Speakers and hearers use prosody to disambiguate scopally ambiguous sentences
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Abstract

Since Jackendoff (1972) first claimed that sentences such as (1) can be reliably disambiguated via a sentence-final contour, (2), various researchers have questioned this strength of this relationship and the nature of the link between prosody and sentence meaning, arguing for a pragmatic account.

(1) a. V: > - (none)
    b. > V (not all)

To date, systematic evidence bearing on this question has been lacking. We present a set of production/perception experiments designed to investigate whether speakers recruit auditory cues (including, but not limited to sentence-final contour) to disambiguate such sentences. While there is considerable variability in speaker production, there are surface-level cues to interpretation. Moreover, hearers successfully recruit these cues at the arrive at the correct interpretation.

We argue that psycholinguistic studies investigating participants’ ability to access multiple interpretations of scopally ambiguous sentences should carefully control for prosody.

Purpose

Determine whether certain scopal relations elicit a particular prosodic contour, and whether any surface-level signature varies with the context.

Participants

26 undergraduates (data from 19 used)

Procedure

Participants were recorded reading a series of short passages:

- read passage
- answer question
- re-read passage
- Sonorance and presence of continuation sentence control for: Analysis: comprehension scores of 1: targets excised in Proot

Sentence presented via headphones in lab using SuperLab. Sentence presentation within blocks randomized.

Analysis: comprehension scores of 1: VTs <55

Background

Theoretical

Jackendoff (1972): prosody is tied to scopal relations

A ‘accent’ (fall) is part of the presupposition, but not focus; ‘b accent’ (non-fall) is associated with the focus (attention)


Emerging contour: While it is possible that a fall-rise contour may (slightly) favor a ‘wide scope’ reading, this contour is neither necessary nor sufficient, and should vary with the context (information structure, QD) speaker knowledge of salient scalar alternatives.

Experimental

Speakers and hearers use prosodic cues to disambiguate a wide variety of syntactic structures (e.g. presupposition/focus distinctions [Spener, et al. 1993; Price et al. 1991], as well as non-quantificational ~because ambiguity [Cooper & Paccia-Cooper 1985; Hirschberg & Avenanti 1997, 2000; Koizumi 2009]), although there is considerable variation in productive strategies.

Greek speakers and hearers do recruit prosodic cues for scopal disambiguation (Baltzani 2002/3), but previous studies in English leave the question open (McMahon et al. 2004; Jackson 2006).

Production Experiment

Stimuli

Target sentences were all ambiguous, with controls clearly able to be disambiguated prosodically.

Sample sentences

test items (n=28) type

All the magnolias won’t bloom
V, ~

Liam doesn’t know many alumni.

~ many

Neil doesn’t enjoy most musicals.
~ most

control items (n=28)

They’re not late because of his driving.
~ because

She even painted the garage.
focus

A few years ago, the town decided to plant magnolias saplings to line a path through the park. The saplings on the north side were planted mainly in sand and haven’t been getting nearly enough nutrients.

However, the soil near the south side is rich, and the magnolias are thriving there. All the magnolias won’t bloom. But I bet the ones on the south side will.

Production Experiments

Stimuli and Procedure

44 undergraduates

Stimuli and Procedure

24 minimal pairs selected from 4 speakers (3 from previous experiment, 1 experimenter)

6 pairs each:

1. all, ~1, ~many/most
2. because; 1; only/even
3. Speakers blocked, minimal pairs in sub-blocks

Sentences presented via headphon s in lab using SuperLab. Sentence presentation within blocks randomized. Analysis: comprehension scores of 1: VTs <55

Perception Experiments

Stimuli and Procedure

18 minimal pairs selected from 3 speakers (2 from previous experiment, 1 experimenter)

6 pairs each:

1. all, ~1, ~many/most
2. because; 1; only/even
3. Blocking and presentation via Superlab as before: Analysis: comprehension scores of 1: 3T5-35

Results

Analysis 1: Sentence-final Contour

All % significantly above chance

4 x 2 x 3 ANOVA

(spaker, scope of ~, lexical item); ME of scope of ~, significant interactions

Analysis 2: Acoustic Analysis

5 acoustic measures - quantifier, sentence-final word max F0, max F0 location, F0 st. dev., word duration

All % significantly above chance

Analysis 3: Longest sentence-final word in context 4

Longest sentence-final word in context 4

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Conclusions and Implications

1. Speakers can distinguish interpretations using surface cues, but these cues (a) are highly variable within and across speakers & contexts, (b) depend on the quantifier and its position, (c) are not restricted to sentence-final contour, (d) are not linked to scope alone.

2. Hearers reliably recruit such cues to arrive at the speaker’s intended interpretation, in most, but not all cases. Success depends on the quantifier, speaker, and scope.

3. Psycholinguistic (including acquisition) studies that present participants with scopally ambiguous sentences should control for prosody, taking into account these patterns. It is not enough to say that prosody was “kept neutral” or was delivered “naturally.”

Selected References

Balbiani 2002 The prosodic structure of quantificational sentences in Greek, Fedor 2002 Psycholinguistics cannot escape prosody; Hirschberg & Avenanti 2000 Prosodic disambiguation in English and Italian; Kadmon & Roberts 1986 Prosody and scope; The role of discourse structure; Jackendoff 1972 Semantic interpretation in generative grammar; Koizumi 2009 Prospecting the not-cause ambiguity in English. The role of pragmatics and prosody; Ladd 1980 Intonation and Grammar; McMahon, Lutz, & Pfeiferheim 2004 Suprasegmental cues to meaning in child-directed speech

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