

Multidimensional Semantics

Lecture 5 - Comparison, Discussion, Open issues

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Outline

- 1 Evaluation criteria
- 2 Current issues
 - How to add commitment dimension?
 - Can we get rid of multiplicativism?
 - Composition tools for multiplicativism
 - Meta-linguistic reference
- 3 Perspectives

Classes of criteria for assessing multidimensionality in semantic-pragmatic theories

- Ontology of dimensions

What sorts of elements constitute a new dimension?

Three main categories

- Contextual elements affecting interpretation
- Linguistic objects involved in meta-linguistic talk
- Distinctions between types of content

- Approaches to multidimensionality

How are these new dimensions accounted for in interpretation?

Among which:

- New indices in the interpretation function
- New types of entities in the grammar / the models
- Multiplication of semantic contributions for one form unit

What? Nature of contextual elements accounted for

- Speakers of the utterances / Participants of dialogue
- Cognitive context of the speakers/participants
- Other elements of utterance context (e.g., time, location)
- Linguistic context / Common Ground
- (Social context)

What? Linguistic objects available for reference

- Sounds, phonology
- Pseudo-linguistic elements (linguistic errors, esp. lexical)
- Grammatical objects: sentences, clauses, phrases, words, fragments
- Propositions (+ content of questions and requests)
- Utterances, as simple labels or with their full eventual and action dimension
- Discourse structure

What? Distinctions between types of content

- At issue / comment
- Clause level / discourse level
- Functions of utterances
- Direct / indirect speech act
- Asserted / presupposed / implicated
- Descriptive / expressive

How? Approaches to multidimensionality

- New indices in the interpretation function / various entailment relations in the models
- New types of entities in the domain of interpretation
- As theoretically constructed objects in an intermediate representation
- By multiplying the semantic contributions of one form unit [Karttunen & Peters / Potts multiplicativism]
- Through dynamic semantics

What? Context elements

	MG	Kaplan	Potts-CI	Potts-Quotations	SDRT discourse + dialogue 1	Bunt	Poesio-Traum	SDRT dialogue 2
speakers		1 per context	1 per L_U	speakers of reported speech (ext. considered)	many	many	many	many
cognitive context					cognitive states	cognitive processes	BDI	no (but see V1)
rest of context of utterance		time, location				Physical / Perceptual Context		
linguistic context / common ground					1 SDRS as CG	Dialogue history, Discourse plans, Speaker role	1 DRS (enriched)	1SDRS per participant

What? Linguistic objects available for reference

	MG	Kaplan	Potts-CI	Potts-Quotations	SDRT discourse + dialogue 1	Bunt	Poesio-Traum	SDRT dialogue 2
sounds				yes		yes	yes	
pseudo-ling. objects						yes	yes	
sentences, phrases, words, fragments			yes	yes		yes	yes	
propositions	prop.	characters + propositions	propositions	propositions	props + questions + requests	yes	yes	props + questions + requests
utterances		say(s, c, w)	utter(u,e)	utter(u,e), say _{speaker} p	labels	labels	events	labels
discourse structure					rich	limited	simple + arg struct.	rich

What? Types of content

	MG	Kaplan	Potts-CI	Potts-Quotations	SDRT discourse + dialogue 1	Bunt	Poesio-Traum	SDRT dialogue 2
at issue / comment			t ^a , t ^c		no (but discourse)			no (but discourse)
clause / discourse levels					DRS / complex SDRS	no (but segment)	no (but segment)	DRS / complex SDRS
utterance functions					relational	many	many	relational
direct / indirect speech act					question • request	rich characterization		question • request
asserted / presupposed / implicated					no (but discourse)			no (but discourse)
descriptive / expressive			yes					

How? Approaches

	MG	Kaplan	Potts-CI	Potts-Quotations	SDRT discourse + dialogue 1	Bunt	Poesio-Traum	SDRT dialogue 2
indices / entailment	Worlds	Contexts + worlds	Worlds + 1 \models per agent	Worlds + utterance worlds	worlds	unspecified	world	Worlds + 1 \models per agent
(types of) entities			$t^a, t^c + u = a \cup q$	u	no (but see Asher 93)	ling objects	situations (in the DRSs), utterances	
constructed objects in a representation			semantic parse tree	constructor on grammar language	SDRS		DRS	SDRS
form unit to content		1 to 1	1 to 2	1 to 2 (1 to n)	1 to 1 (1 to 2 for sp acts)	1 to n	1 to n	1 to 1 (1 to 2 for sp acts)
dynamic sem					Glue Logic + dynamic int.	Update Procedure + model checking	Update procedure + dynamic int.	Glue Logic + dynamic int.

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Methodological aspect, adding a commitment "dimension"

Public commitments:

- [Poesio and Traum, 1997]: Adds them in the representation
- [Vieu, 2011]: Adds them in the model (Commitments are not part of the representation)
- [Lascares and Asher, 2009]: Adds them as a "external" notion corresponding to the restriction of the satisfiability relation to speaker participants

Methodological aspect, adding a commitment "dimension"

Questions to ask:

- Do we refer to them?
 - not clear since discourse units (and potential relations) are available
- Do we need specific semantic properties for this notion?
 - [Vieu, 2011]: yes, $\neg C(S, \phi) \not\leftrightarrow C(S, \neg C(S, \phi))$
- Do we need these different satisfiability notions?
 - [Lascarides and Asher, 2009]: yes, capture nicely the crucial notion of public common ground.

Can we get rid of multiplicativism?

Finer-grained units?

Criteria to identify elementary chunks to associate with single contents (syntax-semantic-pragmatic interface) + prosody?

- OK for supplements
- Not for: direct quotations, speech act functions (if doesn't distinguish)
- Expressives, specific case

Can we get rid of multiplicativism?

Dynamic semantics: one type of content only?

Distinguishing the role of an element during the construction process

- Craige Roberts proposal [Amaral et al., 2007]: requires at least a *Question Under Discussion* for having a notion of at-issue
- [Geurts and Maier, 2005]: For quotation, meta-level predicate (Express) and presupposition management
- SDRT: Handled by dynamic discourse attachment and discourse relations
 - multiplication of types is represented in the structure (quotation, supplements)
 - No obvious sequels in the models (unless adapting the relation)

Tools for handling multiple proposition in the composition

- [Potts, 2005, Potts, 2007a, Potts, 2007b] precise but not strictly compositional [Barker et al., 2011]
 - side-issue content takes information from deep nodes rather than immediate constituents
- Solution using continuations for ensuring that side-issues percolates to the root note without interfering with at issue content [Barker et al., 2011]
- Monads as an a track for preserving compositionality, and preserving the upwards path of the side-issue while allowing some interactions [Giorgolo et al., 2011]

(1) John, who likes cats, likes dogs also.

How to account for meta-linguistic reference beyond standard grammar objects

- Poesio&Traum (not so recent): micro-conversational events
- Ginzburg:
 - Allows for a variety of non-sentential utterances
 - Systematically distinguish utterance tokens from types
- Maier: semantic contribution of "non lexical" objects contextually fixed in dynamic semantics
- SDRT: Add rich utterances in the model + quotation mention / use

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Social Meaning

- (2) [Smith et al., 2010]
- a. I'd [ɑ:d] like [la:k] to welcome all y'all from my [ma:] home state!
Social Meaning: Speaker is from the south of the US
- b. I'd [aɪd] like [laɪk] to welcome all y'all from my [maɪ] home state!
- (3) Donnez-moi deux chocolatines.
Give me two chocolate-pastries SouthWest France

Smith question, does social meaning (socio-phonetics) behave like conventional implicatures?

Social Meaning

- Completely defeasible
 - (4) A: So you are from the South? B: No, I simply enjoy acting accents.
- Speaker is not committed to social meaning (even if accent used with specific intentions)

Social Meaning, another track



(5)

- When I see someone wearing this hat, I might infer that he/she is from Texas
- But he/she is not committed to be (even if he/she purposefully)
- This is rather a direct addition to world knowledge that potentially can be exploited for drawing more inferences

$$\textit{wearing}(x, y) \wedge \textit{WerstenStetson}(y) > \textit{fromTexas}(x)$$

- Same when inferences are drawn from linguistic cues
- Not part of the grammar, but why not include them as a dimension in a model of interaction through language?

Multimodality

- Speech (linguistic and paralinguistic aspect)
- Communicative Function of Gestures [McNeill, 1992]:
 - Deictics: There (described content)
 - Depictives: (described content)
 - Metaphorical: looking for a word (meta-linguistic)
 - Symbols: thumbs up (expressive)

Conclusion

- Subsequent work around Pott's proposal is showing that
 - it is possible to handle multidimensionality in strictly compositional framework
 - The needs for multiplicativism is reduced if one takes a discourse / dynamic approach
- Increasingly context data and phenomena (errors, language variation, code switching, social meaning, multimodality,...)
 - ↔ Multidimensional accounts will continue to emerge
 - not necessary for handling normal language by a normal speaker (competence)
 - but study of interaction through language must go further [Ginzburg, 2012, Levinson, 2006]

References I



Amaral, P., Roberts, C., and Smith, E. (2007).

Review of the logic of conventional implicatures by chris potts.

Linguistics and Philosophy, 30(6):707–749.



Barker, C., Bernardi, R., and Shan, C. (2011).

Principles of interdimensional meaning interaction.

In Proceedings of SALT, volume 20, pages 109–127.



Geurts, B. and Maier, E. (2005).

Quotation in context.

Belgian Journal of Linguistics, 17:109–28.







Ginzburg, J. (2012).

The Interactive stance.

OUP.

References II

-  Giorgolo, G., Asudeh, A., Butt, M., and King, T. (2011).
Multidimensional semantics with unidimensional glue logic.
[Proceedings of LFG11](#), page 236.
-  Lascarides, A. and Asher, N. (2009).
Agreement, disputes and commitments in dialogue.
[Journal of Semantics](#), 26(2):109–158.
-  Levinson, S. (2006).
On the human interaction engine.
[Roots of Human Society](#).
-  McNeill, D. (1992).
Hand and mind. what the hands reveal about thought.

References III



Poesio, M. and Traum, D. (1997).
Conversational actions and discourse situations.
Computational intelligence, 13(3):309–347.



Potts, C. (2005).
The logic of conventional implicatures, volume 7.
Oxford University Press, USA.



Potts, C. (2007a).
The dimensions of quotation.
Direct compositionality, pages 405–431.



Potts, C. (2007b).
Into the conventional-implicature dimension.
Philosophy compass, 2(4):665–679.

References IV



Smith, E., Hall, K., and Munson, B. (2010).

Bringing semantics to sociophonetics: Social variables and secondary entailments.

[Journal of Laboratory Phonology](#), 1:121–155.



Vieu, L. (2011).

On the semantics of discourse relations.