How many conversions from verb to noun are there in French?

Delphine Tribout
LLF and Université Paris Diderot-Paris 7

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Abstract

In this paper, I discuss verb to noun conversion in French. The properties of the input verb and the output noun are presented and a formal representation is proposed using the SBCG framework. The use of such a formalism based on constraints and multiple inheritance highlights the difficulties in defining what exactly is a conversion rule. I propose that the different properties of the input verb and the output noun can be thought of as different dimensions of classification, which characterize the verb noun conversion rule.

1 Introduction

1.1 A definition of conversion

Conversion is a lexeme formation process characterized by two main properties. On the one hand the base lexeme and the derived lexeme are phonologically identical, as the examples in (1) show. In English, GLUE as a verb is identical to GLUE as a noun. As for French, the verb COLLER is identical to the noun COLLE, the inflectional marks being not taken into account.

(1) engl. (A) GLUE (TO) GLUE
(TO) WALK (A) WALK

fr. COLLE COLLE(R)
MARCHE(R) MARCHE

Thus, conversion is very different from affixation processes like those presented in (2), which always add some phonological material to the base lexeme in order to form the derived lexeme. In HOSPITALIZE and PRESENTATION the added material is a suffix, whereas in UNTIE the added material is a prefix.

(2) HOSPITAL HOSPITALIZE
PRESENT PRESENTATION
(TO) TIE UNTIE

On the other hand, the two lexemes involved in a conversion necessarily are from two different parts of speech. This can be seen in the examples (1) where GLUE or COLLE are nouns whereas (TO) GLUE or COLLER are verbs and (TO) WALK or MARCHER are verbs whereas (A) WALK or MARCHE are nouns. Once again this is very different from affixation, which can form a lexeme within the same part of speech, like *un-* prefixation in English which forms a verb out of a verb.

Both noun to verb conversion and verb to noun conversion are very productive processes in French. In this paper I will only focus on verb to noun conversion.

1.2 Conversion within Sign-Based Construction Grammar

In the lexeme-based theory of morphology adopted here (see (Matthews, 1972), (Aronoff, 1994)), the basic unit of morphology is the lexeme, which is defined as a multidimensional object having at least a form, a meaning and a syntactic category. Since the lexeme has properties of different kind, a feature structure based formalism, like Sign-Based Construction Grammar framework (henceforth SBCG, (Sag, 2010)), seems to be an appropriate means to formally represent the lexemes and the lexemes formation rules. SBCG is a feature structure formalism based on attribute-value structure, and is a constraints based declarative model.

In this model, the constructions are organized in a hierarchy of types, which is presented in Figure 1. The *lexical-cxt* type and the *phrasal-cxt* are two sub-types of *construction*. The *lexical-cxt* type further has three sub-types: *derivational-cxt* (*deriv-cxt*), *inflectional-cxt* (*infl-cxt*) and *post-inflectional-cxt* (*pinfl-cxt*).

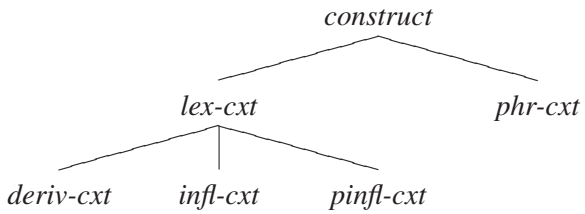

FIGURE 1: Hierarchy of constructions in SBCG, taken from (Sag 2010)

Each sub-type of the hierarchy inherits the properties of its super-type and has its specific ones. These properties are defined as features structures associated to each type. For instance, to the *deriv-cxt* type is associated the contrainst in (3), which stipulates that the derived lexeme (identified as *mother* –MTR feature), has a non empty list of lexical signs as bases (identified as *daughters* –DTRS feature).

(3) $$\textit{deriv-cxt} : \begin{bmatrix} \text{MTR} & \textit{lexeme} \\ \text{DTRS} & \textit{nelist(lex-sign)} \end{bmatrix}$$

In order to account for conversion, I propose to distinguish two sub-types of *deriv-cxt*: an *affixation-cxt* type and a *conversion-cxt* type, as sketched in Figure 2. The *conversion-cxt* type can be further divided into different sub-types of conversion, such as *v2n-conv-cxt* to account for verb to noun conversion, or *n2v-conv-cxt* to account for noun to verb conversion. Since I will only focus on the verb to noun conversion, I leave the hierarchy unfinished. Thus, conversion (*conv-cxt*) can be defined by the constraint (4).

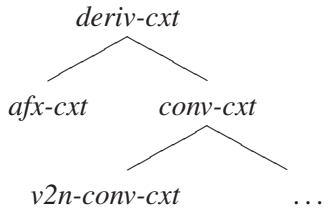

FIGURE 2: Sub-types of *deriv-cxt* and *conv-cxt*

(4)

$$\textit{conv-cxt}: \left[\begin{array}{ll} \text{MTR} & \left[\begin{array}{ll} \text{PHON} & \phi \\ \text{SYN} & \left[\text{CAT} \quad Y\right] \\ \text{SEM} & \left[\text{FRAMES} \quad L_1 \oplus \ldots\right] \end{array}\right] \\ \text{DTRS} & \left\langle \left[\begin{array}{ll} \text{PHON} & \phi \\ \text{SYN} & \left[\text{CAT} \quad X\right] \\ \text{SEM} & \left[\text{FRAMES} \quad L_1\right] \end{array}\right] \right\rangle \end{array}\right]$$

This constraint says

i) that on phonological level the two lexemes are identical (PHON features),

ii) that the two lexemes have different categories (CAT features), and

iii) that the derived lexeme's meaning includes that of the base lexeme (SEM features).

Having defined conversion in this way, verb to noun conversion is thus only characterized by the constraint in (5) which says that the derived lexeme is a noun and the base lexeme is a verb. The other properties of the verb to noun conversion, like those regarding the phonological features, follow from the inheritance of the *conv-cxt* type.

(5)

$$\textit{v2n-conv-cxt}: \left[\begin{array}{ll} \text{MTR} & \left[\text{SYN} \mid \text{CAT} \quad \textit{noun}\right] \\ \text{DTRS} & \left\langle \left[\text{SYN} \mid \text{CAT} \quad \textit{verb}\right] \right\rangle \end{array}\right]$$

2 Stem spaces for verbs and nouns

2.1 Presentation

Based on the notion of morphome from (Aronoff, 1994), Bonami and Boyé (2002) propose that each French verb has a list of indexed morphomic stems, organised in stem space. The verbal stem space worked out by Bonami and Boyé (2002) is presented in Table 1. The stem slots are linked to one another by implicative rules. For instance by default stem 2 is identical to stem 1, stem 3 is identical to stem 2... Each slot is used to build a part of the paradigm: for instance stem 1 is used to inflect the present 1^{st} and 2^{nd} person plural forms (*lavons, lavez, finissons, finissez, mouron, mourez, buvons, buvez*) and all imperfect forms (e.g. *buvais, buvais, buvait, buvions, buviez, buvaient*).

#	stem's use	LAVER	FINIR	MOURIR	BOIRE
1	imperfect, pres. 1 2pl	lav	finis	muʁ	byv
2	present 3pl	lav	finis	mœʁ	bwav
3	present sg	lav	fini	mœʁ	bwa
4	present participle	lav	finis	muʁ	byv
5	imperative 2sg	lav	fini	mœʁ	bwa
6	imperative 1 2pl	lav	finis	muʁ	byv
7	pres. subjv. sg & 3pl	lav	finis	mœʁ	bwav
8	pres. subjv. 1 2pl	lav	finis	muʁ	byv
9	infinitive	lave	fini	muʁi	bwa
10	future, conditional	lav	fini	muʁ	bwa
11	simple past, past subjv.	lava	fini	muʁy	by
12	past participle	lave	fini	mɔʁt	by

TABLE 1: Stem space of LAVER '(to) wash', FINIR '(to) finish', MOURIR '(to) die' and BOIRE '(to) drink'

Bonami and Boyé (2005) propose that adjectives have a stem space too. This stem space is presented in Table 2. Stem 1 is used to inflect the masculine form (*joli, petit, grand, fin*), while stem 2 is used to inflect the feminine form (*jolie, petite, grande, fine*) and to derive lexemes (e.g. *joliment* 'prettily', *petitesse* 'smallness', *grandeur* 'greatness', *finesse* 'thinness').

As for nouns, based on the adjectival stem space worked out by Bonami and Boyé (2005), Plénat (2008) proposes the stem space presented in Table 3. Stem 1 is used to form the singular (*fleur, dent, plomb, bouton*), while stem 2 is used to derive lexemes (e.g. *fleuriste* 'florist', *dentiste* 'dentist', *plombier* 'plumber', *boutonnière* 'buttonhole').

#	JOLI	PETIT	GRAND	FIN
1	ʒoli	pəti	gʁɑ̃	fɛ̃
2	ʒoli	pətit	gʁɑ̃d	fin

TABLE 2: Stem space of JOLI 'pretty', PETIT 'small' GRAND 'great' and FIN 'thin'

#	FLEUR	DENT	PLOMB	BOUTON
1	flœʁ	dɑ̃	plɔ̃	butɔ̃
2	flœʁ	dɑ̃t	plɔ̃b	butɔn

TABLE 3: Stem space of FLEUR 'flower', DENT 'tooth' PLOMB 'lead' and BOUTON 'button'

2.2 Consequences for lexeme-formation rules

The postulation of stem spaces has consequences on lexeme-formation rules. Indeed, since lexemes have a stem space, morphological rules must take a whole stem space as input and build a whole stem space as output. For instance, as pointed out by (Bonami and Boyé, 2006), the *-aire* suffixation forms stem 2 of the adjective by suffixing /ɛʁ/ to the noun stem 1, and *-eur/-euse* suffixation forms stem 1 of the adjective by suffixing /œʁ/ to the verb stem 1, and stem 2 of the adjective by suffixing /øz/ to the verb stem 1. The constraints proposed by (Bonami and Boyé, 2006) to account for these two lexeme-formation rules are presented below in (6) and (7).

(6) *-aire-adj-lxm*:

$$\left[\begin{array}{ll} \text{MTR} & \left[\begin{array}{ll} \text{STEMS} & \left[\text{SLOT-2} \quad \boxed{1}\oplus\text{ɛʁ}\right] \\ \text{SYN} & \left[\text{CAT} \quad \textit{adj}\right] \end{array}\right] \\ \text{DTRS} & \left\langle\left[\begin{array}{ll} \text{STEMS} & \left[\text{SLOT-1} \quad \boxed{1}\right] \\ \text{SYN} & \left[\text{CAT} \quad \textit{noun}\right] \end{array}\right]\right\rangle \end{array}\right]$$

(7) *-eur/-euse-adj-lxm*:

$$\left[\begin{array}{ll} \text{MTR} & \left[\begin{array}{ll} \text{STEMS} & \left[\begin{array}{ll} \text{SLOT-1} & \boxed{1}\oplus\text{œʁ} \\ \text{SLOT-2} & \boxed{1}\oplus\text{øz} \end{array}\right] \\ \text{SYN} & \left[\text{CAT} \quad \textit{adj}\right] \end{array}\right] \\ \text{DTRS} & \left\langle\left[\begin{array}{ll} \text{STEMS} & \left[\text{SLOT-1} \quad \boxed{1}\right] \\ \text{SYN} & \left[\text{CAT} \quad \textit{verb}\right] \end{array}\right]\right\rangle \end{array}\right]$$

As for conversion, the consequence is a new definition of the process. Instead of the identity between the PHON features of the two lexemes, as stated in constraint (4), conversion is now characterized by the identity between one stem of the base lexeme and one stem of the derived lexeme, as presented in the constraint (8).

(8)
$$\textit{conv-cxt}: \left[\begin{array}{ll} \text{MTR} & \left[\begin{array}{ll} \text{STEMS} & \left[\text{SLOT-n} \quad \boxed{1}\right] \\ \text{SYN} & \left[\text{CAT} \quad Y\right] \\ \text{SEM} & \left[\text{FRAMES} \quad L_1 \oplus \ldots\right] \end{array}\right] \\ \text{DTRS} & \left\langle \left[\begin{array}{ll} \text{STEMS} & \left[\text{SLOT-m} \quad \boxed{1}\right] \\ \text{SYN} & \left[\text{CAT} \quad X\right] \\ \text{SEM} & \left[\text{FRAMES} \quad L_1\right] \end{array}\right] \right\rangle \end{array}\right]$$

2.3 Postulating an additional verb stem : stem 0

The new definition of conversion presented in (8) still encounters a problem with second conjugation verbs. Indeed, with second conjugation verbs the form of the noun is never identical to that of the verb, nor to any of the verbal stems, because the verbs systematicaly present an ending /i/ or /is/ which is absent from the noun, as can be seen in Table 4.

Noun			**Verb**			
Lexeme		Stem 2	Lexeme		Stem 1	Stem 3
COLLE	'glue'	kɔl	COLLER	'(to) glue'	kɔl	kɔl
CLOU	'nail'	klu	CLOUER	'(to) nail'	klu	klu
FLEUR	'blossom'	flœʁ	FLEURIR	'(to) blossom'	flœʁis	flœʁi
FARCE	'stuffing'	faʁs	FARCIR	'(to) stuff'	faʁsis	farsi

TABLE 4: Examples of noun verb conversion with 1^{st} and 2^{nd} (below the double line) conjugation verbs

For conjugation, Bonami and Boyé (2003) have argued that there is no strong argument in favor of inflectional classes in French. So that the ending /i/-/is/ of the second conjugation verbs (e.g. *(je) finis* '(I) finish', *(nous) finissons* '(we) finish') must not be analyzed as part of the inflectional marks and can be considered as part of the stems. However, in derivation 2^{nd} conjugation verbs behave differently from other verbs, since they always have an additionnal /i/ or /is/. I thus propose to

add a new stem to the verbal stem space worked out by Bonami and Boyé : stem 0. This additional stem is only used for derivation, and is identical to stem 3 minus the final /i/ for 2^{nd} conjugation verbs, whereas it is identical to stem 3 for all other verbs.

With that stem 0, one stem of the converted verb is identical to one stem of the base noun, as shown in Table 5. So that the definition in (8) still holds.

Noun		**Verb**			
Lexeme	Stem 2	Lexeme	Stem 0	Stem 1	Stem 3
COLLE	kɔl	COLLER	kɔl	kɔl	kɔl
CLOU	klu	CLOUER	klu	klu	klu
FLEUR	flœʁ	FLEURIR	flœʁ	flœʁis	flœʁi
FARCE	faʁs	FARCIR	faʁs	faʁsis	farsi

TABLE 5: Noun verb conversion using stem 0

Thus, stem 0 allows us to account for every noun verb conversion, whatever conjugation group the derived verb belongs to. Moreover, besides conversion, this stem 0 is relevant for all derivational rules involving a second conjugation verb, such as adjective to verb conversion (e.g. ROUGE 'red' ROUGIR 'turn red') or deadjectival *en-* prefixation (e.g. RICHE 'rich' ENRICHIR 'enrich').

3 Properties of verb>noun conversion

3.1 Verb stem selection

Most of the time stem 0 is the base of the derived noun, like the examples in Table 6.

Verb				**Noun**		
Lexeme		Stem 0	Stem 3	Lexeme		Stem 2
DANSER	'(to) dance'	dãs	dãs	DANSE	'(a) dance'	dãs
MARCHER	'(to) walk'	maʁʃ	maʁʃ	MARCHE	'(a) walk'	maʁʃ
SAUTER	'(to) jump'	sot	sot	SAUT	'(a) jump'	sot
BONDIR	'(to) leap'	bɔ̃d	bɔ̃di	BOND	'(a) leap'	bɔ̃d
ENCH RIR	'(to) bid'	ãʃeʁ	ãʃeʁi	ENCH RE	'(a) bid'	ãʃɛʁ

TABLE 6: Verb noun conversions selecting stem 0

Bonami, Boyé and Kerleroux (2009) have shown that a thirteenth stem is needed in the verbal stem space to account for derived lexemes in *-ion, -if* and *-eur/-*

rice such as CORR LATION ‘correlation’ derived from CORR LER ‘(to) correlate’, FORMATEUR ‘formative’ derived from FORMER ‘(to) form’, or ALTERNATIF ‘alternative’ derived from ALTERNER ‘(to) alternate’. This stem is hidden to inflection rules and is only used in derivation. By default it is identical to stem 11 $\oplus$ /t/. Table 7 presents some examples of lexemes derived from stem 13 of their base verb.

Verb		Stem 11	Stem 13	**Derivative**
ALTERNER	‘to alternate’	altɛʁna	altɛʁnat	ALTERNATEUR, ALTERNATIF
CORR LER	‘to correlate’	koʁela	koʁelat	CORR LATION, CORR LATIF
D FINIR	‘to define’	defini	definit	D FINITION, D FINITIF
FORMER	‘to form’	fɔʁma	fɔʁmat	FORMATION, FORMATEUR

TABLE 7: Examples of lexemes derived from stem 13

Kerleroux (2005) has shown that this stem 13 can be selected by verb noun conversion too, like in the case of the examples in Table 8.

Verb				**Noun**	
Lexeme		Stem 0	Stem 13	Lexeme	Stem 2
CORR LER	‘(to) correlate’	koʁɛl	koʁelat	CORR LAT	koʁelat
CONCEVOIR	‘(to) conceive’	kɔ̃swa	kɔ̃sɛpt	CONCEPT	kɔ̃sɛpt
D FENDRE	‘(to) defend’	defã	defãs	D FENSE	defãs
FORMER	‘(to) form’	fɔʁm	fɔʁmat	FORMAT	fɔʁmat
POSTULER	‘(to) postulate’	postyl	postylat	POSTULAT	postylat

TABLE 8: Verb noun conversions selecting stem 13

As for the data in (9) I consider them as verb to noun conversion too. Only, those nouns are based on stem 12 of the verb (past participle stem). There are two main reasons for considering them as conversion : first, no affix is added so that they cannot be analyzed as suffixed nouns ; second, the noun is always identical to the past participle stem of the verb, whatever its conjugation is, as shown in Table 9.

(9)

ARRIVER	‘(to) arrive’	ARRIV E	‘arrival’
D COUVRIR	‘(to) discover’	D COUVERTE	‘discovery’
SORTIR	‘(to) go out’	SORTIE	‘exit’
VENIR	‘(to) come’	VENUE	‘coming’

In this particular case it might be difficult to tell whether the nouns are derived from the past participle word-form or stem. But the meaning of those nouns is a

Verb			Noun	
Lexeme	Stem 0	Stem 12	Lexeme	Stem 2
ARRIVER	aʁiv	aʁive	ARRIV E	aʁive
D COUVRIR	dekuvʁ	dekuvɛʁt	D COUVERTE	dekuvɛʁt
SORTIR	sɔʁ	sɔʁti	SORTIE	sɔʁti
VENIR	vjɛ̃	vəny	VENUE	vəny

TABLE 9: Verb noun conversions selecting stem 12

good argument in favor of the stem base, since those nouns do not show any piece of the meaning of the inflected past participle word-form. Indeed, the meaning of ARRIV E is not 'something which has arrived' but it is 'the action of arriving' or 'the location where one arrives', nor is the meaning of VENUE 'something which has come' but it is 'the action of coming'.

As we have seen, different stems of one verb can serve as the base of a converted noun. In the main case the input stem is stem 0. But, as the examples in Table (8) and Table (9) show, stem 13 and stem 12 can be the input of conversion too. It seems that there are 3 sub-cases of verb to noun conversion, depending on which verbal stem is selected as input. The *v2n-conv-cxt* can thus be divided into three sub-types : *stem-0-conv*, *stem-12-conv* and *stem-13-conv*, as illustrated in the Figure 3.

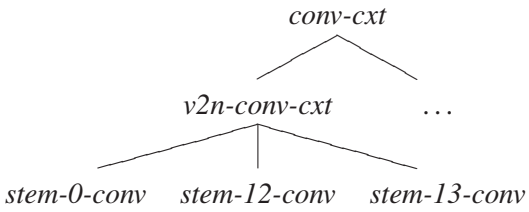

FIGURE 3: Hierarchy of verb noun conversion

To each sub-type of verb noun conversion is also associated the constraints (10)-(12).

(10) *stem-0-conv*:
$$\begin{bmatrix} \text{MTR} & \left[\text{STEMS} \mid \text{SLOT-2} \quad \boxed{1}\right] \\ \text{DTRS} & \left\langle \left[\text{STEMS} \mid \text{SLOT-0} \quad \boxed{1}\right] \right\rangle \end{bmatrix}$$

(11) *stem-12-conv*:
$$\begin{bmatrix} \text{MTR} & \left[\text{STEMS} \mid \text{SLOT-2} \quad \boxed{1}\right] \\ \text{DTRS} & \left\langle \left[\text{STEMS} \mid \text{SLOT-12} \quad \boxed{1}\right] \right\rangle \end{bmatrix}$$

(12) *stem-13-conv*:
$$\begin{bmatrix} \text{MTR} & \left[\text{STEMS} \mid \text{SLOT-2} \quad \boxed{1}\right] \\ \text{DTRS} & \left\langle \left[\text{STEMS} \mid \text{SLOT-13} \quad \boxed{1}\right] \right\rangle \end{bmatrix}$$

Constraint (10) says that the noun stem 2 is identical to the verb stem 0 and accounts for nouns like MARCHE, SAUT, BOND... (11) says that the noun stem 2 is identical to the verb stem 12 which accounts for nouns such as ARRIV E, D - COUVERTE, VENUE... And (12) says that the noun stem 2 is identical to the verb stem 13 and accounts for nouns like R SULTAT, D FENSE, CONCEPT...

3.2 Noun meaning

On the output side, the converted nouns can have a wide range of meanings. They can denote the same event as the base verb like those in (13a), the result of the process denoted by the verb as in (13b), the patient of the process (13c), the agent of the process (13d), a location related to the process (13c) or an instrument helping to realize the process (13f).

(13) a. process	st-0	MARCHER 'walk'	MARCHE 'walk'
	st-12	ARRIVER 'arrive'	ARRIV E 'arrival'
	st-13	D FENDRE 'defend'	D FENSE 'defence'
b. result	st-0	AMASSER 'heap up'	AMAS 'heap'
	st-12	RELEVER 'take in'	RELEV 'statement'
	st-13	CRACHER 'spit'	CRACHAT 'spit'
c. patient	st-0	AFFICHER 'put up'	AFFICHE 'poster'
	st-12	COUVER 'brood'	COUV E 'brood'
	st-13	POSTULER 'postulate'	POSTULAT 'postulate'
d. agent	st-0	GUIDER 'guide'	GUIDE 'guide'
	st-13	RENIER 'renounce'	REN GAT 'renegade'
e. location	st-0	D CHARGER 'dump'	D CHARGE 'dump'
	st-12	ENTRER 'enter'	ENTR E 'entrance'
	st-13	ACC DER 'access'	ACC S 'access'
f. instr.	st-0	R VEILLER 'wake up'	R VEIL 'alarm-clock'

The different meanings a noun may have are independent from the verb stem it is derived from. Event nouns can be derived from the three possible input stems as shown in (13a). Result nouns can be derived from stem 0 (AMAS) as well as from stem 12 (RELEV) or stem 13 (CRACHAT). Patient nouns can be derived from the three verbal stems too, but these are much less common than event and result nouns. Location nouns can derive from the three verbal stems, but only two of them derive from stem 13. Instrument meaning is restricted to nouns derived from stem 0. As for agent nouns, they are very few : about ten agent nouns derive from stem 0 like GUIDE, and only two from stem 13 : REN GAT and SYNDICAT.

Those six semantic types of converted nouns can be seen as six sub-types of verb noun conversion, so that the hierarchy of *v2n-conv-cxt* can be represented in the Figure 4.

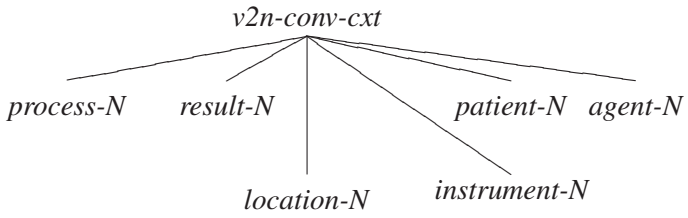

FIGURE 4: Semantic sub-types of verb noun conversions

To each semantic sub-type can be associated a constraint like for example, the constraint in (14) for the event nouns, or the constraint (15) for patient nouns[1]. For the process sub-type, the constraint in (14) only says that the semantics of the noun is identical to the semantics of the verb. As for the patient type, the constraint in (15) stipulates that the semantics of the noun includes the semantics of the verb, and that the noun refers to the patient of the process denoted by verb.

(14)

$$\textit{process-N}: \left[\begin{array}{ll} \text{MTR} & \left[\text{SEM} \quad \boxed{1}\right] \\ \text{DTRS} & \left\langle\left[\text{SEM } \boxed{1} \left[\begin{array}{ll} \text{INDEX} & s \\ \text{FRAMES} & \left\langle\left[\text{SIT } s\right]\right\rangle \end{array}\right]\right]\right\rangle \end{array}\right]$$

[1]Constraints associated to the other semantic sub-types are presented in (Tribout, 2010)

(15)

$$\textit{patient-N}: \left[\begin{array}{ll} \text{MTR} & \left[\text{SEM} \left[\begin{array}{ll}\text{INDEX} & j\\ \text{FRAMES} & \langle \boxed{1} \rangle\end{array}\right]\right] \\ \text{DTRS} & \left\langle \left[\text{SEM} \left[\begin{array}{ll}\text{INDEX} & s\\ \text{FRAMES} & \left\langle \boxed{1} \left[\begin{array}{ll}\textit{agent-pat-fr} & \\ \text{AGENT} & i\\ \text{PAT} & j\\ \text{SIT} & s\end{array}\right] \right\rangle\end{array}\right]\right] \right\rangle \end{array}\right]$$

3.3 Noun gender

As for the gender, converted nouns can be either masculines or feminines. There are no constraints with respect to the semantic type of the noun, as shown in Table 10. Nor are there any constraints with respect to the selected stem of the verb, although some combinations are lacking.

	Masculine nouns			**Feminine nouns**		
	st-0	st-12	st-13	st-0	st-12	st-13
process	SAUT	D FIL	ASSASSINAT	MARCHE	ARRIV E	D FENSE
result	AMAS	RELEV	CRACHAT	ENTAILLE	EMPREINTE	R PONSE
patient	RABAT		POSTULAT	AFFICHE	COUV E	PROMESSE
agent	GUIDE		REN GAT	MARMOTTE		
location	D BARRAS	D BOUCH	ACC S	D CHARGE	ENTR E	
instr.	R VEIL			RALLONGE		

TABLE 10: Noun gender according to the selected verb stem and the noun meaning

Masculine and feminine nouns can be seen as 2 sub-types of converted nouns as illustrated in Figure 5. To these sub-type are associated the constraints (16) and (17). The constraint in (16) only says that the derived noun is masculine, while the constraint in (17) says that the derived noun is feminine.

(16)

$$\textit{masc-conv-N}: \left[\begin{array}{ll} \text{MTR} & \left[\text{SYN} \left[\begin{array}{ll}\text{CAT} & \textit{noun}\\ \text{GENDER} & \textit{masc}\end{array}\right]\right] \\ \text{DTRS} & \left\langle \left[\text{SYN} \mid \text{CAT} \quad \textit{verb}\right] \right\rangle \end{array}\right]$$

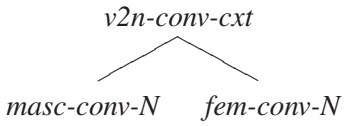

FIGURE 5: Sub-types of verb noun conversions according to noun gender

(17)
$$\textit{fem-conv-N}: \begin{bmatrix} \text{MTR} & \begin{bmatrix} \text{SYN} & \begin{bmatrix} \text{CAT} & \textit{noun} \\ \text{GENDER} & \textit{fem} \end{bmatrix} \end{bmatrix} \\ \text{DTRS} & \left\langle \begin{bmatrix} \text{SYN} \mid \text{CAT} & \textit{verb} \end{bmatrix} \right\rangle \end{bmatrix}$$

4 Defining the verb>noun conversion rule

To account for those properties of the base verb and the derived noun, the conversion rule must specify the verbal stem taken as input, the meaning of the derived noun as well as its gender. It has been shown that on the verb stem level the *v2n-conv-cxt* type can be further divided into three sub-types : *stem-0-conv*, *stem-12-conv* and *stem-13-conv*. On the semantic level *v2n-conv-cxt* type can be divided into six sub-types : *process-N*, *result-N*, *patient-N*, *agent-N*, *location-N* and *instrument-N*. And, on the noun gender level, *v2n-conv-cxt* type can be divided into *masc-conv-N* and *fem-conv-N*. Thus, there are three different hierarchies of *v2n-conv-cxt* according to the property we want to focus on, as illustrated in Figure 6.

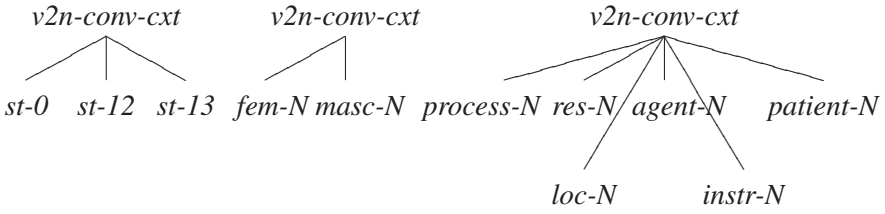

FIGURE 6: Problematic hierarchies of *v2n-conv-cxt*

In order to solve this conflict between different hierarchies, the three discussed properties of verb noun conversion can be thought of as three different dimensions of classification, as illustrated in Figure 7. Each converted noun inherits a property

of these three dimensions of classification by means of multiple inheritance.

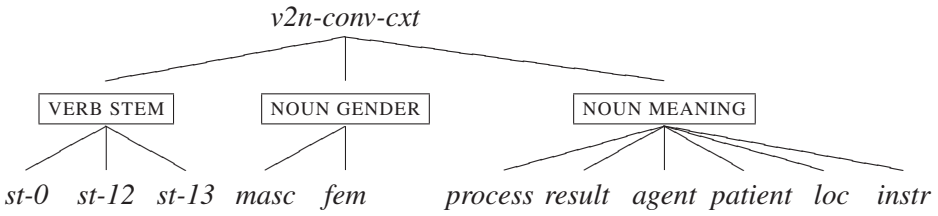

FIGURE 7: *v2n-conv-cxt*'s dimensions of classification

The inheritance of one property from each of the three dimensions of classification leads to 36 possible distinct cases. However it is worth noting that only 27 distinct combinations between a verb stem, a gender and a meaning are observed. This is still a wide range of possibilities, even if some combinations are less common than others. It thus seems that verb to noun conversion is unable to make any prediction about the output. The 27 observed combinations are presented in Figure 8, wich is hardly readable. This figure raises the question of the exact definition of the conversion rule, leading to the question of the number of verb to noun conversions in French. Is there only one verb to noun conversion rule identified by the top node of the tree in Figure 8 and the contraint in (5)? In that case the output of the rule is unpredictable. Or are there 27 distinct and highly specific rules accounting for the different observed cases? Or else, 3 conversion rules depending on the input verb stem, or 6 rules depending on the derived meaning? It seems that what speakers must know about verb noun conversion when using it are the three dimensions of classification presented in Figure 7. Indeed, even though nine of them were not observed, there is no reason to think that some combinations are impossible.

5 Conclusion

The different properties of verb noun conversion have been presented and it has been shown that these properties can be thought of as different dimensions of classification. The verb noun conversion rule can thus be characterized in terms of these dimensions of classification. The question that arises now is wether these dimensions of classification are peculiar to verb noun conversion.

As already pointed out in (Bonami et al., 2009), different deverbal lexeme-formation rules use different verb stem as input such as stem 1, stem 3 or stem 13. As for noun meaning, *-ion*, *-age*, *-ment*... suffixations in French, which form a noun out of a verb, produce the same semantic types of nouns as verb noun conversion. Moreover, those deverbal nouns can be masculine or feminine depending

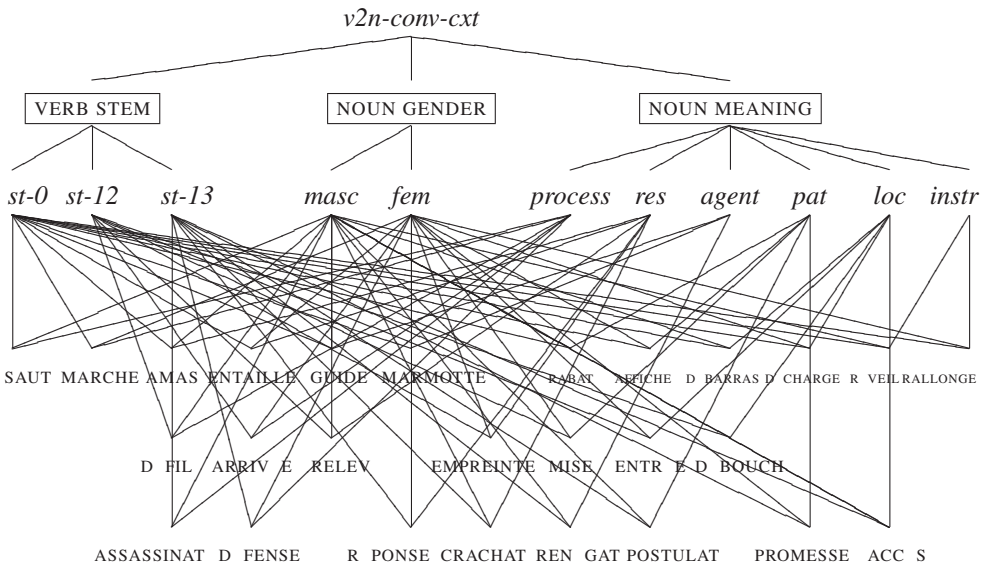

FIGURE 8: The 27 observed combinations between a verb stem, a noun gender and a noun meaning

on the suffixation rule. It thus seems that the dimensions of classification proposed for verb noun conversion are not peculiar to this derivational process, and should be shared by other nouns forming deverbal rules. How to represent this in the SBCG framework is still in question.

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