Adults' and children's use of prosody and head gestures to mark contrastive focus in French

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Prosody (in particular the intonation level) is often employed to signal information structure and contrastive focus (CF hereafter). In French, speakers use prosodic but also syntactic strategies to mark CF [1-2], while in other languages like English prosodic cues are mainly used [3]. Children's use of adult-like prosodic cues for CF has only been observed at late school age [8], although recent results on Dutch suggest that 4-year-old children already use durational cues to mark CF [9]. Head gestures are another relevant cue for the detection of CF in audio-visual speech [4-5]. Head movements appear to be temporally synchronized with focused words, with head apexes being aligned with accented syllables [e.g. 6-7]. To our knowledge, children's use of head gestures to mark CF has not yet been explored, although 4-5-year-old children do start producing beat (hand) gestures along with speech rhythm [10].

This study investigates how French children, as compared to adults, use prosody and headgestures to signal an element in the discourse as contrastively focused. To do so, 20 adults and 40 4- and 5-year-old children (20 per age group) were tested with a new paradigm designed to elicit semi-spontaneous production of CF in declarative sentences. Participants had to tell to a virtual character which object had to be taken out of a bag in order to trigger a playful activity (Figure 1). We manipulated the number and type of objects inside the bag to elicit 5 focus conditions (12 trials per condition, randomized): no-focus ('Take the orange suitcase' [no other object inside the bag]), CF on the noun ('Take the orange SUITCASE' [an orange hat being the alternative]), CF on the adjective ('Take the ORANGE suitcase' [a purple suitcase as the alternative]), corrective focus on the noun ('Take the orange SUITCASE' [the character had wrongly taken an orange hat]), and corrective focus on the adjective ('Take the ORANGE suitcase' [the character had wrongly taken a purple suitcase]). Participants were audio- and video-recorded in order to correlate prosodic cues (pitch contour; pitch range; word, syllable, and vowel duration) with visual strategies (eyebrow movements, head nods, body movements). Electromagnetometer sensors (EMA 501) were also attached to the faces of adult participants to provide a more precise analysis of facial movements. We also obtained measures of children's acoustic and linguistic abilities. Specifically, we analyzed both prosodic Cues (pauses; F0max; F0min; duration of words, syllables, and segments; pitch contour) using PRAAT and gestural cues (gesture type; gesture-speech alignment) using the ELAN annotation tool.

Quantitative results and statistical analyses will be provided. Preliminary observation reveals that French adults use pitch and durational cues together with head gestures to mark CF, with corrective focus conditions showing clearer patterns (as in [11]). Some children seem also to be able to use prosodic and gesture cues to mark focus, with older children performing better than younger children. Crucially, prosodic and gesture cues seem to be acquired together: when one strategy is used the other one is also observed. Our results will contribute to understanding how gesture develops along with speech, and to determining the relative contribution of prosody and gesture in the organization of information in the discourse.

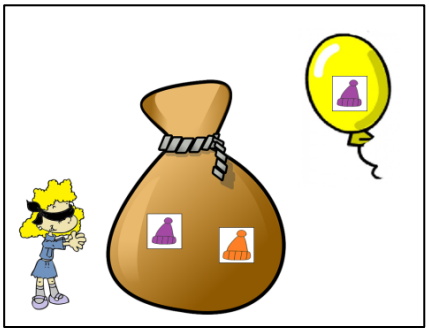

Figure 1. Example of a visual scene during a trial in a CF-adjective condition (expected sentence: *Prends le bonnet VIOLET* 'Take the PURPLE hat'). On the top right corner, the target object is presented together with the target activity (making the balloon explode).

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