

Las entradas adverbiales de diversos léxicos del francés

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Adverbial entries in different French lexica

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Context in 1970's

- ▶ **Syntactic lexicon** for NLP applications
 - syntactic and semantic information of predicates (verb, noun or adjective)
- ▶ Works in syntax: create general rules, i.e., transformation rules of Chomsky
 - the question is **For each word, this general rule can be applied ?**
- ▶ Objective of M. Gross: to create a large-coverage lexical resource
 - **Lexicon-Grammar tables**

Context now

- ▶ **Lexicon-Grammar tables** for French are a large-coverage lexical resource
- ▶ They contain **syntactic** and semantico-syntactic information
- ▶ Such information is **useful for parsing**
- ▶ Experiments have been done in order to integrate them in a real-life **symbolic parser** [Tolone 2011]
- ▶ We continue to improve the data: focus on **adverbs**
→ conversion in useful lexica for different NLP tasks [Laporte & Voyatzi 2008] [Agirre *et al.* 2008]

1. Lexicon-Grammar tables for French

2. *LGLex* lexicon

3. DELA lexicon

4. Evaluación

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1. Lexicon-Grammar tables for French

Lexicon-Grammar tables

Developed **manually** for over 40 years by the LADL group [Gross 1975], and the Computational Linguistics Group of LIGM (Université Paris-Est)

Methodology:

- ▶ Study the syntax of basic sentences (or **subcategorization frames**)
e.g.: N0 V N1
- ▶ Study of French verbs, adverbs, predicative nouns and adjectives and frozen expressions
→ they **share some features = classes**
- ▶ The different meanings are distinguished
e.g.: *se rendre* 'to surrender / to accept'
- '*rendirse* : *capitular* / *acceptar*'

Principle

- ▶ Each class is described in a **table**:
 - ▶ one row for each (lemma-level) entry
 - ▶ one column for each feature relevant to the class
 - ▶ in each cell, + (resp. -) = the corresponding feature is valid (resp. not valid) for the corresponding entry
- ▶ A class is defined by a set of “**defining features**”
- ▶ For a given table, the defining features include:
 - ▶ a **basic defining** feature (a subcategorization frame)
 - ▶ often additional features (distributional, morphological, transformational, semantic, etc.)
e.g.: N0 =: Nhum → human name

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Table V_33

N0 =; Nhum	N0 =; N-hum	N0 =; Nnr	Ppv	Ppv =; se figé	Ppv =; en figé	Ppv =; les figé	Nég	<ENT>	N0 V	N0 être V-ant	N1 =; Nhum	N1 =; N-hum	N1 =; le fait Qu P	Ppv =; lui	Ppv =; y	N0hum V W sur ce point	[extrap]	<OPT>
+	-	-	<E>	-	-	-	-	renaître	+	+	-	+	-	-	+	-	-	Max renaît au bonheur de vivre
+	-	-	se	+	-	-	-	rendre	+	-	+	+	+	-	+	+	+	Max s'est rendu à mon opinion
+	-	-	se	+	-	-	-	rendre	+	-	+	-	-	-	-	-	-	Le caporal s'est rendu à l'ennemi
+	-	-	<E>	-	-	-	-	renoncer	-	-	+	+	-	-	+	-	-	Max renonce à son héritage

Defining feature: N0 V à N1

Inventory

- ▶ Inventory [Tolone 2011]:
 - ▶ 67 classes of **simple verbs**
 - ▶ 13 872 entries for 5 738 distinct lemmas
 - ▶ 81 classes of **simple and compound predicative nouns** (nouns with argument(s) that are studied with their light verb)
 - ▶ 14 271 entries for 10 112 distinct lemmas
 - e.g.: *Luc monte une attaque contre le fort* 'Luc is launching an attack against the fort' - '*Luque monta un ataque contra el fuerte*'
 - ▶ 69 classes of **frozen expressions**, mostly verbal and adjectival
 - ▶ 39 628 entries for 38 658 distinct lemmas
 - e.g.: *Tu n'arrives pas à la cheville de Marie* 'You don't hold a candle to Mary' - '*no llegarle a los talones / a la suela del zapato*', literally '*You don't arrive at the ankle of Mary*' - '*no llegarle al tobillo*'
 - ▶ 32 classes of **simple and frozen adverbs**
 - ▶ 10 488 entries for 9 326 distinct lemmas
 - e.g.: *difficilement* 'with difficulty' - '*difícilmente*' & [*changer*] *du jour au lendemain* '[to change] overnight' - '*[cambiar] de un día para otro*'

Defining features of adverbs

Table	Defining features	Example
ADVMP...	N0 V Adv W	'Este libro esta en venta exclusivamente en este sitio web' Ce livre est en vente exclusivement sur ce site *Exclusivement, ce livre est en vente sur ce site
ADVMP ADVMS ADVMTF	N0 V Adv W Adv, N0 V W	'Este libro esta en venta regularmente en este sitio web' Ce livre est en vente régulièrement sur ce site Régulièrement , ce livre est en vente sur ce site *Régulièrement, ce livre n'est pas en vente sur ce site
ADVMP	N0 V Adv W Adv, N0 V W Adv, N0 ne V pas W	'Este concierto es musicalmente un éxito' Ce concert est musicalement une réussite Musicalement , ce concert est une réussite Musicalement , ce concert n'est pas une réussite

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Simple adverbs in *-ment* (Table ADVMS)

<ID>	<ENT>Adv	C'est Adv Qu P	N0hum être Adj	Adj-ment, P = Qu N0 V W être Adj de la part de N0	Adj-ment, P = Qu N0 V W être Adj de Poss0 part	N0 se comporter Adj-ment W	N0 vivre Adj-ment W	N0 parler Adj-ment W	N0hum V W de (E+une) (façon+manière) Adj	N0hum V W avec Adj-n	Adj	Adj-n
643	paresseusement	+	+	-	-	-	+	-	+	-	paresseux	<E>
644	partialement	+	+	+	+	-	-	-	+	-	partial	<E>
645	passivement	+	+	-	-	+	-	-	+	+	passif	passivité

Defining structure: Adv

Defining features: N0 V Adv W & Adv, N0 V W

→ 3 203 simple adverbs in *-ment* / *-ly* / *'-mente'* [Molinier & Levrier 2000]

Defining structures of simple and frozen adverbs

Identifier	Morphosyntactic structure	Example	Size
PADV	C	enfin	520
PC	Prép C	par exemple	664
PDETC	Prép Det C	de nos jours	848
PAC	Prép Det Adj C	à la dernière minute	776
PCA	Prép Det C Modif pré-adj Adj	à la nuit tombante	840
PCDC	Prép Det1 C1 de Det2 C2	dans la limite du possible	750
PCPC	Prép Det1 C1 Prép2 Det2 C2	à cent pour cent	287
PCONJ	Prép Det1 C1 Conj Prép2 Det2 C2	tôt ou tard	333
PCDN	Prép Det1 C1 de N2	à l'insu de N	555
PCPN	Prép Det1 C1 Prép2 N2	en comparaison avec N	151
PV	Prép V Prépv Detv Cv	à dire vrai	285
PF	ConjS (Det0 C0 + N0) V Prép1 (Det1 C1 + N1)	jusqu'à ce que mort s'ensuive	396
PECO	(Adj) comme Det C	(fidèle) comme un chien	305
PVCO	(V) comme Det C	(travailler) comme un chien	338
PPCO	comme Prép Det C	(disparaître) comme par enchantement	50
PJC	Conjc Det C1 Prép C2	mais aussi et surtout	185

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Simple and frozen adverbs (Table PCA)

N0 =: Nhum	N0 =: N-hum	Neg obl	Ppv	Précat type	<ENT>Prép	<ENT>Det	<ENT>C	<ENT>Modif pré-adj	<ENT>Adj	Prép Det C	Prép Det Modif pré-adj Adj C	Prép Modif pré-adj Adj C	Conjonction
-	+	-	:se	produire	dans	le	cas	<E>	contraire	-	-	-	+
-	+	-	:se	produire	<E>	le	cas	<E>	échéant	-	-	-	-
-	+	-	:se	produire	à	le	cas	<E>	où	-	-	-	-
-	+	-	:se	produire	dans	le	cas	qui	préoccupe ".Nhum"	-	-	-	-
-	+	-	:se	produire	dans	le	cas	<E>	présent	-	+	-	+
-	+	-	:se	produire	dans	un	cas	<E>	semblable	-	+	-	+

Defining structure: Prép Det C Modif pré-adj Adj

Defining features: N0 V Adv W & Adv, N0 V W & Adv, N0 ne V pas W

→ 7 285 simple and frozen adverbs [Gross 1986b] [Gross 1986a]

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2. *LGLex* lexicon

LGLex

The improvement of the tables enables the extraction of a **syntactic lexicon** for each categories from Lexicon-Grammar tables [Constant & Tolone 2010]:

- ▶ named *LGLex* lexicon
- ▶ generated from the original Excel or CSV tables by the *LGExtract* tool
- ▶ exchange format with the same linguistic concepts of the tables
- ▶ text or XML format
- ▶ the version 3.4 contained *LGLex* for each category at <http://infolingu.univ-mlv.fr/>

Format of *LGLex* lexicon

- ▶ **ID=category_numTable_numEntry**
- ▶ **lexical-info**=[...] → lemma and lexical information (auxiliaries, support verbs, determiners, prepositions)
- ▶ **args**=(...) → arguments and their nature with other information (semantic features, mood of the complementizer phrase, argument controlled by the infinitive, prepositions)
- ▶ **all-constructions**=[...] → list of accepted constructions
- ▶ **example**=[...] → an illustrative example of the entry

LGLex: an example of verb

ID=V_33_131

```
lexical-info=[cat="verb",verb=[lemma="rendre",ppvse="true"],
  aux-list=(etre="true"),prepositions=(),locatifs=())
args=(
  const=[pos="0",dist=(comp=[cat="NP",hum="true",introd-prep=(),introd-loc=(),
  origin=(orig="N0 =: Nhum")],
  const=[pos="1",dist=(comp=[cat="NP",hum="true",introd-prep=(),introd-loc=(),
  origin=(orig="N1 =: Nhum")])])
all-constructions=[absolute=(construction="true::N0 V à N1",construction="o::N0 V",
  relative=())]
example=[example="Le caporal s'est rendu à l'ennemi"]
```

- ▶ entry *se rendre*V_33_131 'to surrender' - 'rendirse'

Adverbial variants in *LGLex*

We added the following fields to lexical-info:

- ▶ **paraphrases:** *franchement* 'frankly' - '*francamente*'
→ à *franchement parler* 'frankly speaking' - '*francamente hablando*'
→ *de (façon+manière) franche* 'in a frank way' - '*de (forma+manera) franca*'
(à Adv parler, P & N0 V W de (façon+manière) Adj)
- ▶ **substructures:** *jusqu'à la fin des (=de les) temps* 'until the end of time' - '*hasta el fin de los tiempos*'
→ *jusqu'à la fin* 'until the end' - '*hasta el fin*'
(Prép1 Det1 C1 derived from the basic structure Prép1 Det1 C1 Prép2 C2)
- ▶ **intensified structures:** *particulièrement* 'particularly' - '*particularmente*'
→ *plus particulièrement* 'more particularly' - '*más particularmente*'
(plus Adv)

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3. DELA lexicon

French morphological lexicon DELA

- ▶ Freely available: <http://infolingu.univ-mlv.fr/english> (Language Resources > Dictionaries > Download)
- ▶ Composed of 683 824 simple entries and 108 436 compound entries [Courtois & Silberztein, 1990]

paresseuse, paresseux.A+d+z1:fs 'lazy' - '*peresosa, peresoso*'

- ▶ *paresseuse*: inflected form of the entry
- ▶ *paresseux*: canonical form (lemma) of the entry
- ▶ *A+d+z1*: sequence of gramatical and semantic information
 - ▶ *A*: adjective
 - ▶ *d*: the adjective occurs after the noun
 - ▶ *z1, z2, z3*: the language register
 - ▶ *z1*: general language (*blague* 'joke' - 'broma')
 - ▶ *z2*: specialized language (*disquette* 'floppy disk' - 'disquete')
 - ▶ *z3*: very specialized (or technical) language (*sérialisation* 'serialization' - 'serialisación')
- ▶ *fs*: inflectional code (feminine singular)

LGLex → DELA: an example

ID=P_advms_643

```
lexical-info=[cat="adv",exprF=[adv=[notperm=[complete="paresseusement"]]],  
paraphrases=(adv="de façon <paresseux>",  
adv="d'une façon <paresseux>",  
adv="de manière <paresseux>",  
adv="d'une manière <paresseux>"),  
autres-ID=(),  
autres-structures=())]
```

The four variants associated in *LGLex* to the adverbial entry *paresseusement* 'lazily' - 'peresosamente' produce in DELA format:

de façon paresseuse, paresseusement.ADV+advms
d'une façon paresseuse, paresseusement.ADV+advms
de manière paresseuse, paresseusement.ADV+advms
d'une manière paresseuse, paresseusement.ADV+advms

'in a lazy way' - 'de (E+una) (forma+manera) peresosa'

[Tolone & Voyatzi 2011] [Tolone et al. 2012a]

Conversion into DELA format

We extracted the list of adverbial variants and we converted them in DELA format, so we have:

- ▶ 20 761 entries **without variables**, after substitutions (<*paresseux*> → *paresseuse*) and deletion of duplicates
 - ▶ Corrections were necessary for two reasons: to improve the quality of entries and to **compare with the current version of DELA**
- ▶ 830 entries contain **variables** like <*A*> (adjective) or *:DNUM* (numerical determiner):

par temps <*A*>, *.ADV+pca*

à <*A*> *échéance*, à *échéance* <*A*>. *ADV+pca*

à *:DNUM franc près*, *.ADV+pca*

- ▶ We had to interpret the variables using **graphs**

Integration in the existing DELA

We merged the entries without variables with the relevant entries present in the existing DELA:

abominablement,abominablement.ADV+advmqi (Lexicon-Grammar table)

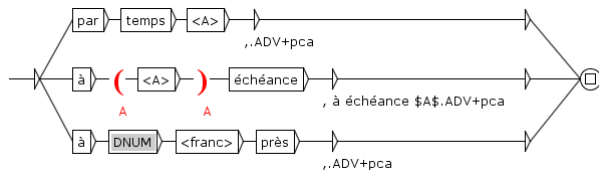
abominablement,abominablement.ADV+z1 (existing DELA)

abominablement,abominablement.ADV+advmqi+z1 (new entry)

'abominably' - 'abominablemente'

We obtained 22 481 final entries merging 9 036 initial entries and 20 761 new entries in DELA format

Graph dictionary: an example



During a corpus processing, this graph can produce the following entries in DELA format:

par temps sec,.ADV+pca

par temps pluvieux,.ADV+pca

à brève échéance, à échéance brève.ADV+pca

à cinq francs près,.ADV+pca

'in dry weather' - 'por tiempo seco'

'in rainy weather' - 'por tiempo lluvioso'

'in the short term' - 'a corto plazo'

'to the very last penny' - 'por un peso'

Number of entries in DELA

	without variables	with variables
Initial entries in DELA	9 036	/
New entries from <i>LGLex</i> (without duplicates entries)	20 761	830
All entries (without duplicates entries)	22 481	(155 graphs)

We enhanced the DELA with 13 445 entries, and we have 830 entries with variables which enable the generation of more entries by using the graph dictionary method

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Corpus anotado

Se han evaluado los datos obtenidos en el corpus de referencia del francés anotado por las expresiones estereotipadas con sus funciones adverbiales [Laporte *et al.* 2008]:

- ▶ <http://infolingu.univ-mlv.fr/corpus/fr-MW-Adv/>
- ▶ contiene 8 794 frases o 168 846 palabras y está compuesto de:
 - ▶ la transcripción de las sesiones de la Asamblea Nacional Francesa del 3 y 4 de octubre 2006
 - ▶ la novela de Jules Verne *Le Tour du monde en quatre-vingt jours*, escrita en 1873

Resultados

Datos utilizados	Número de adverbios anotados
Referencia	3 239 (adverbios estereotipados únicamente)
DELA inicial (9 036 entradas)	3 690
DELA extendido (22 481 entradas)	4 706
Grafos diccionarios (830 entradas con variables)	727
DELA extendido + Grafos diccionarios	5 209

Los grafos diccionarios han permitido reconocer 503 entradas adicionales, 224 entradas ya siendo incluidas en el DELA extendido

Conclusiones y perspectivas

- ▶ Recursos: <http://infolingua.univ-mlv.fr/english>
(Languages Ressources > Lexicon-Grammar > Download)
- ▶ Anotación con el DELA extendido y los grafos diccionarios:
 - ▶ Reconoce adverbios válidos, incluyendo los adverbios simples que no están reconocidos por la referencia, pero también aumenta el ruido
→ filtrar las nuevas entradas añadidas en el DELA para sacar o modificar algunas de ellas
- ▶ Perspectivas:
 - ▶ Convertir las nuevas entradas adverbiales al formato *Lefff* [Sagot 2010] para integrarlas en un analizador sintáctico, como ha sido hecho para los verbos y los nombres predicativos [Tolone & Sagot 2011] [Tolone *et al.* 2012b]
 - ▶ Mejorar el Wordnet del francés con esas entradas adverbiales [Sagot *et al.* 2009]

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5. Evaluation of verbs and predicative nouns

The FRMG parser

A **TAG** parser of French [Thomasset & de La Clergerie 2005]

FRMG fits into a processing chain:

- ▶ upstream
 - ▶ **SXPipe**: segmentation, token, corrections, named entities
 - ▶ **Lefff**: morphological and syntactic lexicon for French
→ connection lexicon/grammar: anchoring with **hypertag**
- ▶ downstream, with a module of **disambiguation** (with heuristics)

The *Lefff*

- ▶ The *Lefff* (Lexique des Formes Fléchies du Français) is a morphological and syntactic lexicon for French [Sagot 2010]
 - ▶ large coverage (536 375 entries corresponding to 110 477 distinct lemmas covering all categories)
 - ▶ freely available (LGPL-LR license)
- ▶ It relies on the *Alexina* framework for the modeling and acquisition of morphological and syntactic lexicons

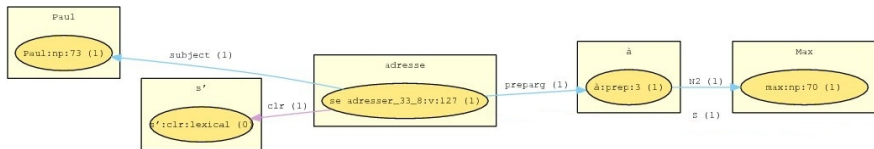
Integration in the FRMG parser

Only verbs and nouns predicatives

- ▶ We replaced the *Lefff* with a modified version of the *Lefff* in which verb entries are replaced by $LGLex_{Lefff}$
- ▶ We added nominal entries of $LGLex_{Lefff}$
- ▶ We kept other entries of the *Lefff*

The result is a **variant of FRMG**, named $FRMG_{LGLex}$ unlike the standard variant denoted by $FRMG_{Lefff}$

Example of dependencies in FRMG



Paul s'adresse à Max 'Paul talks to Max' - 'Paul se dirige a Max'
 → entry *s'adresser* V_33_8

Protocol used

- ▶ We evaluated FRMG_{Leff} and FRMG_{LGLex} by parsing the manually annotated part of the 1st Passage parsers' evaluation campaign of 2007 [Hamon *et al.* 2008]
 - ▶ 4 306 sentences of EASy annotated corpus + 400 new sentences : various genres (journalistic, medical, oral, questions, literacy, etc.)
- ▶ evaluation metrics: those of the first EASy parsers' evaluation campaign that took place in December 2005 [Paroubek *et al.* 2006]
 - ▶ evaluation in **chunks** and **relations** (~ dependencies between lexical words)

Preliminary remarks

FRMG_{LGLex}'s results must be analyzed with the following facts in mind:

- ▶ FRMG_{LGLex}'s verb entries are the result of a conversion process from the original tables
→ this conversion process certainly introduces errors
- ▶ the majority of predicative nouns can not be evaluated because FRMG does not consider those with determiners
- ▶ Passage does not allow to evaluate all the information contained in tables (e.g. semantic features)
- ▶ the *Lefff* was developed in parallel with the EASy and Passage campaigns (unlike Lexicon-Grammar tables)
- ▶ *LGLex_{Lefff}* does not contain all necessary verb entries; we added other ones
→ all verb entries are not encoded

Results

Passage : Comparative results of FRMG_{Leff} and FRMG_{LGLex} (in terms of f-measure):

Sub-corpus	Chunks		Relations	
	FRMG _{Leff}	FRMG _{LGLex}	FRMG _{Leff}	FRMG _{LGLex}
general_lemonde	88.22%	84.60%	62.73%	59.01%
litteraire_2	88.91%	88.46%	65.28%	62.43%
mail_9	82.60%	81.90%	58.55%	56.00%
medical_3	85.04%	85.89%	64.79%	65.26%
oral_delic_4	78.80%	81.79%	51.67%	51.14%
questions_amaryllis	91.30%	90.73%	66.56%	64.77%
<i>total</i>	87.05%	<i>85.53%</i>	63.10%	<i>60.25%</i>

Parsing times higher with FRMG_{LGLex} than with FRMG_{Leff}: the median parsing time per sentence is 0,62s vs. 0,26s

- ▶ this comes from the higher average number of entries per verb lemma (approx. 3) in *LGLex* than in the *Leff*
→ more ambiguity

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