Are babies' cries already language?

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Newborns and young babies communicate through cries. This has generated the hypothesis that there may be a developmental continuity between cries and language. Indeed, a previous study found that French and German babies cry differently, the melody of their cries imitating the melodies of the native languages heard in utero (Mampe et al., 2009). Here, we tested this hypothesis by investigating whether newborns' cries triggered similar neural processing as speech in adults and in newborns, i.e. listeners who themselves can produce cries. Participants were newborns exposed to French prenatally and Italian-speaking adults who do not speak French. Adults unfamiliar with French were tested so that, as newborns, they cannot process the linguistic contents of the stimuli. The two groups were tested using the same paradigm, and their brain activity was recorded using functional near-infrared spectroscopy. Participants were exposed to blocks of cries and blocks of French sentences. Preliminary results from 28 adults and 20 newborns suggest that newborns have significantly heightened brain responses to cries compared to speech in bilateral temporal regions (Figure 1a), while adults show a significantly more pronounced response to speech compared to cries (Figure 1b). If confirmed, these results suggest that while cries are not processed identically to speech at either age, their processing may change during development as a result of their changing relevance for communication and production. Infants' heightened responses to cries may be related to the fact that they use them for communication.

References

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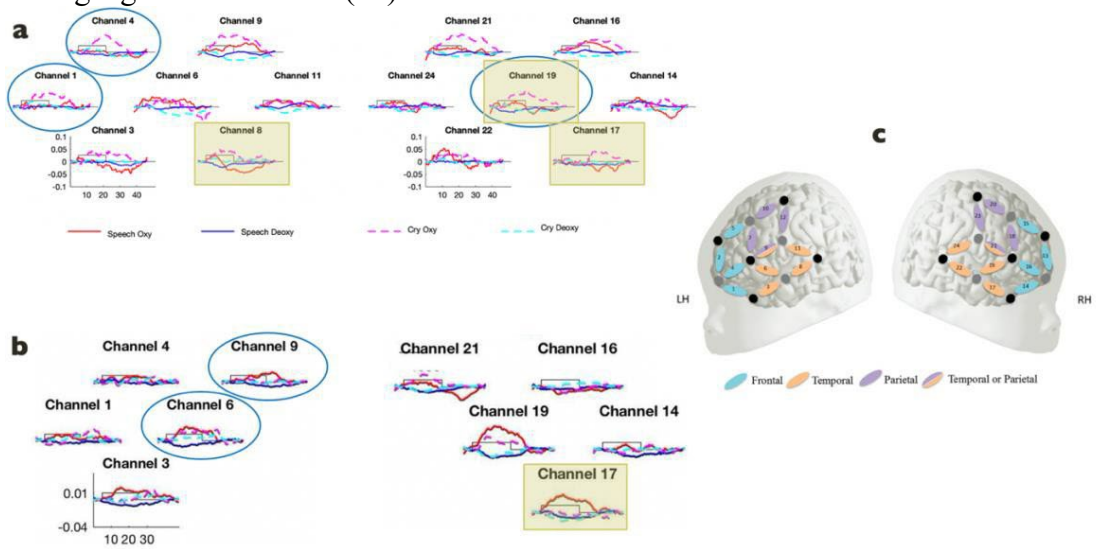

Figure 1. Newborns' (a) and adults' (b) grand average hemodynamic response to cries and speech in frontal and temporal channels. The x-axis represents time in seconds; the y axis shows the concentration in mmol x mm. Channels where a significantly different brain response was found between the two conditions are highlighted by green squares (difference in oxyHb concentration changes) and blue circles (in deoxyHb). (c) Configuration of NIRS measurement channels used in the study overlaid on a schematic newborn brain. Grey circles indicate detectors, while black circles indicate sources. Localization figure adapted from Abboub et al. (2016).