Prosody, Bias and Tag Questions

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Introduction to Bias

- Borkin (1971)— the presence of (certain) negative polarity items in polar and constituent questions creates a negative bias– the speaker evidences a feeling of incredulity or an expectation of a 'no' or negative answer

  (1) Does Fred do a damn thing around the house?

- Pragmatic and Semantic accounts of bias with NPIs
- Extending/Revising these accounts to account for other forms of bias. Main point: intonation, and the surface form of the interrogative (whether there's a fronted negation) really matters for bias.

Some other forms of bias

(2) a. Does Fred do ANYTHING around the house? (bias)

b. Does Fred do anything around the house? (neutral)

c. Is there anyone who gives a FUCK about philosophy?

d. Do you NEED that porkchop?

Bias with Negative Polar Interrogatives: (Ladd 1981):

(3) a. Aren't you tired too?

b. You're not tired, are you?

Some framework questions

- What's a question?
- What is bias? What is a rhetorical question?
- How do questions affect the content of a dialogue?
- Should an account of dialogue really pay attention to the fine grained differences between

(4) a. Are you tired?
    b. Are you at all tired?
    c. Are you somewhat/ a little bit tired?
    d. Aren't you tired?

Some Provisional Answers

- questions are speech acts; interrogatives are linguistic forms that convey questions but may also convey other speech acts (e.g., *can you please pass the salt?*). Sometimes interrogatives may be coerced to do other duty than express questions.
- a biased question is a combination of a question and an assertion about the issue the question raises. A commitment by the speaker to a particular answer.
- a rhetorical question is expressed by an interrogative that conveys only an assertion—an example of coercion (probably a slippery slope between bias and rhetorical questions)
- Insofar as the finegrained differences between interrogatives makes a difference to the speech act being performed, then an account of dialogue should pay attention to them.

Overview of Tag Questions (paper with Brian Reese at SuB11)

Goals

- Relate linguistic form – syntax, semantics, phonology discourse functiond– illocutionary force. Provide a theory of alignment
- Identify and give some semantic substance to the intonational and prosodic features relevant to the interpretation of tag questions.
- Provide a formal analysis in SDRT, which includes a model of the information flow between linguistic form and cognitive states.

Tag Questions: Form and Function

Linguistic Form

reversed polarity tags

(5) Julie is here, isn't she?

(6) Julie isn't here, is she?

constant polarity tags

(7) julie is here, is she?

$$\underbrace{\text{Julie}_i \text{ isn't } [_{VP} \text{ here }]_j,}_{\text{declarative "anchor"}} \quad \underbrace{\text{is she}_i \ \phi_j?}_{\text{interrogative tag}}$$

- Tags can end with either final falling or final rising intonation.
- An intonational phrase boundary between anchor and tag (nuclear tags: / or a single intonational tune encompassing the entire TQ (postnuclear tags: =) (Ladd 1981, McCawley 1988, Huddleston and Pullum 2002, e.g.).
- Previous descriptions do not always recognize the second distinction (see Quirk et al. 1985, for example, who only describe nuclear TQs).

0.1 Discourse Function

The Form–Function Mapping

	$\underbrace{\text{Julie}_i \text{ isn't } [_{VP} \text{ here }]_j,}$	$\underbrace{\text{is she}_i \ \phi_j?}$
SYNTAX:	DECLARATIVE	INTERROGATIVE
	$\Downarrow$	$\Downarrow$
SEMANTICS:	PROPOSITION	QUESTION
FUNCTION:	ASSERTION	INQUIRY/QUESTION

The Uses of Tags

Given these mappings between form and function:

1. Do TQs invariably make an assertion?
2. What kind of inquiries are TQs?

The *After all* Test (Sadock 1971, 1974):

As a sentence initial expression *after all* co-occurs with assertions, but not (neutral) questions.

(8) a. A: The conference should be exceptional this year.
b. A: After all, Julie is coming / isn't she ./?

(9) a. A: The conference might be sub-par this year.
b. A: After all, Julie isn't coming / is she ./?

- The anchors of some postnuclear TQs are asserted.

(10) a. A: Why is Nicholas so sure the conference will be dull?
b. A: After all, Julie is coming=isn't she?

(11) a. A: Pascal's not coming, so why is Nicholas so sure the conference will be a success?

b. A: <u>After all</u>, Julie isn't coming {#too/either}=is she?

Neutral and Biased Questions

The *by any chance* and *tell me* Tests (Sadock 1971, 1974)

- The sentence initial parenthetical *tell me* occurs with all question types, viz. neutral and biased questions, but not with simple assertions.
- *By any chance* only co-occurs with neutral, questions.

Nuclear TQs are Biased

(12) a. Tell me, Jane {is/isn't} coming / {isn't/is} she.

b. #Jane {is/isn't} coming, by any chance / {isn't/is} she.

(13) Tell me, Jane {is/isn't} coming={isn't/is} she?

(14) #Jane is coming, by any chance=isn't she?

(15) Jane isn't coming {too/#either},by any chance=is she?

A Quick Summary

- Nuclear TQs are biased i.e. they're complex speech acts consisting both of an assertion and a question.
- Some postnuclear TQs are biased.
- Some postnuclear TQs are neutral.

Acknowledgement Questions

- Falling intonation TQs seek acknowledgement that the anchor is true; strong bias for an answer that confirms the anchor.
- Ladd (1981) associates this interpretation with nuclear tags.

(16) a. A: Julie wouldn't do it that way.

b. B: Well, Julie isn't here, / is she.

Confirmation Questions

- Rising intonation TQs ask for confirmation of the anchor, but express some uncertainty.
- Ladd (1981) associates this reading with post-nuclear tags.

(17) a. A: Maybe Julie could do it.

b. B: Julie isn't here, / is she?

Neutral Questions

- Some TQs are neutral requests for information; the speaker is open to either answer.
- Grammatical ingredients: (i) rising intonation, (ii) a negative anchor and (iii) lack of a rhythmic break between anchor and tag

(18) a. A: We need to find somebody who has done this before.

b. B: Julie isn't here = is she?

- Nuclear TQs: licensing of polarity items follows from the morpho-syntactic properties of the anchor.
- Postnuclear TQs: PPIs are licensed in some negative anchors 19; some NPIs are not licensed in negative anchors 20.

(19) a. Jane's coming {too/*either}=isn't she?

b. Jane's not coming {too/?either}=is she?

(20) a. *You're going to lift a finger to help=aren't you?

b. *You're not going to lift a finger to help=are you?

"Fake" Negation?

- "Fake" negation (McCawley 1988): an "instance of *n't* that does not count as negative for the purposes of syntactic rules that are sensitive to negation."
- Meta-linguistic negation shares these properties of "fake" negation (Horn 1989).
- This negation is necessary for a neutral reading, and so matters for interpretation.
- Conclusion: Neutral TQs involve an instance of meta-linguistic negation.

	acknowledgement	*confirmation*	*neutral*	TOTAL
fall:	15	1	0	16
rise:	9	10	1	20
TOTAL	24	11	1	36

A Corpus Study of Spoken English

- We extracted 36 tag questions from Parts 2 and 4 of the Santa Barbara Corpus of Spoken American English.
- 30 WAV format speech files, 11.75 hours of spontaneous speech.
- 105K words (11K unique words).
  how many words in TQs?
- We classified each token according to phonological features – final tune, nuclear vs. postnuclear tag, and discourse function.

- Strong correlation between final fall and acknowledgement questions: 15:1
- No correlation between final rise and confirmation questions: $\sim$1:1

	ack.	*confirm.*	*neutral*	TOTAL
nuclear:	20	8	0	28
postnuclear:	4	3	1	8
TOTAL	24	11	1	36

Intonational Phrasing and Question Type

- A weaker correlation holds between nuclear tags and acknowledgement questions: 5:1
- No correlation between postnuclear tags and neutral and confirmation questions: 1:1

	ack.	*confirm.*	*neutral*	TOTAL
falling nuclear:	13	0	0	13
falling postnuclear:	2	1	0	3
rising nuclear:	7	8	0	15
rising postnuclear:	2	2	1	5
TOTAL	24	11	1	36

Combining Phonological Features

- Combining phonological features does not significantly alter these results.

Interpretation of the Findings

- Falling intonation makes no semantic contribution; acknowledgement questions arise as the default interpretation.
- Rising intonation contributes an expression of uncertainty.
- Speakers choose to convey uncertainty for a variety of reasons, e.g., true uncertainty, but also politeness (treats H and S's knowledge as if equal (Brown and Levinson 1978)).
- Hard to conclude anything about the association of postnuclear tags and neutral questions.

Computing Discourse Function in a Formal Framework—Basic Assumptions

- Interrogative sentences denote functions from worlds to sets of propositions, viz. the set of true direct answers to the question (Karttunen 1977, Asher and Lascarides 1998).
- Answerhood is defined in terms of set membership.
- Interrogative tags have the same denoation as full interrogatives.
- Tag meanings are "filled in" via two anaphoric components: (i) a subject pronoun and (ii) a VP anaphor.
- Given DRT/SDRT constraints on anaphoric accessibility, tags must attach to the anchor.
- The discourse function of a given tag is captured via its rhetorical relation to the anchor.

Past Work on Final Rise

- Ward and Hirschberg (1985): English fall-rise contour conveys speaker uncertainty or skepticism.
- Merin and Bartels (1997): final rise conveys "alienates choice for alter".
- Gussenhoven (1984), Steedman (2000), Gunlogson (2003): final rise conveys a lack of speaker committment.
- Final rises contribute an epistemic modal operator, viz. Veltman (1996)'s $\Diamond$ operator (Šafářová 2005).
- In interrogatives, $\Diamond$ applies to the core propositional content of an utterance, yielding a meaning pair.

Segmented Discouse Representation Theory

- SDRT is a modular theory of discourse: separate logics of info. content, info. packaging. (i.e. the "glue logic") and cognitive modelling.
- Each contribution to a discourse or dialogue is rhetorically linked to the previous discourse context via some relation, i.e.,*Explanation*, *Correction*, QAP, etc.
- DRT (or DPL) formulae are also SDRT formulae.
- If R is a relation symbol and π_1 and π_2 are labels, then $R(\pi_1, \pi_2)$ is a formula.
- If ϕ and ϕ' are formulae, then so are $(\phi \wedge_D \phi')$ and $\neg\phi$.

Logic of Cognitive Modelling

- indexed belief and intention operators $\mathcal{B}_A, \mathcal{B}_B, \ldots, \mathcal{I}_A, \mathcal{I}_B, \ldots$.
- propositional variables $p_1, p_2, \ldots$
- modal operators SARG, *Sanswer*, ...
- functions symbols S and H from labels to individual terms
- connectives $\rightarrow, \wedge, \vee, \neg$ and a nonmonotonic modal conditional $>$
- a nomonotonic consequence relation $\mid\!\sim$

Speech Act Related Goals

`Indicative Related Goals (IRG)`:

Suppose: $Info(\tau) \wedge Done(Say(\beta)) \mid\!\sim R(\alpha, \beta, \lambda)$.

Then: $Info(\tau) \wedge Done(Say(\beta)) \wedge veridical(R) \wedge veridical(\lambda) \mid\!\sim \text{SARG}(\beta, \mathcal{B}_{H(\beta)}(p_\beta))$.

`Question Related Goals (QRG)`: $Sanswer(\alpha, p) > \text{SARG}(\alpha, \mathcal{B}_{S(\alpha)}p)$

`Known Answers`: $(Sanswer(\alpha, p) \wedge \mathcal{B}_{S(\alpha)}p) > \neg\text{SARG}(\alpha, \mathcal{B}_{S(\alpha)}p)$

The Semantics of $Acknowledgement_Q$

- $Acknowledgement_Q(\alpha, \beta)$ holds iff the answer γ to β entails that the speaker of γ has accepted or achieved $S(\alpha)$'s SARG of α.

`Axiom on Acknowledgement`:

1. $(?(\alpha, \beta, \lambda) \wedge$
2. $\textsc{sarg}(\alpha, \phi) \wedge$
3. $Sanswer(\beta, p) \wedge$
4. $(\mathcal{B}_{H(\alpha)}(p) > \mathcal{B}_{H(\alpha)}\phi)) >$

$Acknowledgement_Q(\alpha, \beta, \lambda)$

$Acknowledgement_Q$ as Default

(21) A: Jane is coming (π_1) /
A: isn't she. (π_2)

- The tag attaches to the anchor. so $?(\pi_1, \pi_2, \pi)$ (instantiate 1)
- IRG assuming that π is a veridical context., so $\textsc{sarg}(\pi_1, \mathcal{B}_B(p_{\pi_1})$ (instantiate 2)
- $Sanswer(\pi_2, p_{\pi_1})$ compositional semantics of anchor and tag (instance of 3)
- $(\mathcal{B}_B(p_{\pi_1}) > \mathcal{B}_B\mathcal{B}_B(p_{\pi_1}))$ Cognitive modelling theorem (instance of 4)
- So conclusion of the Axiom on Acknowledgement follows:
$Acknowledgement_Q(\pi_1, \pi_2, \pi)$

Final Rise Blocks $Acknowledgement_Q$

(22) A: Jane is coming (π_1) /
A: isn't she? (π_2)

Many of the conjuncts of the Axiom on Acknowledgement still hold

1. $(?(\pi_1, \pi_2, \pi) \wedge$ (Yes)
2. $\underline{\text{SARG}(\pi_1, \mathcal{B}_B(p_{\pi_1})) \wedge}$ (??)
3. $Sanswer(\pi_2, p_{\pi_1}) \wedge$ (Yes)
4. $(\mathcal{B}_B(p_{\pi_1}) > \mathcal{B}_B\mathcal{B}_B(Yes)(p_{\pi_1}))) >$

- $Acknowledgement_Q(\pi_1, \pi_2, \pi)$

- The final rise conveys $\Diamond\neg p_{\pi_1}$ (and assuming A is sincere) $\mathcal{B}_A(\Diamond\neg p_{\pi_1})$.
- It follows (in SDRTs logic of cognitive modelling) that π_1 and π_2 have conflicting SARGs.
- This blocks `Axiom on Ackowledgement_Q` (in the absence of further information).

Confirmation Questions

- P <u>confirms</u> Q iff $Prob(Q|P) > Prob(Q)$.
- Given the semantics of polar questions, if $Sanswer(\alpha, p)$, p is p_α or $\neg p_\alpha$.
- $Prob(p_\alpha|p_\alpha) = 1$, so positive answers are confirmations.
  $Prob(p_\alpha|\neg p_\alpha) = 0$, so negative answers are disconfirmations.

The Semantics of $Confirmation_Q$

- $Confirmation_Q(\alpha, \beta)$ holds iff the answer γ to β (defeasibly) entails p_α or $\neg p_\alpha$.

`Axiom on Confirmation_Q`:

1. $(?(\alpha, \beta, \lambda) \wedge$
2. $Sanswer(\beta, p) \wedge$
3. $((p > p_\alpha) \ \vee \ (p > \neg p_\alpha))) >$

$Confirmation_Q(\alpha, \beta, \lambda)$

Complications with Final Rises

- Final rises are only slightly less likely to be associated with $Acknowledgement_Q$ than with $Confirmation_Q$.
- Final rises convey a variety of pragmatic nuances: uncertainty, speaker-hearer solidarity, politeness, tentativeness, etc.
- If the addressee infers the speaker is truly uncertain about the truth of the anchor, then $Confirmation_Q$.
- If the speaker is conveying politeness etc., then $Acknowledgement_Q$ is still possible.
- Requires deep cognitive modelling and world knowledge, e.g., about social context, etc.

Postnuclear TQs & Neutral Questions

(23) A: Jane isn't coming=is she?

- Anchor contains metalinguistic negation $\sim$.
- $\sim \phi \equiv \neg Assert(\phi)$ (Bochvar 1981)
- Prevents attachment with a right-veridical rhetorical relation.
- Bartels (1997) associates the **L-** phrase tone with assertiveness and **H-** with its absence.
- Go further, associate the absence of any phrase boundary with lack of assertiveness.
- Dovetails with meta-linguistic negation.
- Given this information, `Known Answers` does not fire, i.e. `QRG` is not blocked.

Future Work

- Phonological/phonetic details!
  - Existence of postnuclear tags is controversial. What's the correct phonological description? Experiments?
  - Full ToBI transcriptions of corpus examples.
- TQs in nonveridical contexts; weaker SARG.

(24) A: If Nicholas comes (π_1), Pascal won't come (π_2), will he? (π_3)

(25) $\textsc{sarg}(\pi_2, \mathcal{B}_B(\mathit{Consequence}(\pi_1, \pi_2, \pi)))$

- TQs with non-declarative anchors.

More generally

- How do we integrate intonation/prosody with semantics and pragmatics?
- Is the layer of cognitive modelling useful (Faller uses it for evidentials, perhaps also for emotive content)

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