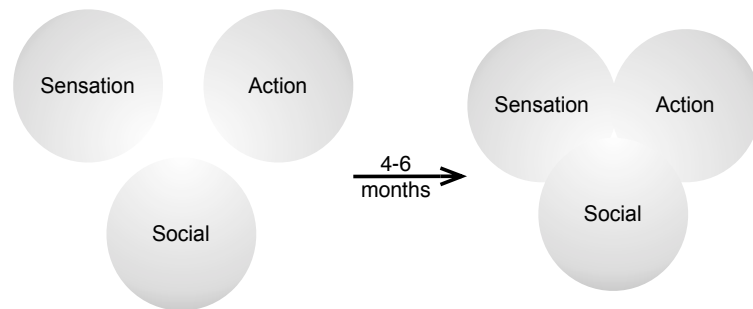


Fig 1 – Hypothesized timing of convergence of components present at or before birth.

## Empirical approach

Fig 1 depicts an impressionistic convergence of three hypothetically distinguishable components. To test this conception and its implications requires research that examines them together, rather than separately or not at all, as in the past. Some examples of such research are:

**Example 1** – Measures of body motion of 14-month-olds and shared gaze with a human producing the auditory component of a multimodal stimulus in a sound-object association task, are good predictors of task performance [1, see Fais et al. poster].



Fig 2. Orientation of infant to caregiver, experimenter (source of auditory stimulus) and display screen (source of visual stimulus)

**Example 2** – Postural re-orientation improves performance in an *A not B* social interaction task. Ten-month-old infants accustomed to seeing an object placed repeatedly in one container (A) will generally choose container A even when the object is placed in a different container (B). However, when made to stand up between the habituation block and the first test trial, they correctly identify the container into which the block is placed (either A or B) [2].

**Example 3** – Vocal tract events influence auditory discrimination.

**3a.** – HAS/NIRS (High Amplitude Sucking/ Near InfraRed Spectroscopy) data for newborns sucking show greater activation over temporo-parietal areas – associated with auditory-articulatory mapping in adults – when babies hear /u/ (congruent with lip shape) compared to /i/ (non-congruent) [3].



Fig 3. HAS/NIRS setup for newborn sucking studies.

**3b.** – Looking time in 6-month-olds shows failure to discriminate non-native (Hindi) alveolar contrasts when a flat teether is present (Fig 5a) compared to when it is absent (Fig 5b) [4]. Fig 4 shows depression of tongue surface (left side) by the teether. Similar disruptions have been observed in adult listeners [5].



Fig 4. Tongue depression by teether.

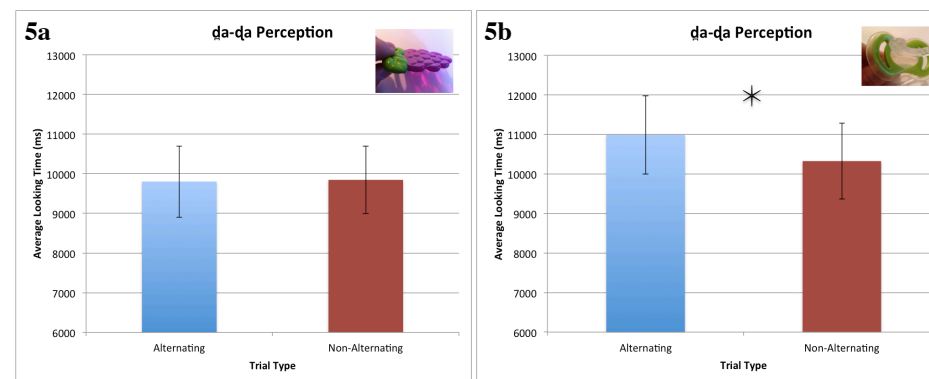
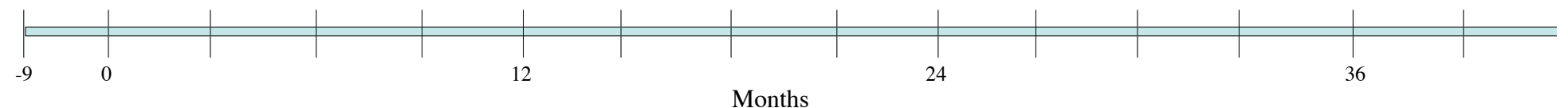


Fig 5. Alternating and non-alternating Hindi syllables are not discriminable when a flat teether sits between Canadian infants' lips and teeth (5a) compared to a gum soother (5b).

## Interactive Task

Using the timeline below, please feel free to add one or two events that you believe are crucial to our understanding of the child's language learning process.



## Thesis – part 2

**Perception, motor skill, and semantic agency** are more stable than, and must continue to coexist with, their native antecedents (sensing, acting, participating); but they are still dynamic contributors to language learning and variation. Thus, how can there be a fixed endpoint for language “acquisition” or a fixed onset of language change? ... language is intact at all times.

## Questions to be addressed

- What are the criteria for saying that a child “has” language?
- Must this follow the onset of intentional (and therefore meaningful) communication at 4-6 months (mo)?
- Must children exhibit lexical and/or grammatical awareness or specific levels of articulatory or prosodic prowess?
- Must they be able to perform competently in all these areas without having to focus attention on one aspect of performance to the detriment of others?
- Must these criteria be shaped by the theories and perspectives of adults and laboratory research?
- What can other developmental milestones tell us? For example,
  - Caricature-based imitation (7-8 mo) – as opposed to reflexive behaviors (<1 mo)
  - The decoupling of respiration and vocalization – i.e., multiple syllables on the same expiratory half-cycle (3-4 mo)
  - Awake time not solely devoted to feeding or social interaction – free time to explore their auditory-articulatory mapping (3-4 mo)
  - Motor development for reaching and locomotion (4-6 mo)

## Summary

Language learning has been presented here as dynamic and dependent on myriad processes that extend well beyond what we normally consider to be linguistically relevant and that contribute to both gradient and seemingly punctuated development [2, 6]. The view that language is not an abstract commodity to be acquired in some final form is not new [7]. If we treat language as essentially intact at any given moment, then we may consider the rapid increase of complexity early in life as contextually specialized type of language change.

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