Understanding speech development
- Children with Down syndrome (DS) - expressive language delays relative to mental age-matched typically developing (TD) children (Zampini & D’Odorico, 2013).
- Large individual differences in expressive language abilities in DS (Karmiloff-Smith et al, 2016).
- Can naturalistic speech environments explain the variability in expressive language abilities in DS?

Language Environment Analysis (LENA)
- Up to 16 hours of child-oriented audio.
- Estimates speech produced by and around the target child.
- Validated for use with TD children from 2-48 months (Xu et al., 2009; Gilkerson and Richards, 2008).
- Older children produce more vocalisations.
- Amount of adult speech does not change with age.
- Limited similar studies exist with children with DS (Thiemann-Bourque et al., 2014; Parikh and Mastergeorge, 2017).

Participants
- 71 young children with Down syndrome (DS):
  - Preschool sample - 24 participants
    - Chronological age = 2;11 - 4;10 years, Median = 3;8 years, IQR = 0;11 years
  - Primary School sample - 47 participants
    - Chronological age = 7;1 - 11;5 years, Median = 8;10 years, IQR = 1;6 years

LENA Measures
- Child Vocalising (CV) - number of speech-related vocalisations (not vegetative sounds) produced by the target child.
- Adult Word Count (AWC) - number of words spoken by adults in the child’s environment.

Vineland Adaptive Behavior Scales (VABS-II) Standardised Scores
- Expressive language (EL)
- Receptive language (RL)
- Written communication
- Caring for self
- Caring for home
- Living in the community
- Relating to others
- Play and leisure
- Adapting
- Gross motor (GM)
- Fine motor (FM)

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Results

Does the amount of speech that children with DS hear and produce at home change with chronological age?

Key findings
- Most LENA measures do not change with age in DS, contrary to TD findings.
- Only adult word count showed a trending relationship in older children.
- LENA measures did not explain variability in expressive language in DS.
- Motor and receptive language abilities did explain variability in expressive language in DS.

Next Questions?
- Are the speech environments of young children with and without Down syndrome significantly different?
- Compare quantity of speech, quality of speech
- How does the speech environment relate to young children’s sensorimotor interactions with the environment during play?
- What speech and sensorimotor features of play predict concurrent and longitudinal vocabulary size for young children with and without Down syndrome?