

Prosody of presupposition projection: Comprehension experiments

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April 2, 2019

1 Introduction

- Factive presupposition:

(1) Perhaps she realized that he was unreliable.

- Our production experiment investigated prosodic cues to the projection of factive presuppositions based on utterances by 11 talkers of 15 sentences produced in contexts in which the presupposition either projects (committed condition) or doesn't project (not-committed condition) (Vaikšnoraitė, de Marneffe, and Tonhauser 2018).

We established 3 cues to the projection of factive presuppositions:

1. pitch accent on the last content word: (L+)H* is more likely in not-committed than in committed condition
 2. duration: duration of last content word is longer in not-committed than in committed condition
 3. f0: the f0 of the entire utterance is higher in the not-committed than in the committed condition
- The goal of the comprehension experiments is to identify which prosodic cues listeners attend to in identifying what they take a speaker to be committed to and, in particular, whether they attend to the prosodic cues identified in the production experiment.
 - The stimuli for both experiments are productions from the production experiment. There are a total of 114 utterances to choose from. Because one of our comprehension experiments involves choosing the member of a pair that fits the context best, we limited our attention to those where we have a target sentence produced by the same talker in the two conditions.

There are 43 pairs of utterances, i.e., target sentences like (1) that were produced both in the context in which the presupposition projects and in the context in which the presupposition does not project. To better understand the properties of these 43 pairs, we coded them for consistency with each of the three prosodic cues for (non-)projection identified in the production experiment:

1. PA Consistent: iff PA on the last content word is (L+)H* non-committed condition AND not (L+)H* in committed condition
2. DUR Consistent: if the duration of the last content word duration is longer in non-committed condition than committed condition
3. F0 Consistent: if the utterance F0 mean is higher in non-committed condition than committed condition

Thus, each utterance pair is consistent with 3, 2, 1 or 0 of the cues that emerged from the production experiment.

2 Comprehension Experiment 1: Matching task.

In this comprehension experiment, participants are presented with a written context and two utterances of the same sentence by the same talker. Participants are asked to identify which of the two utterances sounds better as part of this context. The context is either from the committed or the non-committed conditions; one of the two utterances was produced in that context, the other one was not.

Participants. Recruited on AMT.

Stimuli. A stimulus consists of a written context that excludes the target sentence and two utterances of the target sentence by the same speaker from the production experiment. Participants are asked to chose the production that sounds best given the written context.

(2) **Sample discourse.** My church was looking for a new financial administrator. We interviewed a very well-qualified man who had great references and a lot of experience. We were completely shocked when our pastor refused to hire him, and she didn't want to tell us why. *Perhaps she was aware that he was unreliable.* Or perhaps she just didn't like him.

We wanted to use the maximal number of utterance pairs for this experiment while also ensuring the following:

1. Each list has the same number of target stimuli: this limits us to 7 target stimuli per list, namely utterances of the target sentences N2, K2, A3, A1, K3, D2.
2. Each of the 11 talkers occurs at most once per list (the talkers are identified by 'P' for 'participant'); in the end, productions by 10 of the 11 talkers are used.
3. Each list has utterance pairs with 0, 1, 2, and 3 cues.
4. Each list contains roughly the same amount of cues that go in the right direction.

We were able to create 8 lists of 7 utterance pairs each, using a total of 28 of the 43 utterance pairs. As shown in Table 1, each pair of lists (a/b) includes the same 7 utterance pairs, but the two lists in each pair of lists differ in whether the utterance pair is presented in the context in which the presupposition projects (subscript c) or doesn't project (subscript nc).

List	target sentences						
	N2	K2	A3	A1	A2	K3	D2
List 1a (10 cues)	P1 _c	P14 _{nc}	P8 _c	P6 _{nc}	P11 _c	P4 _{nc}	P12 _c
List 1b (10 cues)	P1 _{nc}	P14 _c	P8 _{nc}	P6 _c	P11 _{nc}	P4 _c	P12 _{nc}
List 2 (11 cues)	P12 _c	P11 _{nc}	P6 _c	P4 _{nc}	P8 _c	P9 _{nc}	P3 _c
List 2 (11 cues)	P12 _{nc}	P11 _c	P6 _{nc}	P4 _c	P8 _{nc}	P9 _c	P3 _{nc}
List 3 (11 cues)	P3 _c	P8 _{nc}	P14 _c	P12 _{nc}	P3 _c	P1 _{nc}	P5 _c
List 3 (11 cues)	P3 _{nc}	P8 _c	P14 _{nc}	P12 _c	P3 _{nc}	P1 _c	P5 _{nc}
List 4 (12 cues)	P6 _c	P4 _{nc}	P5 _c	P3 _{nc}	P1 _c	P12 _{nc}	P8 _c
List 4 (12 cues)	P6 _{nc}	P4 _c	P5 _{nc}	P3 _c	P1 _{nc}	P12 _c	P8 _{nc}

Table 1: 8 lists of 7 target stimuli each

Prosodic cue	Pitch Accent	Duration	F0
List 1 (10 cues) (a/b)	3	6	1
List 2 (11 cues) (a/b)	2	4	5
List 3 (11 cues) (a/b)	3	4	4
List 4 (12 cues) (a/b)	3	5	4
Total	11	19	14

Table 2: Lists: the number of prosodic cues occurring in each list

Procedure. The participants were presented a written discourse on the screen excluding the target sentence. They had to read the discourse and then listen to the auditory stimuli. The participants were asked to type the target sentence (as an attention check) and to choose one of the two utterances.

Instructions: tell participants that there are several attention checks. If they always read the text and listen to both sounds, they are sure to get them right.

Present the discourse

Here are two utterances of the sentence that is missing from the text above:

Present the two utterances (call them SOUND 1 and SOUND 2)

Please type the sentence into the box:

PRESENT BOX

Please select the sound you like best:

BUTTON 1 = SOUND 1 BUTTON 2 = SOUND 2

Analysis We are interested in i) whether participants can choose the correct utterance (i.e., the utterance that was produced in the context that they read) and ii) which prosodic cues they attended to in making their decision, whether correct or not.

To answer the first question, we calculate the % correct answer in the two conditions, i.e., when the context is such that the presupposition projects and when the context is such that the presupposition does not project. We then use a one sample t-test to determine whether the number of correct answers in each condition is significantly different from chance (50%).

To answer the second question, we also analyze separately the responses in the two conditions, i.e., the responses to stimuli with a committed context (presupposition projects) and to stimuli with a not-committed context (presupposition doesn't project).

We code the chosen utterances for whether they were originally produced in a committed context (1) or in a not-committed context (0).

We then fit binomial mixed effects models to the data in each condition to identify which prosodic cues (differences between the two utterances!) listeners attended to in making their choice.

committed context: choice (0/1) ~ prosodic cues + (1|participant) + (1|item)

⇒ if a prosodic cue is significant with a positive coefficient, then that prosodic cue is a cue to projection

not-committed context: choice (0/1) ~ prosodic cues + (1|participant) + (1|item)

⇒ if a prosodic cue is significant with a positive coefficient, then that prosodic cue is a cue to non-projection

The preliminary models include the following fixed effects for prosodic cues:

1. presence/absence of (L+)^H* pitch accent on last content word

2. difference in duration of last content word
3. difference in f0 of the two utterances
4. difference in duration of the predicate
5. difference in duration of the complement clause
6. pitch accent on the predicate (need to think about how to code “difference”)
7. difference in f0 of the predicate
8. difference in f0 of the complement clause
9. others?

In selecting the prosodic cues, we are guided by the literature on focus in American English.

3 Comprehension experiment 2: Certainty rating

In this comprehension experiment, participants are presented with an utterance of a target sentence and asked to assess whether the speaker is certain of the content of the complement, as in Tonhauser 2016; Stevens et al. 2017; Tonhauser et al. 2018.

Participants. Recruited on AMT.

Stimuli. The stimuli consist of the 56 utterances from the first comprehension experiment. They are presented to participants as utterances by a named speaker, as in (3). Participants were asked whether the speaker is certain of the content of the complement.

(3) Dana (about Valeria and Scott): *Perhaps she realized that he was unreliable.*

The 56 target stimuli were divided into 8 lists of 7 utterances (same as in the first comprehension experiment). On each list, about half of the stimuli come from the committed condition and about half come from the not-committed condition.

Procedure. Each participant was randomly assigned to one of the eight lists from the experiment in and presented with the 7 stimuli and two controls (as attention checks) in random order. As in prior research, participants were told that they overheard somebody say something at a party. Participants were instructed to listen to each stimulus (as often as they wanted) and to answer the question presented with the stimulus. Participants recorded their responses on a 7-point Likert scale labeled at four points to allow for maximal comparability with previous comprehension studies: Not certain/1, Possibly not certain/3, Possibly certain/5, Certain/7.

Analysis: ordinal mixed effects models

certainty rating ~ prosodic cues + (1|participant) + (1|item)

References

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