Comparing the morphological complexity of ADS and CDS in a polysynthetic language

Sara Carter & Amalia Skilton (University of Edinburgh)

Introduction

- Differences between adult-directed speech (ADS) and child-directed speech (CDS) are a classic topic in language development research
- However, this topic has hardly been studied…
    - In Indigenous languages [1]
    - In languages with very complex morphology [2]
- **CDS** is studied fairly often in these language groups
- But **comparison to ADS** is missing, due to issues collecting ADS corpora [3-5]

This Study

- We have access to observational corpora of both CDS and ADS in a specific Indigenous language with polysynthetic morphology
- **Overall** goal of work: test classic findings about CDS (vs. ADS) from work with Indo-European + Global North languages
- Goal of **this paper**: describe the morphological complexity of CDS vs. ADS

Theoretical Background

- Mixed evidence on morphological complexity in polysynthetic CDS [3-8]
- Studies supporting simplification/low complexity:
    - Low(er) number of affixes (tokens) on verbs and nouns [3, 5, 6]
    - Low(er) number of verb and noun word types [3, 5, 7]
    - Low(er) number of affix types, especially for inflectional affixes [7, 8]
- Studies supporting high complexity:
    - Low affix count is due only to distribution of clause types, e.g. more frequent use of imperative [4]
    - Even when decrease in affix count occurs, affix count remains high in absolute terms, e.g. no bare roots [5]
- Limitation shared by all of these studies: no ADS [3], only incidental ADS [4], narrative rather than interactive ADS [5]

Background on Ticuna

Indigenous language isolate
- Spoken in Peru/Brazil/Colombia (Figure 1)
- 45,000 – 70,000 speakers primarily in Brazil [9]
- Data collected in Cushillococha, Peru
    - ~5000 residents; 90-95% speak Ticuna
    - Many also speak Spanish
- Language has complex morphology on both nouns and verbs [9, 10]. Verbs have:
    - Aspect, subject, and object prefixes
    - Noun incorporation
    - Many different suffixes and enclitics

Figure 1: Location of Ticuna region (circle) and field site (star)

Figure 2: Still of a 3;4 child and caregiver from the CDS corpus

Example Utterances

(1) nge³ma²   ra³ã³   ma³ra³ã³   ku¹gi²ta²e³=wa⁵   ṹ³¹-tʃaʔi¹-ʔĩ⁵tʃi²-ne³ta²-ʔĩ⁴-ã̃³   ni⁴
    DEM   TOP   PERF   football=ALL   go-want-very-pretend-SUB-REP FOC
'As for that guy, now he's reportedly acting like he really wants to go play football.' **(ADS)**

(2) ŋe³ma²-ta²ã̃⁴,   ti̧³¹-ʔĩ³   i⁵-na⁴-ku̧¹-ʔu²tʃi⁴-pi̧¹ʔi̧³-ma³re³
    DEM-only   3-ACC   DIR-3SBJ-push-DIR:outward-CLF:round-just
'Leave it like that, she's just going to push the ball out.' **(CDS, adult to child 1;10)**

Results & Analyses

We conducted three analyses, all of verbs:
1. **Verb Length by Register:** Are verbs in ADS longer in morphemes than verbs in CDS?
2. **Verb Length by Addressee:** Are verbs directed to older children longer in morphemes than verbs directed to younger children?
3. **Verb Types:** Do speakers use more unique verb types in ADS than CDS?

We fit mixed models, but only reporting descriptive statistics here.
- Participants who used <10 total verb tokens are excluded from all analyses

Figure 3: Verb Lengths by Register
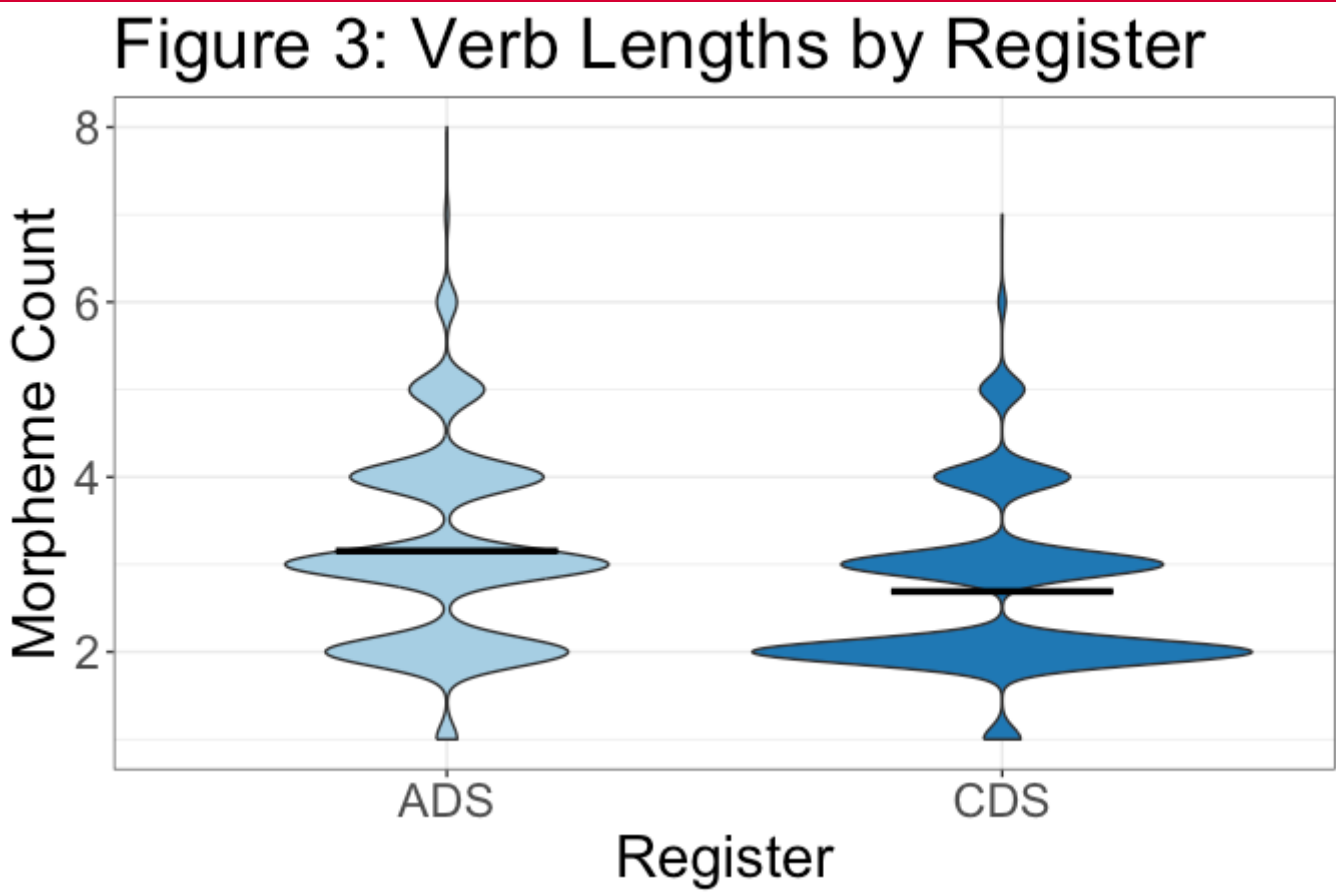
Verbs are **longer** in ADS (M = 3.2 morphemes) than CDS (M = 2.7)
- Difference persists even when imperatives removed, cf. [4]

Bare roots still rare in CDS
- High # verbs with exactly 2 morphemes, cf. [5]
- 2 = minimum length of a grammatical verb

Figure 4: Verb Lengths by Age Bin

No evidence of relationship between CDS verb length & age of target child
- Ages binned, not continuous
- Opposite finding to [4, 5]

Small increase in length at 4;0-4;11 age bin, but only numeric

Figure 5: Verb Word Type Counts
By Participant and Register
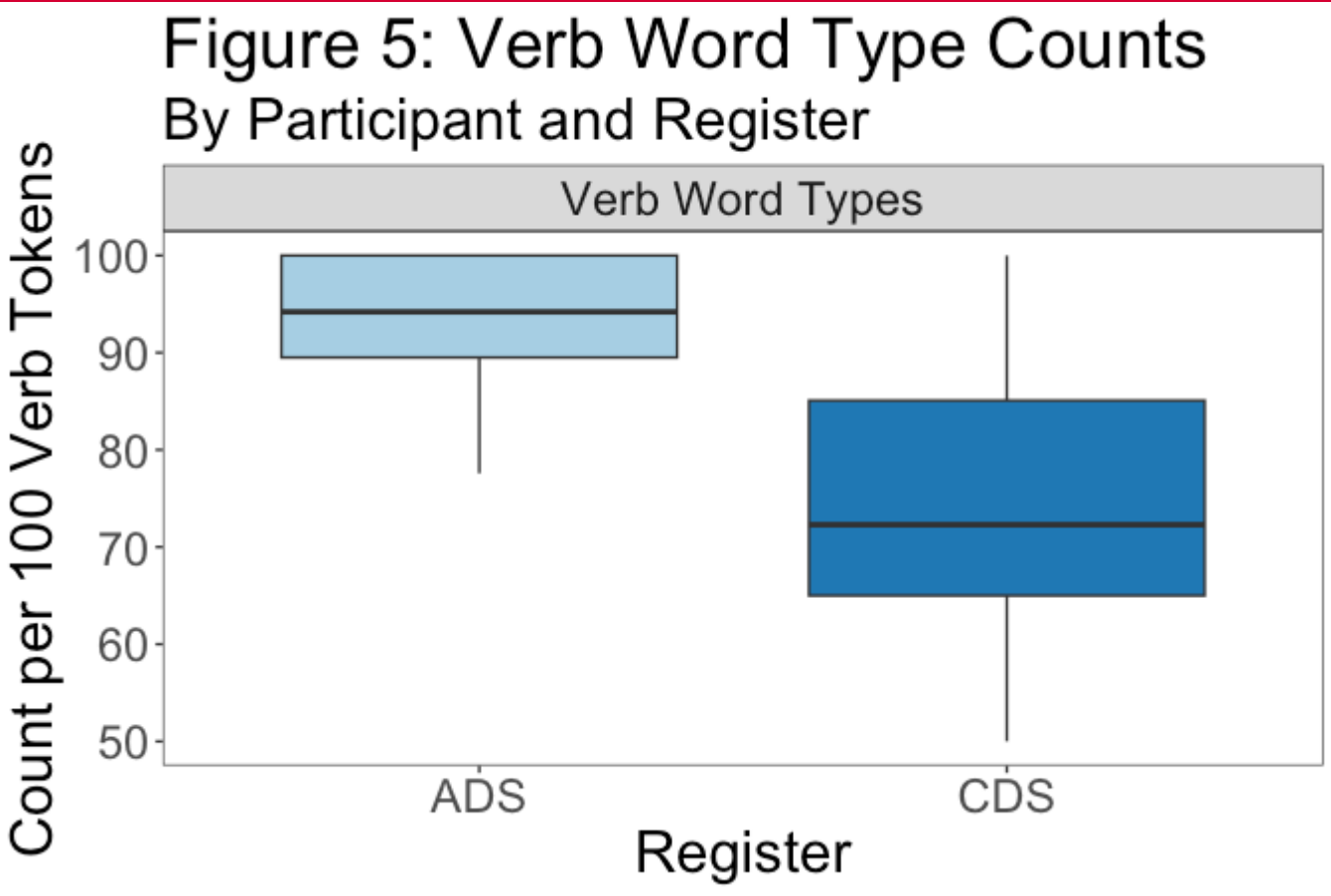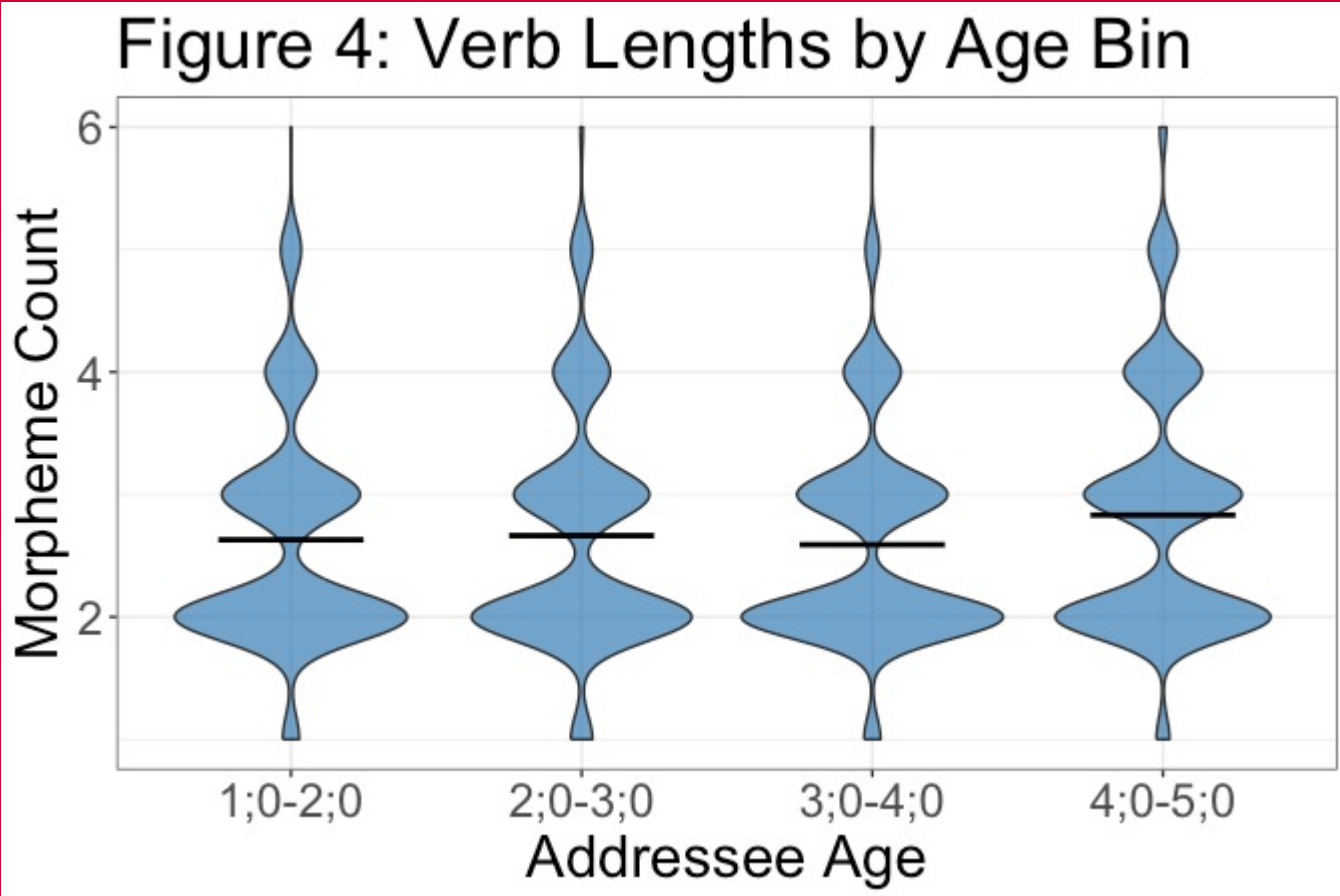
Adults use **more unique verb types** in ADS (M = 93.6 types/100 verb tokens) than CDS (M = 74.8)
- ADS type:token ratio is near ceiling

As in [3, 5, 7], could reflect:
- Repetition of entire turns
- Variation sets where verb is repeated verbatim

Methods

- CDS corpus: 45 children aged 1;0 - 4;11 recorded in their homes interacting with primary caregiver for 60 min
    - No directions given + Other family members welcome
    - 10 min sampled / child / recording, as described in [11]
- ADS corpus: Adults from the same families involved in CDS corpus
    - Most recordings were 60m; sampled entire recording
- Every turn transcribed, translated, morphologically analyzed, coded as ADS/CDS
- "CDS" in analyses = Adults' CDS from the CDS corpus
    - "ADS" = All adult-to-adult speech, including incidental ADS in CDS corpus

Conclusions & Future Work

- We add support **based on comparisons to ADS** to some conclusions in literature:
    - CDS verbs are **shorter** than ADS verbs, not merely short [3, 5, 6]
        - Yet caregivers still speak grammatically, i.e. do not use bare roots [5]
    - CDS uses **smaller lexicon** of verb types, is more repetitive than ADS [7]
- Other conclusions vary from literature, e.g. no effect of child age [4, 5]
    - CDS is simpler, but is the simplicity due to / motivated by child's own language development?
- Next step: Analyze data from CDS directed to children aged 5;0 – 7;11

References

Register	Corpus Recording Time	Count of Speakers	Count of Turns	Count of Words	Count of Verbs
ADS	5h39m	106	10,316	42,549	7,188
CDS	7h30m	74	4,022	13,673	2,590

Table 1: Characteristics of the ADS and CDS samples

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