False starts, jokes, and music: semantics in the 21st century

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Outline

Introduction

Event-related compositionality and the bounds of grammar

Jokes and laughter in conversation

Music and Language
Compositionality and the year 0 Anno Domini Montagovi (ADM) in Semantics

- The modern era in natural language semantics was ushered in by an insistence on taking natural language syntax seriously.
- Philosophers like Russell used to emphasize a putative mismatch between logical structure and surface structure:

(1) a. Jill saw every goat.
   b. $\forall x [goat(x) \rightarrow saw(j, x)]$
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- Montague’s triumph: meanings can be systematically assigned to words which can combine on the basis of (sort of) surface syntax to the desired sentential meaning.

- In a word (not much less charged than that of the divine presence) compositionality.
The meaning of a compound expression is a function of the meanings of its parts and of the syntactic rule by which they are combined. (Graetzer 1979, cited in Janssen 1997)

This notion of compositionality is idealized relating as it does abstract syntactic representations to meanings.

Compositionality—a fundamental principle/guideline/desideratum underlying much formal semantic research ever since.
Ecological or Event-related compositionality I

- Barwise and Perry 1983: Real situations at the heart of the semantic enterprise.
- Barwise and Perry: speech events (incl speakers, addressees, the speech token) as fundamental semantic units; paired with described situations as basic relata of semantic analysis.
Jackie is biting Molly.

Joe's utterance.
Barwise and Perry actually posit a compositional aspect to speech events:

(4) a. If $\alpha$ is a phrase with sub-constituents $X, Y$, then uttering $(a, \alpha, u)$ entails the existence of two subevents of $e \ e_1, e_2$ such that
   
   b. $e_1 \prec e_2$ ($e_1$ temporally precedes $e_2$)
   
   c. uttering $(a, X, u_1)$
   
   d. uttering $(a, Y, u_2)$
Introduction

Event-related compositionality

- Lacking in real ‘applications’, the basic idea lay dormant for a while until Massimo Poesio realized its significance for dialogue processing. (Poesio 1995; Poesio and Rieser 2010)
- An utterance is taken to be a sequence of micro-conversational events (MCEs).
- (Dynamic) Event-related compositionality: $\text{InfSState}(e) = \text{InfState}(e_1)(e_2)$, where $e = e_1; e_2$ (cf. inter alia Cooper 2004).
- Emphasizes that
  1. In dialogue (much more than text) no meaning without information state.
  2. The embodiedness of communicative events is crucial.
Today’s Talk

- Conversational language ↔ Event-related compositionality
- What should be included in the grammar? Dysfluencies?
- Jokes and laughing in conversation.
- Music and semantics
Outline

Introduction

Event-related compositionality and the bounds of grammar

Jokes and laughter in conversation

Music and Language
Some examples of real conversations I

Terry: Yeah I but think he gave me all his drink.
Damion: **Who?** (=Who is ‘he’)
Terry: Sam.
Damion: He gave it to you? (= Are you saying Sam gave it to you)
Terry: No, no, I was (laughing) drinking all his drinks.
Damion: **Which Sam?** (Which Sam is ‘Sam’)
Terry: Sam, Sam, the one
Damion: The one
Terry: who was totally pissed. (British National Corpus, KR2)
Some examples of real conversations II

Dave: Y’know there- there’s no- no long explanation is necessary.
Freda: Oh no no no: (‘You should not think that’)
I’m not- I jus:: uh-wanted: you to know that you can go up anyway.
(‘I wanted you to know that you can go up anyway’)
Rubin: Yeah::
(‘I agree’) (silence: 0.2)
Freda: You know.
(‘Do you see what I what I was just saying’) (silence: 0.2)
Freda: Becaus-ah
(‘The reason for that is . . .’)
( silence: 3.3 seconds)
(‘No one knows what to say’)

Event-related compositionality and the bounds of grammar
Some examples of real conversations III

Rubin: They don mind honey they’re jus not gonna talk to us ever again.
(‘Dave and Kathy don’t mind. Unseriously, Dave and Kathy are just not going to us talk to us ever again.)
Dave: =([laugh]: hehem)/(ri: (h)ight)
Kathy: We don mind, we jus ne:ver gonna talk to you e:___ver ([laugh]) hh(h’g)
(‘[I think] I get your unserious utterance’)
Dave: No, b’t
Rubin: [laugh] heheheheheh (from Schegloff 2001)
Event-related compositionality and the bounds of grammar

Real conversations and abstract compositionality

- Abstract compositionality not very helpful for semanticist wishing to process conversations like the above.
- There is a lot going on that cannot be squeezed into traditional syntax (‘syntax’):
  - Referents for clarification utterances
  - Dysfluent utterances
  - Laughter
Event–related compositionality perspective

- Use utterance events as antecedents for clarification.
- Treat dysfluencies as bona fide, interpretable utterance events.
- Treat laughter events as semantically potent communicative events.
- Explain how such events can concatenate successfully, together with dynamically changing information state and what effect they produce.
Real conversations and abstract compositionality

- Wait!
- It’s easy to keep Abstract compositionality in play.
- Filter out dysfluencies and laughter and add lots of little silent elements.
- I won’t say more about the ‘add lots of little silent elements’ part, though note that we will of course need to distinguish these from the real silent events which have a very significant communicative effect.
Real conversations and abstract compositionality

- Chomsky: Competence v. performance distinction motivated, to a large extent, because of the mismatch between dysfluency ridden actual speech and what generative grammars would/could characterize.

- (From a critic of the competence v. performance distinction): ‘The competence approach uncontroversially excludes performance mishaps such as false starts, hesitations, and errors from the characterization of linguistic knowledge.’ (Seidenberg 1997)

- (From computational linguists who pioneered algorithms for detecting and filtering out dysfluencies): “We propose that these tasks [a.o. detecting and correcting speech repairs, the authors] can be done using local context and early in the processing stream.” (Heeman and Allen 1999)
To include or not to include X in the grammar?

- Who decides what’s in the grammar?
- Court de Gébelin, *Grammaire universelle et comparative* 1774 (see Richet 2001): interjections not in the grammar.
- Core v. periphery (Chomsky and Lasnik 1993): don’t really need to deal with fixed expressions (‘all hands on deck’), idioms (‘kick the bucket’), Noncanonical utterance types (‘The Red Sox 4, the Yankees 3’), . . . (examples from Jackendoff 2005, who provides various arguments contra Core v. periphery distinction )
To include or not to include X in the grammar? I

- A genuinely difficult question, with no easy answers.
- Empiricist, conversational event perspective:
  
  (5) ECE criterion: which conversational events are classified as conveying an intentional and systematic import?

- (5) needs some tightening for sure. BUT: the burden of proof on the ‘conservatives’ . . .
To include or not to include X in the grammar? II

- ... if we view grammar as providing us with criteria for characterizing the coherently interpretable conversational events.
- Not a smallish step.
- Cf. probabilistic view of grammaticality (Lappin 2012): within a language model that assigns probability values to the sentences of a language, the acceptability (grammaticality) of a sentence becomes a graded value, relative to the properties of that sentence and the language of which it is a part.
Do not include dysfluencies in the grammar

- Chess analogy: a theory of chess would not feel responsible for all the hints that players give that they are uncertain about moves or changing their minds mid-move.

- Programming language analogy: Errors can be significant, but we don’t take errors to be part say of the grammar of writing a program.

[Joint work with Raquel Fernández and David Schlangen]
Do include dysfluencies in the grammar

- Friction analogy: non-dysfluent speech is analogous to frictionless motion. Some of the time it’s useful to ignore effects of friction, but the theory of motion is required to explicate the existence and quantitative effects of friction.
Do include dysfluencies in the grammar: dysfluencies are semantically potent

- Dysfluencies are not *noise*: they participate in semantic and pragmatic processes such as anaphora, conversational implicature, and discourse particles:

  (6) a. Peter was + { well } he was ] fired. (Example from Heeman and Allen 1999)

  b. A: Because I, [ [ [ any, + anyone, ] + any friend, ] + anyone ] I give my number to is welcome to call me (Example from the Switchboard corpus) (implicature: ‘It’s not just her friends that are welcome to call her when A gives them her number’)

  c. From yellow down to brown - NO - that’s red. (Example from Levelt 1983)
Do include dysfluencies in the grammar: dysfluencies are semantically potent

- Dysfluencies are source for inference: (7a) entails (7b) and defeasibly (7c):

  (7) a. Freda: Becaus-ah ( silence: 3.3 seconds)
     b. Freda was unsure what she should say after ‘because’
     c. Freda was unsure about how to explain the situation
Do include dysfluencies in the grammar: dysfluencies are semantically potent

Why privilege other–interaction over self–interaction?

   b. A: Did Bo . . . I mean my cousin phone?
   c. A: They’re pretty ... um, how can I describe the Finns? They’re quite an unusual crowd actually.
   (Interview with Steve Backley, The Guardian)
Accommodating dysfluencies in the grammar

▶ We can accommodate dysfluencies in the grammar/semantics at little cost.
▶ The basic perspective is that we think of how utterances get incorporated in people’s information states as follows.
▶ When conversationalists perceive that an utterance has taken place, they update their information state with a *locutionary proposition*, a data structure constructed from the utterance event $u$ and its parts ($u_1, u_2, \ldots$) and an entity provided by the grammar $T_u$ (the *grammatical type* associated with $u$) that classifies this event along its various dimensions (phonology, syntax, meaning).
Accommodating dysfluencies in the grammar

Depending on whether the conversationalist has managed to match $T_u$ and $u$ sufficiently well, two basic results can happen:

1. **Grounding**: the utterance is understood, which leads to a successful update of the context, accompanied by oral or gestural feedback.

2. **Clarification interaction**: a clarification question becomes relevant, concerning an unclear aspect of the utterance, e.g. Who is the referent of ‘Sam’?, as we saw above.
Accommodating dysfluencies in the grammar

- The same story will accommodate dysfluencies with the sole modification that we need to take an incremental perspective.
- The monitoring and update/clarification cycle is happening at the end of each word (in fact, there is plenty of psycholinguistic evidence that in practice it happens at an even higher frequency.).
- And given their privileged position the producer of the utterance is monitoring her own speech constantly checking if indeed she uttered what she meant to utter (if yes, continue; if not ‘self-clarification’ and correction).
Accommodating dysfluencies in the grammar

- So on this picture a word like ‘uh’ is like an existential quantifier for an upcoming utterance.
- Plenty of psycholinguistic controversy: some arguing that ‘uh’/‘um’ is frequently an intentionally produced signal (Clark and FoxTree 2002; Horne 2008), others presenting counterevidence (O’Connell and Kowal 2005; Corley and Stewart 2008).
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Jokes and laughter in conversation

Music and Language
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One of the main issues in this field (Raskin 1985; Attardo 1994) is to characterize the origin/function of jokes.
Release theories

- Freud 1905; Freud 2003
- Certain events create sexual/aggressive energy; when the tension is undone dramatically, energy release and result: humour.
Jokes and laughter in conversation

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- But it came out as ‘You bitch, you ruined my life!’.
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- Last night I was dining with my mother and I wanted to say, ‘Please pass the butter.’
- But it came out as ‘You bitch, you ruined my life!’.
- Important insight in the Freudian perspective, not so much about jokes, but about laughter.
Release theories

- Outside of a dog, a book is man’s best friend. BUT
Release theories

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- Inside of a dog it’s too dark to read. (Groucho Marx)
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- What, according to Freud, comes between fear and sex?
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- Inside of a dog it’s too dark to read. (Groucho Marx)
- What, according to Freud, comes between fear and sex?
- *fünf.*
Two goldfish were in their tank.
Two goldfish were in their tank.

Goldfish A: I drive, you man the guns.
Jokes and the input to humour evaluation

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- Not preserved under substitution/translation salva facetia:
Jokes and the input to humour evaluation

- Jokes are a hyperintensional context.
- Not preserved under substitution/translation *salva facetia*:
- Tank $\mapsto$ APC: Two goldfish were in their armoured personnel carrier . . .
Jokes and laughter in conversation
Jokes and the input to humour evaluation

- Dwie złote rybki były w zbiorniku.
Jokes and the input to humour evaluation

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- Demonstrates that the input to humour evaluation is not (semantic) content
- Consistent with the view of utterance processing discussed earlier, where the utterance is represented in context as locutionary proposition, individuated in terms of the utterance and its grammatical type \((u, T_u)\)
Laughter not correlated with jokes

- Jokes are an important testing area for semantic/pragmatic theories.
- But as far as conversation goes—we should care above all about *laughter events*.
- Vettin and Todt 2004 found that during 10 minutes of conversation, the median number of laughter bouts per participant was 5.8 ($d = 2.5$);
- Within their study: 43% of laughter occurs within 3 seconds of one’s own sentential utterance, whereas 40% within 3 seconds of the other’s sentential utterance.
- Vettin and Todt 2004 found no difference between laughter frequencies of dyads of acquaintances and dyads of strangers.
- This suggests that high laughter frequencies in stranger dyads may be due to normative requirements.
The meaning of laughter I

- laughter as conventionalized force cancellation

Freda: Becaus-ah
(silence: 3.3 seconds)
Rubin: They don mind honey they’re jus not gonna talk to us ever again.
Dave: =(laugh: hehem)/(ri: (h)ight)
Kathy: We don mind, we jus ne:ver gonna talk to you e:__ver
(laugh) hh(h’g)
Dave: No, b’t
Rubin: (laugh) hehehehehe (from Schegloff 2001)
The meaning of laughter II

- laughter as conventionalized tension reduction (cf. Freud on jokes):
  Roger: To tell you the truth, I'd rather I'd, I'd - would like to avoid more than one ICSI meeting per day, if possible. ((laugh)) But - ((laugh))=
  Brian [OK. ]
  Roger =I mean. I don’t know. Whatever.
  Brian No, that’s fine.

- Dealing with laughter as cancelling ‘seriousness’ of previous dialogue segment—tricky to get right, both in terms of ‘downdating’ and in terms of identifying what to cancel. But logical operation.
The meaning of laughter III

- laughter as conventionalized tension reduction—coheres with our previous view of context evolution as involving mutual and self monitoring of how communicative events get classified.
- Need to build in periodic potential for laughter occurrence.
- An extra dimension: not merely monitoring whether the communicative event is understood or is what one wanted to convey. BUT also: incrementally monitoring the other’s *emotional* state re this communicative event.
- Emotional state? Briefly: Information state + mechanism for *emotion appraisal* (Ortony and Turner 1990; Marsella and Gratch 2009)
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Music and Language

- Long standing issues: is music a language? does music have meaning? (See Patel 2008 for a neuroscientist’s extensive discussion of all aspects of this issue)
- In contrast to many animal communication systems, music (like NL) highly and hierarchically structured, multiply organized (scale, chord, rhythm structures).
- Syntactic structure different from NL—but not ‘poorer’.
- One can have highly syntactic communication system with negligible semantics (cf. finches)
Music and meaning: caveats

- Important qualifications when considering the linguistic or semantic nature of music: music examples typically taken from art music, whereas linguistic ones ‘arbitrarily’, from isolated sentences.

- The ‘meaning of language’ or its emotional affect etc becomes more mysterious when one considers a complete text (or segment thereof), whose meaning is more difficult to ascertain.

- So music really should be compared with theatrical piece or poetry etc, for which good techniques for analyzing sentential segments, but more difficult with larger scale units.
Music and emotion

- Basic intuition: music has emotional import (people clap and cheer etc).
- Extensive empirical support for *convergent* emotional effects, cross culturally and across musical traditions (e.g. Krumsahl 1997 on Western classical music; Balkwill and Thompson, 1999 on Westerners listening to Indian classical music)
Initial story

- Grasping a piece of music involves grasping its ‘emotion conditions’ (by analogy with truth conditions of declarative sentences).

- *Grasping* because one recognizes the requisite emotion without necessarily feeling it.
Example 1: Chopin sonata number 2, 3rd movement

- Martha Argerich.
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- *Sviatoslav Richter - Stalin’s Funerals, 1:50 minutes in* http://www.youtube.com/watch?v=xWvtth79374
Example 1: Chopin sonata number 2, 3rd movement

- Martha Argerich.
- *Sviatoslav Richter* - *Stalin’s Funerals*, 1:50 minutes in http://www.youtube.com/watch?v=xWvtth79374
- *Monty Python* - *Undertaker’s Film*, 2:30 minutes in ... http://www.youtube.com/watch?v=c0MC_4c-zbY&feature=related
Accept for a moment that the meaning of music is emotion–based.

According to best theories of emotional reasoning (e.g. Adam et al. 2009; Marsella and Gratch 2009), this involves monitoring real world events and deducing their positive/negative import on our current plans.
Music v. Natural Language: atomicity

- NL meaning is atomistic.
- Strong evidence for this—clarificational potential.

(9) a. Who rearranged the plug behind the table?
    b. Who? / rearranged?/ the plug? / behind? / the table?

- Little bits obligatorily carry a combination of semantic and speaker reference.
- Less clearly so for music.
Evidence for referentiality in Music

▶ And yet there is emerging evidence for the (coarse grained) referentiality of music.

▶ Important not to be blinded by the analogy of NL. One can be referential without being atomistic.
Evidence for referentiality in Music

- Study by Hacohen and Wagner (1997), in Israel, where music by Richard Wagner was banned at the time.
- 174 listeners presented with motifs, asked to rate them on scale of: joy/sadness, hope/despair, natural/supernatural, impetuous/restraint, dignity/humility, kindness/cruelty
- Strong clustering effects.
The Music drawing task

- Pairs of participants collaborate using a shared ‘virtual’ whiteboard.
- In the typical set-up, each participant has a 30-second target piece of piano music. They can control playback of the target piece using buttons on the whiteboard.
- Their task is to decide whether they both have the same piece of music.
- Their only means of communication is by drawing which is displayed in real time on the whiteboard. No use of NL allowed.
- Subjects succeed at above chance rates.
Witold Lutosławski (1913-1994)
Witold Lutosławski

Lutosławski String Quartet beginning of main movement
Witold Lutosławski

Possible scene descriptions?

- *Tiny driver ants Vs red ants, 25 seconds in:*
  http://www.youtube.com/watch?v=LP76fWWfm1Q

- *Honey Bees swarming into a bait hive:*
  http://www.youtube.com/watch?v=HL3sHuK3iGE

- *But not: Queen formally opens Parliament, 2 minutes in:*
  http://www.youtube.com/watch?v=r1g-RzRh368&noredirect=1
Witold Lutosławski

- Not intentionally ‘descriptive’.
- Constructed from micro-rhythmic variation across the parts (see e.g. Stucky 1981 for detailed analysis.).
Reversing the question

- Language as a kind of music?
- A sequence of sound/silence events with continual monitoring of understanding and emotional import.
- A kind of improvisation interaction performed by conversationalists with the basic constraint that one conversationalist plays at a time. (cf. Clark 1996)
Raw Signal Semantics

- Doing semantics with (cough) ‘sanitized logical representations’ is unavoidable and convenient at times.
- But taking seriously as much as possible of the ‘raw signal’ is, um, ultimately crucial.
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