# Agentivity and Suffix Selection[1]

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# 1 Introduction

In French, as in most languages, the process of deriving nouns from verbal stems is a fairly regular process, and one which has been argued to involve argument structure processes (e.g., Grimshaw 1990, Laczkó 2000, Markatonatou 1995). In particular, there has been much discussion of the licensing of syntactic arguments of the deverbal noun and the effect of the nominalizing suffix on the argument structure of the base verb. However, there has been rather less work on the more subtle issue of which verbal stems are compatible with which nominalizing suffixes and why. One recent paper on this question is Barker 1998 on English *-ee,* as in *attendee*.

In this paper, I would like to show which principles determine the selection of the French suffixes *-age* and *-(e)ment*.

For noun derivation in French, several authors have proposed accounts of suffix selection, claiming that *-age* attaches to transitive verbs and *-(e)ment* is added to intransitive, reflexive or passivized verbs. We shall see that this is not sufficient for an account of these nominalization patterns. Rather, the lexical argument structure properties of the verbal bases must be analyzed more precisely in terms of Dowty's (1991) notion of Proto-Roles.

The paper is structured as follows: First, I will give a descriptive analysis of derivations with *-age* and *-(e)ment,* and a short summary of previous studies of the competition between these two suffixes, showing that not all cases are covered by the traditional analyses (the Transitivity and the Action Hypothesis); second, I will present a proposal within the framework of Lexical Mapping Theory (LMT), which I will call the [– o] Hypothesis and which explains most, but not all of the data, and third, I will present an approach elaborating Dowty's (1991) Proto-Roles with LMT. I call this approach the Agentivity Principle.

However, there are still counterexamples. They will be explained by a diachronic view of the data, and also by blocking mechanisms that play a role in the derivation processes discussed in this paper. The membership in special vocabulary domains may also produce counterexamples. Words that have disappeared from the lexicon, and words that came into the language within the last decades give further evidence for the analysis proposed here.

The conclusion will be that the selection of the French suffixes *-age* and *-(e)ment* is not due to syntactic properties of the base such as transitivity / intransitivity, but to a calculation of Proto-Role property sets.

## 2 Descriptive analysis

Historically there are a number of suffixes by which French nouns expressing an action or the result of an action have been derived from verbs. The following competing noun-forming suffixes are attested:

(1)

| | |
|---|---|
| *-ade* | *bousculade* 'hustle' |
| *-age* | *abattage* 'felling' |
| *-aison* | *comparaison* 'comparison' |
| *-ance* | *espérance* 'hope' |
| *-at* | *résultat* 'result' |
| *-ation* | *centralisation* 'centralization' |
| *-ée* | *traversée* 'going through' |
| *-(e)ment* | *glissement* 'gliding' |
| *-erie* | *tricherie* 'cheating' |
| *-is* | *cliquetis* 'jingling, clicking' |
| *-ure* | *blessure* 'injury' |
| (*-ing* | *feeling* 'feeling') (in loan words) |

These suffixes further compete with conversion and 'affixless derivation' as in (2):

(2) *le venir* 'coming'
*le vol* 'flight'
*la nage* 'swimming'

However, the productivity of the mentioned suffixes varies widely: above all, *-ation* and its allomorphs is productive today, and also *-age* and *-(e)ment*, the first being a non-native suffix combining almost exclusively with learned stems; the latter are native suffixes choosing native stems as bases. Affixless derivation is productive in familiar speech.

In the following, I will only examine transparent derivations and derivatives without a meaning shift, nominals such as *gouvernement* 'government' will not be considered.

Among the French suffixes deriving nouns, *-age* and *-(e)ment* are particularly interesting in that they yield more than 400 pairs of nominalizations derived from the same verbal base. These pairs were found by searching the FRANTEXT corpus of the *Institut National de la Langue Française* (INaLF).

The examples in (3) illustrate that both suffixes under consideration here derive masculine nouns. Both are productive, and there are derivations from all three

French verb classes, suggesting considerable similarity of the formal morpho-syntactic properties of the base verbs and of the output nouns:

(3) *-age:* -er (class 1): *lavage* 'washing'
-ir (class 2): *brunissage* 'burnishing'
-re (class 3): *battage* 'beating'

*-(e)ment:* -er (class 1): *changement* 'changing'
-ir (class 2): *agrandissement* 'enlargement'
-re (class 3): *battement* 'beating'

# 3 Previous Approaches

## 3.1 The Transitivity Hypothesis

Although the question of which kind of verb base combines with which suffix has been the topic of many studies, the distribution of the affixes has not been explained satisfactorily. Dubois (1962, 1999), Trésor (1971ff) and Lüdtke (1978) claim that there is a tendency for *-age* to select transitive verb stems, whereas, *-(e)ment* selects intransitive, reflexive and passivized verb stems, with 'passivized' meaning a so-called 'result passive'. Consider the examples in (4) to (6):

(4) a. *battage* 'beating' < *battre*$_{tr}$ 'beat, thresh'
b. *battement* 'beating (of the heart)' < *battre*$_{intr}$ 'beat'

(5) a. *étirage* 'stretching (of metal)' < *étirer*$_{tr}$ 'stretch'
b. *étirement* 'stretching of oneself' < *étirer*$_{refl}$ 'stretch'

(6) a. *gonflage* 'pumping (of a tire)' < *gonfler*$_{tr}$ 'pump up'
b. *gonflement* 'expansion (of a tire)' < *gonflé*$_{pass}$ 'pumped up'

But there are counterexamples that cannot be explained by these approaches, see (7) and (8). The intransitive verb *fureter* 'search' selects *-age*, and the transitive *essouffler* derives *essoufflement* by adding *-(e)ment*.

(7) *furetage* 'searching' < *fureter*$_{intr}$ 'search'

(8) *essoufflement* 'losing of one's breath < *essouffler*$_{tr}$ 'make lose one's breath'

## 3.2 The Action Hypothesis

In contrast to Dubois (1962, 1999), Trésor (1971) and Lüdtke (1978), Zwanenburg (1984) and Debaty-Lyca (1986) subsume all suffixes deriving deverbal nouns under one derivation type (Zwanenburg 1984) or one suffix expressing ACTION (Debaty-Luca 1986), thus blurring the undoubtedly existing selection differences. Debaty-Luca assumes that the different suffixes are all allomorphs of a single morpheme ACTION.

## 3.3 Summary

These and other similar examples indicate that neither the Transitivity Hypothesis, nor even less, the Action Hypothesis can give a satisfactory explanation of suffix selection of *-age* and *-(e)ment*.

However, this first glance at the data gives the impression of a connection between *-age* and agentivity, and I shall try to model this within the LMT framework in section 4.

# 4 An LMT Approach: the [– o] Hypothesis

Most of the data presented in the previous sections can be elegantly explained by LMT's intermediate level of argument classification, i.e., by the intrinsic argument classification (e.g. Bresnan & Kanerva 1989, Bresnan & Zaenen 1990) for arguments and grammatical functions, using the features [± r] (for restricted and unrestricted) und [± o] (for objective and non objective) for both grammatical functions and thematic roles. The features predict the appropriate mapping of thematic roles onto grammatical functions. (9) shows the features of Grammatical Functions, (10) the intrinsic features of thematic roles.

(9) Grammatical Functions classified by features

| Grammatical Functions | Features | |
|---|---|---|
| SUBJ | [– r, – o] | r: restricted, o: objective |
| OBJ | [– r, + o] | |
| $OBJ_\theta$ | [+ r, + o] | |
| $OBL_\theta$ | [+ r, – o] | |

(10) Intrinsic features of thematic roles

| Thematic Roles | Features | Possible Mappings |
|---|---|---|
| agent | [– o] | SUBJ / OBL |
| theme / patient | [– r] | SUBJ / OBJ |
| locative | [– o] | SUBJ / OBL |

In the following, we will need especially the [– o] feature for the agent role. A combination of these features and a thematic role hierarchy as in (11) results in the appropriate mapping of thematic roles onto grammatical functions:

(11) Thematic Hierarchy:

agent > beneficiary > experiencer / goal > instrument > patient / theme > locative

**[– o] Hypothesis on Suffix Selection**

The claim here will be that the French suffixes are selected according to the [± o] / [± r] features of the first argument of their verbal base. In the competition between *-age* and *-(e)ment*, the hypothesis predicts that *-age* is chosen whenever we find a [– o] feature for the first argument and that *-(e)ment* is selected in cases where we do not find a [– o] feature for the first argument of the verbal base.

In the following, I give the LMT analyses for some of the verbs listed in (4) to (8). Consider the analysis of *battre* in (12). French transitive *battre* 'beat' has an agent- and a patient-argument. Intrinsically, the first argument has the feature [– o] and is mapped onto the SUBJ function. The patient-argument has the feature [– r] and is mapped onto the OBJ function according to mapping principles. The [– o] Hypothesis predicts the selection of the suffix *-age*, and we get the derivative *battage.*

(12)

| | BATTRE 'beat' | <arg1 agent | arg2> patient | | |
|---|---|---|---|---|---|
| | | \| | \| | | |
| Intrinsic | | [– o] | [– r] | | |
| | | \| | \| | | |
| GF | | SUBJ | OBJ | → | battage |

The other transitive verbs can be analyzed in the same way. The intransitive *fureter* 'search' also presents the [– o] feature for the first argument and therefore selects the *-age* derivation. Consider (13):

| | | | | |
|---|---|---|---|---|
| (13) | FURETER | <arg1> | | |
| | 'search' | agent | | |
| | | \| | | |
| Intrinsic | | [– o] | | |
| | | \| | | |
| GF | | SUBJ | → | furetage |

Thus, unlike the simpler Transitivity Hypothesis, LMT predicts the correct selection of *-age* even for intransitive verbs.

For the selection of *-(e)ment,* the [– o] Hypothesis also makes the correct predictions for the intransitive and for the passivized cases. For the result passive[2] cases like *est gonflé* in *Le pneu est gonflé* 'The tire is pumped up', we do not have a [– o] feature, and therefore *gonflé* cannot combine with *-age*, but it combines with *-(e)ment*, giving *gonflement.*

| | | | | |
|---|---|---|---|---|
| (14) | EST GONFLÉ | <arg1> | | |
| | 'pumped up' | theme | | |
| | | \| | | |
| Intrinsic | | [ – r] | | |
| | | \| | | |
| GF | | SUBJ | → | gonflement |

However, for the reflexive and the transitive *-(e)ment*-cases, LMT errs in predicting *-(e)ment*-selection but rather *-age*-selection because of the [– o] feature of the first argument; consider (15): we get *étirage*, although we should get *étirement.*

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[2] I assume here an analysis of the result passive as copula plus an adjectival passive here. For a discussion see Bresnan (1982, 2001) and Levin / Rappaport (1986). True verbal passives trigger *-age*-selection, because there is still the [– o] feature of the first argument, whereas in the adjectival passive cases, the [– o] argument is not in the argument structure any more; compare (i) for the verbal passive and (ii) for the adjectival passive:

(i) Le pneu a été gonflé (par Max). → le gonflage du pneu par Max
theme agent
[– r] [– o]

With *gonflement*, there is no [– o] feature, and therefore, the indication of an agent is impossible:

(ii) le gonflement du pneu *par Max

| | | | | | |
|---|---|---|---|---|---|
| (15) | S'ÉTIRER | < arg1 | arg2> | | |
| | 'stretch oneself' | agent | patient | | |
| | | \| | \| | | |
| Intrinsic | | [– o] | [– r] | | |
| | | \| | \| | | |
| GF | | SUBJ | OBJ | → | *étirage |
| | | | ↓ | | |
| | | | se | | |

It can be observed nevertheless that when an agentive verb selects *-(e)ment*, the agent is in some sense 'worse' or 'less agentive' than in the cases where *-age* is selected. So we evidently need a finer grained notion of agentivity in order to account for the data examined here. With Dowty's Proto-Role approach we can in fact obtain such a framework.

## 5 Proto-Roles (Dowty 1991)

In Dowty's (1991) proposal, there are no atomic roles such as AGENT and PATIENT, but he assumes different entailments or properties for prototypical agent and patient respectively. He lists the following AGENT properties:

(16) a. volitional involvement in the event or state
b. sentience (and / or perception)
c. causing an event or change of state in another participant
d. movement (relative to the position of another participant)
e. exists independently of the event named by the verb

Dowty further assumes the Argument Selection Principle in (17):

(17) **Argument Selection Principle** (Dowty 1991: 576)
In predicates with grammatical subject and object, the argument for which the predicate entails the greatest number of Proto-Agent properties will be lexicalized as the subject of the predicate; the argument having the greatest number of Proto-Patient entailments will be lexicalized as the direct object.

However, Dowty's Argument Selection Principle does not account for the selectional behavior of *-age* and *-(e)ment*: e.g., there is nothing said about argument selection for the passive voice or for reflexive verbs[3].

# 6 Elaboration of Proto-Roles and LMT

## 6.1 Previous elaborations of LMT and Proto-Roles

As far as I am aware, previous approaches have not attempted to elaborate LMT with Proto-Roles, which would allow for a gradation of agentivity (Zaenen 1993, Ackerman / Moore 2001). In her 1993 paper, Zaenen already presents a combination of Dowty's Proto-Roles with LMT, replacing the LMT Role Hierarchy by Proto-Role Properties. However, the principles she introduces, serving to ensure mapping of unergative and unaccusative arguments, meet the same problems as standard LMT mapping principles for the data to be analyzed here: they do not distinguish between 'good' and 'worse' agents.
What we need is a selection criterion based on the Proto-Agent Properties proposed by Dowty.

## 6.2 Agentivity Principle

In order to account for the data presented in this paper, I assume the following Agentivity Principle:

**Agentivity Principle**
The French suffix *-age* combines with verb stems whose first argument is proto-agentive, whereas the French suffix *-(e)ment* combines with verb stems whose first argument is less proto-agentive.

In section 7, I will present an Analysis of the data using the Agentivity Principle.

# 7 Analysis of the data using the Agentivity Principle

In the following examples, the first arguments decide the choice of *-age* or *-(e)ment*, and therefore, I will only list the agent-properties of the first arguments.
In the first case in (18), (19) and Figure 1.1 and 1.2 we will deal with the transitive vs. intransitive case (*battre*$_{\text{tr}}$ 'beat, thresh' vs. *battre*$_{\text{intr}}$ 'beat').

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3 But see Ackerman / Moore 2001.

The number of proto-agent entailments or properties (a: volition, b: sentience, c: cause, d: movement, e: existence) is important for the choice of *-age* and *-(e)ment* if both can in principle attach to one and the same verbal stem: *-age* is added if many proto-agent properties are present, *-(e)ment* is attached if there are fewer. In a sentence like (18) we have four agent properties; whereas, in (19), there is only one agent property.

(18) Max bat les tapis. > battage
'Max beats the carpets.'

| PRED | agent-properties of $arg_1$ | suffix | derivation |
|---|---|---|---|
| battre <SUBJ OBJ> | a, b, c, e | -age | battage |

Figure 1.1

(19) Le cœur bat. > battement
'The heart beats.'

| PRED | agent-properties of $arg_1$ | suffix | derivation |
|---|---|---|---|
| battre <SUBJ> | e | -(e)ment | battement |

Figure 1.2

In the second case, the transitive vs. reflexive distinction: *étirer*$_{tr}$ 'stretch' vs. *s'étirer*$_{refl}$ 'stretch', the number of proto-agent properties is decisive for the choice of *-age* and *-(e)ment* again: for the transitive verb, we have more proto-agent properties than for the reflexivized verb, as seen in (20) and (21) and Figures 2.1 and 2.2. For the first argument in (20), there are four agent-properties, and *-age* is attached. For the first argument in (21) there are only three agent-properties, and accordingly *-(e)ment* is selected.

(20) Max étire le métal. > étirage
'Max stretches the metal.'

| PRED | agent-properties of $arg_1$ | suffix | derivation |
|---|---|---|---|
| étirer <SUBJ OBJ> | a, b, c, e | -age | étirage |

Figure 2.1

(21) Max s'étire en baillant. > étirement
'Max stretches himself, yawning.'

| PRED | agent-properties of $arg_1$ | suffix | derivation |
|---|---|---|---|
| s'étirer <SUBJ> | a, b, e | -(e)ment | étirement |

Figure 2.2

Nearly the same holds for the third case, active *gonfler* and the 'result passive' *est gonflé* in (22) and (23). The difference is that the argument in the adjectival passive case has only one agent property, and therefore we get an *-(e)ment* derivative.

(22) Max gonfle le pneu. > gonflage
'Max pumps the tire up.'

| PRED | agent-properties of $arg_1$ | suffix | derivation |
|---|---|---|---|
| gonfler <SUBJ OBJ> | a, b, c, e | -age | gonflage |

Figure 3.1

(23) Le pneu est gonflé. > gonflement
'The tire is pumped up.'

| PRED | agent-properties of $arg_1$ | suffix | derivation |
|---|---|---|---|
| est gonflé <SUBJ> | e | -(e)ment | gonflement |

Figure 3.2

The Agentivity Principle also explains the cases in which *-(e)ment* attaches to transitive verbal stems and the cases where *-age* combines with intransitive bases, consider (24), (25) and Figure 4.1 and 4.2: the first argument of *fureter* 'search' has four proto-agent properties, and *-age* is selected. With *essoufler* we have only two proto-agent properties, and we get an *-(e)ment*-derivative.

(24) Max a fureté (dans tous les coins). > furetage
'Max has searched (in all corners).'

| PRED | agent-properties of $arg_1$ | suffix | derivation |
|---|---|---|---|
| fureter <SUBJ> | a, b, c, e | -age | furetage |

Figure 4.1

(25) Les efforts l'ont essoufflé. > essoufflement
'The efforts made him lose his breath.'

| PRED | agent-properties of SUBJ | suffix | derivation |
|---|---|---|---|
| essouffler <SUBJ OBJ> | c, e | -(e)ment | essoufflement |

Figure 4.2

## 8 Apparent counterexamples

Most derivatives with *-age* and *-(e)ment* follow the Agentivity Principle, but there exist counterexamples that can be explained by a diachronic view of the data, blocking mechanisms and the membership in special vocabulary domains.

### 8.1 Explaining counterexamples from a diachronic view

The *-(e)ment* suffix comes from Latin *-mentum*, deriving verbal nominals, e.g.

(26) FRANGERE 'break' > FRAGMENTUM 'piece broken off, fragment'
ORNARE 'prepare; equip' > ORNAMENTUM 'ornament; equipment'

In contrast to Latin, where *-mentum* derived nouns expressing the result or the instrument of the action conveyed by the base verb as in (26), the French suffix *-(e)ment* has derived action nouns since Old French period.
The suffix *-age* stems from Latin *-aticus*, and unlike *-mentum*, *-(a)ticus* in general did not derive nouns but adjectives; consider (27): AQUATICUS is a derivative of AQUA, and SILVATICUS of SILVA.

(27) AQUA 'water' > AQUATICUS 'of or belonging to water'
SILVA 'wood' > SILVATICUS 'belonging to woodland'

Only very few deverbal adjectives are attested, e.g. (28):

(28) DONARE 'give, present' > DONATICUS 'formally presented'

In French, there are denominal derivatives of adjectives with *-age* until the sixteenth century. Although the first deverbal nouns derived by *-age* are already attested for the thirteenth century, it is more or less productive only since the fourteenth century

(examples are those in (29)), and it does not become really productive until the nineteenth century.

| | | | | |
|---|---|---|---|---|
| (29) | *chauffer* 'heat (up)' | > | *chauffage* 'heating' | 13th century |
| | *limer* 'file' | > | *limage* 'filing' | 14th century |

So for *-(e)ment* nominalizations derived from verbs with typical agents, we should expect to find that they were introduced before *-age* is very productive for the derivation of deverbal nouns. In fact we find:

| | | | | |
|---|---|---|---|---|
| (30) | *abaisser* 'pull down' | > | *abaissement* 'pulling down' | 12th century |
| | *effacer* 'efface, erase' | > | *effacement* 'effacing, erasing' | 13th century |

As we will see later in section 9, it is possible that *-age* derivatives can replace *-(e)ment* derivatives, and these replacements are in accordance with the Agentivity Principle. However, not all existing *-(e)ment* nominalizations can disappear, because they are stored in the lexicon and as such stable parts of the French vocabulary.
Evaluating these diachronic facts leads to the assumption that the Agentivity Principle introduced in section 6, has emerged during the recent centuries, and it is very improbable that we will find counterexamples derived since this development.

## 8.2 Blocking

To complete the picture, I would like to mention that there are blocking rules that may explain further counterexamples, e.g., phonological blocking (in the sense of Wurzel 1988) in (31), where the sequence *-ageage* is avoided:

(31) saccagement 'turning upside down' *saccageage.

## 8.3 Special vocabulary domains

Membership in a special vocabulary domain may overrule the Agentivity Principle, e.g., in the vocabulary of commerce and finance, *-(e)ment* is selected even in contexts where *-age* would be expected; consider (32):

| | | | | |
|---|---|---|---|---|
| (32) | *intéresser* 'give a share' | > | *intéressement* 'profit-sharing' | |

# 9 Further evidence

## 9.1 Words that have disappeared

For *age/-(e)ment* pairs, Dubois (1962) investigated which items disappeared from the Larousse Dictionary between 1949 and 1962 (+: still in the lexicon, –: disappeared). If we examine these examples with respect to the agentivity of the first argument of their verbal base, we can see that they follow exactly the Agentivity Principle: if there are many proto-agent properties, the *-age* derivative stays in the lexicon, and if there are fewer, the *-(e)ment*-nominalization survives.

| | | | |
|---|---|---|---|
| (33) | + *affichage* | – *affichement* | 'posting' |
| | + *babillage* | – *babillement* | 'babbling' |
| (34) | – *apparentage* | + *apparentement* | 'grouping (of electoral lists)' |
| | – *déferlage* | + *déferlement* | 'breaking (of waves)' |

## 9.2 New words

Of course, the Agentivity Principle must also hold for the derivation of new words, and this is the case for the examples in (35) for *-age* and in (36) for *-(e)ment:*

(35) *guillemetage* 'putting in quotes'
*spatulage* 'typing'

(36) *crainquement, craquement, criquement*... (of steps)
*zizillement* (of the TV)

# 10 Conclusion

The degree of agentivity of the first argument of the base verb determines the combinatory possibilities of verbal stem and nominalizing suffixes *-age* and *-(e)ment* in French. This finding allows us to predict all cases including those that are exceptions for the traditional syntactic account.

The correct analysis for the distribution of *-age* and *-(e)ment* can be formulated nicely via an elaboration of LFG's mapping theory with Dowty's (1991) Proto-Role Approach. Lexical Mapping Theory accounts for correct mapping from arguments to grammatical functions, including cases of reflexivization and passivization. Proto-role properties are necessary for the expression of a gradation of agentivity.

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