The Intonational Disambiguation of Potentionally Ambiguous Utterances in English, Italian, and Spanish

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Abstract

We investigated the role that intonation plays in disambiguating potentially ambiguous utterances in English, Italian, and Spanish, to see a) whether speakers employ intonational means to disambiguate these utterances, and b) whether speakers of the three languages employed consistently different intonational strategies in this disambiguation. In a preliminary production study, speakers of the three languages did differentiate among some types of syntactic and scopal ambiguity intonationally. Their strategies differed among languages, with Spanish and Italian patterning together more often than either patterned with English.

INTRODUCTION

It is often been claimed that phenomena such as the scope of negation and quantifiers and the attachment of prepositional phrases and relative clauses can be disambiguated intonationally (Ladd, 1980; Bolinger, 1989). In this preliminary study, we investigated the strategies native speakers of English, Italian, and Spanish might use to disambiguate structurally identical utterances.

METHOD

We conducted a production study to identify intonational variations associated with different readings of potentially ambiguous utterances embedded in disambiguating contexts. We focused on the following types of ambiguity: 1) scope of negation; 2) quantifiers; 3) PP attachment. An Italian example of (1) is: *Non sono scappato da casa perché mia madre mi faceva paura*; an English example of (2) is: *None of the students would embarrass them*; a Spanish example of (3) is: *Ganó a la mujer con los dados.* Each sentence has two possible interpretations, a wide and a narrow scope reading for the negation, wide vs. narrow scope for the quantifier, and VP vs. NP attachment for the prepositional phrase. We constructed potentially ambiguous utterances in Italian, embedding each in two disambiguating contexts, and then translated the resulting paragraphs into English and Spanish.[1] We intended that subjects be able to infer each of the two interpretations of the sentences from the surrounding context. For example, a wide scope interpretation of negation for a sentence like *William does not drink because is unhappy* was conveyed by embedding it in the following paragraph:[2]

> I know William very well. Since his girlfriend left him, he's done nothing but drink. Now, such a long time since his separation, he's used to living alone. Now, *William doesn't drink because he's unhappy.* He drinks because he's an alcoholic.

A narrow scope was induced by embedding it in the following context:

> There's something about William that puzzles me. When he's happy, he has a good time with his friends, and certainly he does't dislike drinking. I think I understand what's wrong. *William doesn't drink because he's unhappy.*

We recorded four native speakers of each language (3 males and one female per language) reading these paragraphs. Two Italian speakers (GR, CA) are speakers of northern Italian, one (RP) of Tuscan, and one (RS) of a southern variety. Among them, only one (RS) can be said to have a strong regional (southern) prosodic characterization. Of the Spanish speakers, one is from the Ecuadorian Andes (JG) and the three others are Catalan, speaking Castilian for this experiment; of these, one is from Murcia (JP), and two

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[1] Our corpus is unbalanced: we have three pairs of utterances for scope of negation, two for quantifiers, and one for PP attachment.

[2] See the appendix for examples of additional sentence types, embedded in disambiguating contexts.

from Barcelona. The English speakers are all American, from New Jersey (AB), Missouri (JH), and California (MK, GW).[3] Recording was done in a sound-proof room, results were analysed using Entropic Research Laboratory's Waves+ speech analysis software, and speech was transcribed using the ToBI. annotation conventions (Pitrelli, Beckman, and Hirschberg, 1994).

ANALYSIS AND RESULTS

English

For our English speakers, wide vs. narrow scope of negation in sentences like '*William doesn't drink because he's unhappy*' was distinguished in two ways, with speakers following one or both strategies in all cases. In the majority of cases, speakers placed an intermediate or intonational phrase boundary between the material within the narrow scoped negative (i.e., after *drink*, meaning "William doesn't drink") and uttering the wide scope version of the sentence (meaning "William does drink, but not because he's unhappy") as a single intermediate phrase. Also, in about 90% of cases, speakers employed falling intonation (a LL% ending) for narrow scope utterances but a continuation rise (LH%) for readings where the interpretation was wide scope.[4]

Quantifier scope shows no such pattern: While two speakers (AB, JH) distinguished wide from narrow scope for the negative quantifier *none* in sentences like '*The presence of none of the students would embarrass them*' by accenting the focus associated with the quantifier (i.e., *student*) in the wide scope case and deaccenting it in the narrow, the other speakers produced different patterns. And for ambiguous association of focus with *only*, no common intonational variations among any of the speakers distinguished between readings.

Ambiguous prepositional phrase attachment in sentences like '*He won the woman with the die*' was distinguished by three speakers (JH, MK, GW) by the presence of an intonational phrase boundary setting off the PP from the direct object to indicate VP attachment, compared to the presence of an intonational boundary between the verb and direct object or the absence of any internal prosodic boundary for the NP-attached reading. That is, a boundary was placed after *woman* to indicate VP attachment; for NP attachment readings, either a boundary was placed after *won* or the sentence was uttered as a single phrase. The fourth speaker (AB) produced no prosodic differences between the two readings.

So, our production studies suggest that speakers of American English may disambiguate scope of negation by varying prosodic phrasing and/or utterance-final tones (final fall vs. continuation rise). PP attachment ambiguities are also distinguished by three of our speakers by differences in prosodic phrasing. However, productions of quantifier scope ambiguous sentences (containing *none* and *only*) exhibit no such clear generalities, although two speakers did use accent placement to distinguish ambiguities involving the scope of *only*.

Italian

All our Italian speakers were quite consistent in the way they disambiguated ambiguous scope of negation. All instances of wide scope utterances were uttered as single intonational phrases; all the narrow scope utterances were uttered as two intermediate phrases, with a phrase boundary delimiting the scope of negation. So, for example, in *Guglielmo non beve perché é infelice*, speakers placed an intonational phrase boundary after *beve* in tokens with narrow scope readings, and no internal boundaries for those uttered in wide scope contexts. In uttering the wide scope utterances all speakers associated a prominent nuclear pitch accent with the negative verb, deaccenting the remainder of the utterance. In the narrow scope utterances, uttered as two phrases, one nuclear pitch accent was associated with the verb and one nuclear pitch accent was associated with *infelice*. As a combined effect of phrasing and accent placement, the lexical material in the subordinate clause was deaccented in the wide scope utterances, accented in the narrow ones.

Speakers were also consistent in the way they intonationally disambiguated the scope of quantifiers. In sentences like '*La presenza di nessuno studente potrebbe metterle in imbarazzo*', the strategy for disambiguating the scope of the negative quantifier *nessuno* for all speakers was: for narrow scope ("there will be no student who can embarrass them"), all speakers produced an utterance with one intonational phrase, placing the nuclear pitch accent on the quantifier itself and deaccenting the subsequent lexical material. For wide scope ("if no students come, they will be embarrassed") two speakers (GR, CA) produced

[3] The three authors participated as speakers.

[4] In one pair of paragraphs an orthographic difference may induced this distinction; however, even excluding tokens from this pair, only one pair of productions fails to exhibit this distinction.

utterances with a single intonational phrase, placing nuclear stress on the last content word of the utterance ("imbarazzo"); two others (RP, RS) produced utterances with two intermediate phrases, separated by a high intermediate phrase accent. Note that all speakers appeared to use same phrasing and same intonational contour for disambiguating the narrow scope of the negative quantifier and the wide scope of negation in type (1) sentences.

A different strategy was used for disambiguating the quantifier *solo*, in sentences like '*E' necessario che venga solo Maria*'. Accent placement and relative prominence appear to be the relevant means employed to disambiguate here, but speakers were inconsistent in their productions. One (RP) used pitch accent placement as a main prosodic cue, accenting the quantifier and deaccenting the noun (*Maria*) in the narrow scope utterances, while deaccenting the quantifier and accenting the noun in the wide scope ones. CA and GR accented both quantifier and noun in both cases, but assigned greater prominence to the quantifier than to the noun in the narrow scope contexts.

Intonational phrasing seemed to be the most important cue in disambiguating VP from NP attachment for prepositional phrases in sentences like '*Vinse la donna con i dadi*'. All speakers distinguished VP attachment by producing two intermediate phrases, with the phrase boundary occurring after the direct object (*la donna*). NP attachment differed among subjects: For three speakers (RP, CA, GR), the sentence was uttered as one intonational phrase (RP, CA, GR); for the fourth (RS), the sentence was uttered as two intermediate phrases, but the boundary occurred after the verb *vinse*; so, this speaker delimited the domain of attachment using phrasing in each case.

Summarizing, it appears that intonational phrasing was the only means used consistently by our Italian speakers to disambiguate the scope of the negative quantifier and to disambiguate ambiguous PP attachment. In type (1) utterances, intonational phrasing and nuclear accent placement were used by all speakers to disambiguate. Accent placement and prominence were the means through which our speakers disambiguated the scope of the quantifier *solo*. When speakers differ in their production of one member of the pairs, speakers of the northern Italian generally pattern together, as do speakers of Tuscan and southern Italian. In only one case (NP attachment) did northern and Tuscan speakers exhibit similar behavior among themselves, differing from the southern Italian speaker.

Spanish

Spanish-speaking subjects used phrasing to disambiguate ambiguous scope of negation in utterances like '*Guillermo no bebe porque está triste*. All four speakers produced wide scope utterances as single intermediate phrases and narrow as two intermediate phrases, with a high phrase accent at the end of the first phrase. For wide scope utterances, speakers deaccented *triste*, while accenting it in narrow scope utterances.

Quantifier scope disambiguation in sentences like '*La presencia de ningún estudiante podría ponerlas nerviosas*' was disambiguated through phrasing variation. Our Spanish speakers produced wide scope utterances as two intermediate phrases, and narrow scope utterances as a single intermediate phrase. However, the scope of the quantifier *sólo* was disambiguated by three speakers (PP, JG, JP) though pitch accent assignment. Wide scope utterances were produced with a deaccented *sólo* or a low accent (**L***), and the narrow scope reading was uttered with a peak (**H*** accent) on the quantifier.

Spanish subjects were inconsistent in the disambiguation of PP attachment. While speakers JG and PP did not distinguish between the two readings, JS and JP disambiguated the sentences through variation in phrasing. NP attachment was indicated by producing utterances as single intonational phrases, and VP attachment by producing two intermediate or intonational phrases.

So, our Spanish speakers consistently disambiguated scope of negation by varying prosodic phrasing and by varying accent placement. They disambiguated negative quantifer scope by varying phrasing alone, and the scope of *sólo* by varying accent placement and type. PP attachment was less consistently treated by these speakers.

DISCUSSION

We found that most of our speakers used intonational means to disambiguate the potentially ambiguous sentence types under investigation in this study. English, Spanish, and Italian speakers were most similar in their disambiguation of the scope of negation, employing variation in prosodic phrasing to distinguish wide from narrow scope productions, with wide scope utterances produced as a single phrase and narrow produced as two phrases. Italian and Spanish speakers also differentiated wide from narrow scope by similar variation in phrasing; however, they also placed nuclear stress on the verb to indicate wide scope negation, while English speakers located nuclear stress later in the utterance. Also, English speakers further distinguished wide from narrow scope by utterance-final tonal variation, with continuation rise employed for wide scope readings and falling intonation for narrow. While our Italian speakers consistently used phrasing variation to indicate differences in PP attachment (between NP and VP attachment), English and Spanish subjects were inconsistent in this regard. For quantifier disambiguation, the picture is more complex: For Italian and Spanish speakers, renditions of sentences containing scope-ambiguous negative quantifiers were disambiguated by variation in nuclear stress placement and in prosodic phrasing; for two English speakers, accent placement served to disambiguate these utterances. However, *only/solo/sólo* was treated less consistently by speakers of all three languages.

Inconsistencies among speakers of all three languages could be due to regional differences in the use of prosodic variation. Our limited evidence for different patterning of the Italian speakers according to language variety suggests that this may be an area worth exploring further. A partial analysis of the present data for differences in pitch accent prominence and duration also suggest that prosodic cues other than those discussed might also contribute to the disambiguation of ambiguous utterances. Collection of a larger corpus with more speakers for each language and more paragraphs for each ambiguity type should shed light on both these areas.

SAMPLE PARAGRAPHS

VP **attached** PP: I remember that scene in the officers club. There were four of them, and they were playing dice. One of them, the youngest, was in love with the commandant's wife. The commandant was older than she was, and had a wild passion for gambling. That night he lost all he had. The youngest player proposed the woman as a stake. The commandant accepted. They rolled the die. The young player won. *He won the woman with the die.*

NP **attached** PP: Paradiso worked in the carnival. In the next stand, there was a target-shooting game, where the prizes were old paintings. Paradiso's favorite one showed a woman throwing a pair of dice. Paradiso tried and tried to win this painting, but try as he would always failed. Finally, one night he decided that he no longer wanted the painting. And what do you suppose happened then? *He won the woman with the die.*

wide scope negative quantifier: Usually our university organizes at least one seminar per year. Every student and every researcher is supposed to attend that seminar. Next week, Maria will give a talk with Marina on quantifiers. *The presence of none of the students would embarrass them.*

narrow scope negative quantifier: Maria and Marina are close to getting their degrees. Tomorrow they will rehearse their thesis defenses. I've heard them already. They're really good. *The presence of none of the students would embarrass them.*

wide scope quantifier: Mary is organizing a party for next weekend in her parent's place. I think that she wants to invite a bunch of people I don't really care about. It's really not important to me whether they come or not. There's only one person I'm interested in. All of you know who it is. For me, *it is important that only Mary comes.*

narrow scope quantifier: I have a problem. Mario likes Mary but he is a little timid about asking her out. He's asked me if I could organize something so that the two of them can be alone. It needs to be something casual, and, naturally, with nobody else around. I've thought of organizing a party at home and inviting the two of them, as well as some other people. At the last minute I will explain to everyone but Mary and Mario that the party has to be postponed. I don't know what else I could do. *It is important that only Mary comes.*

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