

The role of domain-general sensory and motor constraints on early word learning

Early lexical development is influenced not only by language-specific mechanisms but also by domain-general sensory and motor constraints. I will present two recent research lines that illustrate how visual-cognitive and oral-motor subsystems jointly shape word learning in both typically developing (TD) children and neurodivergent populations.

1. Visual-cognitive constraints on the comprehension-production gap (CPG).

The CPG—an asymmetry in which comprehension normally precedes production—is markedly attenuated in children with Williams syndrome (WS). WS children exhibit a general lexical delay together with a reduced CPG, showing a relative production advantage for words tied to specific exemplars. I will present computational modelling evidence suggesting that this pattern may arise from atypical visual processing that favours exemplar-based rather than prototype-based categorisation. The model reproduces the observed lexical profile and predicts that visual-cognitive constraints can flexibly modulate the CPG.

2. Oral-motor constraints via non-nutritive sucking (NNS).

Theoretical accounts propose that NNS temporarily disrupts the sensorimotor feedback loop needed for refining speech-sound representations, thereby slowing word-learning efficiency. I will present two empirical studies that test this hypothesis. In a cross-sectional sample of 1,630 infants aged 12–24 months, we found that pacifier use was associated with smaller vocabularies in both comprehension and production. A second, longitudinal eye-tracking study of 67 infants followed from 6 to 24 months showed that greater NNS use correlated with reduced word comprehension in older infants.

Together, these findings suggest that early language dynamics are jointly constrained by visual-categorical processing (affecting the CPG in WS) and oral-motor processing (influencing the overall rate of lexical acquisition). The results highlight the interactive role of domain-general subsystems in shaping linguistic development and suggest new avenues for early assessment and intervention.