

# **Optional semester project**

## **Communication application for children with speech disabilities on Android platform**

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# Outline

- **The problem and solution**
- **Demo**
- **Technicalities**
- **Converting picture sequence into sentence(s)**
- **Future work**

# Recap...

- **The problem**

- for children without ability to speak
- no French apps available
- very limited functionality or expensive

- **Solution: Android Application**

- Free
- ease of use
- icons into French/English sentences

- **Collaborating with:**

- AAC specialists from Arasaac.org, Spain
- Disabled children care institution in Swiss

# **Demo...**

**P.S. People like it as a toy to learn Frech too**



Je ne veux pas manger de  
cerises sucré

me	nous	on	verbes	adv.place
te	vous	négation	objets	qualités
lui	eux	vouloir	aliments	expr.comun
lui	eux	pouvoir	être	avoir
ça	passé	futur	point	question



Je ne veux pas manger de  
cerises sucré

## verbes



manger



acheter



reposer



accrocher



acheter



acquérir



amoureux



appeler



arriver





manger

manger



marcher

marcher



maltraiter

maltraiter



essuyer les mains

essuyer les mains



rappeler

rappeler



raconter

raconter



deranger

déranger

ns

# Deliverables

- **App. freely available at GitHub**
  - Open Source and will continue the project
  - Will submit to Android Market
  - Will advertice us: ARASAAC in Spain; RNT in France
- **Icon set processed and tools**
  - Django app
  - 18 icons modified
  - user documentation
- **Extra**
  - SimpleNLG modified
  - Replacement for gesture search



# Some Technicalities

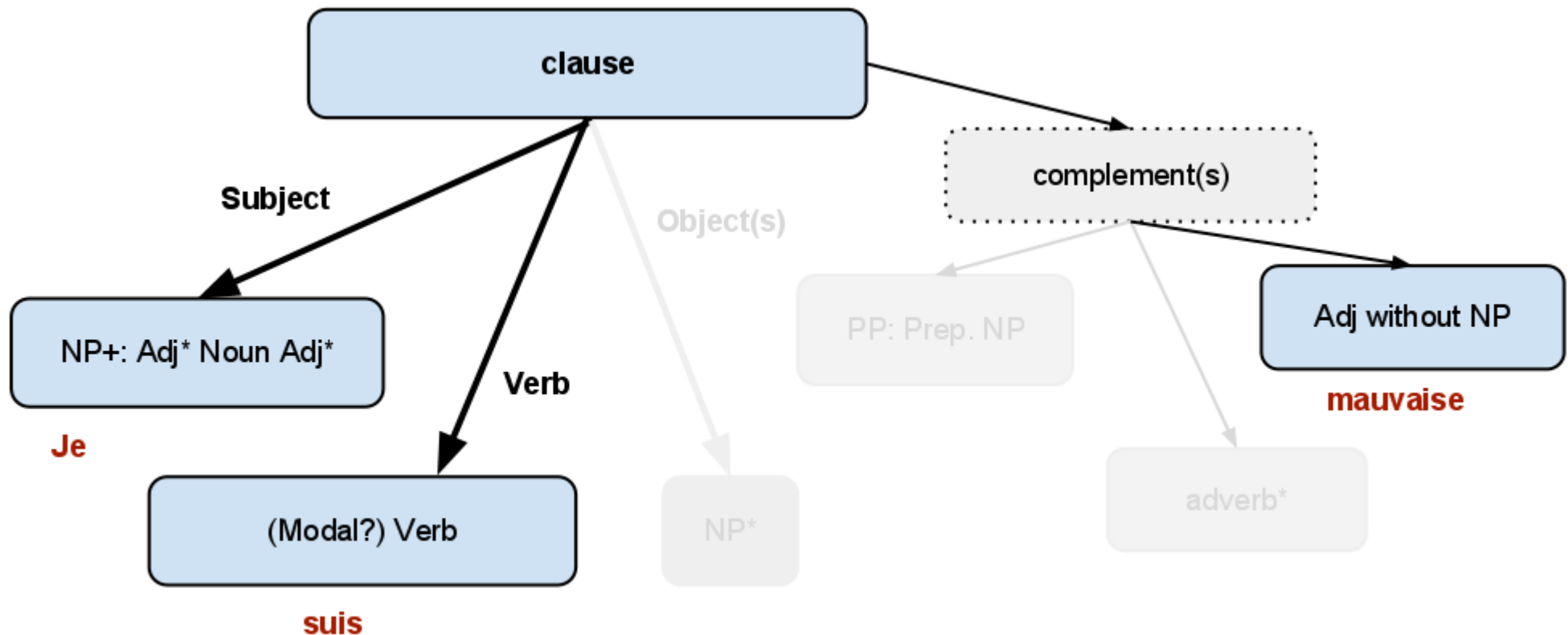
- **SimpleNLG lib. issues**
  - DOM parser rewritten into XmlPull
  - Memory use decreased; loads 30% quicker
- **Loading large number of bitmaps**
  - *GridView* with *CursorAdapter*
  - Separate asynchronous thread
  - WeakReference and `bitmap.recycle()` for Garbage Collector
- **Downloading zip and pipelined extraction**
  - 5,7K files
- **MergeCursor**
  - merge 2+ Cursors
  - Q. which cursor? A. Add fake "field": '1 AS source'

# Pictures into Sentence

## Simple 1/2

**Input:** je [feminin] etre mauvais

**Output:** je suis mauvaise

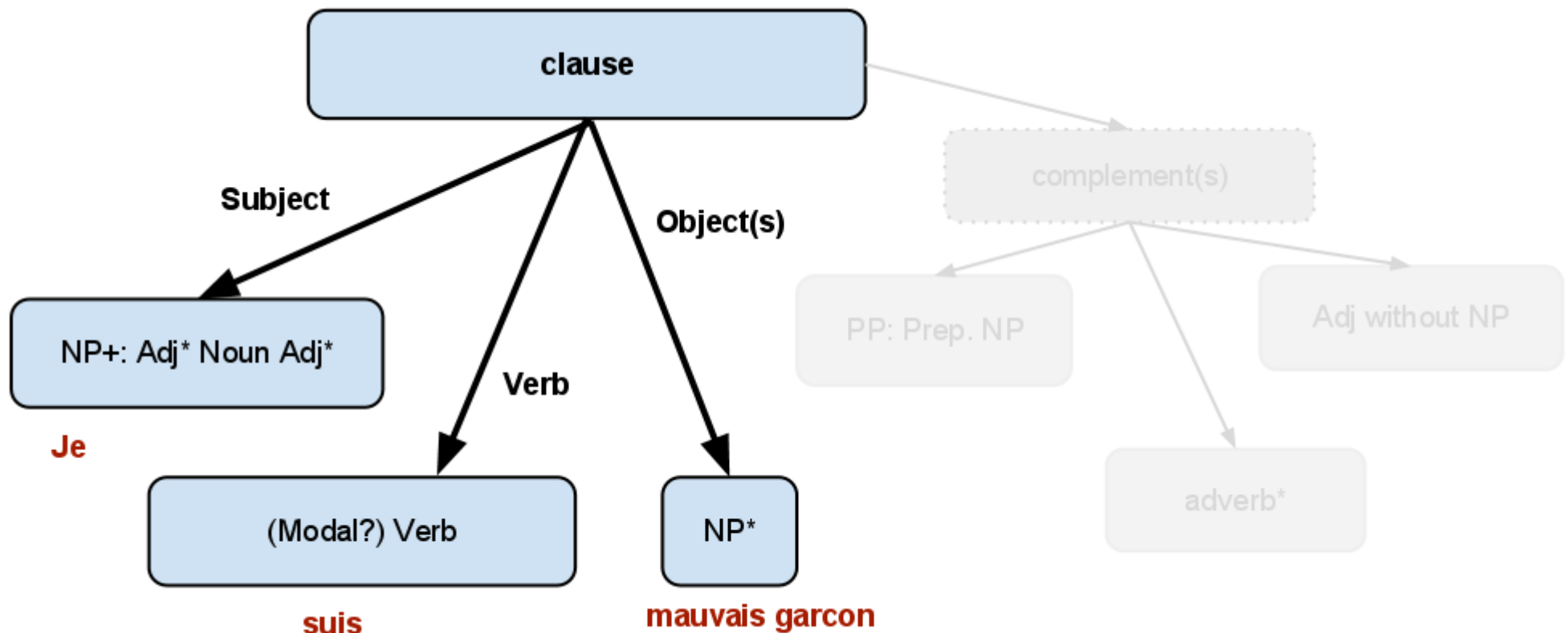


# Pictures into Sentence

## Simple 2/2

**Input:** je [feminin] etre mauvais garçon

**Output:** je suis mauvais garçon

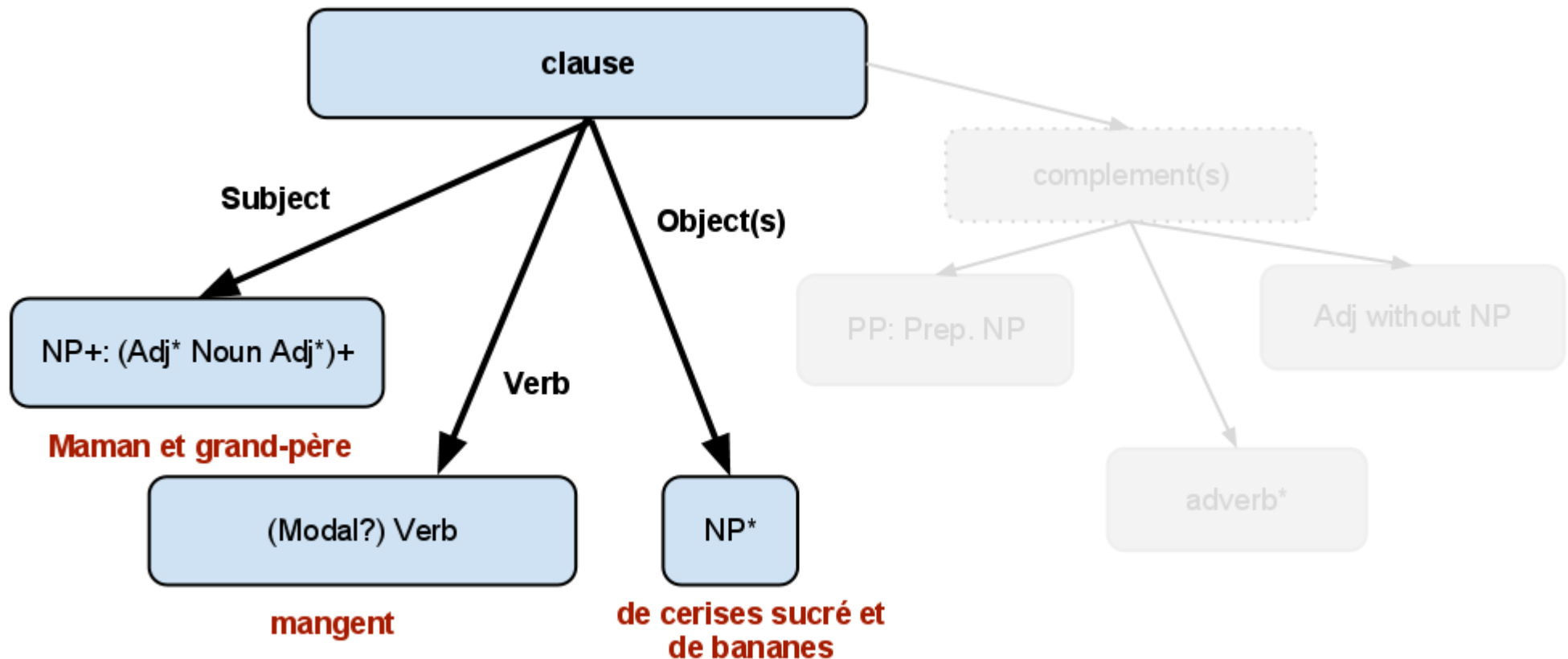


# Pictures into Sentence

## More complex 1/3

**Input:** Maman grand-père manger cerises sucré  
bananes

**Output:** Maman et grand-père mangent de cerises sucré et de bananes

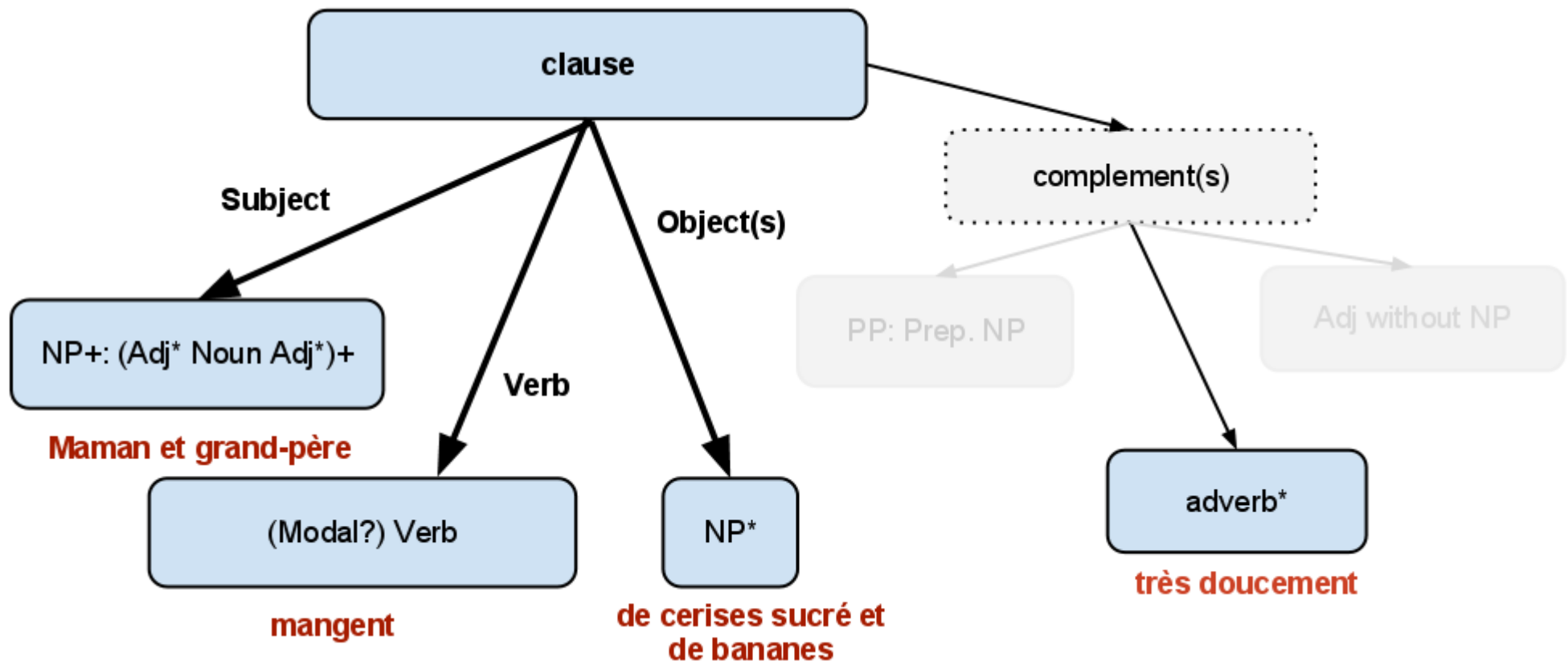


# Pictures into Sentence

## More complex 2/3

**Input:** Maman grand-père manger cerises sucré  
bananes très doucement

**Output:** Maman et grand-père mangent très doucement de cerises sucré  
et de bananes

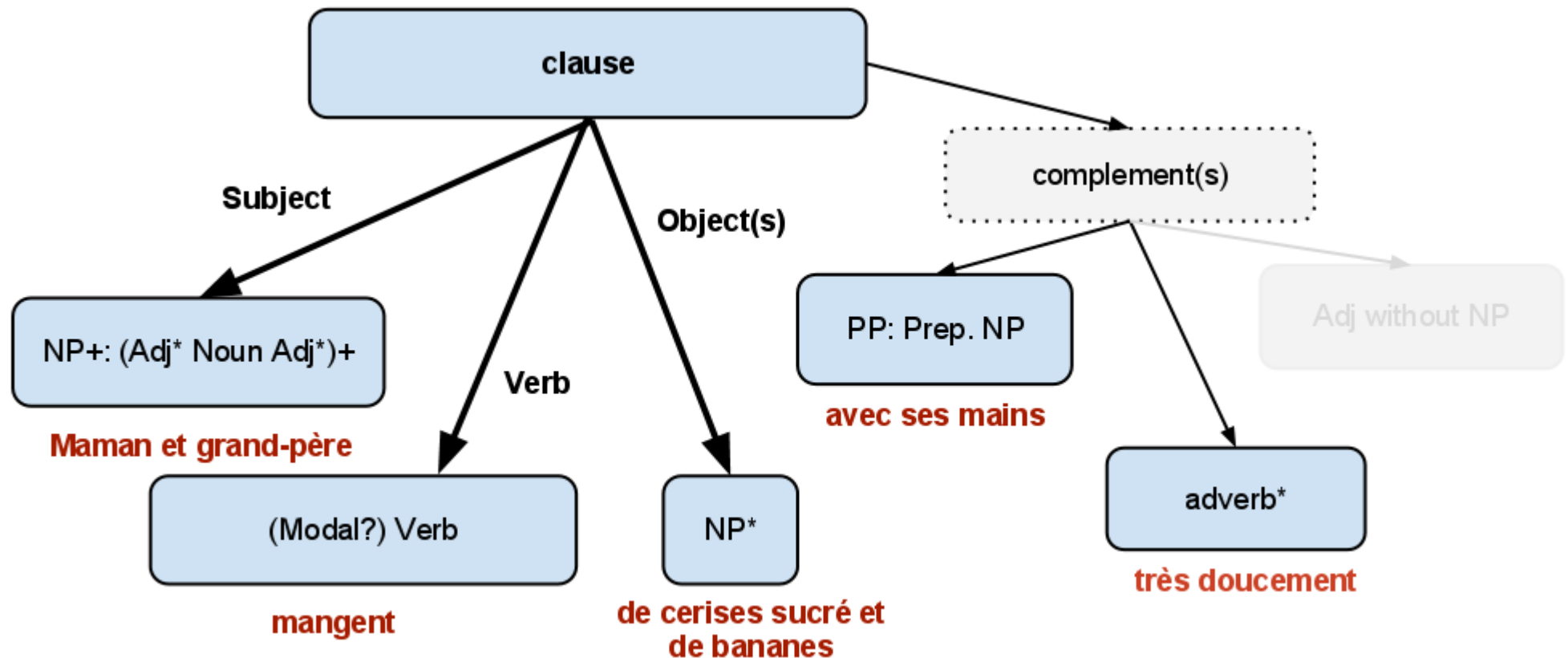


# Pictures into Sentence

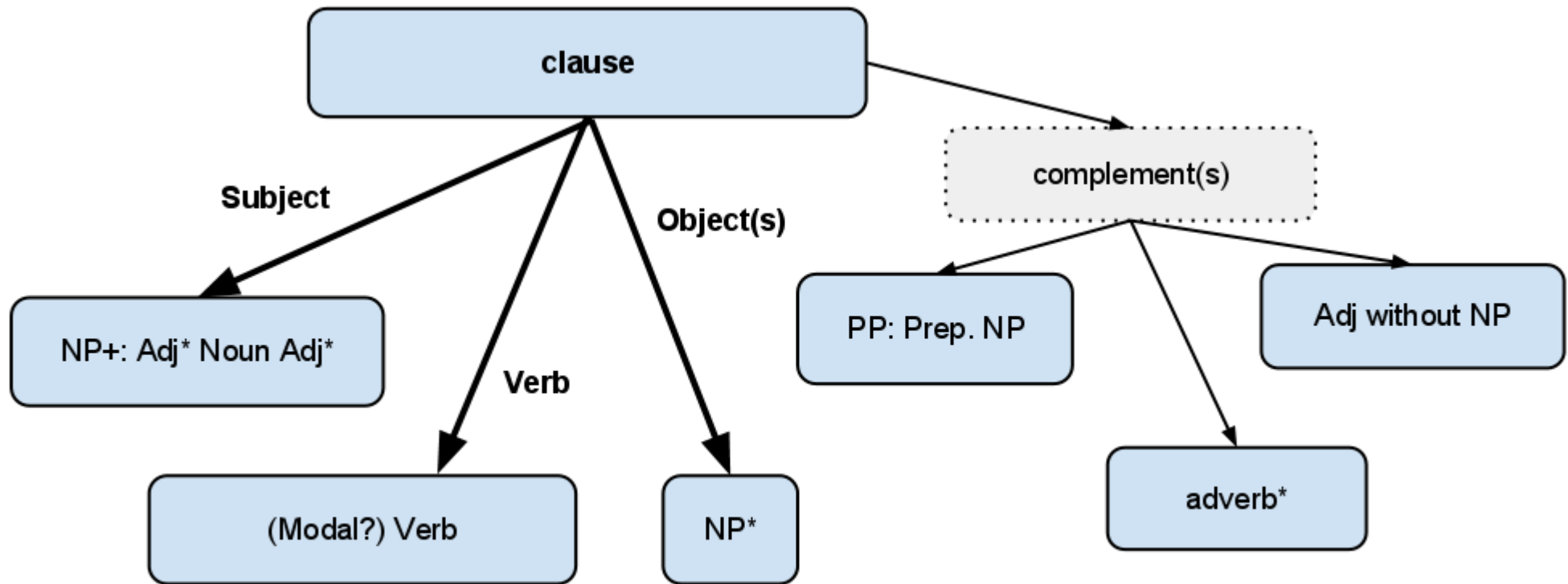
## More complex 3/3

**Input:** Maman grand-père manger cerises sucré  
bananes très doucement avec ses mains

**Output:** Maman et grand-père mangent très doucement de cerises sucré  
et de bananes avec ses mains



# The simplified grammar



# Pictures into Sentence: Algorithm

- Match L-to-R:
  1. NP coordinate(s) greedily until  $w \notin (N, Adj)$ 
    - 1) First subject
    - 2) Other objects & guess specifier (de, à)
  2. Prepositional Phrase
  3. Adverb or Adjectives as Complements
  4. Verbs (modal, verb)
- Apply other: tenses, negation, question, dot etc



# Future work

- **Improve Dataset**
  - Better part-of-speech tags
- **Improve NLG**
  - compound words
  - English support
- **Further UI improvements**
  - for tablets
  - adding words on the device
  - more linguistic options / possibilities
    - Gender, number, determinant

**Questions...**

