

Effects and Non-effects of Non-maternal Child-care on the Language Environment and Child Vocalizations



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The impact of early child care



- Use of child care continues to rise
 - Children under 2 years
 - Lower socioeconomic status (SES)
 - Early intervention programs
- High quality child care leads to high quality outcomes
 - But the converse is also true
 - What defines “high quality”?
- Strong correlations between language environment, SES, and language outcomes
 - E.g. Hart & Risley (1995)

What does the language environment look like?



- To date: ***No systematic comparisons*** of language environments across child care settings
- Large-scale longitudinal studies
 - e.g. NICHD ECCYD, QLSCD
- Murray et al. (2006)
 - Quantity words/utterances/word types >> middle SES
 - Quality (utterance length, +/- utterances) >> high SES



The LENA system: The basics

- Two components
 - Durable, portable recording device
 - Sophisticated software suite for automated acoustic analyses





Client Manager



LENA Reports



Developmental Snapshot



Digital Language Processor

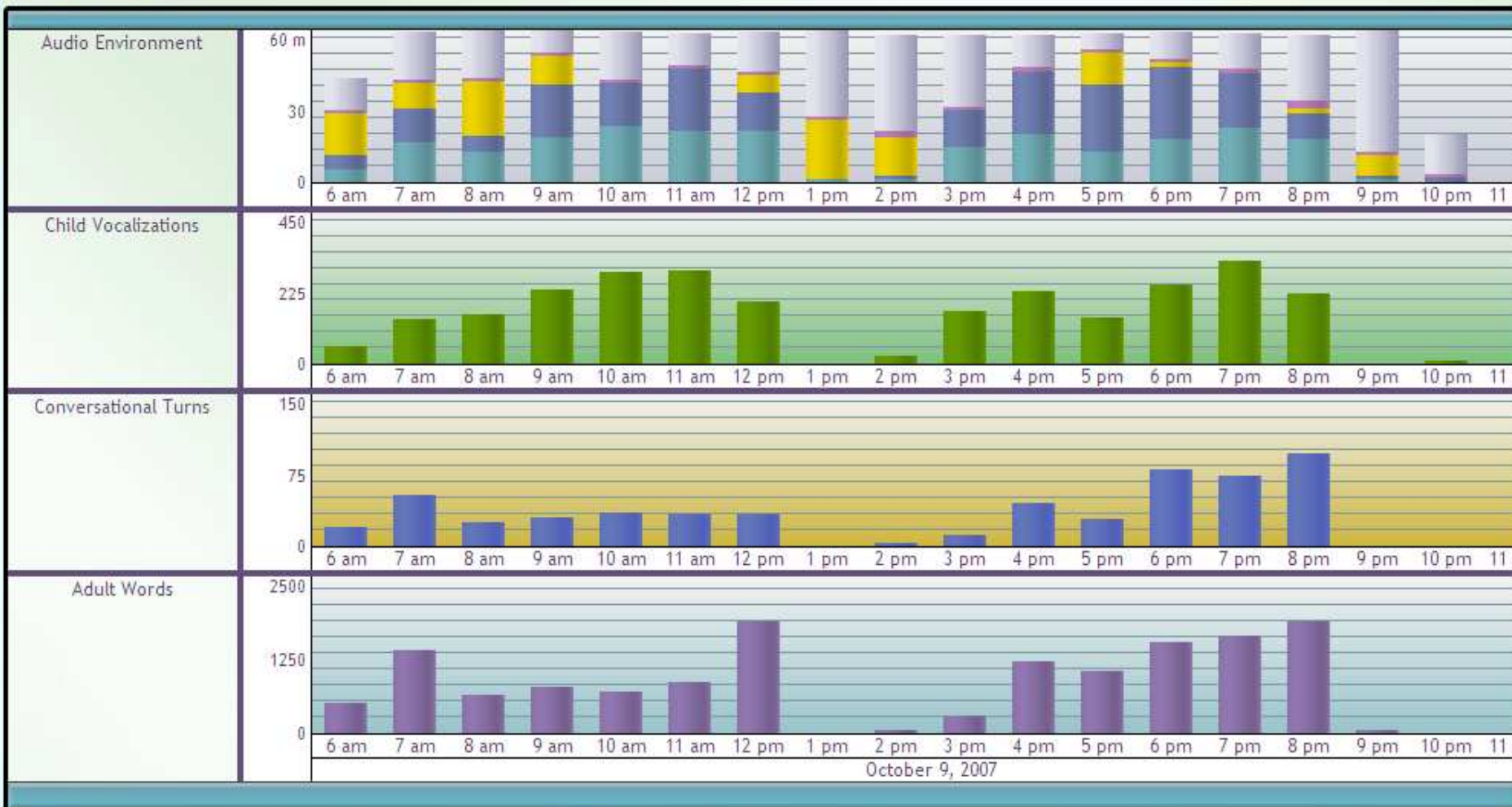


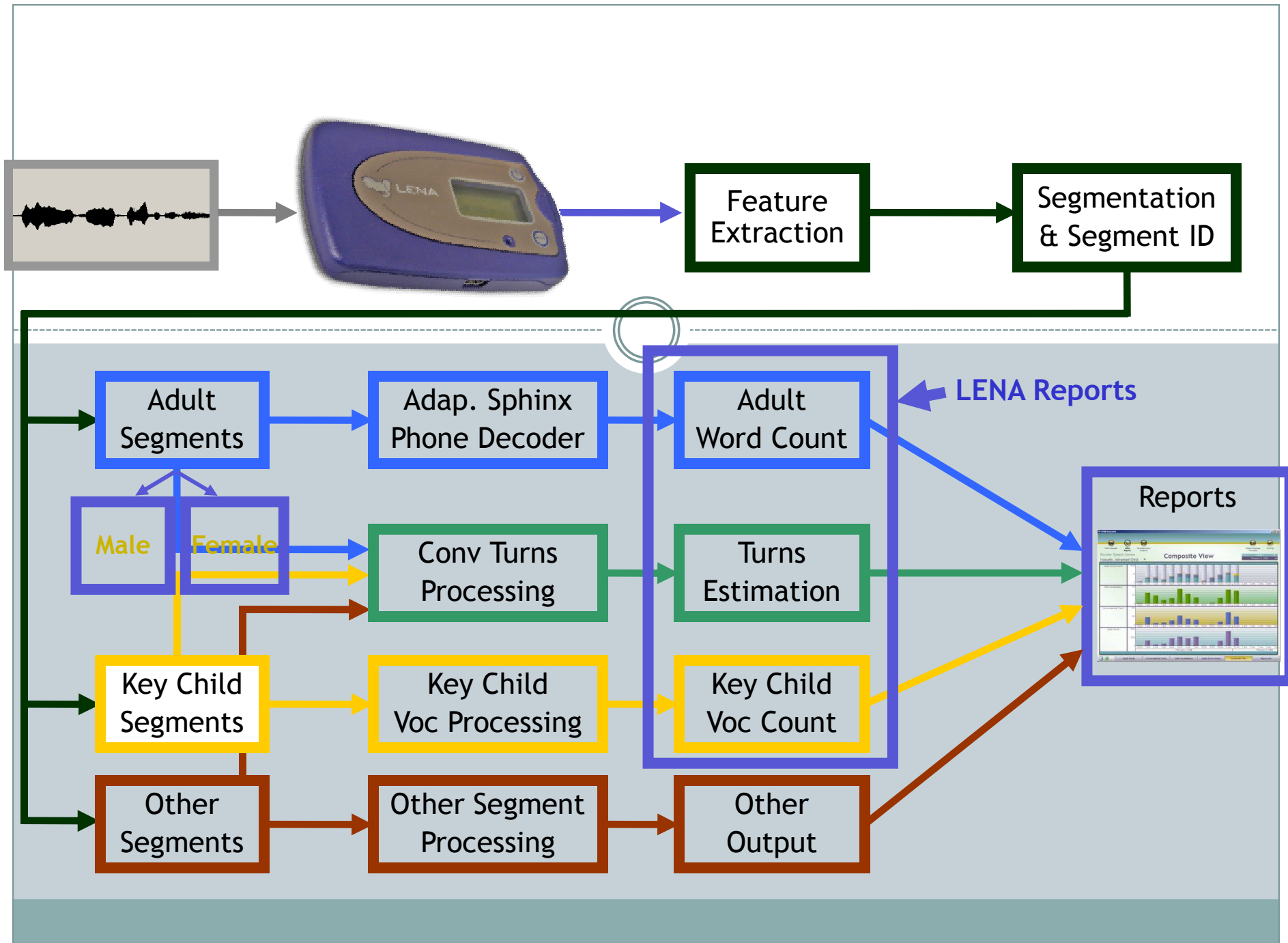
Settings

AVA
Child, Average

Composite View

HOURLY
October 9, 2007





The variables we're looking at



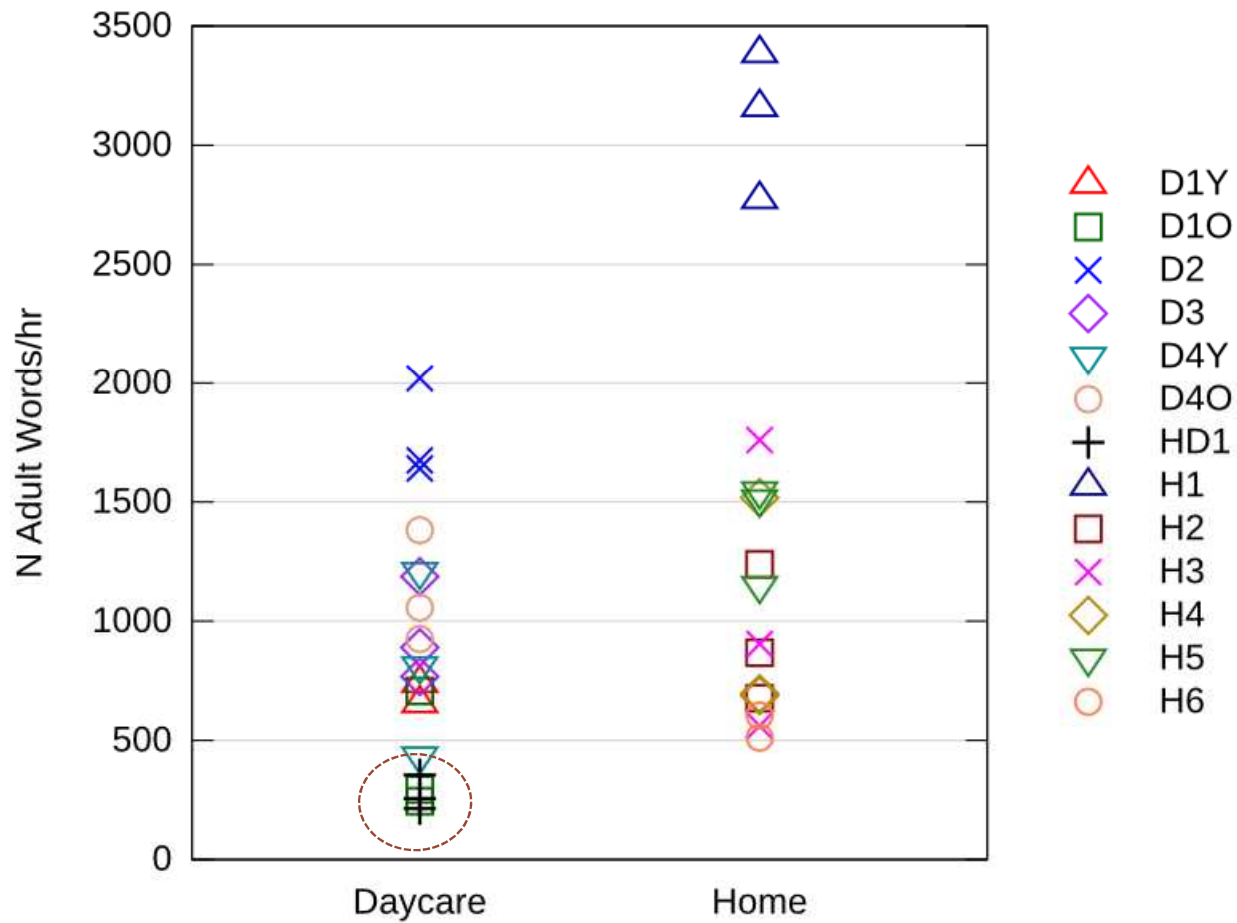
- **Basic LENA quantitative measures**
 - Adult word count, turns, child vocalizations
- **Basic LENA qualitative measures**
 - Percentage meaningful (adult f/m, target, other child), “fuzz”/distant, silent, noise, TV
- **Other language measures**
 - Overlapping speech, decibel level, pitch (fo)
- **Observational measures**
 - Number of participants, time of day, activity

The study: Participants

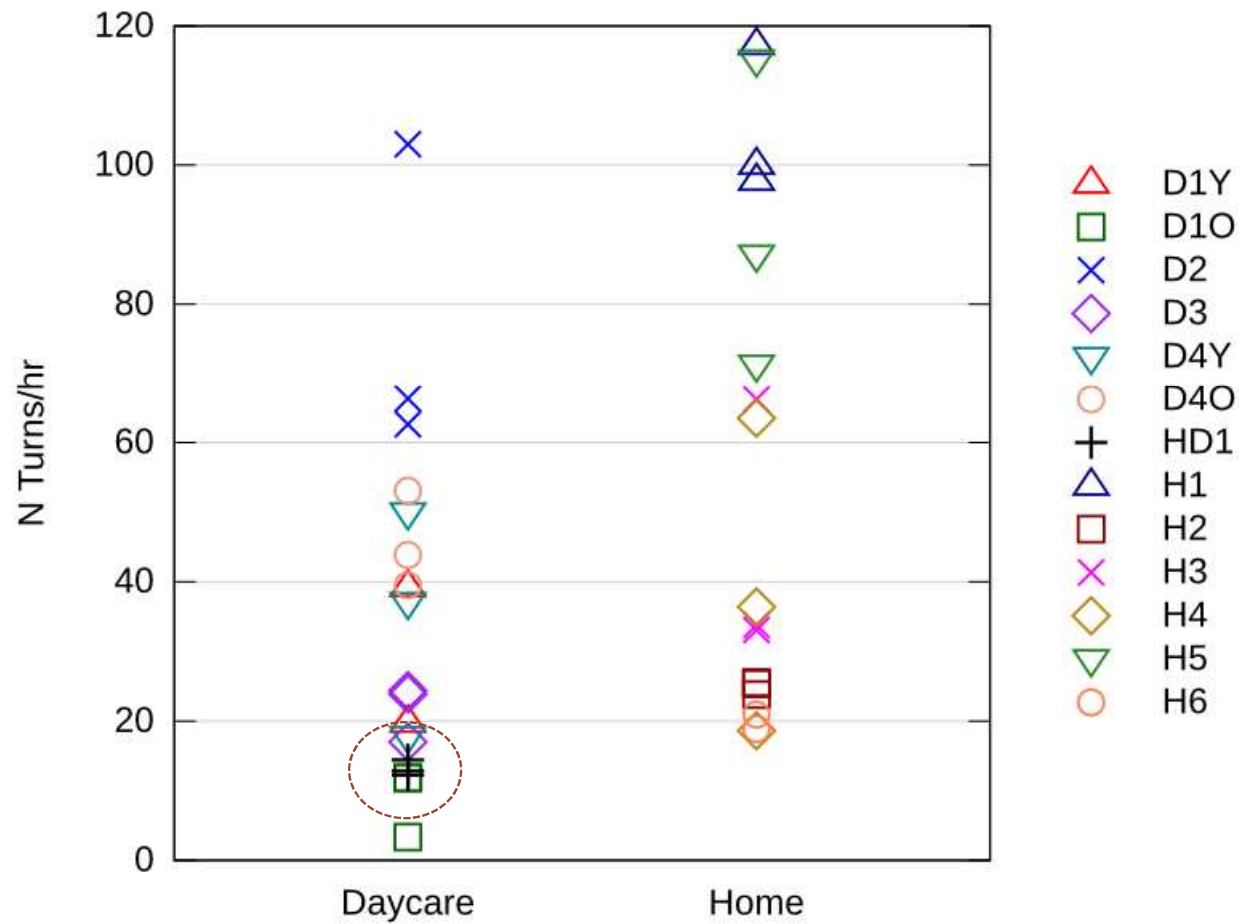


- 3 day-long (8-10 hour) recordings of daily life
- Stay-at-home (N = 7)
 - 12F, 20M, 20M, 21F, 22F, 23F, 23F
- Home daycare (N = 1)
 - 27M
- Child care centre (N = 6)
 - Infant room (N = 3) 14F, 18M, 19M
 - Toddler room (N = 3) 26F, 29M, 29F

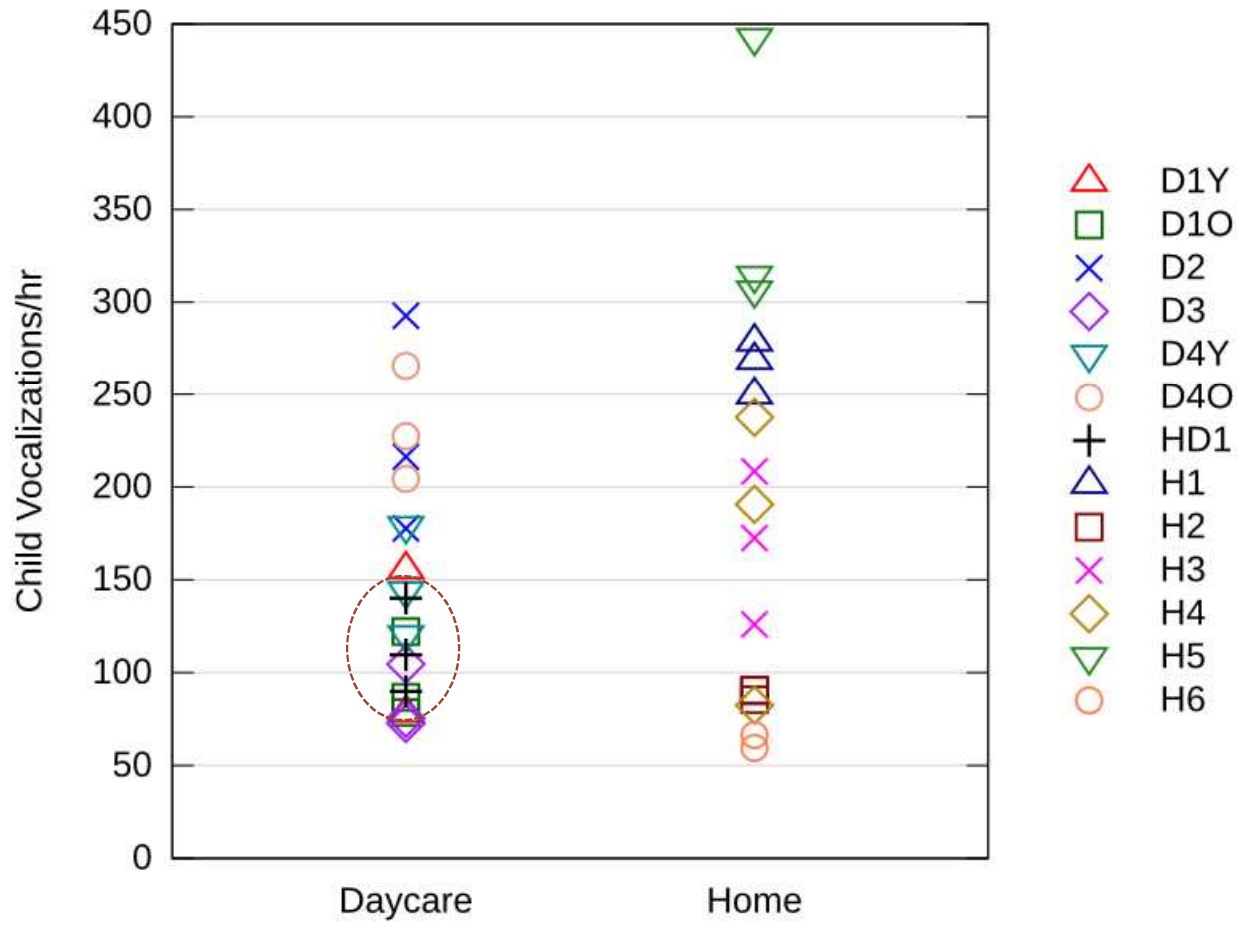
Adult Word Count



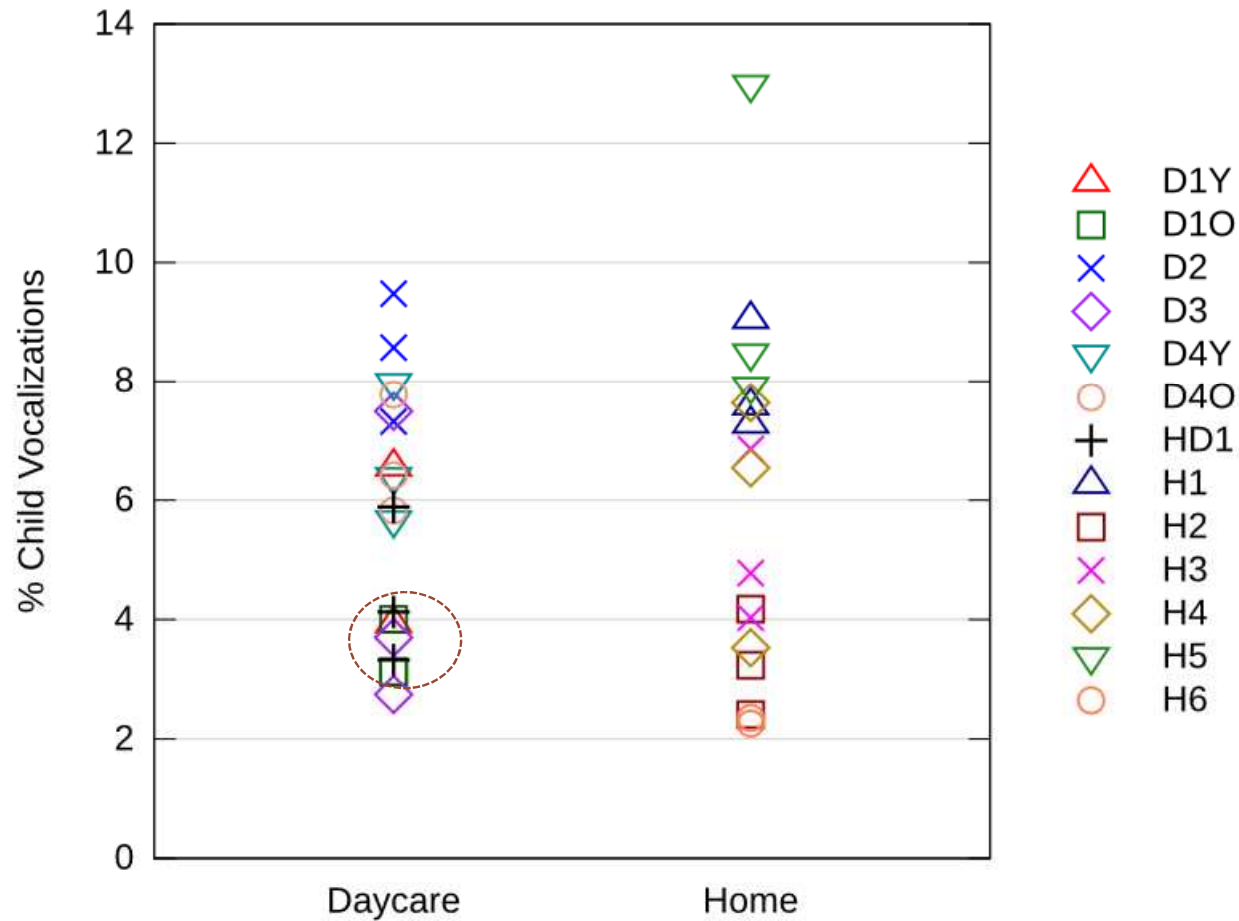
Conversational Turns



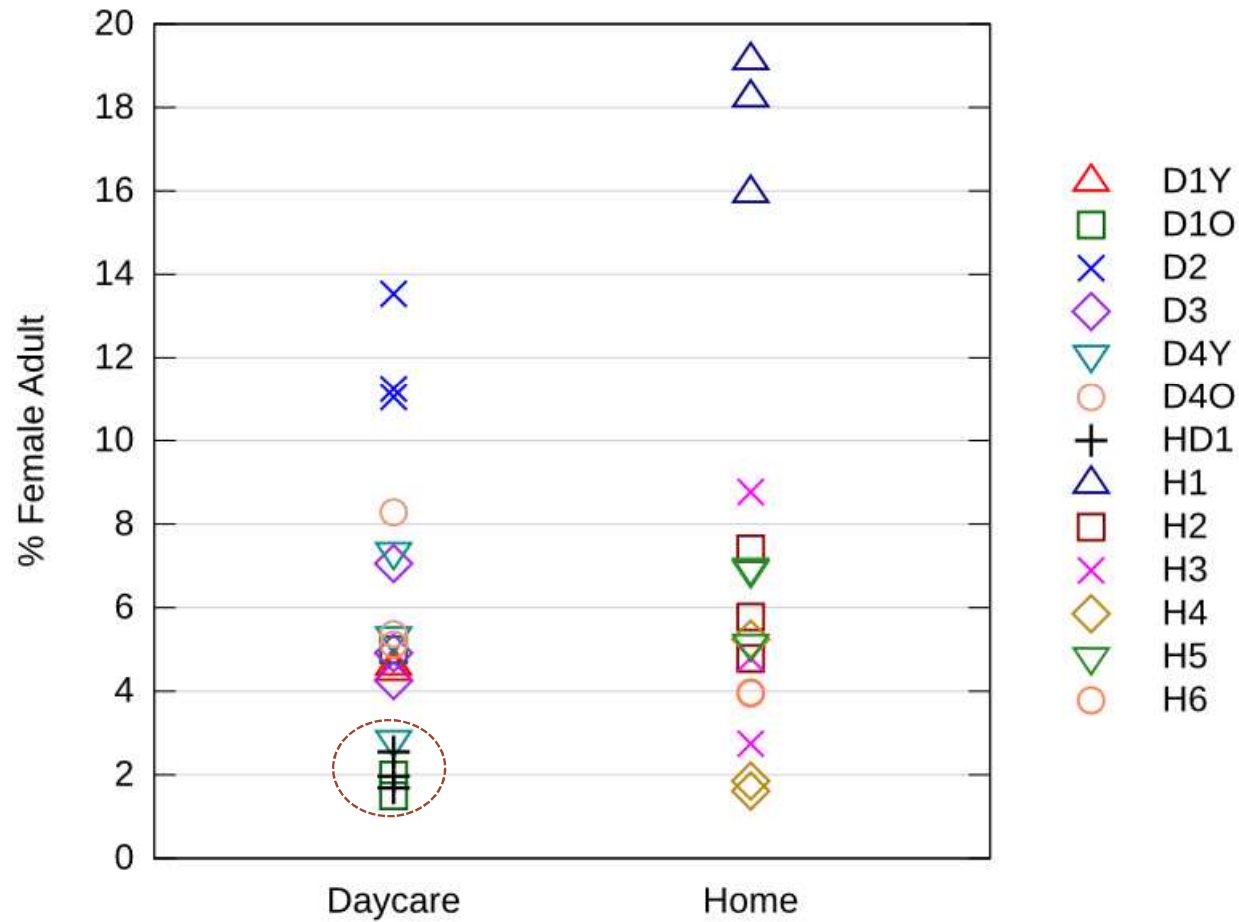
Child Vocalizations (N/hr)



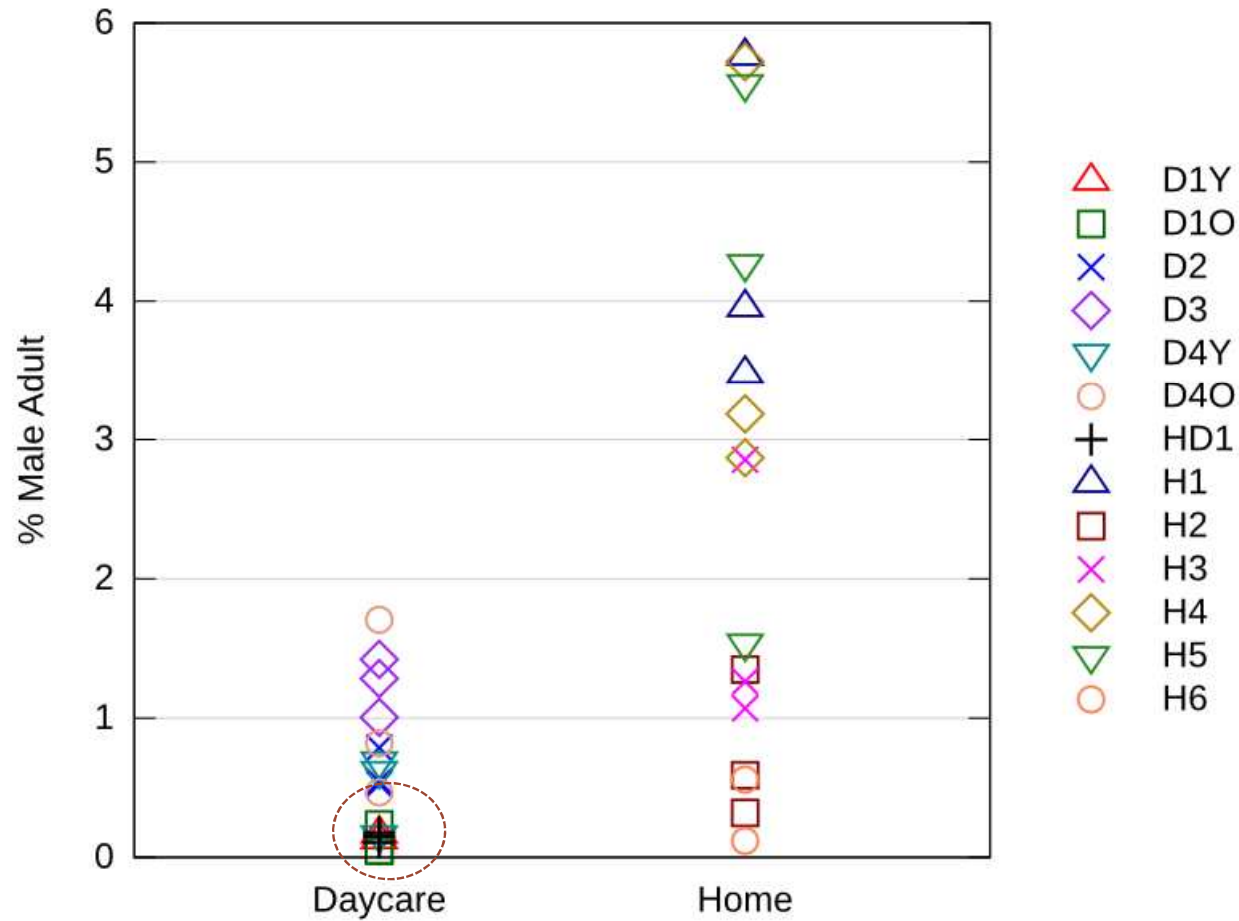
Child Vocalizations (% Time)



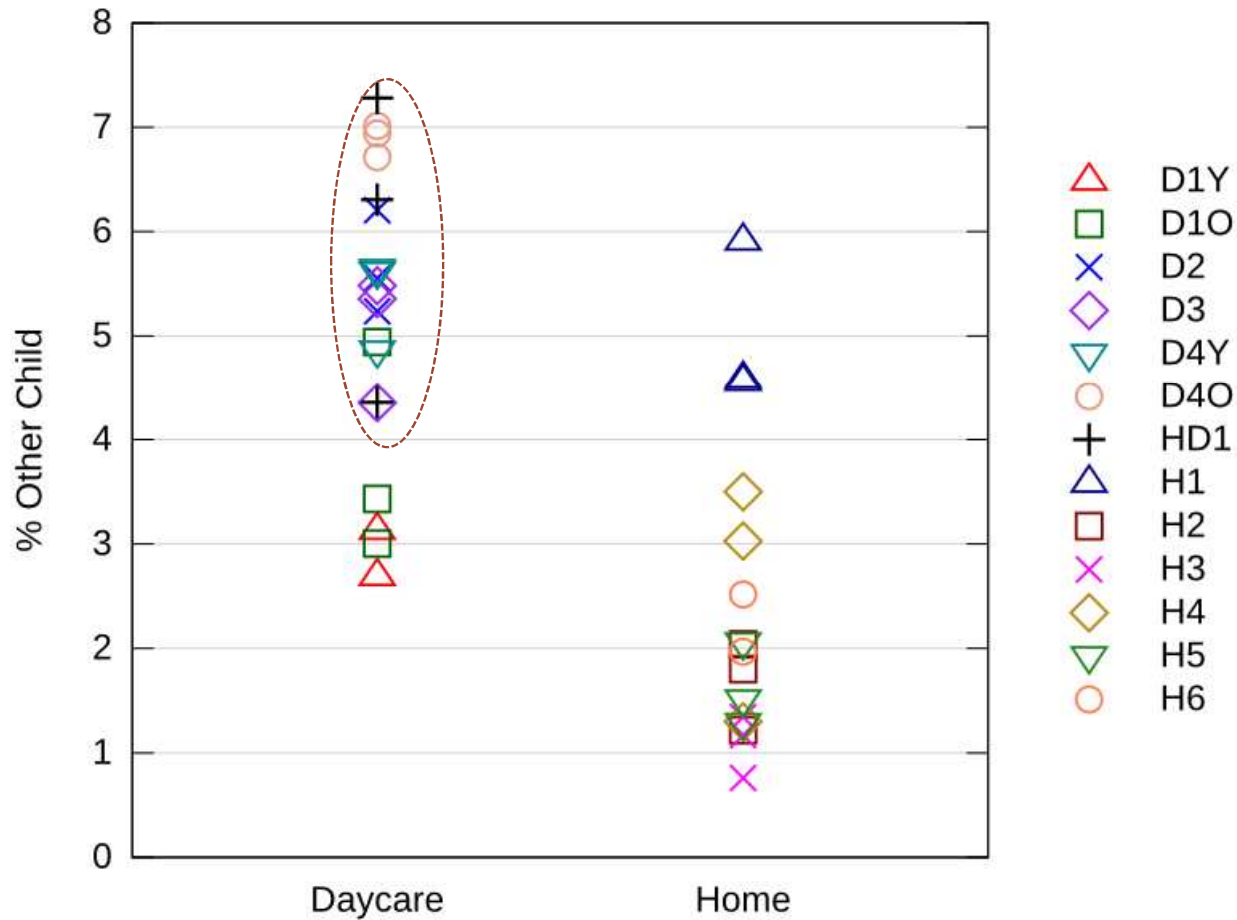
Female Adult (%)



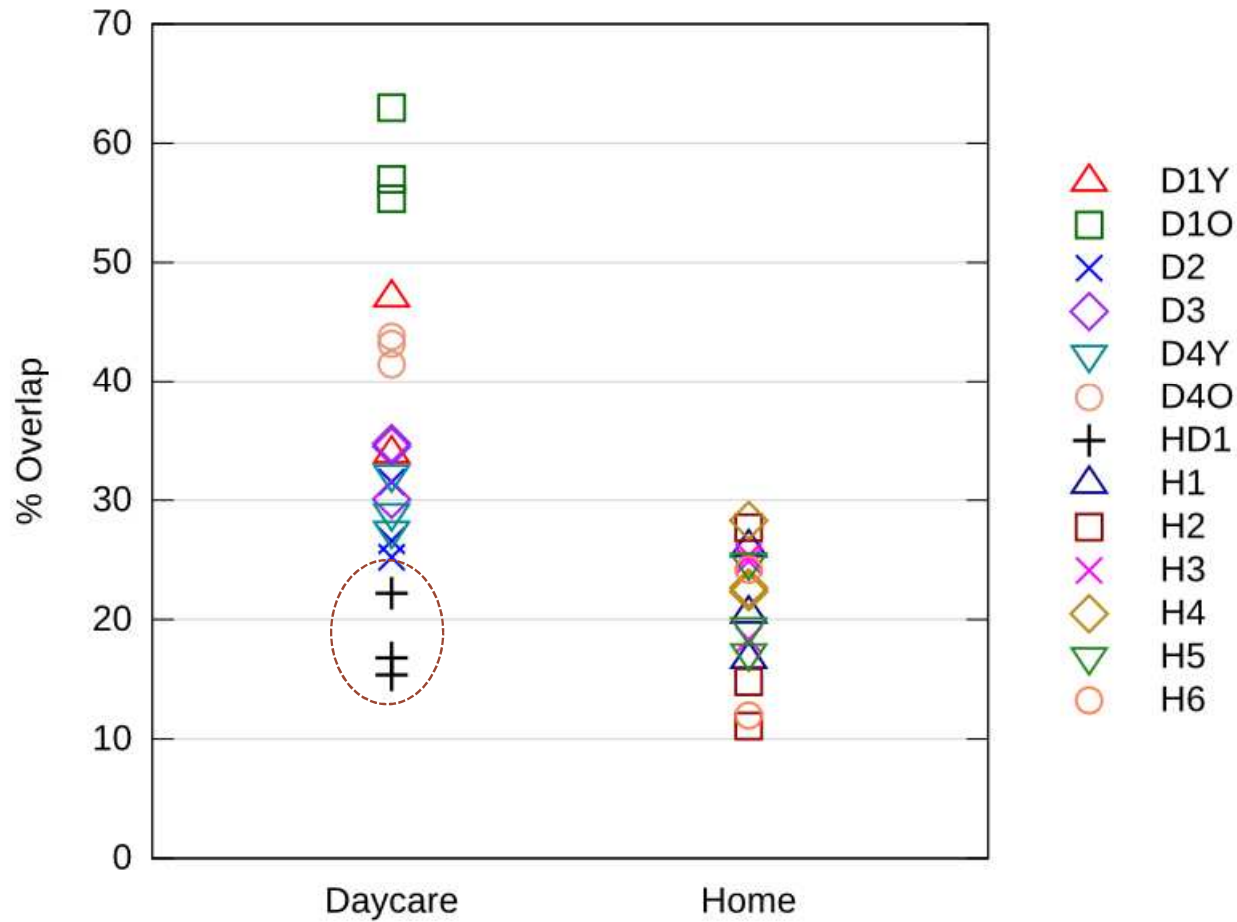
Male Adult (%)



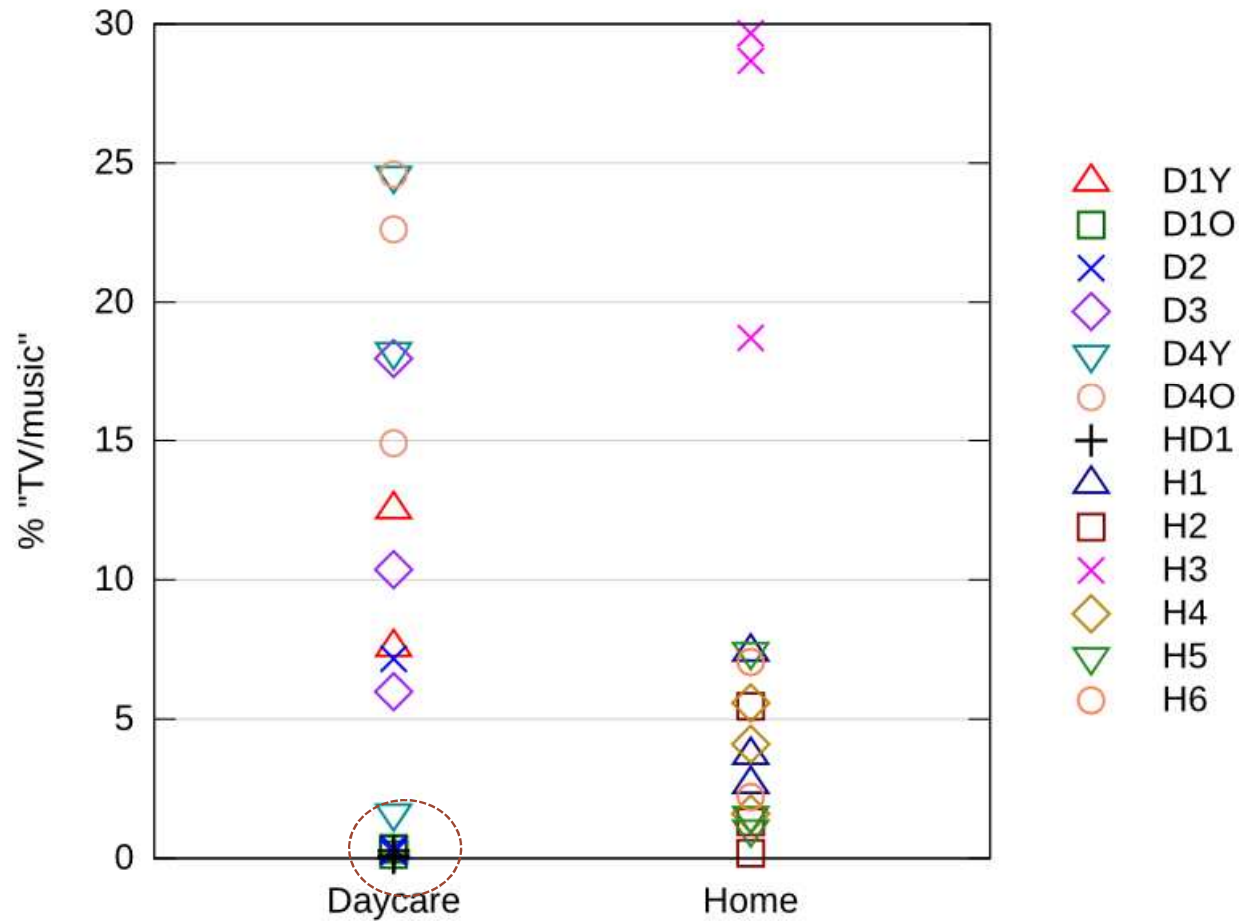
Other Child (Peer/Sibling %)



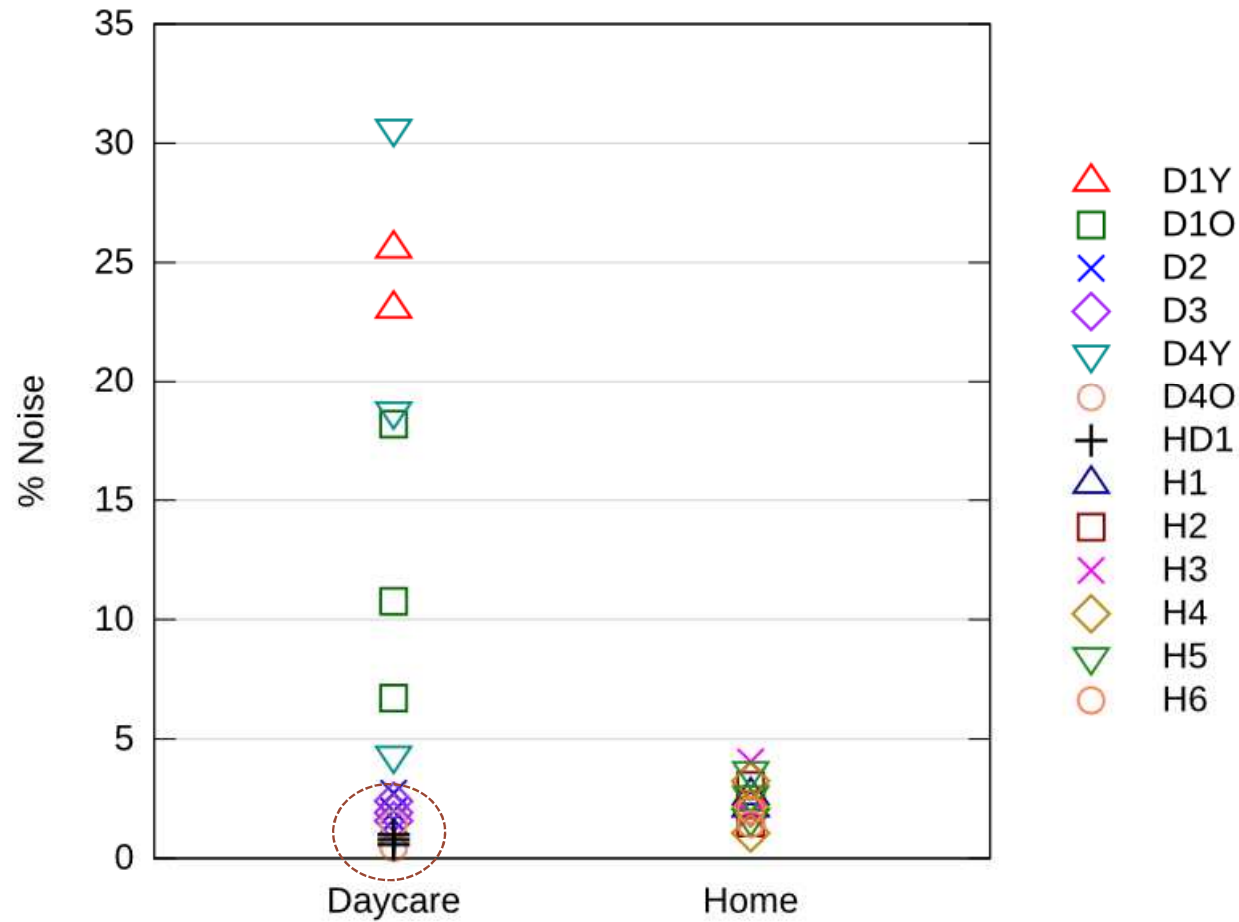
Overlapping Speech (%)



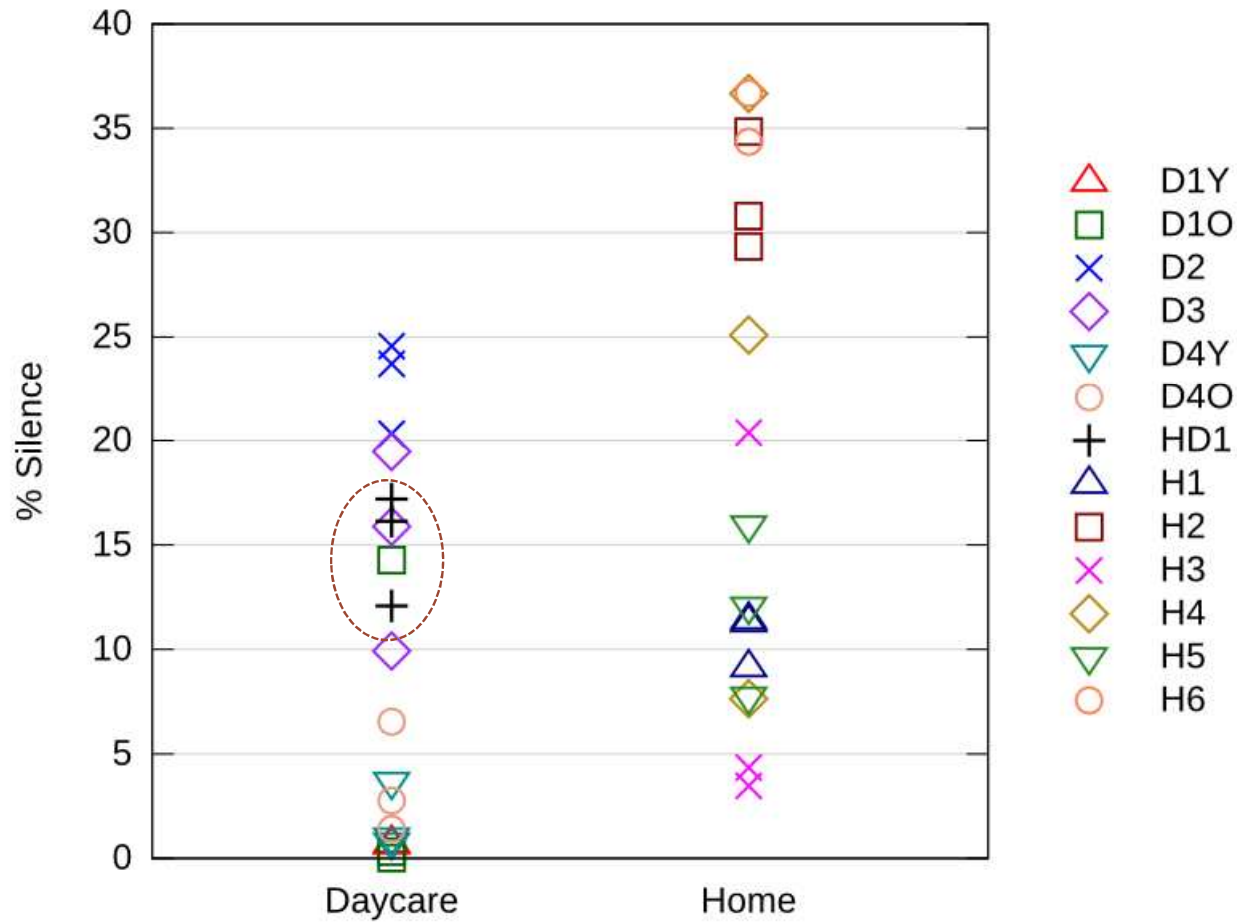
“TV/music” (%)



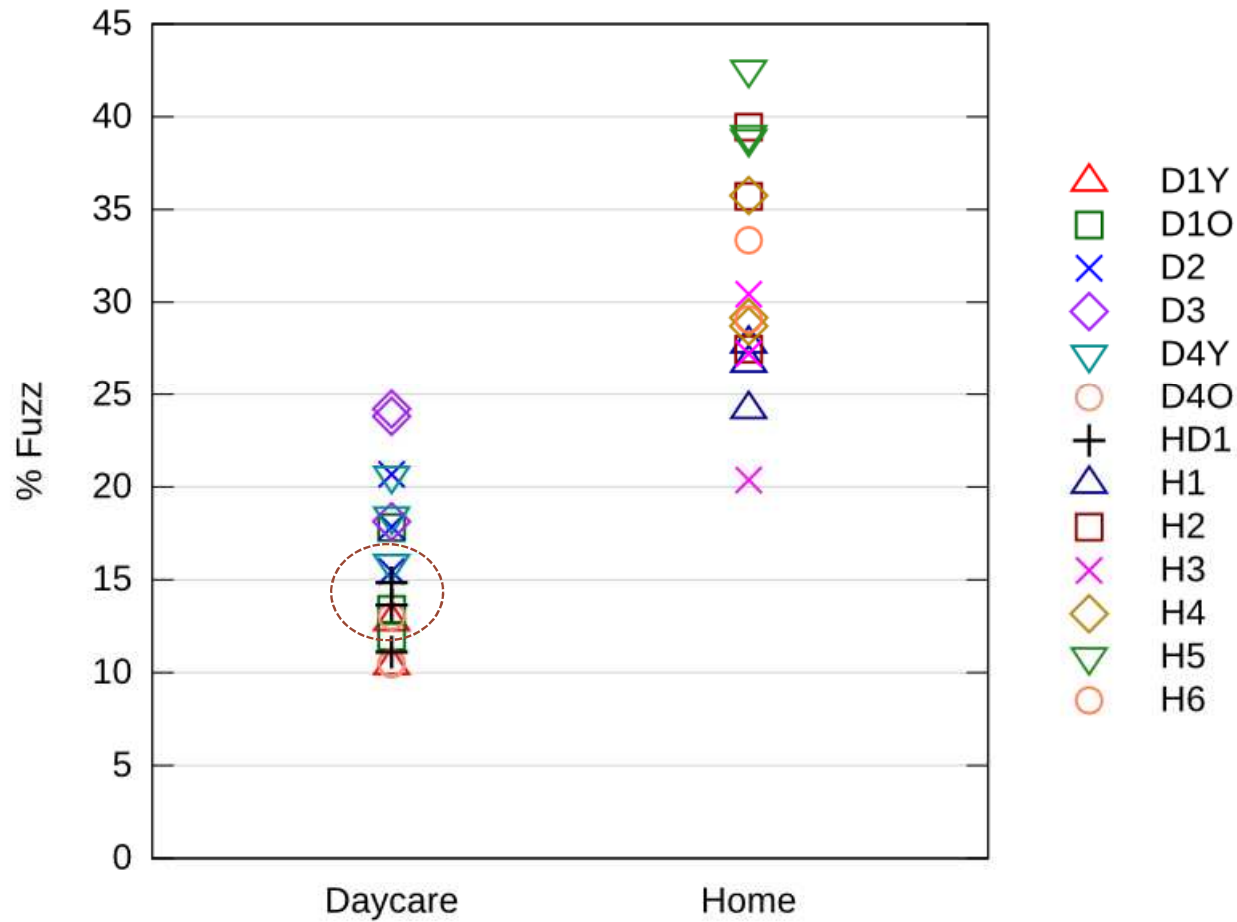
Non-verbal Noises (%)



Silence (%)



Unclassified/distant (%)



Summary: So far



- **Differences**
 - Male voice, sibling/peer, overlapping speech, noise, distant, silence
- **Similarities**
 - Quantitative measures of meaningful language input
- **Home Daycare**
 - Like a home: overlapping speech, non-verbal noise
 - Like a daycare: other child input, unclassified/distant

Implications



- The role of noise
 - Overlapping speech, non-verbal noise, music/TV
- The role of quiet
 - Is it helpful or just lost opportunities?
 - Can children learn from “distant” speech?
- I.e. are children’s perceptual capabilities like LENA?
- The role of peers in language acquisition
- The role of male voice??

Activity and Time of Day



- Observation sheets plus retrospective coding
- 2 participants each Home and Daycare
 - 12 days total (4 participants each 3 days)
- Activity:
 - 5 minute increments
 - Categories: diaper change, mealtime, naptime, outside, general playtime, organized playtime, TV time, other
- Number of Adults/children
- Statistics: series MANOVAs, Pearson correlations

Activity and Basic Quant Measures



- Activity significantly affects AWC, Turns, and Child Voc ($p < .001$)
 - If *naptime* excluded: *TV time* and *outside* lead to reduction in AWC, Turns, ChildVoc
- When activity included
 - Significant effect of childcare on Turns ($p = .001$) and Child Voc ($p < .01$), no effect AWC
 - Significant interactions of activity X childcare all three measures
- Comparing playtime: general vs. organized
 - Highly significant effects of *playtime* AWC, Turns, Child Voc
 - Effect of childcare in ChildVoc only (higher at home)

Activity and Basic Qual Measures



- Percentage of audio classified as:
 - Target Child, Male Adult, Female Adult, Other Child, Overlap, TV, silence, Noise, Unclassified (Fuzz)
 - Naptime excluded
- Highly significant effects of activity on all categories
 - Other child: highest *organized playtime*, lowest *outside*
 - Overlap: highest *TV time*, lowest *outside*
 - Fuzz/Distant: highest *playtime – general*, lowest, *playtime – organized*
 - Multiple interactions w/ childcare

Effects of Number of Adults/Children



- **Significant effects of N adults**
 - AWC, Turns, less ChildVoc
 - Sweet spot at 2-3 adults all three variables

- **Significant effects of N children**
 - AWC, Turns, NOT ChildVoc
 - AWC: Sweet spot at 2 children
 - Turns: negative correlation w/ N children
 - ChildVoc: marginal positive correlation daycare-only

Summary of Findings: Activity



- **Strong effects of activity on language environment**
 - Naptime, playtime (organized vs. free), outside/inside
 - Important interactions with child care environment
- **Number effects (both adult and child)**
 - Possible “sweet spot” at $N = 2-3$
 - Effect of “small conversation”?
 - Strongest AWC, Turns

Overall Implications



- **Qualitatively different environments**
 - Activity-mediated
 - Number-mediated
- **Quantitatively similar environments?**
- **Importance of Perceptual Studies**
 - How well do infants perform in noise?
 - How well do infants process quiet speech?
 - What is the role of other-child language?
 - What is the role of male-voice?

Acknowledgments



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