

DISCOURSE SEGMENTATION AND DISCOURSE MARKERS IN SPOKEN FRENCH

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Research context: Exploring the discourse level

- Discourse is a crucial notion for understanding human communication (Sanders & Spooren 2007)
- “Discourse is what makes us human, what allows us to communicate ideas, facts, and feelings across time and space.” (Graesser, Millis, & Zwaan 1997: 164)
- Discourse phenomena to investigate:
 - Spoken Discourse Segmentation
 - The paradox of Discourse Markers

DISCOURSE SEGMENTATION

Basic Discours UNITS in LOCAS-F

Spoken Discourse Segmentation

- “The stepwise structure of speech can give us many clues about cognitive processes. It suggests units for planning, production, perception and comprehension.” (Holsánová 2008: 1)

Spoken Discourse Segmentation

- Basic Discourse Units segmentation model accounts for
 - Discourse as **product**: structured and organized object in terms of coherence and discourse relations between states and events → coherence relations approach (cf. Grosz & Sidner 1986; Mann & Thompson 1988; Polanyi 1988; Roulet et al. 2001; Sanders, Spooren & Noordman 1992)
 - Discourse as **process**: temporal event that is dynamic, transitional, subject to linearization and interactional achievement; i.e. transitory, irreversible, synchronized cf. discourse **flow** (of thoughts/ideas and of sounds/forms), (cf. Chafe 1994; Couper-Kuhlen 2012 ; Auer 2009)

Linguistic correlates of discourse segmentation

- Both syntax and prosody provide linguistic cues that may be used to segment the discourse flow into delineated units
 - Discourse as product → priority to syntax (Carlson, Marcu & Okurowki 2001, Givón 1983, Monschau, Kreyer and Mukherjee 2003)
 - Discourse as process → priority to prosody (Altenberg 1987, Chafe 1994, Swerts and Geluykens 1994)
- Not a strict divide! (Helasvuori 2001, Pawley and Syder 2000, Thompson and Couper-Kuhlen 2005)

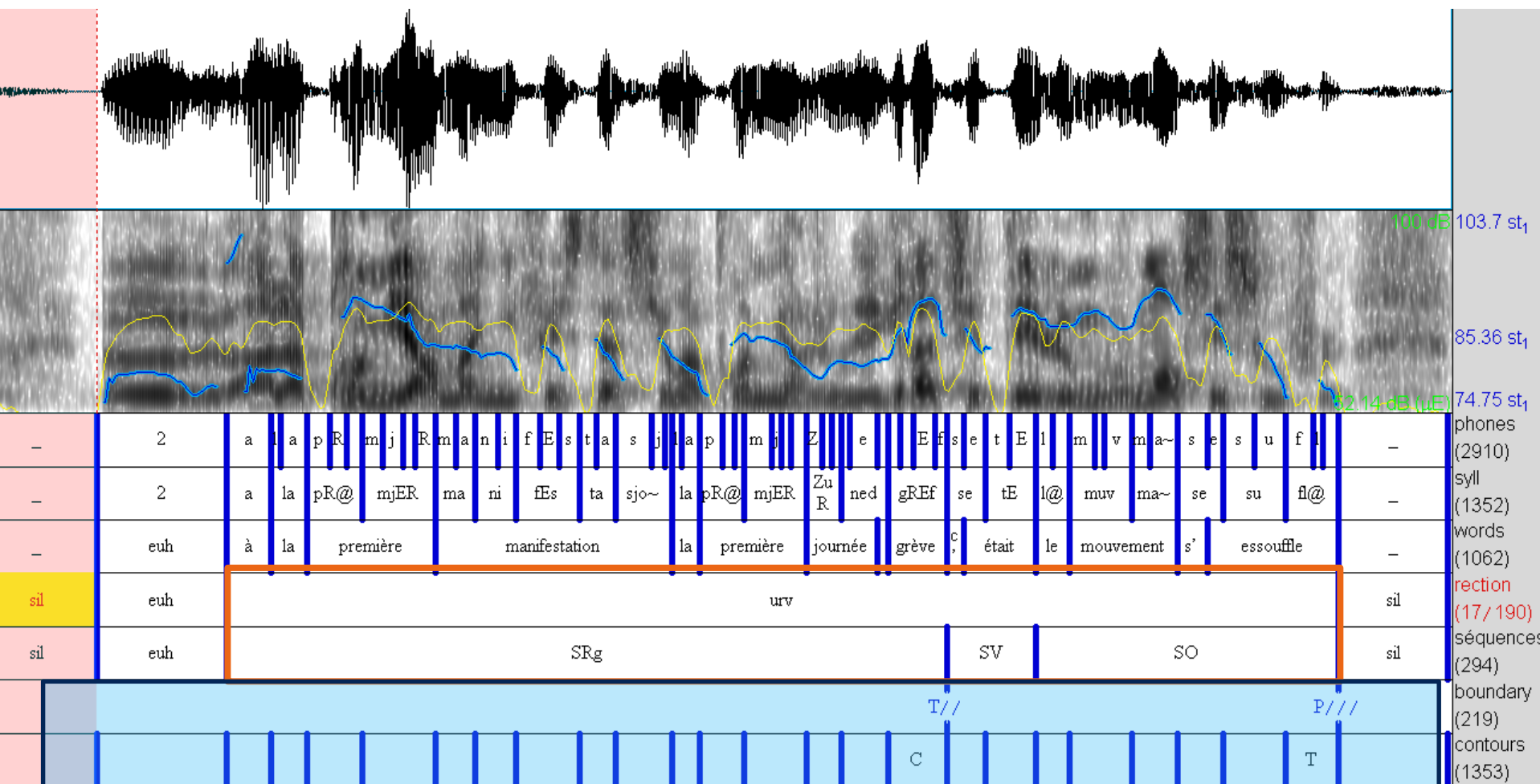
Basic Discourse Units model

- Syntax and prosody are two distinct, yet interdependent and complementary levels of surface segmentation, that work together to give rise to a specific discourse organizational level (Degand & Simon 2009; in prep.)
- A basic discourse unit (BDU) emerges whenever a syntactic boundary coincides with a prosodic boundary. As long as the two levels do not coincide, the hearer awaits completion. More precisely, prosodic and syntactic structures do not always align in a one-to-one relation (see also Chafe 1994; Croft 1995, Ford & Thompson 1996)

Segmentation into Basic Discourse Units

- Mapping of two **independently** performed levels of analysis generates specific discourse organising level
 - **Syntactic analysis**: segmentation into dependency clauses (and functional sequences)
 - **Prosodic analysis**: segmentation into major (and intermediary) prosodic units

Syntactic and Prosodic Segmentation



Syntactic segmentation

- Theoretical basis: dependency syntax (see e.g. Blanche-Benveniste 2002; Blanche-Benveniste et al., 1990; Berrendonner 2002; Deulofeu 2003)
 - 4 types of dependency clauses
 - a) verbal dependency clause (*urv*)
 - b) averbal dependency clause (*ura*)
 - c) elliptical dependency clause (*ure*)
 - d) interrupted dependency clauses (*urx-l*).
 - + macro-syntactic segments: adjuncts and discourse markers

Syntactic segmentation

- Functional sequences: clausal constituents that occupy a main syntactic function like Verb, Subject, Object, etc. (Bilger & Campione 2002: 119).
 - Verbal clauses: verb (SV, including the pronominalized subject and object, if any), (lexicalized) subject (SS), object (SO), (weak) governed constituent (SR) and insert.
 - Averbial clauses: morphosyntactic constituents, like nominal sequence (SN), adverbial sequence (SAdv), prepositional sequence (SPrep), etc.

Examples

- 1) <ben>_{md} [(on va aller voir)_{sv} (un autre film)_{so}]^{urv} [(on n'allait pas)_{sv}]^{urv-l} <enfin>_{md} [(on va aller voir)_{sv} (un autre film)_{so}]^{urv}

<well> [we are going to watch another movie] [we were not going to]

<well> [we are going to watch another movie]

- 2) euh [(Dreyfus)_{ss} <donc>_{md} euh (a valu)_{sv} (on va dire)_{insert} (à Zola)_{so} euh (de s d'émigrer en en Angleterre)_{so}]^{urv+} [(pourquoi)_{sAdv}]^{ura} [(parce qu'on on lui a reproché son intervention peut-être un peu trop radicale)_{SRg}]^{ure}

uh [Dreyfus <then> uh caused we shall say Zola uh to to emigrate to to England] [why] [because he was blamed for his intervention that was maybe a little too radical]

- 3) <ça>_{ag} [(c'est)_{sv} (la ville)_{so}]^{urv}

<that> [that's the town]

Prosodic segmentation and annotation

- Step 1: Double blind prosodic segmentation by two experts, focusing on perceptive effects (~~syntax~~), multiple listening
- Step 2: Testing of semi-automatic procedure of different prosodic boundary levels → 2 levels
- Step 3: « Validation » of semi-automatic annotation

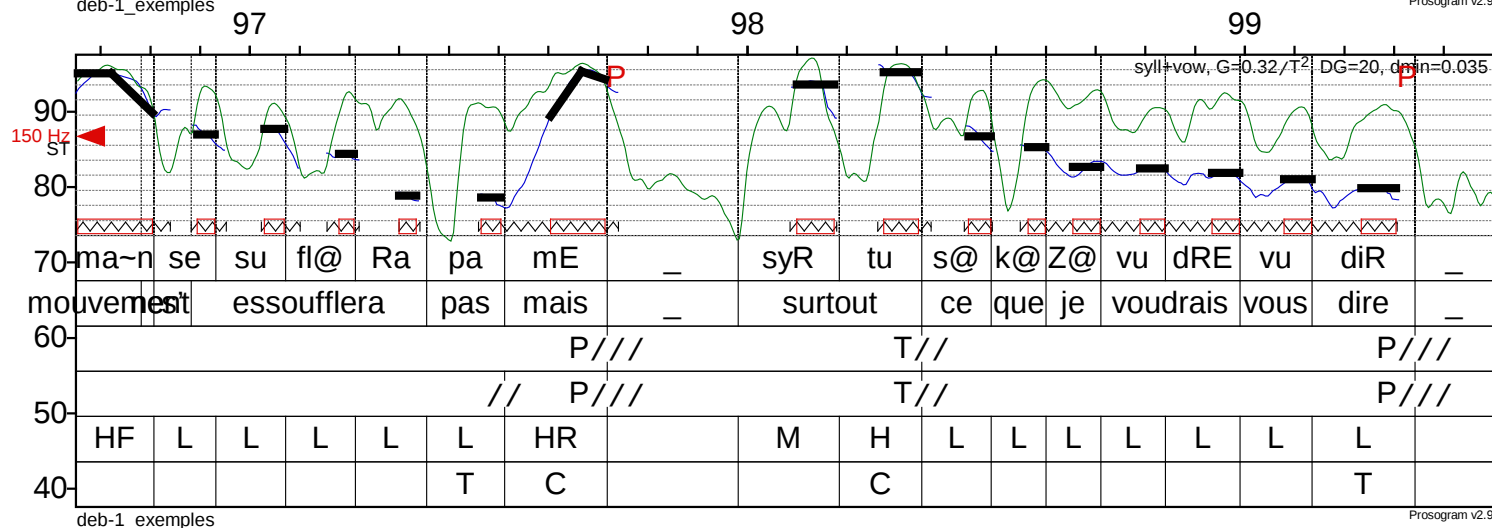
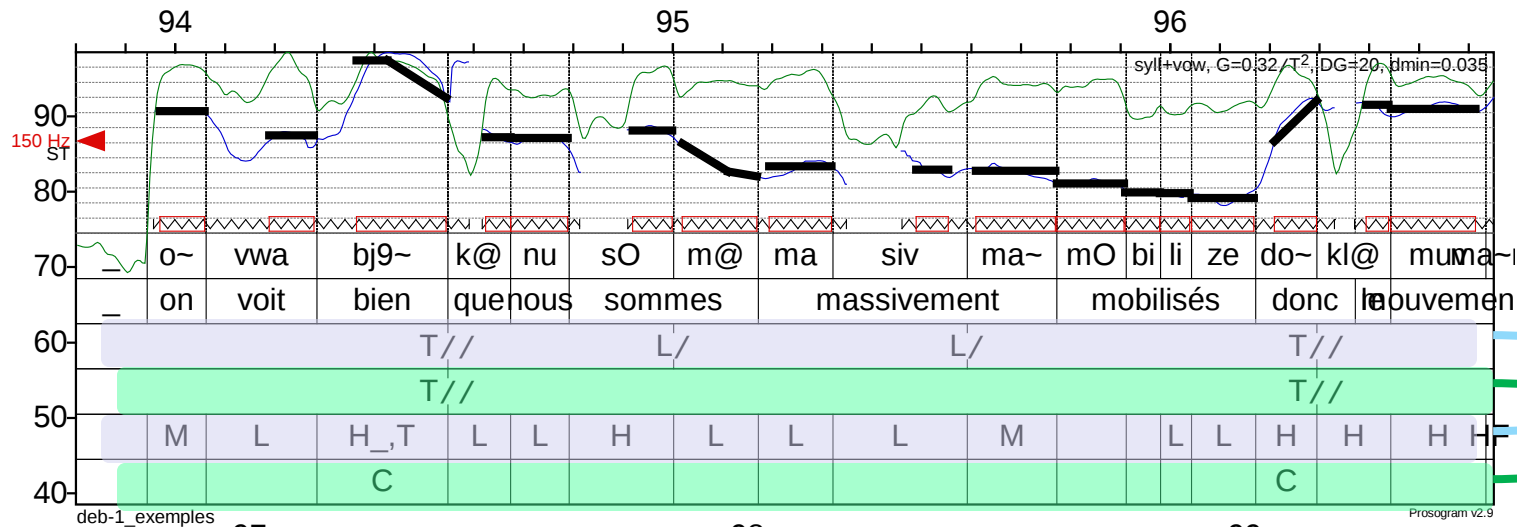
Major intonation units

- A major prosodic boundary (///) is established when one of the following cues is detected on the final syllable of a word (or penultimate when the final syllable is a schwa):
 - a subsequent silent pause longer than 250 ms ;
 - an extra-lengthening (the syllable is three times longer than the syllables in the context);
 - a sharp rise of f0 (intra-syllabic f0 rise superior to ten semi-tones), even when the f0 rise does not correlate with the lengthening of the syllable.
 - manual exclusion of a boundary which coincides with a hesitation mark ('euh' particle or vowel extra-lengthening with a level contour, and creaky voice).

Intonation contours

- Four alternatives exist for each prosodic boundary:
 - Continuation (rising f0 movement),
 - Finality (falling or low f0),
 - Focus (sharp falling from high to low contour)
 - Suspense (flat and lengthened contour).
- Two coders independently annotate intonation contours ,
and rest on automatic intonation annotation (Mertens 2012)
for resolving the disagreement cases.

Automatic annotation and manual validation



Mapping of prosody and syntax

- A BDU emerges from the mapping of coinciding syntactic and prosodic boundaries
 - Halford's 'talk units', i.e. "the maximal unit defined by syntax and intonation". (Halford 1996: 43)
- Concretely, PRAAT script → 5 types of BDUs

Types of BDU

DC	[]	[a, md]	[] []	[]	[] [] []
MPU	[]	[]	[]	[] [] []	[] []
BDU	[bdu-c]	[bdu-a]	[bdu-i]	[bdu-s]	[bdu-x]

(Degand & Simon 2009a)

- **Congruent BDU-c** : one dependency clause corresponds to one major prosodic unit
- **BDU-s grouped by syntax**: several major prosodic units correspond to one dependency clause
- **BDU-i grouped by intonation**: several dependency clauses correspond to one major prosodic unit
- **Adjunct BDU-a** (or regulatory): a non governed element is autonomized in a major prosodic unit
- **Mixed BDU-x** : sequence of mismatching syntactic and intonation units

Types of BDUs: Examples

Congruent BDU-c

- [(dans la majorité politique libanaise) (beaucoup de voix) (s'étaient élevées) (contre sa venue)]^{urv} **///C**



in the lebanese political majority many voices raised against his coming ///

Syntax-bound BDU-s

- [(pourquoi) (ce rôle majeur) (n'est-il pas dévolu) **///S** (à la religion)]^{urv+} **///C**



why isn't this major role devoted /// to religion

Intonation-bound BDU-i

- euh [(on est devenu) (bien potes)]^{urv} [(tout le monde) (se connaissait)]^{urv} **///C**



uhm we've become good friends [urv] everybody knew one another [urv]

Regulatory BDU-a

- <mais> <bon> **///T**

but well ///

Types of BDUs: examples



'Mixed' BDU-x

- <sinon>_{md} //C [(les les exercices oraux)_{ss} //C <pr/ à proprement parler>_{ag} **///C** (sont minimales)_{sv} **]**^{urv+} **//T** [(ils existent)_{sv} //C (au niveau de la lecture //C bien sûr **///C** d'un **///S** déchiffrement //C ou défrichage //T comme vous voulez //C dans les deux sens //C en quatrième **///C** et certainement //C à propos de la lecture des poèmes //C en cinquième)_{SRd} **]**^{urv} **///C**

Corpus LOCAS-F

- **Louvain Corpus of Annotated Speech – French**
(collaboration with Anne Catherine Simon, Laurence Martin - Noalig Tanguy, Thomas Van Damme)
 - **14** « genres »
 - Communicative situations (degree of interactivity, degree of preparation, degree of broadcasting, number of speakers)
 - **48** audio samples
 - 3 hours 38 minutes
 - ca. 15 min/genre
 - **48** different speakers (12 speakers in more than one genre)
 - At least 3 different speakers per genre
 - **41 322** tokens

LOCAS-F Situational features

Genre	Duration	Interactivity	Preparation	Broadcast
Conference talk	16:44	0	2	0
Debate	19:19	2	1	2
Academic address	15:18	0	2	1
Political address	20:26	0	2	2
Homily	13:23	0	2	1
Survey	16:04	1	1	0
Free interview	15:33	2	0	2
Radio interview	20:29	1	1	2
Radio news	14:45	0	2	2
Reading	15:18	0	2	0
Free narration	10:22	2	0	0
Radio creation	13:24	0	1	2
Total	3:11:05			

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Functions of Basic Discourse Units

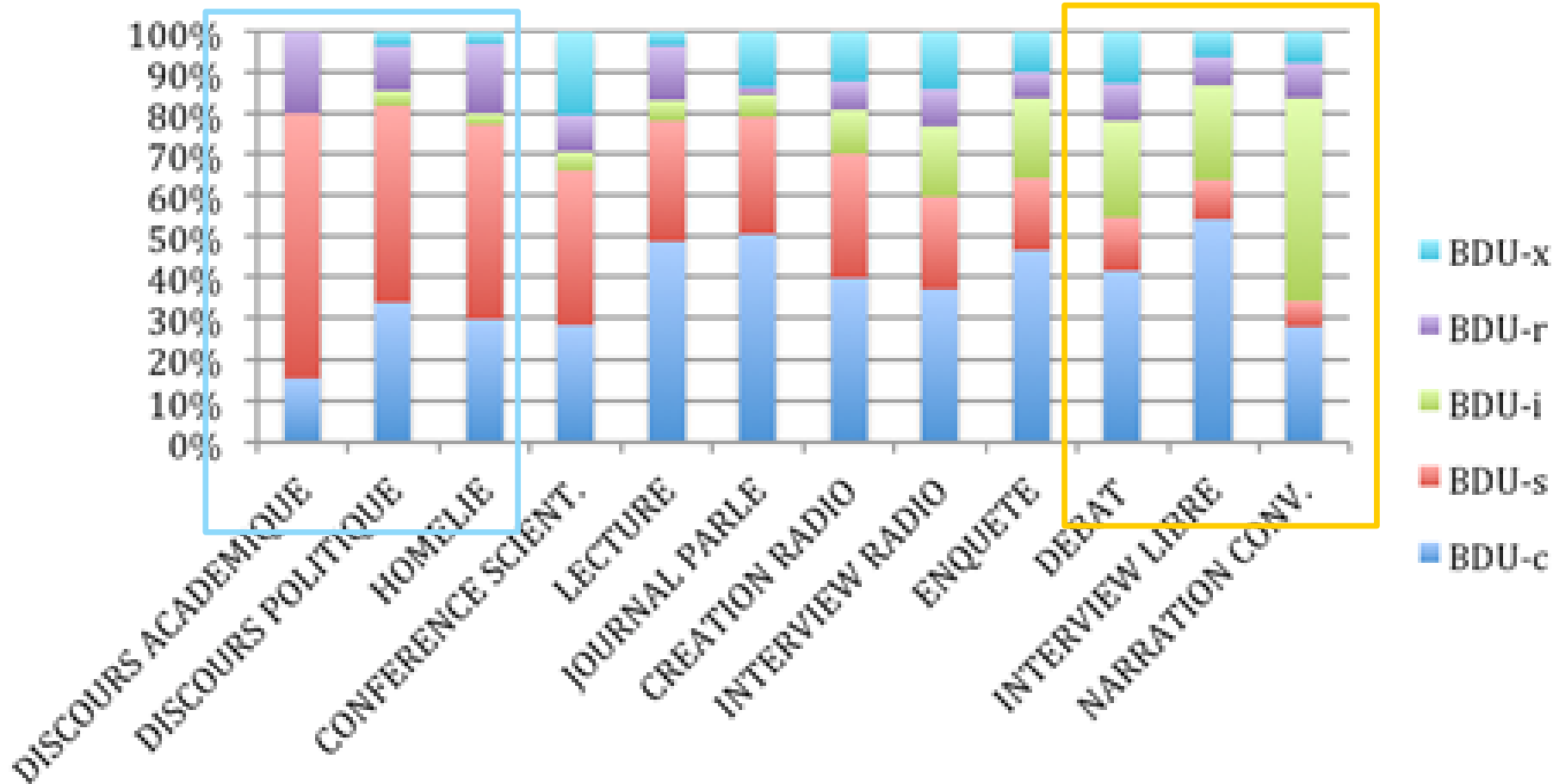
Hypothesis

- BDUs are “the segments speakers and hearers rely on to construct and interpret the ongoing discourse, viz. segments on the basis of which inferential processes can take place.” (Degand & Simon 2009a: 82)

Data-proof

- BDUs are discourse strategic units that vary with the communicative situation (Degand & Simon 2009ab, 2011; Simon & Degand 2011).
- Different genres call for different BDU distributions (40% congruent).

LOCAS-F: BDU distribution



$$\chi^2 = 602,84 ; dl = 44 ; p < 0,0001$$

LOCAS-F in figures

#	BDUs	Words	Length	Genres	Samples	DM
Total	2875	41322	3:38	14	48	1780



BDU-c: 43%
BDU-i: 17%
BDU-s: 23%
BDU-r: 9%
BDU-x: 8%

BDU Intermezzo

- What is the cognitive status of BDUs?

- Production units?
- Comprehension units?

Models of Discourse processing

Kintsch & van Dijk 1978, Oakhill et al. 1989, Dell & Brown, 1991, Bock, 1996 ...

- How to find out?

- Systematic (conversation) analysis of non-congruent BDUs?
- Systematic analysis of prosodic units vs. Syntactic units vs. BDUs?
 - One idea one unit vs. One clause constraint
- BDUs in interaction?
- BDUs in writing (keystroke logging?)
- Other ideas ...

THE PARADOX OF DISCOURSE MARKERS

The paradox of Discourse Markers

- Sentence-level: optional, not a (morpho-)syntactic category
- Discourse-level: Communicatively obligatory in ALL acts of human communication
 - written/spoken
 - formal/informal
 - CMC, even when space-constrained (texting, twitter, ...)

The paradox of Discourse Markers

- Human communication is not possible without a linguistic category that is itself vaguely defined, i.e. DMs.
- Indices of fundamental cognitive processing during (spoken) language production, and genuinely constitutive of human communication.
- DMs are both **speaker-oriented** traces and **hearer-oriented** signals (but how do we find out?) – see also Clark & Fox Tree 2002

Discourse Markers

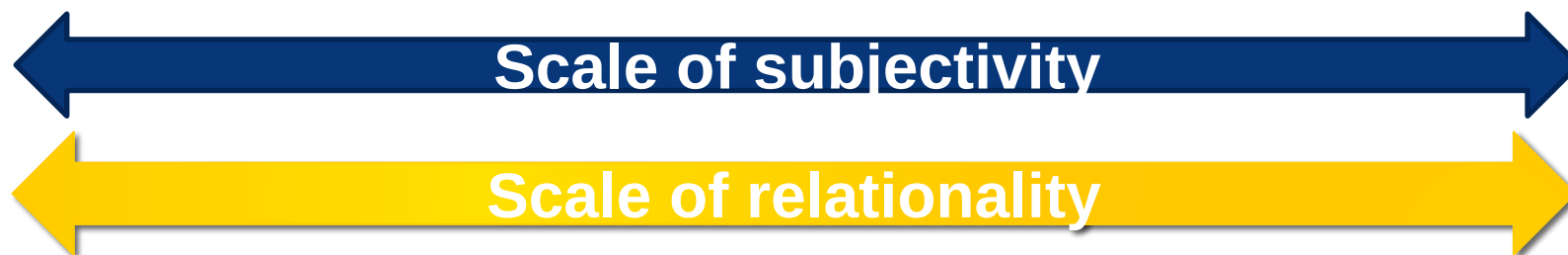
- Linguistic expression whose primary function lies at the discourse level, i.e. relating their host utterance to the discourse situation.
- Can play a threefold role:
 - contributing to the discourse organization (textual coherence),
 - to the speaker/hearer interaction (interpersonal meanings),
 - and/or to speaker attitudes

Discourse Markers in LOCAS-F

- Macro-syntactic constraints
 - It has to be syntactically detachable from a sentence (Schiffrin 1987)
 - They do not enter into the construction syntactically with other elements of the sentence (Sankoff et al. 2007)
 - [DMs are] “either outside the syntactic structure or loosely attached to it” (Brinton, 1996: 34).
- **Weak clause association** (outside the dependency clause)
- Identification of 1780 DM tokens (73 types)
 - From semasiology to onomasiology!

Functional annotation of DMs

Ideational	Rhetorical	Sequential	Interpersonal
linked to states of affairs in the world, semantic relations between real events .	pragmatic relations applying to subjective claims and implicit assumptions. .	linked to the structuring of discourse segments, explicit signals of the progressing steps of speech and thought.	linked to intersubjective and phatic functions in the management of the speaker-hearer relationship



Rounds of functional annotation

Round 1	Round 2	Round 3
Kappa: .43 + (abstract) coding scheme	Kappa: .59 + bias ideational > rhetorical > sequential > interpersonal	Kappa: .78 + bias + DM cues/paraphr.

- Double-blind coding
- Progressive procedure

Sense annotation: inter-dependent taxonomy

Ideational	Rhetorical	Sequential	Interpersonal
cause	motivation	punctuation	monitoring
consequence	conclusion	opening boundary	face-saving
concession	opposition	closing boundary	disagreeing
contrast	specification	topic-resuming	agreeing
alternative	reformulation	topic-shifting	elliptical
condition	relevance	quoting	
temporal	emphasis	addition	
exception	comment	enumeration	

Revised taxonomy: independence



Speaker
intensions

Ideational	Rhetorical	Sequential	Interpersonal
WHAT?	Cause/consequence		
	Addition		
	Contrast/Concession		
	Temporal		
	Condition		
	Alternative		
	Specification		
	Punctuation		
	Structuring (topic-shift, opening,...)		

Functional annotation: First results

- Annotation of 500 DMs, in context, with coding scheme

# DMs	Prepared	Semi-Prepared	Non Prepared	Total
Interactive	/	37	146	183
Semi-interactive	/	123	/	123
Non interactive	145	12	37	194
Total	183	145	172	500

Frequency of domains and senses

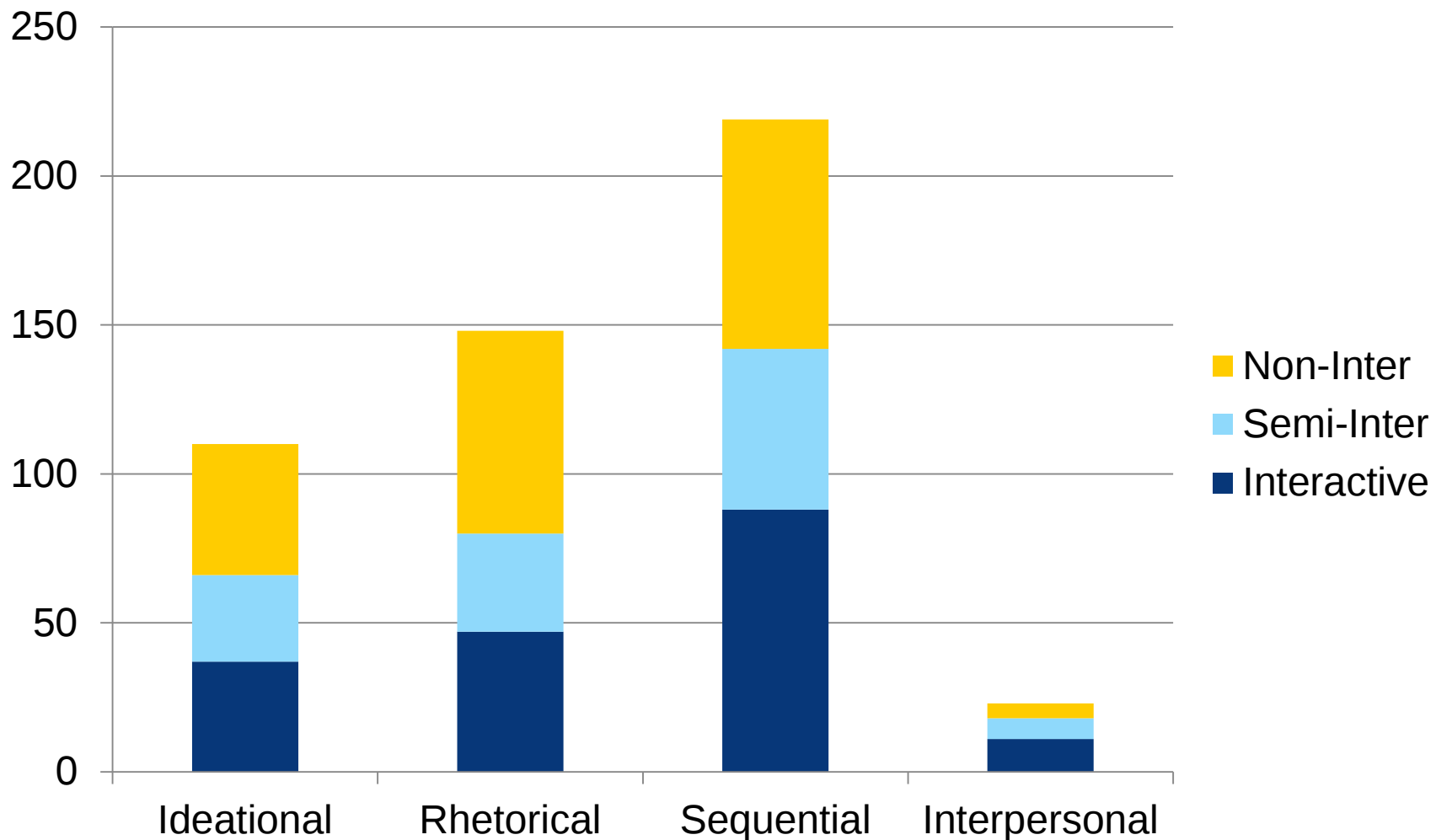
Sequential	219 (44%)	
Rhetorical	148 (30%)	
Ideational	110 (22%)	
Interpersonal	23 (4%)	

Addition	94 (19%)	
Contrast	81 (16%)	
Specification	56 (11%)	
Temporal	45 (9%)	
Consequence	45 (9%)	
Punctuation	41 (8%)	
Concession	30 (6%)	
Opening	28(6%)	
Alternative	19 (4%)	
Topic-shift	16 (3%)	
Resuming	13 (2%)	
Closing	11 (2%)	
Other	21 (5%)	

Independence between domains and senses

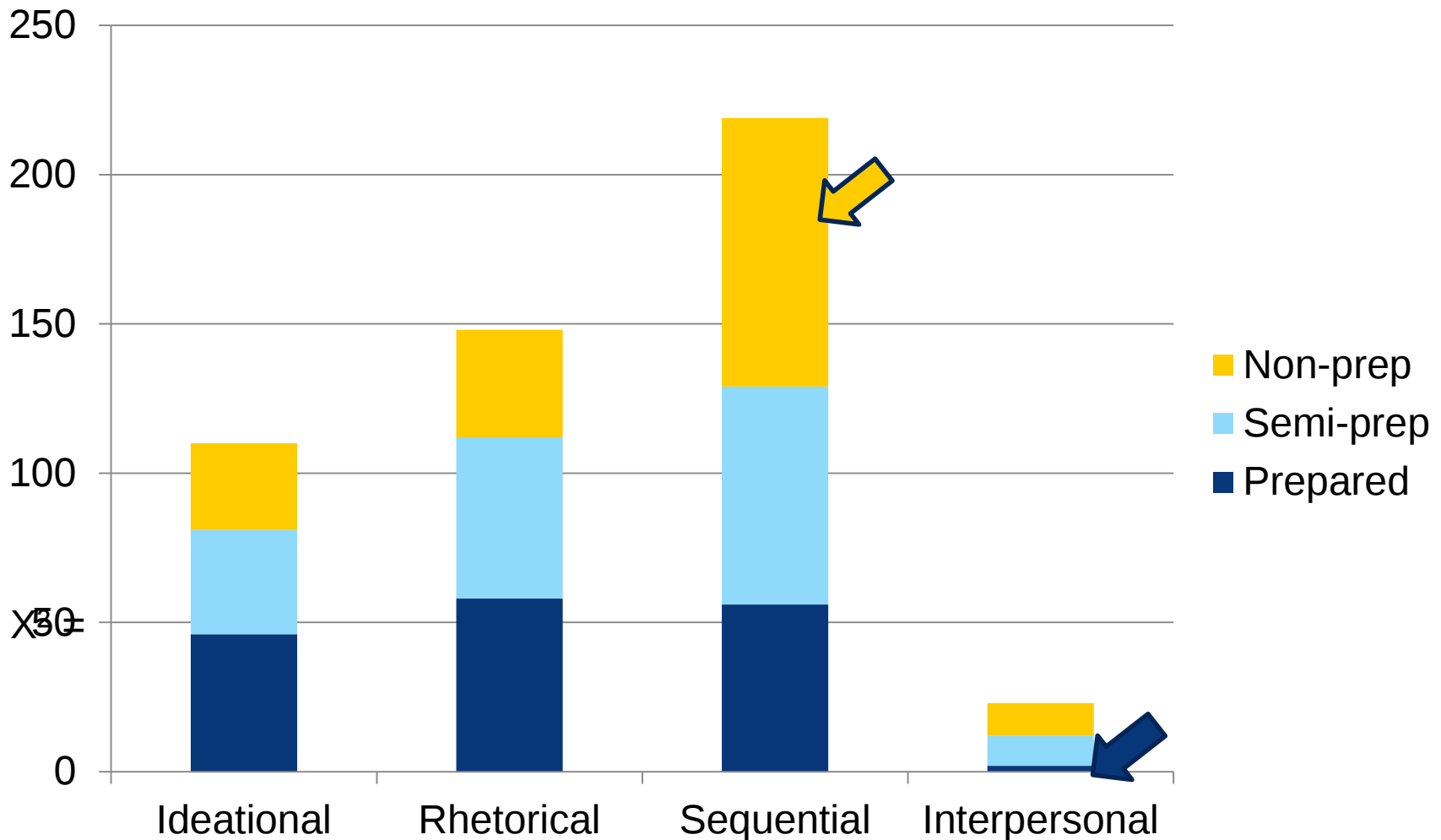
Ideational	Rhetorical	Sequential	Interpersonal
Contrast - Punctuation			
Addition– Specification– Consequence– Concession– Alternative– Topic-Shift			
Temporal		Temporal	
		Opening	
	Resuming– Closing - Condition		
Enumeration		Enumeration	
	Agreement		Agreement
	Cause		

Domains and degree of interaction



$\chi^2 (6, N=500), = 8.01; p = 0.237$

Domains vs. Degree of preparation



$\chi^2 (6, N=500), = 23.94; p < 0.0005$

Polyfunctionality of DMs

	ideational	rhetorical	sequential	Inter-personal	Total
<i>et</i>	52	6	70		128
<i>mais</i>	8	55	26	1	91
<i>donc</i>	10	23	19		52
<i>alors</i>	7	4	22	1	34
<i>et puis</i>	15	1	13		29
<i>ben</i>			16	2	18
<i>hein</i>			17		17
<i>enfin</i>		6	10		16
<i>en fait</i>		8	6		14
<i>bon</i>			11		11
Total	92	103	193	22	410/500

DM = 10 most frequent → 82%

(Micro and Macro)Functions of DMs

- Highly frequent DMs are polyfunctional (domain & sense)
 - Good for the speaker, not for the hearer
 - Hell for annotation !
- Most discourse relations/senses (addition, contrast, ...) cross domains
 - Core meaning of (polyfunctional) DM?
 - *mais*: 72% contrast, 18% concession, + ... → specific signal!
 - *et* : 66% addition, 9% temporal, 7% specification, 12% « structuring », 4% contrast → underspecified signal/trace?
 - *donc*: 60% consequence, 25% specification, 10% opening or resuming, + ...
- (under)specified relations or (under)specified DMs??

(Macro)Functions of DMs

- Sequential function (topic-shift, closing, quoting, addition, ...)
 - Organization/Structuring of speaker's (ongoing) discourse flow
 - Good for the speaker, and? the hearer
- Rhetorical function (motivation, reformulation, comment, ...)
 - Expression of speaker's point of view
 - Good for the speaker, and? the hearer
- Interpersonal function (monitoring, face-saving, agreeing, ...)
 - Not very frequent, even in highly interactive contexts
- Variation with discourse situation
 - the less prepared, the more sequential; the more prepared, the less interpersonal

DMs as markers of coherence relations

- The analysis of discourse markers is part of the more general analysis of discourse coherence—how speakers and hearers jointly integrate forms, meaning, and actions to make overall sense out of what is said. (Schiffrin, 1987:49)
- ... the recognition of coherence relations by the hearer or reader enables them to assign coherence to a text. Discourse markers guide the text receiver in the recognition of those relations. (Taboada, 2006: 567-568)
- ...connectives certainly play a role in guiding the interpretation of the relation: the coherence relation that is assumed between the segments must be compatible with the meaning of the connective and with the meaning of the segments. (Sanders, Spooren & Noordman, 1993: 94)

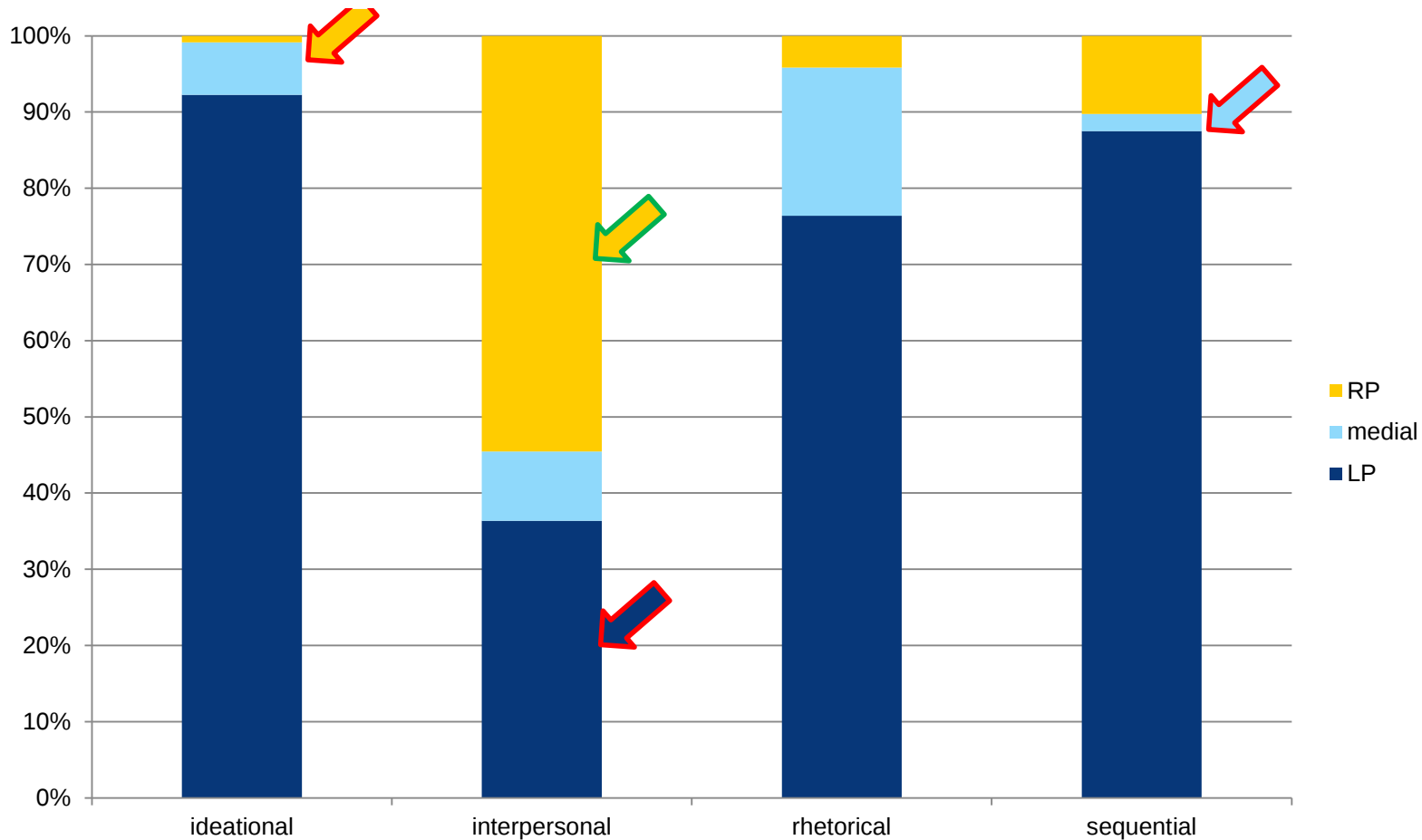
Or not?

- ... theories of discourse based on coherence relations are not adequate in general, and in particular not adequate as a framework for analysing discourse connectives. (Unger, 2006: 420)
- ... there is no evidence that discourse is hierarchically structured beyond the sentence level. (Unger, 2006: 424)
 - No appeal to hierarchical discourse structure is necessary. On the contrary, in a relevance theoretic framework there is no reason to assume discourse segments in the sense of formal entities or units. (Unger, 2006: 428)

Position of DMs in LOCAS-F

	Initial	Medial	Final	Isolated
BDU	697 (39%)	833 (47%)	163 (9%)	87 (5%)
Clause	1345 (83%)	88 (5%)	179 (11%)	/
Intonation Unit	715 (40%)	797 (45%)	181 (10%)	87 (5%)

Functional domain and position in clause



DM types vs. Position in Clause

- Initial (left periphery)
 - 1345 tokens vs. 48 types
 - Top DMs: *et* (467), *mais* (278), *donc* (133), *alors* (79), *ben/bien* (77)
- Medial (parenthetical)
 - 88 tokens vs. 28 types
 - Top DMs: *quand même* (17), *donc* (14), *d'ailleurs* (8)
- Final (right periphery)
 - 179 tokens vs. 29 types
 - Top DMs: *quoi* (42), *hein* (38), *donc* (12), *voilà* (11)

DM in the right periphery

- Unexpected uses in RP

L1: [je sais pas] // <moi> [je ne v/] [non] // [je di/ dis pas de chiffre] //
 <parce que j'en ai euh ///S une bonne dizaine en tête> // <mais> ///C

L2: [ah] // <donc> <quand même> // [une bonne dizaine] ///

L1: I don't know I no I don don't say a figure because I have at least a dozen in my head <mais> ('but') ///

L2: ah so at least a dozen

[j'ai fait des vols] // <enfin> [j'ai volé dans les petit mag/ des petits bonbons dans les magasins] // [j'ai fait mes petits trucs] [c'est jamais des grands trucs euh de grand gangster] // <mais> ///T [j'ai fait mes petites conneries] // <quoi> ///T

I have stolen // well I have stolen in small sh/ sweets in shops // I have done my little things never big gangster things // <mais> I did my stupid things you see

Functional domain and position in BDU

Domain	Position in BDU				Total
	initial	medial	final	Isolated	
ideational	35 (43%)	45 (55%)	1(1%)	1(1%)	82
rhetorical	30 (26%)	70 (60%)	7 (6%)	9 (8%)	116
sequential	80 (43%)	77 (42%)	14 (8%)	13 (7%)	184
interpersonal	2 (13%)	9 (56%)	4 (25%)	1 (7%)	16
Total	147	201	26	24	398

Functional domain and position in clause

Domain	Position in clause				Total
	LP	Medial	RP	/	
ideational	76 (93%)	2 (2%)	1 (1%)	3 (4%)	82
rhetorical	80 (69%)	22 (19%)	2 (10%)	12 (2%)	116
sequential	141 (77%)	3 (2%)	20 (11%)	20 (11%)	184
interpersonal	5 (31%)	1 (6%)	8 (50%)	2 (13%)	16
Total	147	201	26	24	398

→ DMs play a relational and structuring role at the local level

Conclusions

- Study of discourse segmentation and discourse markers to get insight into what makes discourse so crucial to human communication
- Basic Discourse Units are discourse strategic units reflecting projection of syntactically and prosodically complete units
- Discourse markers are lexical devices functioning as (listener-oriented) signals but also as (hearer-oriented) traces of the discourse production process.
- From case studies to « category » studies
 - Loss of fine-grainedness
 - Gain insight into the system
 - Cross-linguistic robustness of the taxonomy

Conclusions

- The two level annotation in domains and senses is promising
 - Distinction between general discourse functions from specific DM senses
 - New insight into polyfunctionality of DMs → signal and/or trace of discourse production
 - Speaker intentions (illocution / perlocution) → contextual implicatures
 - Core (procedural ?) meanings → explicatures
 - Weak representation of interpersonal domain even in highly interactive contexts
 - Importance of the sequential domain in spoken language

Research perspectives

- What is the cognitive status of BDUs?
 - Units of projection during language production?
 - Fit with models of language/discourse production?
- What makes DMs to signals or symptoms?
 - Cognitive load during language production?
 - Frequency of polyfunctional / underspecified DMs
- How can we cognitively make sense of the difficulty of (discourse) annotation?
 - Semantic underspecification?
 - Relational underspecification?

Research perspectives

- What is the (cognitive) nature of discourse production? Is (spontaneous) spoken discourse speaker-oriented?
“adults routinely process language egocentrically” (Keysar, Barr, and Horton, 1998: 46)

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 - <http://textlink.ii.metu.edu.tr>

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BDU intermezzo: conversational narration

BDU-I	<moi>ag [(c'est)SV (la fête)SO //C (parce que mon parrain //C c'est comme si c'était mon frère)SRd]urv //C euh<et>md [(comme)SAdv-I]urv-I ///S
BDU-C	[(c'est un peu)SV (les seules la seule occasion //C d'avoir un bébé //C très proche de moi)SO]urv //C <quoi>md ///T
BDU-C	<puisque j'ai pas de frère>ad //C [(j'aurais jamais eu)SV (de neveux //C ou de nièces)SO]urv ///C
BDU-R	<et>md <voilà>md ///C
BDU-X	<puis>md euh<bon>md //C [(quelques mois après)SRg euh (une une fois que je vais chez eux)SRg //C (je les entends)SV ///C (en train de discuter)SO]urv //C [(ah)int]int [(comment)SRg (est-ce qu')mi (on va préparer)SV]urv //S [(comment)SRg (est ce qu')mi (on va demander)SV //C (à //C une copine de de la femme de mon parrain)SO ///C (pour qu'elle soit marraine)SRd]urv //C <et>md [(je les entends)SV //C (préparer toute une surprise //C pour elle //C et tout)SO]urv //C <et>md [(je me dis)SV]urv //C [(ah)int]int ///C

BDU intermezzo: scientific conference



BDU- C	<alors>md //S euh<le phonostyle>ag //C [(c'est un un objet d'étude particulier)SO]urv //C
BDU- S	euh [(pour paraphraser ce qui a été dit ce matin euh par Ioannis Kanellos)SRg (on peut dire)sv (que le phonostyle comme l'expressivité //C c'est une question de norme de réception)so] ^{urv} //C
BDU- X	<donc>md <évidemment>ag //S [(un phonostyle)SS //S (va être interprété)SV ///S euh (par un auditeur)SO]urv //C <et>md //C [(on ne peut pas toujours //C savoir)SV (à l'avance)SRd //C (quelles sont les caractéristiques du signal de parole qui vont ///S euh qu'il va associer à un phonostyle particulier)SO]urv //C
BDU- I	<et>md <la fonction du phonostyle>ag //C [(c'est une fonction euh extra euh phonologique)SO]urv <si on veut>ad //C <puisque elle est destinée à montrer //C où à faire exister une communauté d'appartenance>ad [(j'ai dit)SV (tout à l'heure)SRd //C (une profession //C ou des choses comme ça)SO]urv ///T
BDU- R	euh<mais>md <pourtant>md //C