The Influence of Logical Polarity on Acceptance and Rejection Force

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Introduction

Acceptance and Rejection

- To maintain coherence over the course of a dialogue, interlocutors must track which information they jointly take for granted.
- To this end, they must determine which prositions have been accepted and which have been rejected.
- But frequently, this is non-trivial.

(1) A: I never did care for him, in the James Bond movies.
B: I was never into those movies, either.

(2) A: Nobody taxes groceries.
B: Yeah, they do.

Polarity Particles

We focus on the apparent ambiguity of polarity particles like *yes* and *no* and arrive at a wider theory on logical polarity:

(3) A: But it's uh yeah it's uh original idea.
B: Yes it is. $\rightsquigarrow$ acceptance.

(4) A: a banana is not it's not really handy .
B: Yes it is. $\rightsquigarrow$ rejection.

(5) A: It's not very well advertised.
B: No, it's not. $\rightsquigarrow$ acceptance.

Classical Semantics

(6) Sue failed the exam.
Yes she did. / No she didn't.

(7) Sue did not pass the exam.
No she didn't. / Yes she did.

- A propositional possible worlds semantics would assign (5) and (6) the same set of possible worlds (propositional content).
- Partition semantics would assign (5) and (6) the same partition.
- Also, (5) and (6) highlight the same proposition.
- Inquisitive Semantics assigns the polarity particles absolute and relative polarities.

Farkas, Roelofsen. 2013. *Polar initiatives and polar particle responses in an inquisitive discourse model*.

Dialogue Model

Approach

The problem is tackled from a different direction: The task is to determine the accepting or rejecting force of an answer.

- It's not about what the response means, but about what it does.
- With proposal P on the table, does a response R accept or reject?

Relative Polarity

We assign a polarity, either positive or negative, to both proposal and response.

- aligned polarities $\rightsquigarrow$ accepting force.
  - Polarity signature positive-positive or negative-negative.
- misaligned polarities $\rightsquigarrow$ rejecting force.
  - Polarity signature positive-negative or negative-positive.

- Yes (yeah, yeh, . . .) signals positive polarity.
- No (nope, nah, . . .) signals negative polarity.

Parallelism

The relative nature of these response is reflected in sentential parallelisms.

(8) A: It's still working.
B: It is.

(9) A: It's a fat cat.
B: It is not a fat cat.

- Sometimes, polarity particles aren't even required to establish a polarity signature.

- sentential negation signals negative polarity.
- per default we assume positive polarity.

Absolute Force

Disregarding proposal polarity, there are absolute acceptance / rejection moves.

(10) A: Ah, that's not the ecological part, yeah.
B: That's true.

(11) A: We can't make a docking station anyway.
B: That's not true.

- Agreement Acts signal agreement.
  - *I hereby agree.*
- Rejection Acts signal disagreement.
  - *I hereby disagree.*

- Yes (yeah, yeh, . . .) signals acceptance.
- No (nope, nah, . . .) signals rejection.

Formal Model

Assume a proposal P is on the table. The next move R accepts P iff $P \wedge R$ is consistent.

- $R \equiv \top$: absolute agreement.
- $R \equiv \bot$: absolute rejection.
- $R \equiv P$: relative agreement.
  - P positive $\rightsquigarrow$ default case; signature positive-positive.
  - P negative $\rightsquigarrow$ reverse case; signature negative-negative.
- $R \equiv \neg P$: relative rejection.
  - P positive $\rightsquigarrow$ default case; signature positive-negative.
  - P negative $\rightsquigarrow$ reverse case; signature negative-positive.

Realization 1

Assume a positive polarity proposal P is on the table.

- $R \equiv \top$: absolute agreement.
  - *Yes.*
  - *I hereby agree.*
- $R \equiv \bot$: absolute rejection.
  - *No.*
  - *I hereby disagree.*
- $R \equiv P$: relative agreement.
  - *Yes [it is].*
- $R \equiv \neg P$: relative rejection.
  - *No [it is not].*

Realization 2

Assume now that a negative polarity proposal $P \equiv \neg Q$ is on the table.

- $R \equiv \top$: absolute agreement.
  - *Yes.*
  - *I hereby agree.*
- $R \equiv \bot$: absolute rejection.
  - *No.*
  - *I hereby disagree.*
- $R \equiv P \equiv \neg Q$: relative agreement.
  - *No [it is not].*
- $R \equiv \neg P \equiv Q$: relative rejection.
  - *Yes [it is].*

Empirical Study

Setup

For a corpus study on the AMI Meeting Corpus and the Switchboard Corpus we used:

- Simple indicators for acceptance and rejection.
  - *absolutely, okay, agree, true,...*
  - *but, well, actually...*
- Heuristics to determine proposal polarity and response polarity.
  - Indicators are polarity particles and negation indicators
  - *not, never, nobody...*
  - Tag questions need special treatment.
  - The contrast particle *but* cancels polarity particles.
- Parallelisms indicating agreement/disagreement for pronouns *prp*, auxillary verbs *aux*, and verbs *v*.
  - *prp aux not – prp aux.*
  - *prp (aux) not v – prp v.*
  - *I do not {think | know} {that | if} prp aux – prp aux.*

Results

- *Yeah* appears to be an absolute polarity particle, unless the acceptance/rejection force is specified by an adjoined sentence.
  - P – R =“Yeah.” $\rightsquigarrow$ acceptance.
- There was insufficient data to confirm the analogous effect for *nope*.

- In the task of discerning acceptance from rejection, it is advantageous to filter absolute responses and then focus on relative polarity particle usage.
- Polarity is signalled quickly; we got the best results by considering the first 5 words in the responding utterance.
- Considering sentential parallelism improves retrieval of rejections.

Conclusion

Summary

- A reply can have absolute acceptance/rejection force or that force is determined relative to the proposal it replies to.
- The force of a relative proposal–response pair is determined by its polarity signature:
  - positive-positive
  - negative-negative
  - positive-negative
  - negative-positive
- Both absolute and relative polarity particle usages occur in actual spoken language.
- Our formal model can be operationalized in a computational system with simple heuristics.

Schlöder & Fernández. The Role of Polarity in Inferring Acceptance and Rejection in Dialogue. To appear in *Proc. of the Annual Conference of the ACL Special Interest Group on Discourse and Dialogue (SIGDIAL 2014)*. Philadelphia, USA, June 2014.

Thank you!