Evidence for the Prosodic Structure of Multiword Utterances in L2 Speech

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Introduction

- Models of native (L1) language production agree that speaking involves a series of stages that prepare intermediate representations at each step.

- During the **phonological encoding** stage, prosodic structures are built by attaching segmental specifications to prosodic frames during syllabification.

- One of the most obvious signs of a non-native (L2) English speaker is incorrect **stress assignment** in multisyllabic words:
  ˈagenda for aˈgenda
  ˈgazelle for gaˈzelle

- This phenomenon has often been ascribed to interference by the L1 metrical structure in the prosodic framing of the L2 word (Archibald, 1993, 1997).

- **English compounds** consist of two lexical items therefore, by definition, they also consist of two prosodic items.
  $[dog]_N$ $[house]_N$
  $(dog)_\omega$ $(house)_\omega$

- However, when combined, the compound *doghouse* functions as a single phonological word with main stress on the first constituent.
  $((dóg)_\omega(house)_\omega)_\omega$

- Our focus here is on phonological encoding of complex words in English by fluent speakers of a language with different word stress but similar prosodic framing (Bengali).

Research Questions

- How do speakers of an L2 with an incongruent stress system phonologically-encode multiword utterances in English?

- does the L1 stress system interfere with L2 complex word formation?
  - Are metrical processes separate from prosodic processes in phonological encoding?

Stimuli

Four experimental conditions:
1: Noun noun compounds
2: Adjective noun phrases
3: Monomorphemic disyllabic words with initial stress
4: Monomorphemic disyllabic words with final stress

(1) Comp	(2) Adj-N	(3) Initial	(4) Final
dishcloths	dark cloths	donkeys	decrees

Stimuli were matched for
- word length (number of letters)
- imageability
- frequency measures
- Word familiarity, stress placement confirmed with a native speaker judgement task (N= 35).
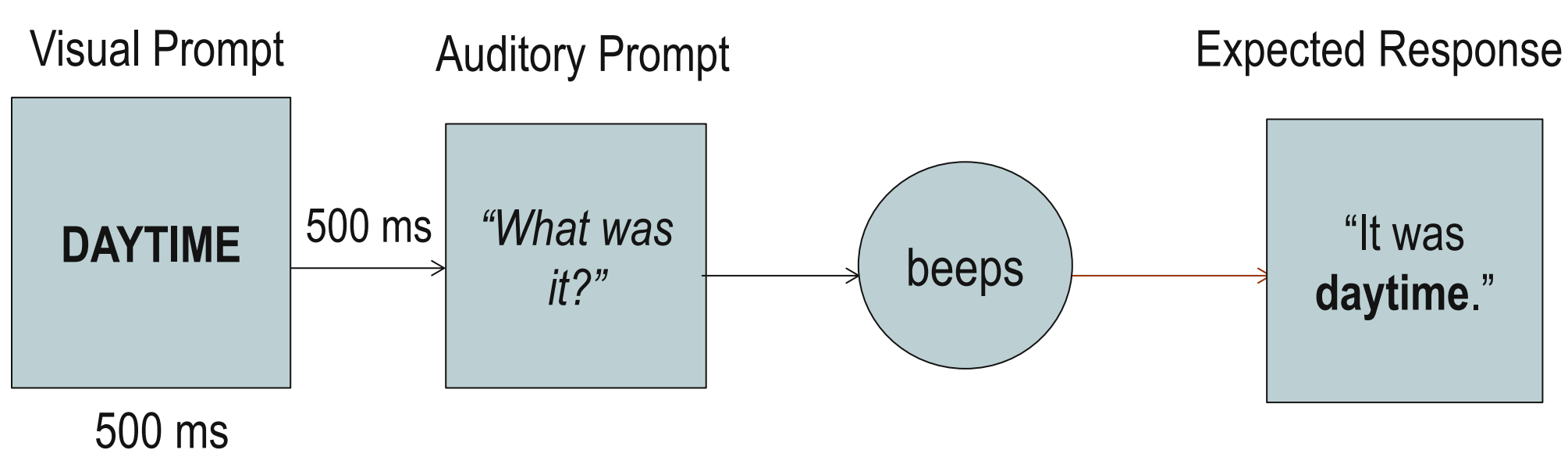
Participants

- 24 adult **native British English speakers** for Experiment 1 (all students from the University of Oxford, ages 18-24)

- 24 adult highly-fluent **native Bengali speakers** for Experiment 2 (all students from Gokhale Memorial College and Shri Shikshayatan School, Calcutta, India, ages 17-22)

➤ English proficiency in the L2 speakers was based on a language background questionnaire (cf. Li et al, 2014) as well as a reading and speaking task based on the International English Language Test System (IELTS).

Design

- Two delayed naming tasks

- Target stimuli were preceded by a fixation cross for 500 ms, followed by an auditory prompt, then three beeps.

- The third beep occurred at three different points (800 ms, 1200 ms, 1400 ms).

Visual Prompt | Auditory Prompt | Expected Response
DAYTIME — 500 ms → "What was it?" → beeps → "It was daytime."
500 ms

- Latencies were measured from the third beep to the onset of speech.

Hypotheses and Predictions

Native English Speakers
- Preparation latencies will be sensitive to the prosodic structure of the utterance.
- Phrases will elicit longer naming latencies than compounds, because they are built from two discrete prosodic units.

Non-Native English Speakers
- Preparation latencies will be longer in these speakers.
- These speakers will make more errors, particularly in the disyllabic final-stressed condition.
  ➤ This is due to the Bengali stress rule, which stipulates that stress is overwhelmingly word-initial (cf. Chatterji, 1926):
  táka (unit of money)

- Despite these errors, L2 speakers will be able to access the correct prosodic structure of English compounds.

Analysis

Analysis:
Generalised additive models containing the fixed effect factors of condition (cond) and preparation time (beep), with thin plate regression smoothing for the random effect factors of subject and item. The models were fit with scaled t-distributions:
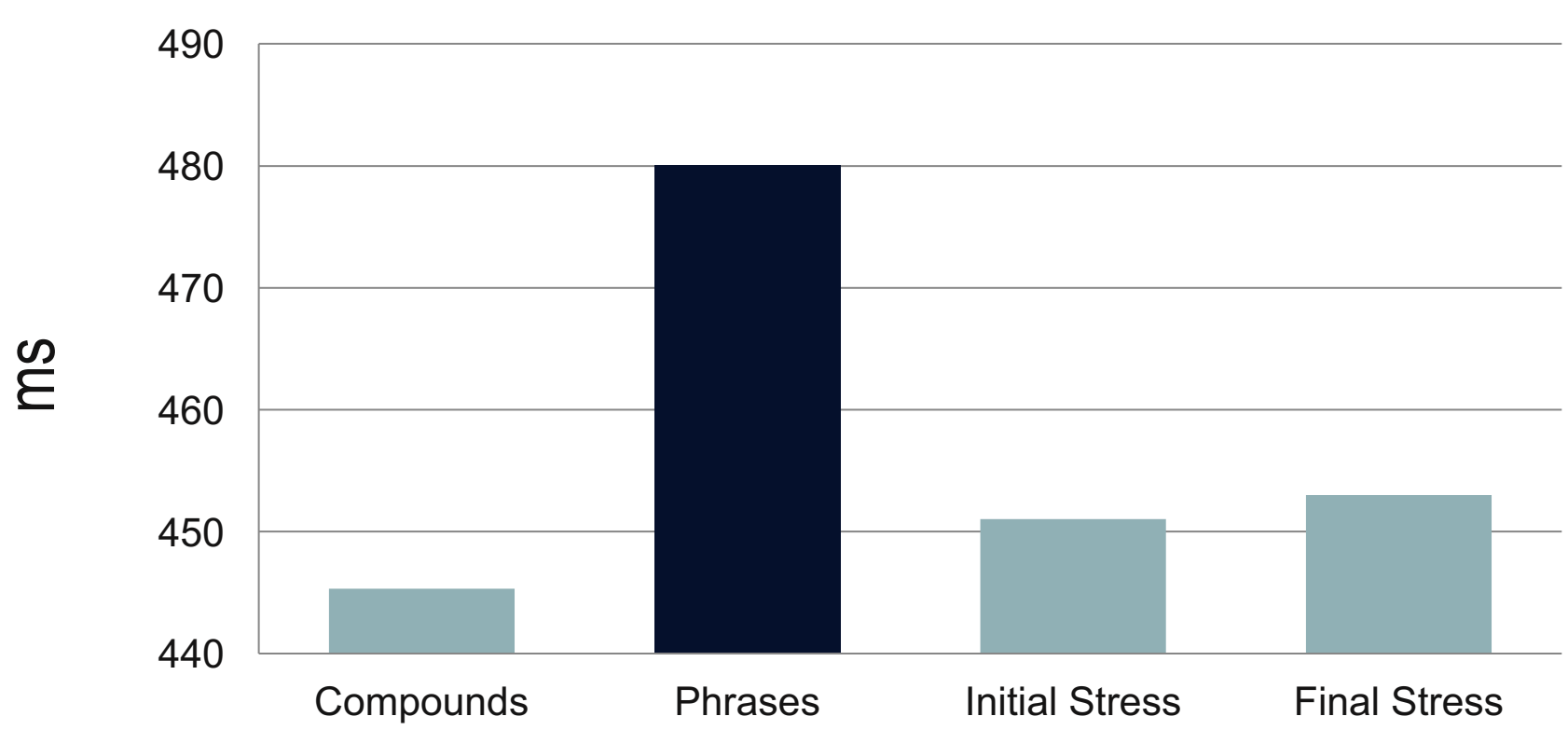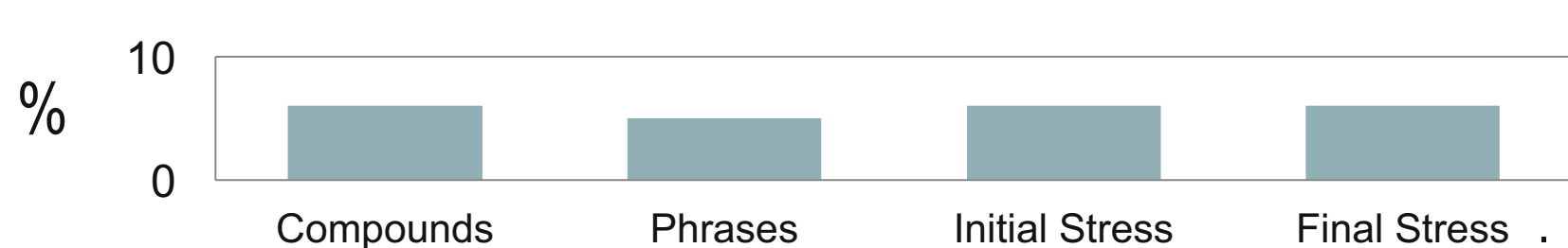gam(RT~ cond+ beep + s(sub,bs="re") + s(item,bs="re"), family="scat")

Results

Experiment 1: Native Speakers
- Phrases took significantly longer than all other conditions to prepare (t=7.02*)
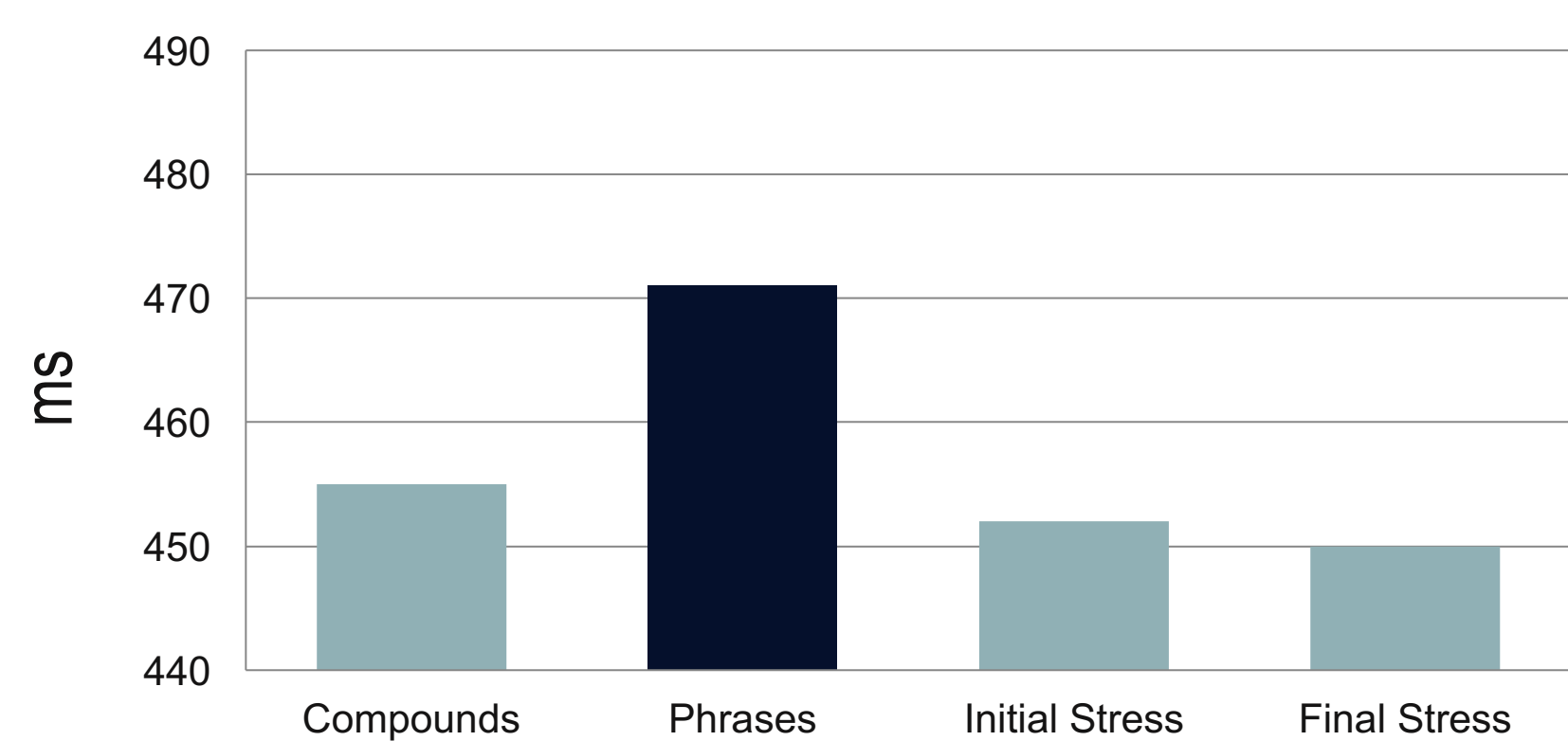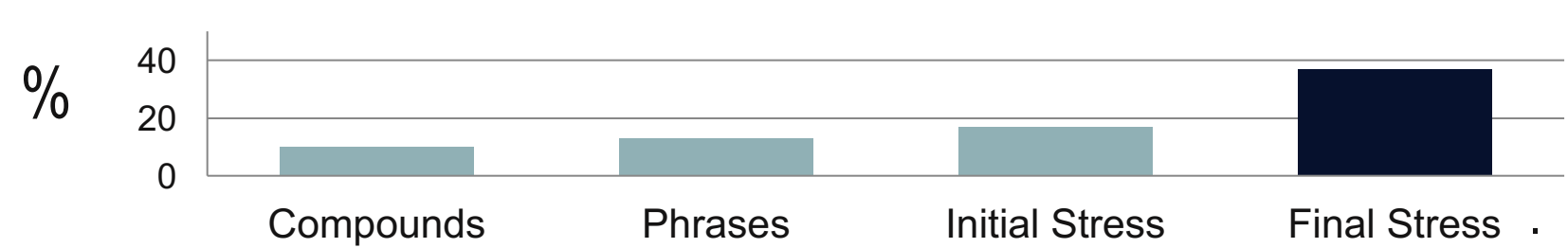- No effect of preparation time (t= -1.92)

RT data:

Error data:

Experiment 2: Non-Native Speakers
- Phrases took significantly longer than all other conditions to prepare (t=2.23*)
- Main effect of preparation time (t=-5.23*)
- No interaction between condition and preparation time

RT data:

Error data:

Discussion

a) Naming latencies reflect the preparation of an utterance's prosodic structure in both L1 and L2 speakers.

b) The size of the effect was much smaller for L2 speakers than for L1 speakers.
  - in line with results of other L2 naming tasks (cf. Ando et al., 2014).

c) L2 errors were significantly higher in Condition 4 (the disyllabic final stress condition).
  - This fits with our hypothesis regarding the Bengali stress rule.
  - L2 speakers intended to replace the target words with higher frequency words:

Target Item	Freq	Replacement	Freq
ballad	50	*bell*	745
lament	23	*lemon*	278
robe	257	*road*	4458

➤ **Although longer naming latencies and stress errors reflected interference, the L2 speakers built the correct prosodic frames for English compounds.**

➤ **This highlights the need to separate the processes that prepare prosodic structure from those that prepare metrical structure in phonological encoding.**

Contact

Selected References

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