

Computational Pragmatics

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Raquel Fernández
Institute for Logic, Language & Computation
University of Amsterdam

Speech Act Theory vs. Joint Action Model

Models of language use: product vs. process.

- Classic pragmatic models of speech acts (Austin 1962, Searle 1975) emphasise the idea that language is a form of **action**.
- However:
 - ▶ the characterisation of speech acts focuses on the speaker
 - ▶ and abstract away from actual conversational contexts
 - ▶ speech acts are a **product** of the speaker.
- Dialogue models (Clark & Schaefer 1989, Allwood 1995) emphasise the idea that language is a form of **interaction**.
 - ▶ focus on communication (Latin *communicare* - 'to share')
 - ▶ conversation is a continuous **process** of establishing common ground (Stalnaker 1978) between speaker and addressee.

The Joint Action Model

Also called collaborative model or grounding model.

- Clark & Schaefer (1989) put forward a model of dialogue interaction that sees conversation as a **joint process**, requiring actions by speakers and addressees.
- Conversation is a continuous process of establishing common ground between speaker and addressee ⇒ **grounding**
- Speakers and addressees have **mutual responsibility** in managing the grounding process and making communication successful.

Clark & Schaefer (1989) Contributing to discourse. *Cognitive Science*, 13:259–294.

Clark (1996) *Using Language*. Cambridge University Press.

Levels of Communication

Ladder of actions at different levels of communication performed by speakers and addressee with each utterance (Clark / Allwood)

Level	Actions
1 contact:	A and B pay attention to each other
2 perception:	B perceives the signal produced by A
3 understanding:	B understands what A intends to convey
4 uptake:	B accepts / reacts to A's proposal

In contrast to Austin's distinction between locutionary, illocutionary, and perlocutionary acts, the emphasis here is in the joint character of the actions performed with/by utterances

⇒ effective utterances in dialogue are **joint actions**.

Grounding Criterion

Level	Actions
1 contact:	A and B pay attention to each other
2 perception:	B perceives the signal produced by A
3 understanding:	B understands what A intends to convey
4 uptake:	B accepts / reacts to A's proposal

Lack of understanding may occur at any level of action

- we may not realise we are being addressed
- we may not hear our interlocutor properly
- we may not know the meaning of a word the speaker uses
- we may fail to recognise the relevance of what is said

To achieve grounding, dialogue participants must understand each other at all levels of communication **up to the grounding criterion**:
⇒ the appropriate degree of understanding given the communicative situation at hand (sufficient for current purposes).

Evidence of Understanding

How does it become established whether the grounding criterion has been reached?

- Addressees give constant feedback to the speaker regarding their level of understanding.
 - ▶ **positive feedback**: implicit or explicit acknowledgements
 - ▶ **negative feedback**: clarification requests
- Mechanisms to provide positive evidence of understanding:
 - ▶ acknowledgement / backchannel
 - ▶ repetition
 - ▶ demonstration (paraphrase, reformulation, completion)
 - ▶ relevant next contribution
- This need for evidence of understanding structures the dialogue into **contributions**:
 - ▶ each contribution to dialogue is made up of a **presentation** phase and an **acceptance** phase.

Connections between levels of understanding

Level	Actions
1 contact:	A and B pay attention to each other
2 perception:	B perceives the signal produced by A
3 understanding:	B understands what A intends to convey
4 uptake:	B accepts / reacts to A's proposal

According to Clark, the levels of action are connected by two principles:

- **Upward causality:** actions at lower levels (completed successfully up to the grounding criterion) allow actions at higher levels.
- **Downward evidence:** evidence that a level has been achieved can be taken as evidence that the grounding criterion has been reached at all lower levels.

A: How would you like to be contacted?

B: By email, please. At `john.smith@email.com`

A: OK. Thank you very much and have a good day

B: Goodbye.

Feedback

Feedback mechanisms can be classified according to the level of communication at which the evidence of understanding is given.

A: I know a great tapas restaurant in Goldoni street.
B: Pardon?
A great what?
Goldoni street?
Should I consider this an invitation?

However, there is not a one-to-one correspondence between the form of feedback utterances and their function.

yeah ~→ level 1 / 2 / 3 / 4 ?
Goldoni street? ~→ level 2 / 3 / 4 ?

Note also that one single utterance can give positive and negative feedback simultaneously:

B: A tapas restaurant where?

A: ... I need to travel in May.

B: And, what day *in May* did you want to travel?

A: *OK* uh I need to be there from the 12th to the 15th.

B: And you're flying from what city?

A: I want to fly from Pittsburgh

B: *Mm hmm*

A: to Seattle.

B: *OK.*

A: Most machines don't record that slow. So I'd wanna, when I make a tape

B: *be able tuh speed it up.*

A: *Yeah.*

Grounding and Metacommunication

- The primary function of feedback acts is to manage the grounding process
- They are *meta-communicative*: while other types of acts deal with the topic of the conversation, the subject matter of feedback utterances are the basic acts of communication.

	Layer 1: basic communicative acts	Layer 2: meta-communicative acts
B:	There is not one ticket left in the entire planet! So annoying!	
C:		Where for?
B:		Crowded House.
B:	My brother is going and he doesn't even like them.	
A:	Why doesn't he sell you his ticket?	<i>implicit positive evidence</i>
B:	Cos he's going with his work. And Sharon.	<i>implicit positive evidence</i>
A:		Oh, his girlfriend?
B:		Yes.
B:	They are gonna come and see me next week.	

Grounding Utterances and Turn-Taking

Backchannels ('*uhu*', '*mhm*') do not follow the CA model:

- frequently produced in overlap;
- not meant and not perceived as attempts to take the floor;

According to Clark (1996), the CA turn-taking rules do not apply to utterances at the **meta-linguistic level** of interaction:

- backchannels do not indicate floor competition
- their placement determines which part of the utterance they react to.

Clarification requests have slightly different constraints:

- they involve turn switching
- but the preceding turn can be resumed smoothly

- (1) A: They X-rayed me, and took a urine sample, took a blood sample.
Er, the doctor...
B: Chorlton?
A: Chorlton, *mhm*, he examined me...

Feedback timing

Skantze, G. (2012). A Testbed for Examining the Timing of Feedback using a Map Task. In *Proceedings of the Interdisciplinary Workshop on Feedback Behaviors in Dialog*.

“we present a fully automated spoken dialogue system that can perform the Map Task with a user. By implementing a trick, the system can convincingly act as an attentive listener, without any speech recognition. An initial study is presented where we let users interact with the system and recorded the interactions. Using this data, we have then trained a Support Vector Machine on the task of identifying appropriate locations to give feedback, based on automatically extractable prosodic and contextual features.”

Video demonstration:

<https://www.youtube.com/watch?v=MzL-B9pVb0E>

Decision-theoretic models of grounding

Which feedback mechanism is appropriate in a given situation depends on several factors

- the degree of uncertainty regarding a possible misunderstanding
- the desire to be brief and efficient
- ...

↪ How important is to perform a grounding act in a given situation? how **useful** will it be?

↪ Is it worth it? how **costly** is it to perform it?

To do: read the following paper, which we will discuss on Tuesday

Skantze, Gabriel (2007). Making grounding decisions: Data-driven estimation of dialogue costs and confidence thresholds. In *Proc. of SIGdial*