

ParadigMo 2017
First Workshop on Paradigmatic
Word Formation Modeling
Toulouse, 19 - 20 June 2017

In the wake of the word-based models, specifically in connection with the word and paradigm approach introduced by Blevins (2013, 2016), the paradigmatic approach is gaining a growing support in the field of Word Formation (WF), essentially derivation but also compounding. More and more work refers to this approach: Van Marle 1985, Stump 1991, Bochner 1993, Bauer 1997, Pounder 2000, Booij 1997, Roché & Plénat 2015, Štekauer 2014, Strnadová 2015, among others. Paradigmatic WF is an alternative to the generative models in morphology and to binary and oriented rules. Paradigmatic models involve derivational relations that are not limited to base-derivative pairs and that may be oriented both ways or have an unspecified direction (Jackendoff 1975). Morphological paradigms are usually considered as interconnected by more or less complex networks of words, reflecting the patterns of the many relations that each word has with the others. These networks cluster into derivational families on one dimension and pile up and form analogies on the other.

Paradigm-based approaches to WF are characterized by several distinctive properties:

- the need for a strong meaning/form correlation
- the nature of the paradigmatic regularities, which (re)defines canonicity in WF
- the importance taken by derivational families and the fundamental question of their identity and their limits (unlike lexemes, families are open sets).

On the orthogonal dimension, we also have to figure out how morphological families are grouped into paradigms according to the properties shared by their matching relations. The paradigmatic conception of WF leads us to define structures composed of partial and overlapping networks.

This workshop will provide an opportunity to discuss recent proposals and advances on paradigms in WF, and in particular with respect to derivation. It constitutes a contribution of the debate and discussion on this issue, in particular within the two workshops organized during the 49th SLE conference (“Paradigms in Word-Formation: New perspectives on data description and modeling” and “Similarities and differences between inflectional and derivational paradigms: individual languages and beyond”).

The goal of ParadigMo is to identify and discuss a series of fundamental issues that underlie the principles of paradigm-based approaches to WF. These include the following ones:

- what does paradigmatic WF look like?
- what objects do we need to describe WF paradigms?
- how are semantic and formal dimensions connected within WF paradigms?
- what questions/issues/problems arise from the shift to paradigmatic WF?

The topics relevant to the notion of paradigms in WF also the following questions:

- what are the definitions of the notion of paradigms in WF?
- are WF paradigms structured semantically or phonologically?
- what are the identity and limits of derivational families?
- what are the WF phenomena that need paradigmatic analyses and paradigmatic WF models?
- should there be any correspondences at all between derivational and inflectional paradigms?
- are there separate semantic and formal paradigms or just WF paradigms?

Invited Speakers

Olivier Bonami
LLF, Université Paris Diderot &
CNRS
Paris, France

Gregory Stump
University of
Kentucky
Lexington, USA

Program

Monday, 19 June 2017

08:45 – 09:15	<i>Registration</i>	
09:15 – 09:30	Welcome	
09:30 – 10:30	Gregory Stump (U. Kentucky)	Missing links in derivational paradigms
10:30 – 11:00	Bernard Fradin (LLF, CNRS & U. Paris Diderot)	The role and nature of series in lexeme formation morphology
11:00 – 11:30	<i>Coffee break</i>	
11:30 – 12:00	Mathilde Huguin (U. Lorraine & ATILF)	Anthroponyms and paradigmatic derivation in French
12:00 – 12:30	Lior Laks (Bar-Ilan U.)	Paradigmatic relations as a trigger for morphological change
12:30 – 13:00	Fabio Montermini (CLLE, CNRS & U. Toulouse) Giuseppina Todaro (CLLE, CNRS, U. Toulouse & U. Roma 3)	A multi-layered model for morphological constructions. The example of Italian prefixed verbs
13:00 – 14:30	<i>Lunch</i>	
14:30 – 15:30	Poster Session	
15:30 – 16:00	<i>Coffee break</i>	
16:00 – 16:30	Laurie Bauer (Victoria U. of Wellington)	Notions of paradigm and their value in word-formation
16:30 – 17:00	Vito Pirrelli (ILC-CNR) Claudia Marzi (ILC-CNR) Marcello Ferro (ILC-CNR) Franco Alberto Cardillo (ILC-CNR)	Paradigm Relative Entropy and Discriminative Learning
17:00 – 17:30	Andrew Spencer (U. Essex)	Participles: inflectional paradigms, derivational paradigms or something else?

Tuesday, 20 June 2017

09:30 – 10:30	Olivier Bonami (<i>LLF, CNRS & U. Paris Diderot</i>)	Predictability in inflection and word formation
10:30 – 11:00	Gilles Boyé (U. Bordeaux Montaigne & CLLE) Gauvain Schalchli (U. Bordeaux Montaigne)	Realistic Paradigms for Derivational Morphology
11:00 – 11:30	<i>Coffee break</i>	
11:30 – 12:00	Sabrina Piccinin (U. Verona) Serena Dal Maso (U. Verona) Hélène Giraudo (CLLE, CNRS & U. Toulouse)	Formal and semantic transparency in bound stem processing
12:00 – 12:30	Livio Gaeta (U. Torino) Marco Angster (U. Torino)	Paradigmatic Word-Formation in a Decaying Language: The Case of <i>-etò</i> / <i>-etu</i> in Walser German
12:30 – 13:00	Florence Villoing (U. Paris Ouest & Modyco) Maxime Deglas (U. Paris Ouest & Modyco)	French converted nouns/verbs as a paradigm: how did the verbal suffixation with <i>-é</i> in Creole emerge?
13:00 – 14:30	<i>Lunch</i>	
14:30 – 15:00	Jan Radimsky (U. South Bohemia)	ATAP compounds in French and Italian: a paradigmatic approach
15:00 – 15:30	Georgette Dal (U. Lille & STL) Nabil Hathout (CLLE, CNRS & U. Toulouse) Stéphanie Lignon (U. Lorraine & ATILF) Fiammetta Namer (U. Lorraine & ATILF) Ludovic Tanguy (U. Toulouse & CLLE)	Data-Driven vs. Dictionary-based description of French nominalizations in <i>-age</i> and in <i>-ment</i> : the paradigmatic evidence
15:30 – 16:00	Magda Sevcikova (Charles U., Prague) Jarmila Panevova (Charles U., Prague) Patrice Pognan (Charles U., Prague)	Inflectional and derivational paradigm of verbs in Czech: the role of the category of aspect
16:00 – 16:10	<i>Break</i>	
16:10 – 16:30	Final Discussion	

Posters

Munevver Erdem Aksehirli (Bogazici U.)	Towards a more uniform notion of paradigms: Evidence from Turkish
Alexandra Bagasheva (Sofia U.)	Families, paradigms and (para)synthetic compounds and compound verbs in English
Hélène Giraudo (CLLE, CNRS & U. Toulouse)	Morphological priming effects within derivational paradigms: A study on series ending with the final sound [o] in French
Borja Herce (U. Basque Country)	Morphemes and the paradigm
Petr Kos (U. South Bohemia)	Onomasiological evidence on the limits of derivational families
Andreas Nolda (U. Szeged)	Paradigmatic word formation. Word-formation relations in the Pattern-and-Restriction Theory
Alexandra Soares Rodrigues (U. Coimbra) Pedro João Rodrigues (Instituto Politécnico de Bragança)	Cross-paradigms or word formation patterns in interface: evidence from Portuguese

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Towards a more uniform notion of paradigms: Evidence from Turkish

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The boundary between word-formation and inflection has been a source of debate among linguists (Blevins 2001; Beecher 2004; Haspelmath and Sim 2012; Stump 2015 among many others); consequently, researchers have different views as to whether a word is derived or inflected. Following the rise of word and paradigm models and an increase in the paradigmatic treatment of inflection, another important question has arisen: Do derivational paradigms exist alongside the inflectional ones? Rather than proposing a theoretical answer to this question, this study aims to exhibit both the similarities and differences of inflectional and derivational¹ morphology of Turkish and it concludes that the similarities between the paradigms and the nature of derivational morphology in Turkish allow for a paradigmatic account for derivation. However, certain natural distinctions between the two processes are not ignored.

I consider the overlapping features of word-formation and inflection along with the fact that inflection is not a uniform phenomenon in itself strengthen the continuum-type relation between derivation and inflection. I, additionally, believe that a more uniform treatment of morphological processes of derivation and inflection; or in other words, modelling these two processes in a more similar way rather than two distinct issues will lead to a simpler grammar.

To distinguish inflection from derivation, there have been proposed more or less the same criteria almost none of which applies to all forms of inflection or word-formation regularly. Since this study intends to show what Turkish data can contribute to the inquiry whether there exist derivational paradigms in a language, it focuses on only some of these criteria that may have reflections on the (potential) paradigmatic structure of derivation and inflection. Therefore, the points raised here will add new perspective to the field as Turkish morphology has not been analyzed in this respect apart from Kunduracı 2013 which is the first and only study proposing a word-formation paradigm for Turkish derivation and compounding.

Some similarities shared by derivational and inflectional paradigms in Turkish:

Following Stump (2001), I regard inflectional morphology as realizational which realizes the values of the related morphosyntactic properties. As for derivational morphology, it marks agent / quality / status noun or facilitative / proprietive adjective kind of quite a few diverse meanings which I regard as analogous to the values marked by inflected words. The markers of these values or meanings are paradigmatic in the sense outlined below:

- i. *Same lexeme:* Like inflectional paradigms, derivational paradigms do project different forms of the same lexeme where the new forms preserve both the form and semantics of the lexeme as in (1) and (2).

¹Following Kunduracı 2013, I also consider that the whole word-formation process (derivation and compounding) is paradigmatic in Turkish. However, since compounding is not within the scope of this paper, I intentionally use derivation rather than word-formation in certain contexts particularly when I refer to derivational affixes and paradigms.

- ii. *Same position*: Different values of a morphosyntactic property and different derivational markers of the same category appear in the same position as in (1) and (2).

(1) The declension of KADIN ‘woman’

Nominative	<i>kadın</i>
Accusative	<i>kadın-ı</i>
Dative	<i>kadın-a</i>
Locative	<i>kadın-da</i>
Ablative	<i>kadın-dan</i>
Genitive	<i>kadın-ın</i>
Comitative	<i>kadın-la</i>

(2) Partial derivational paradigm of KADIN ‘woman’

<i>kadın-lık</i>	‘womanhood’	<i>kadın-lı</i>	‘with a woman’
<i>kadın-cık</i>	‘little woman’	<i>kadın-sız</i>	‘without a woman’
<i>kadın-cağız</i>	‘poor woman’	<i>kadın-ımsı</i>	‘womanish’
<i>kadın-ca</i>	‘language of women’	<i>kadın-sı</i>	‘feminine’

- iii. Semantic regularity: Derivational affixes preserve their meaning on various lexemes as do inflectional markers in Turkish:

(3)

a. Türk-çe ²	‘Turkish’	d. erkek-çe	‘the language of men’
Türk-CA		man-CA	
b. kadın-ca	‘the language of women’	e. şair-ce	‘the language of poets’
woman-CA		poet-CA	
c. çocuk-ça	‘the language of children’		
child-CA			

- iv. Inflectional markers sometimes lack semantic transparency as it is the case in word-formation. While inflected word forms are known to have compositional meaning as opposed to word-formation processes which may lead to non-compositional meanings, one of the most common inflectional markers nominal Plural suffix *-lar* appears in many contexts where its meaning is not compositional; hence its functioning like a derivational suffix in respect of this criteria as can be observed in (4b-c-d):

(4)

a. kadın-lar	‘women’	c. bir yer-ler	‘an unknown place’
woman- <i>lar</i>		a place- <i>lar</i>	
b. elektrik-ler	‘electric power’	d. bir hal-ler	‘a strange thing/condition’
electric- <i>lar</i>		a situation- <i>lar</i>	

² Suffixes exhibit variation due to consonant and vowel harmony in Turkish.

I should clarify here that the appearance of plural suffix *-lar* in contexts like (4b), (4b) and (4d) are frequently attested in Turkish and the marker neither denotes plural value nor the semantics of the complex word is compositional in a regular way.

Some differences between inflectional and derivational paradigms in Turkish:

The similarities should not preclude us from displaying the differences between inflectional and derivational paradigms which would lead us to understand the properties of each process better. The primary distinction, also the underlying reason for other differences between inflection and word-formation is the fact that the products of word-formation are new lexemes. As aforementioned only some of the differences between the paradigms of inflection and derivation are outlined below to provide a general scope of the issue.

- i. The inflectional affixes of the same category marking different values cannot be used successively; e.g. accusative and dative markers in a lexeme's inflectional paradigm cannot be used together whereas two affixes in a lexeme's derivational paradigm can:

(5)

- a. *kadın-a-dan
woman-DAT-ABL
- b. kadın-sız-lık 'the status of being without a woman'
woman-*sız*-*lık*
- c. kadın-cık-sı 'like a little/poor woman'
woman-*Cık*-*sı*

- ii. Turkish inflectional morphology does not change the word category as it is the case in many languages. Derivational affixes, on the other hand, surface in cross-categorical contexts. Moreover, formally the same derivational affix can appear in different word-formation processes.

(6)

- a. Noun>Noun kadın-ca 'the language of women'
 woman-*CA*
- b. Noun>Adjective kadın-ca 'womanlike'
 woman-*CA*
- c. Noun>Adverb kadın-ca 'womanly'
 woman-*CA*

- iii. Although the affixes in derivational paradigm of a lexeme can be viewed as analogous to the inflectional markers in a paradigm in certain ways, the productivity of the derivational markers in the same set may differ highly, which is not observed among the affixes within an inflectional paradigm. For instance, when the productivity level of three adjective forming suffixes, namely proprietive *-lı*, privative *-sız* and relational *-sal*, are compared, the relational suffix *-sal* is less productive than the other two in Turkish (see Kunduracı 2013 for a survey on the productivity of derivational suffixes in Turkish).

Conclusion: The similarities between the derivational and inflectional paradigms and the lack of convincing evidence against the possibility of accounting for word-formation paradigmatically should lead us to focus on a more unified notion of paradigms and continuum-type relation between inflection and word-formation (Haspelmath and Sims 2013). Two other motivations for such a consideration is as follows: i) To the extent that we can argue for a “paradigmatic word formation” a more unified structure of autonomous morphology is possible as already proposed by Göksel (2007), Kunduracı (2013), Kunduracı and Göksel (2015) for Turkish. ii) The existence of a paradigmatic model for derivation will undoubtedly have implications on the debate about the theoretical significance of paradigms. If justified, the compatibility of the notion of paradigms with derivational morphology will weaken the argument that paradigms are just descriptive devices that are epiphenomenal (cf. Bobaljik 2002 among others).

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Word-formation paradigms, compound verbs and (para)synthetic compounds in English

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The prevalent view in the word-formation literature is that complex words are exclusively derived by syntagmatic relations between constituent parts and the operations performed on them (Bach 1989: 46). In Marchand's influential theory (1969: 3), complex lexical items are considered to be syntagms based on a determinant/determinatum relationship.

However, Booij (2001) explicitly maintains that the rules for establishing the types of syntagmatic relations between constituents (and all constraints regulating possible combinations thereof, i.e. word-formation rules) are derived on the basis of paradigmatic relations or associations in form or meaning. While in inflection morphology a paradigm is clearly understood as "a central principle of morphological organization" (Stump 2001: 32) where a paradigm can be conceived of as a set of paradigm functions and realization rules, the nature of paradigmatic relations in word-formation is not exactly clear. In Booij's (2001: 3) opinion the recognition of different types of word-formation processes as syntagmatic operations is based on establishing the nature of the differences in the paradigmatic relations that hold sets of words together. Simply put, this implies that different word-formation processes are based on different types of paradigmatic relations and supposedly should yield lexemes with different properties. Consequently, since they arise from different word-formation processes and standardly, distinct word-formation processes are characterized by different specific meaning generation mechanisms (cf. Lieber 2004, Sandor 2007, Nagano 2007, etc.), the following lexemes should be expected to have different properties: *to bear hug*, which arises through conversion, *to baby-sit*, which is derived via back-formation and *to kick start*, which is the result of composition/compounding proper. Yet all three are unanimously recognised as compound verbs, i.e. as lexemes that share a sufficient number of properties to be recognised as a uniform class. Besides the fact that this implies dissociation between derivational process and resultant lexical item, it also suggests that a syntagmatic approach to the analysis of compound verbs in English cannot provide the necessary generalizations to account for their properties as a uniform class.

In parallel to the morphosyntactic properties that are paired with a root of a lexeme and determine the word form occupying the corresponding cell in the lexeme's paradigm (Stump 2001: 32), we need a set of conceptual-semantic, formal properties or properties of a different kind which when applied to a root would yield the requisite new lexeme that fills out the corresponding cell in a word-formation paradigm.

The hypothesis is put forward here that there are three basic types of properties (that can also be interpreted as specific types of paradigmatic relations) that underlie paradigmatic structures in word-formation. Consistently with the constructionist approach to language (Booij 2007, 2010), it is assumed that the constructicon is an ever-expanding network of branching word-formation paradigms - based on different organizing principles - meaning-based paradigms (where conceptual/ontological categories underlie the projection of the paradigm's members), analogy-based paradigms (where an exemplar is used as a model for pattern imitation), and form-based paradigms (where series of co-derivatives establish a

formal pattern with at least one identical constituent). While all three types of paradigm are detectable in the creation of compound verbs in English, it appears that only the latter two have validity in the case of parasynthetic adjectival compounds. Such a hypothesis is consistent with the claim made by Arndt-Lappe, Bell, Schäfer and Schlücker (2016: 107) concerning all kinds of compounds and “the looseness of the link between their formal characteristics and their semantic interpretation.” Any processing problem that such a loose link between meaning and form can pose is resolved by the ‘maximisation of opportunity’ view of language processing, according to which “the system makes maximum and opportunistic use of the information that is available” (ibid.). Word families and word-formation paradigms facilitate this maximisation of opportunity.

A word-formation paradigm is to be understood as a network of lexico-semantic, morphotactic, formal relations and pattern identity between words characterized by a strong potential for analogical creations. The semantic relations are based on conceptual plausibility determined by the ontological types: “THING QUALITY QUANTITY PLACE TIME STATE PROCESS EVENT ACTION RELATION MANNER” (Cruse 2000: 49). Not all possible relations are actualized in a paradigm, only those that are triggered by “pragmatic pressure” (Booij and Lieber 2004: 350). The paradigm can be conceived of as correlation between potential, possible and actual words. The lexico-semantic relations in a word-formation paradigm are based on different profiling of a background frame (Barsalou and Hale 1993) as the central type of knowledge structure with direct relations with lexical items as defined by Fillmore (2006). As a method of analysis frame semantics necessarily involves the study of the unidirectional backgrounding/foregrounding relations between concepts and the lexical items evoking and evoked by them. A *frame* is a “system of concepts related in such a way that to understand any one of them you have to understand the whole structure in which it fits; when one of the things in such a structure is introduced into a text, or into a conversation, all of the others are automatically made available” (Fillmore 2006, p. 373). Frames constitute the *gestalts* against which the semantic relations in a word-formation paradigm are established. Each actualised lexeme out of the set of potential words represents a uniquely profiled portion of a scene/frame.

- (1) a. A word sense’s semantic frame (what the word ‘means’ or ‘evokes’)
 - = profile + background frame
- b. A word sense’s profile: what the word designates, asserts
- c. A word sense’s background frame: what the word takes for granted, presupposes (Goldberg 2010: 40).

Nouns profile or construe (in Langacker’s sense 2008: 43) more or less static, conceptually autonomous wholes, while verbs profile “participants interacting energetically in a “force-dynamic” event” (Langacker 2008: 103). Thus the word-formation paradigm in conceptual-semantic terms can be equated with the background frame, which can be construed or profiled alternatively and surface as a nominal lexical concept, verbal or adjectival one.

Three types of compound verbs are usually recognised in relation to the immediate process of derivation:

- i) incorporating verbs – *gift-wrap*, *spoon-feed*, *rough-dry*, *husband-hunt*, *boyfriend-drop*, *name-ambush*, *mass-produce*, etc.
- ii) compounding/composition proper verbs – *kick-start*, *stir-fry*, *sleepwalk*, *sleep-talk*, etc.
- iii) converted verbs – *moonlight*, *piggyback*, *brownbag*, *redshirt*, *bear hug*, etc.

On the basis of this heterogeneity, Lamberty and Schmid (2013: 591) claim

that “speakers of English apparently do not have a productive schema for the creation of genuine verbal compounds at their disposal”, yet they are exposed to such compounds and process them with ease. The authors find an explanation for this seeming paradox (compound verbs are not processed as the result of compounding) in the speakers’ deployment of “different processing strategies [...], trying to take recourse to possible *base nouns* or *adjectives* and interpreting meanings on the basis of analogies to similar lexical items in the network” (ibid.; emphasis added). In the face the considerable rise in the productivity of compound verbs in English (Wald and Besserman 2002) support the role of word-formation paradigms in the creation and comprehension of compound verbs.

The minimal paradigmatic relations can immediately be recognised: incorporating compound verbs are usually claimed to be associated with synthetic or parasyntetic compound nouns as their source, while converted ones are based on a root [NN/AdjN] compound.

Most compound verbs are also associated with an adjective. It is easy to explain this occurrence with “the ambicategorical status of participles, which are known to combine verbal and adjectival features” (Hilpert 2015: 117; references there). Both *-ing* and *-ed* adjectives can be derived from the compound verbs without a glitch. Since paradigmatic relations are ones in absentia and result from “cumulative patterns” (Bochner 1993), analogy, conversion, the polysemy of the *-ing* and the *-ed* formative and the ‘flexible’ type-token, degrammaticalised part of speech system in English (Vogel 2000) the minimal word-formation paradigm for compounds comprises an action compound noun, a compound verb, an agentive compound noun and a participial adjective, no matter whether the source is a compound noun or a compound verb. Thus from a verb source the following paradigmatic slots are freely actualised: *to apple-polish*, *apple-polishing* (n), *apple-polisher* (n), *apple-polished* (adj.) and *apple-polishing* (adj.), and from a noun source: *namedropping* (n), *to name-drop* (v), *name-dropper* (n) and *namedropping* (adj.).

Within this analysis a surprising caveat arises. Parasyntetic adjectival compounds seem to stand out as not conforming to the patterns established for compound verbs. Parasyntetic compounds are defined as “compounds, constructed via the addition of a derivational suffix to a combination of two lexical stems, though this combination itself is a non-attested form” (Scalise and Vogel 2010: 16) (the bulk of verbocentric adjective compounds in English, such as *heartbreaking*). While for all compound verbs at least a minimal paradigm between a noun and a verb is established, parasyntetic adjectives correlate with collocations, not with corresponding nouns or verbs; parasyntetic adjectives are formed via inversion (Brömser 1985). A random list can be used to illustrate the point: none of the adjectives *record-breaking*; *mouth-watering*; *thought-provoking*; *slow-moving*; *far-reaching*; *time-saving*; *forward-thinking*; *man-eating*; *hand-carved*, computer-based, etc. is associated with a corresponding compound verb, though they have a corresponding compound noun, e.g. *good-looker*, *record-breaker*, *time-saver*, etc. with the common semantics of ‘bearer of quality X’. Ackema and Neeleman’s (2004) stipulation that the morphological subcomponent merges the N and the V nodes only when they are ‘[e]mbedded under a category-changing affix’ (quoted after Melloni and Bisetto 2010: 203) cannot explain this discrepancy in the paradigms of compound verbs, verbocentric compound nouns and parasyntetic (NV) compound adjectives.

It is possible that an explanation can be sought in relation to: a) blocking effects (the existence of verb complement constructions with identical meaning, e.g. *to look good*, *to break the record*); b) the nature of the paradigmatic relations

(conceptual-semantic, formal, pattern-based) and c) purely conceptual constraints (relating to profiling alternatives). While in the case of compound nouns and verbs form- and meaning-based paradigms are fleshed out, in parasynthetic compounds the paradigmatic relations are based on analogy within an established construction or pattern. Parasynthetic compound adjectives are derived and processed via analogy with an established exemplar via the reversal of constituent order of an alternative construction. Within the construction analogy-based paradigms comprise constituents not related conceptually/semantically, but analogically replicating an exemplar, in the manner in which Hilpert (2015: 118-119) explains the cases of violation of the “no-direct-object constraint” in noun participial compounding “through analogy with [...] usage patterns” (Hilpert 2015: 119). The background frame of an adjective necessarily includes an underspecified bearer of a quality and the natural re-profiling is between ‘quality’ and ‘bearer of quality’ but profiling an event relational lexical concept would require too much cognitive effort, as there are unrestricted possibilities of pattern completion within the gestalt of the frame.

The analysed phenomena suggest that meaning- and form-based word-formation paradigms comprise easily re-profiled lexical items and are restricted in terms of potential words by the underlying ontological types, while analogy-based ones are constituted by pattern replication and can encompass various numbers of lexemes.

Though in its infancy and facing a lot of problems, word-formation paradigmaticity is an established language fact, and not an analytical whim. Psycholinguistic research on the morphological family size effect (see e.g. Moscoso del Prado Martín et al. 2004) and the processing of compounds (Gagné, Marchak and Spalding 2010; Gagne and Spalding 2009; Libben and Jarema 2006) has provided ample evidence for the psychological reality of the word-formation paradigm and the strongly paradigmatic organization of the mental lexicon.

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Notions of paradigm and their value in word-formation

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Let us say that two items are in a paradigmatic relationship with each other when one can replace the other in the stream of speech with a resultant difference in the message (i.e. they contrast). A paradigm is a set of items which are in a paradigmatic relationship with each other.

Consider a standard Latin inflectional verbal paradigm like that in (1).

(1) Latin present tense of *amo* 'I love'

am·ō

am·ās

am·at

am·āmus

am·ātis

am·ant

Here we have a morphological paradigm of present tense endings, defined by their FORM. However, there is another paradigm here, a more general one. It is a paradigm of present tense/person/number slots in Latin. This includes the tense/person/number slots in second and third conjugation verbs, as well as in irregular verbs. This is a paradigm of FUNCTIONS.

But there are other paradigms here, as well. If we look away from the paradigms of MORPHOLOGICAL MATERIAL and consider the paradigm of LEXICAL MATERIAL, we have a paradigm of elements which are in paradigmatic relationship with *am-* in (1). This is not usually termed a paradigm, but a conjugation class; nevertheless, it fits the criteria for a paradigm. Further, there is a paradigm of elements which can fit into the appropriate slot with the functional morphological paradigm. This would normally be called a word-class. But again, it is a paradigm.

Where there are multiple lexical items involved, it is possible to have a paradigm of RELATIONSHIPS between them, or between them other material. For instance, *concrete wall*, *steel wire*, and *vegetable soup* all have a relationship of 'made of' holding between them.

Paradigms can be more or less PREDICTABLE. Phenomena such as deponent verbs and defective verbs provide instances where inflectional paradigms might be less fully predictable than might be expected.

Some paradigms have a closed set of items in them, others have a set of members which is, in principle, open. For instance, in (1) there are just six values because the system of Latin allows just three persons and two numbers. This is a CLOSED SET paradigm. In an OPEN SET paradigm it would, in principle, be possible to add new members to the paradigm.

Paradigms differ in how EXTENSIVE they are. *Cleave* (with alternative forms), *speak*, *steal* and *weave* (and their derivatives) are the only verbs in English which show that particular pattern of past tense/past participle (/i:/ - /əʊ/ - /əʊ/...*en*). On the other hand, adding -ō for a first person singular present tense in Latin is found with hundreds of verbs.

Paradigms may involve just ONE RELEVANT ITEM or more than one relevant item. Consider the French verb-forms in (2).

(2) French

vous donn-ez	‘you (pl or polite) give’
vous donn-er-ez	‘you will give’
vous donn-er-i-ez	‘you would give’

We can look on this data in a number of ways: (i) we can just see this as a root to which inflectional material has been added in an undifferentiated lump; (ii) we can think of the different forms to which, e.g., -ez can be added, which include just the root or a root with one or two affixes already added; (iii) we can see this in terms of several relevant items (morphs) being added to the base. If we take option (iii), then we can look at sequences of morphs (morphotactics) as well as at the position in the sequence in which any given morph can be found (e.g. -ez is always final): there may be valuable generalisations at any level.

Paradigms may differ in terms of their SPECIFICITY. The paradigm defined by the slot in *I am ~ing* is less specific, and thus includes more forms, than that in *I am ~ing NP*. Underspecified paradigms set up in this way may include irrelevant items: a paradigm like *We ___ play* sets up not only modal verbs but also items such as *all*. In morphological paradigms, we usually expect the limits of the word to determine the limit of the environment, but periphrastic paradigms suggest this is not always the optimal answer. However, the sense in which *je finirai* ‘I will finish’ is in the same paradigm as *j’ai fini* ‘I have finished’ is different from the sense illustrated in (1).

While this list of paradigm-types may not be exhaustive, it means that there are at least nine different factors in paradigms to be considered (and since the factors are

not all mutually exclusive, there may be more types when the various factors are combined).

The canonical inflectional paradigm is both a paradigm of form and of function, but with function generally given precedence. It is a paradigm of morphological material, it is a paradigm of relatively high predictability (both formal and functional) over a closed number of elements, with a relatively extensive paradigm. It is usually presented as containing only one relevant item, though little would be lost if it were viewed as involving more, where appropriate.

Most paradigms in word-formation differ from this canonical pattern in a number of ways, although the same range of types of paradigm can be found in word-formation as can be found in inflection. Interestingly, some potential paradigms in word-formation are of little use in terms of prediction, while others are of great use.

Consider deverbal derived nominalizations as an example of derivational morphology. The form of the nominalization is not predictable across the vocabulary (and indeed, many verbs have more than one nominalization: *committal*, *commission*, *commitment*). The result is that a paradigm of forms leaves us with a list of lexemes to which the ending can be added which cannot be deduced from other factors. In other words, the derivational equivalent of a conjugation class is a random set of verbs which is not derivable from any other feature. The paradigm of functions is rather more complete, but even then there are many verbs with no derived nominalization (*defraud*, *draw*, *hurtle*, *interleave*, etc.), and neither the class with nor the class without nominalizations can be fully predicted. Although there are many sub-regularities in the set of nominalizations, there are also many gaps. Consider the data in (3) from English.

(3)	committal	commission	commitment	*
	*	admission	*	admittance
	*	emission	*	*
	transmittal	transmission	*	transmittance
	acquittal	*	acquittment	*
	*	*	refitment	*
	*	*	containment	*
	*	obtention	obtainment	*
	*	retention	retainment	*

Nevertheless, some regularities are noticeable. Verbs that end in *-ize* take nominalizations in *-ation* (exception: *aggrandizement*, on the basis of a French loan), so that it is the sequence of relevant items in the paradigm which allows prediction. Even if we agree with Aronoff that Latin elements like *-mit* allow prediction, because of the semantic specialization of the nominalizations where several are available, the meanings associated with the forms are not necessarily predictable in detail.

The fact that inflectional and derivational paradigms are different does not negate the notion that paradigms are involved in both cases. In this paper, I take a closer look at paradigms in word-formation, and consider how they compare with those in inflection, not only in terms of the types outlined above, but also in terms of the extent to which they allow predictability of forms and meanings and the extent to which they may have an influence on the productivity of word-formation processes.

Predictability in inflection and word formation

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There are two distinct ways in which an approach to word formation can be said to be paradigmatic, which correspond to two senses of ‘paradigmatic’ in modern linguistics. On the one hand, it may focus on paradigmatic relations between words by opposition to syntagmatic relations between words and word parts (van Marle, 1984; Becker, 1993).¹ On the other hand, it may literally extend analytic strategies originally conceived for the study of inflectional paradigms (see among many others Matthews, 1972; Aronoff, 1994; Stump, 2001; Ackerman and Malouf, 2013; Blevins, 2016) to the domain of word formation. In this talk I will address the relevance of the second strategy, by focusing on the role of predictability in morphological relations. I will address this issue from two complementary sides: predictability of form, and predictability of content.

Crucial to the present enterprise is the intuition that it makes sense to draw an analogy between inflectional paradigms and structured derivational families. I will follow Štekauer (2014) in assuming that this makes sense, to the extent that derivational families, like inflectional paradigms, are structured by systematic contrasts in content. This idea is illustrated schematically in Figure 1: on both sides of the figure, we see a three-dimensional representation of a structured subpart of the French lexicon, where families of morphologically related words are represented as horizontal planes. The horizontal planes have the same structure in the sense that the contrast in content between horizontal pairs of words match vertically: *lavage* is to *laver* as *formation* is to *former* as *gonflement* is to *gonfler*, just like *égale* is to *égal* as *petite* is to *petit* as *vieille* is to *vieux*. Such structured collections of morphological (sub)families I call PARADIGMATIC SYSTEMS, be they subfamilies of inflectionally or derivationally related forms. Note that crucially, only the systematicity of relations of content matters to the identification of paradigmatic systems: in derivation just as in inflection, filling the same cell means having the same relational content, not exhibiting the same exponents. Also note that under the present view, the notion of a paradigmatic system is not dependent on the idea that paradigms are multidimensional systems of orthogonal oppositions (a.k.a. morphosyntactic categories or features; see among many others Wunderlich 1996; Corbett 2012; Stump and Finkel 2013). In derivation just as in inflection, some paradigmatic systems may have such a structure, but not all do.

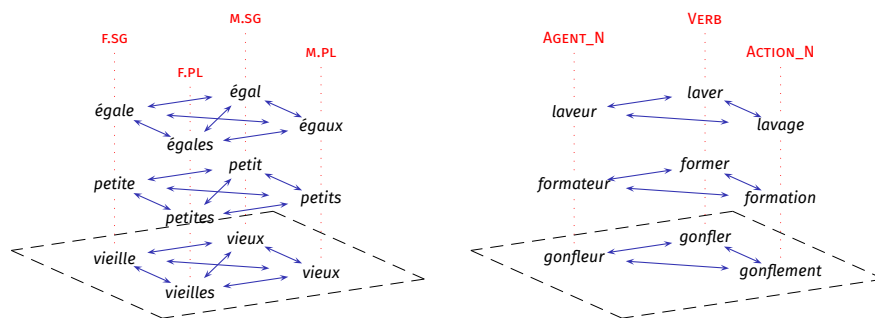


Figure 1: Inflectional and derivational paradigmatic systems exemplified

¹Notice that here *paradigmatic* is used, following Hjelmslev (1938) and much following literature, as a substitute for Saussure’s *associative* dimension.

Predictability of form

Recent research on inflectional paradigms has placed much focus on the issue of predictability of forms in paradigms (Ackerman et al., 2009; Ackerman and Malouf, 2013; Stump and Finkel, 2013; Sims, 2015; Bonami and Beniamine, 2016). The central idea in such research is that individual words provide more or less reliable information as to the shape that other words in the same paradigm have—information that speakers can then readily use to address what Ackerman and colleagues call the Paradigm Cell Filling Problem, the problem of being able to infer the shape of unknown members of a paradigm. In addition, as Stump and Finkel (2013) and Bonami and Beniamine (2016) establish with different methodologies, joint knowledge of multiple members of a paradigm provides strikingly strong information about the rest of the paradigm: knowing two words simultaneously provides more than the sum of information that is provided by each of them individually. This provides a strong argument for the centrality of paradigm structure in morphology: relations between three words (two predictors and one predictee) are irreducibly paradigmatic. In this talk, I will argue that the same kind of joint predictiveness effect documented in inflection is also found in derivation. I will do this using two separate methodologies.

First, I will apply the tools developed by Bonami and Beniamine (2016) for the study of implicative relations in inflectional paradigms to French derivational subfamilies documented in Hathout and Namer (2014). I will show that, just as in inflection, the average predictability in paradigms, measured as the average implicative entropy, is much lower when predicting from two words than when predicting from one.²

Second, I will present part of a statistical study of the rivalry between *-iser* and *-ifier* suffixation in French. This study uses logistic regression to model affixation preferences, and shows that the co-presence of a noun and denominal adjective in a morphological family is a significant predictor of a preference for *-iser* suffixation.³

Although they address different questions using different methodologies, these two studies both lend support to the idea that some generalisations on the French word formation system can only be formulated in terms of paradigmatic structure.

Predictability of content

The distinction between inflection and word formation is both extremely intuitive and vexingly elusive. One strong intuition is that inflection is fully productive and fully deterministic: for any lexeme, it is fully predictable that there is one and only one word filling each cell of its paradigm. That intuition lost much of its appeal in recent years, as the prevalence of phenomena of defectiveness (no form filling a cell; see notably Baerman et al. 2010; Sims 2015) and overabundance (multiple forms filling a cell; see notably Thornton 2011, to appear) was progressively realized. Hence the difference between inflection and derivation in terms of productivity and determinism is at best gradient.

Another strong intuition concerns the semantic stability of inflectional relations as compared to derivational relations (see among many others Wurzel 1989; Stump 1998; Walther 2013). As the argument goes, the contrast in content between pairs of parallel inflected forms is always the same, whichever lexeme one is looking at, whereas the contrast in content between pairs of derivationally related words across derivational families is unstable—be it because of meaning variability or of semantic drift applying to lexemes as a whole rather than to individual word-forms. This question is crucial to the present enterprise, since I put the stability of relations of content at the heart of the definition of paradigmatic systems.

²This part of the talk is based on joint work with Jana Strnadová (Google, Inc.).

³This part of the talk is based on joint work with Juliette Thuillier (Université Toulouse Jean Jaurès).

In the last part of the talk, I will report on a pilot study that addresses this issue using tools from distributional semantics.⁴ In this study, we operationalize the relation between the content of two words as the difference between two vectors representing their respective distributions in a corpus, as exemplified schematically in Figure 2.⁵ The predicted consequence of semantic (in)stability is then that the similarity between these difference vectors should be higher on average when comparing inflectionally related words than derivationally related words.

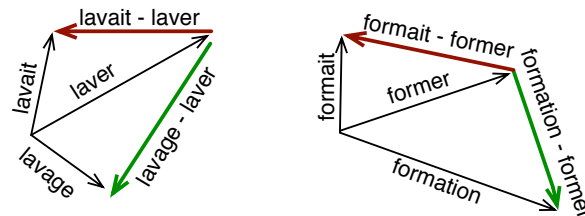


Figure 2: Semantic effect of a morphological alternation as a difference vectors

Relying on existing resources to identify derivational and inflectional relations in French, we examine different datasets consisting of series of triples, where two of the words are inflectionally related and both are derivationally related to the third one, as exemplified in Table 1 in the case of two forms of a verb and the corresponding agent noun.

Agent noun	Infinitive	Imperfect 3sg
dresseur	dresser	dressait
préparateur	préparer	préparait
éclaireur	éclairer	éclairait
...

Table 1: Sample data for the study of the predictability of content in inflection and derivation

The prediction is borne out: difference vectors between inflectionally related words are more stable than difference vectors between derivationally related words. We assessed this by computing the deviation of each difference vector from the average, calculated as the Euclidian distance between the given difference vector and average across the whole group of analogous vectors (e.g. the average difference vector between infinitive and imperfective across a range of verbs). Semantic shift variance, defined in this way, formalizes a measure of shift predictability. I will thus argue that distributional semantics lends support to the hypothesis that there is a nonspurious difference between inflection and derivation in terms of semantic predictability. It does not follow, however, that the difference is categorical rather than gradient: on the contrary, we do expect to also find significant differences in predictability among derivational relations and among inflectional relations.

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⁴This part of the talk is based on joint work with Denis Paperno (CNRS - Loria).

⁵We used the FrWac web corpus (Baroni et al., 2009) and computed vectors using *word2vec* (Mikolov et al., 2013).

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Realistic Paradigms for Derivational Morphology

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1 Introduction

Paradigms in derivation are accepted since Bauer (1997) argued for acceptability of the notion of derivational paradigm. The traditional generative relation between base and derived words can be contrived as a minimal binary derivational paradigm. Some researchers argued explicitly for this kind of paradigms with derivational material in French: adjective–adverb (Dal, 2007), noun masculine-feminine (Zwanenburg, 1988; Roché, 1997; Bonami and Boyé, 2015).

After Van Marle (1985), systematic studies of multiple derivations have appeared in France. First, within a generative approach, Corbin (1988) described the ternary relation between *-isme*, *-iste* and *-ique* suffixed words and their reciprocal truncations. Then, in a post-generative framework, Roché (2004, 2007) with the notions of double, transitive and reciprocal motivations. Recently, Lignon *et al.* (2014) proposed derivational triangles with explicit direct relations between words derived from the same base.

However, the use of paradigms in derivation encounters resistance because of its association with inflection. Following Boyé and Schalchli (2016, 2017), we believe that the unrealistic expectations about inflectional paradigms hinders the transposition of the concept in derivation and that an abstractive perspective on inflectional paradigms could lead to a definition more valuable for inflectional morphology and transferable to derivational morphology.

In their view, a realistic definition of inflectional paradigms includes the two following principles: i) the paradigm is an emergent property driven by differentiation, ii) the nature of syncretisms (a.k.a polysemy) guides the formation of the paradigm. A distinction between occasional and systematic syncretisms must be made. Applying these descriptive requirements, they define a *morphomic paradigm* as:

- the optimal association of possibly distinct forms with their respective set of meanings

For example, in English conjugation, BE 1pl present *are* belongs to a cell associated with {prs.2sg, prs.1pl, prs.2pl, prs.3pl} since every verb shares the same form for all these feature sets, and BE, in particular, has different forms for all other feature sets.

In this paper, we show that a realistic definition of paradigms allows for its application to derivation in two symbolic cases. First, the ethnic network composed of three related sets of words (country, ethnic group, language) with a paradigmatic structure resembling inflection, uniform and morphomic. Second, the animal family which displays global paradigmatic diversity but partial sub-paradigmatic uniformity.

2 The ethnic network and paradigm economy

Roché (2008) proposes a paradigmatic description of ethnic word families in French defines as a country name, a constructed demonym derived from the name and the two corresponding relational adjectives. At first his *ethnic system* constitutes a four-cell derivational paradigm but then he extends his paradigm to include the language name and its relational adjective bringing it to a six-cells paradigm.

	Country	Inhabitant	Language
N	France	français _M /française _F	français
Adj	français	français	français

Roché advances that this lexical structure obeys a principle of paradigm economy based on recycling existing forms rather than deriving new ones as he observe that the six different lexemes never exhibit more than two forms. We propose that Roché’s paradigm economy principle is an effect of systematic and occasional syncretisms, and can be captured with a combination of a morphomic paradigm and analogical relations between cells. In our analysis of the ethnic network, following Roché’s remarks, we consider a ten-cell paradigm for the ethnic network adding a difference between an ethnic N/Adj and an inhabitant N/Adj for examples like *malais* (‘Malay’) vs *malaisien* (‘Malaysian’), and a speaker N/Adj for *francophone* (‘French speaker’).¹

	Country	Inhabitant	Ethnic	Language	Speaker
N	Belgique	belge _M /belge _F	wallon _M /wallonne _F	français	francophone _M /francophone _F
Adj	belge	belge	wallon	français	francophone

We argue that this ten-cell tabular paradigm can be reduced to a five-cell morphomic paradigm. As shown by the preceding example, the most suppletive network only distinguishes five phonological forms. Country Adj and Inhabitant N/Adj are always syncretic, and the three other N/Adj pairs also have identical forms.

Cell ₁	Cell ₂	Cell ₃	Cell ₄	Cell ₅
Country N	Inhabitant N	Ethnic N/Adj	Language N/Adj	Speaker N/Adj
	Country/Inhabitant Adj			

As the shape of the network is homogeneous because the semantical distinctions between elements do not vary depending on the family identity on a par with paradigm shape in inflection, we analyze the analogical relations between cells in an implicative morphology framework (Ackerman *et al.*, 2009; Bonami and Boyé, 2014) to capture the predictable relations.

3 Animal families and paradigm diversity

While the ethnic network structure is rife with systematic syncretism, animal families display only occasional syncretism and various types of differentiations between members.

Roché (1996), on the gender variation in animal names, proposed implicitly a small lexical paradigm with three nouns <species, male, female> and regular occasional syncretism. The three way distinction is warranted by animals like sheep <*mouton*, *bélier*, *brebis*> but many families have a syncretism between the species name and the male or the female (e.g. dog <*chien*, *chien*, *chi-
enne*>, goat <*chèvre*, *bouc*, *chèvre*>). Following Damourette and Pichon (1930) and Roché (2009), Schalchli (2016) extends the family to the offspring names with a sex-neutral noun and a pair of gender-specific nouns bringing the family description to a six-cell paradigm combining age/size (adult/baby, normal/small) with the sex/gender opposition (sex-neutral/male/female).

The analysis of syncretisms in the offspring names shows that the morphomic reduction is impossible because some species have three different forms like chicken (<*poussin*, *coquelet*, *poulette*>) even though species with only two forms always use the same one for the sex-neutral and the male name. As such, the semantic definition of the paradigm seems uniform.

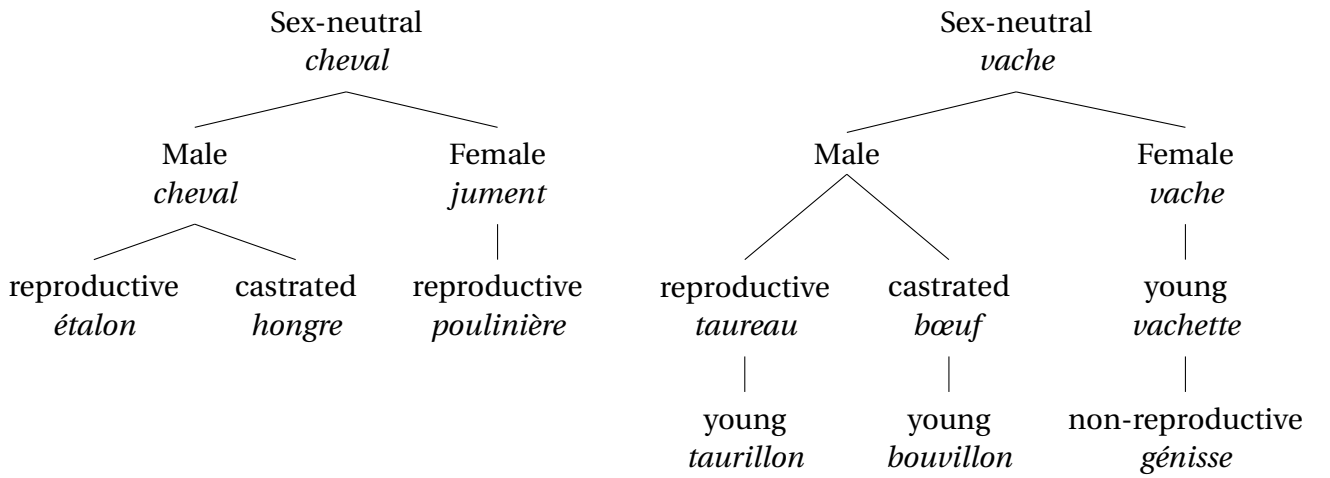
However, the analysis of larger families shows that the six-cell paradigm is not sufficient to account for their form contrasts.

- cow: *vache*, *taureau*, *bœuf*, *génisse*, *vachette*, *taurillon*, *bouvillon*, *veau*

¹Following Bonami and Boyé (2015), we count the masculine/feminine noun pairs as occupying the same cell.

- horse: *cheval, jument, étalon, poulinière, hongre, poulain, pouliche*
- chicken: *poule, coq, poulet, chapon, poussin, coquelet, poulette*

The three preceding families pose a problem with more distinctions than expected in the animal names. The male names have competing forms (*taureau/bœuf, cheval/étalon/hongre, coq/chapon*). This could be treated as overabundance but the contrasts between the forms differ from one animal to the next: *bœuf* is the castrated counterpart of a full *taureau*, *cheval* is generic, *étalon* is a *cheval* reserved for reproduction, *hongre* is a castrated *cheval*, *chapon* is a young castrated *coq*. The same situation arises both with female adults (*vache/génisse/vachette*) and with offsprings (*veau/taurillon/bouvillon, poussin/coquelet/poulet*). Making space for all oppositions would allow for a uniform paradigm but it seems arbitrary, as most cells would have no content for most families or rules of referral to an hypernym.



Conversely, we consider family diversity as fundamental and choose to use heterogeneous paradigms. This is a move away from the canonical paradigm as defined for inflectional morphology (Corbett, 2007) where uniformity and unicity are considered crucial. We think that the one paradigm fit all strategy should not be applied to derivational morphology because the semantic is organised in an hierarchy of related meanings rather than values of an attribute. Therefore, the usual combination of features used to construct inflectional paradigms cannot be applied on this structure. In this case, the paradigms are obtained by extracting slices of the semantic hierarchy and analysing the relations between forms in that layer. It does not mean that generalisations on animal families cannot be stated in a paradigmatic manner but rather that they need to be expressed through a paradigm with adaptive levels of organisation. In practice, the diversity could be represented by the same type of model we proposed for the ethnic network with morphomic paradigms associated with multiple layers addressing different levels of semantic distinctions.

4 Conclusion

A number issues with derivation are blocked out by the paradigm uniformity principle: the paradigmatic dimension of lexical morphology, the reorganisation of family (neology, semantic drift, polysemy), analogical processes. A realistic and abstractive approach can redefine the notion of paradigm and apply it to derivation to get a unified account of morphology both inflectional and derivational. But the extension of the morphomic definition of paradigm to derivation requires multiple, associative and semantically abstractive paradigms: a flexible morphemic paradigm concept.

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Data-Driven vs. Dictionary-based description of French nominalizations in -age and in -ment: the paradigmatic evidence

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Many studies addressed the question of French nominalizations in *-age* and in *-ment* and tried to find a distinction between these two suffixations. Several authors claim that suffixation in *-age* attaches to transitive verbs while suffixation in *-ment* attaches to intransitive, reflexive or passivized verbs (Dubois, 1962, Lüdtke, 1978): consequently, nouns in *-age* would denote iterative events, while nouns in *-ment* would denote resultant states, with durative or terminative value. Others as Kelling (among others: 2001 and 2003) use Dowty's notion of Proto-Roles approach combined with LFG's mapping theory (Bresnan & Zaenen, 1990) and claim that the number of proto-agent entailments determinates the choice of the more adequate suffixation: suffixation in *-age* would be chosen if all proto-agent criteria are fulfilled while suffixation in *-ment* would be preferred otherwise. Martin (2010, among others) connects the choice of one or the other suffixation with the "length of the eventive chain" denoted by the nominalization: she assumes that verb bases denoting causative predicates (and more generally, semantically complex events) are preferably selected by *-age*, whereas inaccusative verbs (i.e. with a simpler semantic content), derive into *-ment* nouns. Uth (2010) explores diachrony in order to offer explanation of the synchronic difference between these two suffixations.

All these studies share a common assumption: French nominalizations in *-age* and in *-ment* should be distinguished. This presupposition is based on another one: each exponent must coincide with a unique Lexeme Formation Rule (LFR), or, more precisely, an exponent being a phonological manifestation of a given morphosyntactic property-set (Coates, 2000; Trommer, 2012), if there are two different exponents, the LFRs they belong to must be different.

Moreover, excepted Uth (2010), none of these studies is based on real data

In the vein of Dal & al. (2004) and Fradin (2016), the aim of the present communication is to confront the robustness of previous results through the examination of noun pairs derived from the same verb, where one member is attested in dictionaries of contemporary French, and the other one is only present on the Internet.

Through an automatic acquisition procedure, Dal & al. (2004) gathered from the Web a large amount of *-ment* and *-age* ending nouns, and ranked them according to whether they are stored in dictionaries, or newly coined words. Then, *-age* and *-ment* nouns sharing the same base verb were paired.

For each (N1, N2) pair, where N1 is a lexicalized nominalization and N2 is a neologism found online, the following annotations, illustrated here with the {*amincissement*, *amincissage*} and {*encuvage*, *encuvement*} pairs, have been systematically recorded:

	amincissement	amincissage
Suffix	ment	age
Stored in dictionaries (TLF+RE)	Yes	no
Lexical status	correct	correct
Base verb	amincir "(to) slim"	
Type of use	General	Technical
Domain(s) of use	Medicine, health, meteorology, zoology, philately	Tannery, textile industry, health ...
Relations between domains	Partial overlap	
Number of pages on the Web	17410	10
Number of occurrences analyzed	150	9
Contexts	centre/cure/produit d'aminçissement "center/cure/product for SLIM-MENT"	(système d')aminçissage des coutures "(system of) SLIM-AGE of seams"
	aminçissement de la couche d'ozone / de la lithosphère "SLIM-MENT of the ozone layer/lithosphere"	technique d'aminçissage ionique "technique for ionic SLIM-AGE"
		aminçissage des capitons "cellulite SLIM-AGE"

	encuvage	encuvement
Suffix	age	ment
stored in dictionaries (TLF+RE)	Yes	No
Lexical status	Correct	correct
Base verb	encuver "(to) vat"	
Type of use	Technical	Technical
Domain(s) of use	Viticulture	Masonry
Relations between domains	Disjointed	
Number of pages on the Web	198	243

Number of occurrences analyzed	47	61
Contexts	encuvage (du vin, du cabernet,...) “(wine, cabernet, ...) VAT-AGE”	un encuvement dans la fondation “a VAT-MENT in the foundation”
	trappes d’encuvage “VAT-AGE trapdoors”	fût à encuvement pour poteaux “VAT-MENT barrel for poles”
	... doit être préparé pour l'encuvage “... must be prepared for VAT-AGE”	
	Triez votre vendange avant l'encuvage “sort your grape harvest before VAT-AGE”	

“Lexical status” indicates whether the lexeme is correct (it contains no incorrect spelling; the lexeme is not an archaism or a foreign term); the value of “domain of use” is deduced from the contexts of use.

Our main conclusion is that, for speakers, there is not a clear cut distinction between suffixations in *-age* and *-ment*:

- (i) Both are equally available to coin new lexemes.
- (ii) No radical contrast can be observed between them.
- (iii) Their meaning often overlap, at least partially.
- (iv) Even with long-time stored nominalizations, as *remboursement*, one can find on the Web its counterpart with the other suffix, with no semantic distinction, as with *remboursage* in (1):

- (1) Je demande à l'OM le remboursage des 19 casquettes que j'ai achetées.
[I ask the OM the refund-AGE for the 19 caps I bought]

This conclusion contradicts the theoretical assumption “one exponent/one LFR”: the implicit postulate of discreteness of LFRs underlying the above theoretical distinctions between suffixations in *-age* vs *-ment* do not usually hold with real data. At best, such descriptions capture the core of LFRs, but, instead of discrete patterns, LFRs should be considered as forming systems with cores and inclines: saying that LFRs are in competition is another way of saying that their inclines can overlap.

Our investigation and conclusion are in line with the assumption of Aronoff & Lindsay (2013, 2014): “If blocking and synonymy avoidance were driving the interaction of rival suffixes, then we would expect the rival suffixes to each develop a distinct meaning over time. Remarkably, they do not”.

According to these authors (see also Aronoff 2016), historic as well as synchronic investigations prove that pattern competition – as illustrated by French *-ment* and *-age* – leads to either affix extinction or rules coexistence, in separate specialized sectors, or to a situation where one rule is hegemonic and the other survives into so-called *niches*.

We will show how {Xage, Xment} noun pairs in French, with X the common base verb, are distributed according to various classes of *niches*, and therefore how Xage and Xment pattern description reflects sub-paradigmatic regularities.

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The role and nature of series in lexeme formation morphology

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1. A derivational series is a set of lexemes analogically formed on the same pattern (Hathout, 2011). More precisely, a morphological derivational series is a set of lexemes that show a recurrent correlation between their form, their meaning and what Mel'čuk (1993) calls their syntactics. The goal of the presentation is to assess the role of derivational series in lexeme formation morphology and to show that several types of such series must be distinguished.

2. Derivational series reflect the entrenchment of derivational patterns in the existing lexicon. Series and sub-series play a crucial role for the selection of morphophonological stems in derivation. This is what we observe in French for names of status derived from nouns ending in *-ant* (Plénat & Roché, 2014) (the number of Google hits is given between brackets).

- (1) a. Normal : *parent* 'parent' / *parent-at*, *régent* 'regent' / *régent-at*, ***assis-***
tant 'assistant' / ***assistant-at*** (120), etc.
- b. Innovative : ***assistant*** 'assistant' / ***assistan-at*** (742,000), *figurant* 'extra,
walk-on' / *figuran-at*, *postulant* 'postulant' / *postulan-at*, etc.

Lexemes of series (1a) follow the traditional pattern: suffix *-at* is added to the derivational stem of the base noun, which ends in /t/, a consonant that is not pronounced if the noun is used in isolation (Bonami & Boyé, 2005). But nouns ending in *-ant* have developed a new pattern, where *-at* is suffixed on the stem deprived of its final /t/, as (1b) illustrates. This probably happened because dissimilatory constraints, which are very strong in French, make speakers avoid derived sequence [tã.ta]. Noun *assistant* belongs to both series, but the number of Google hits indicates that the new pattern is by far the preferred one. Data (1) illustrate how a local conditioning makes a new sub-pattern emerge and became entrenched in the language because it involves highly frequent lexemes. In this type of series (Type 1) the meaning is kept constant while the form is slightly altered.

3. A second type exists (Type 2) where the form is kept constant while the meaning changes. This is what we observe for *garage* in (2).

- (2) a. *Le **garage** des voitures est interdit dans la cour.*
'The parking of cars is forbidden in the courtyard'
- b. *Le **garage** s'est écroulé.*
'The garage collapsed'

In (2a) *garage* denotes an action, in (2b) an object, namely a building, which indicates that the two lexemes do not belong to the same derivational series. But how do we know that, since the forms in question do not present any formal cue that could help us to make the right meaning / form association? The question is all the more vexing that both GARAGE can be correlated with the same verbal construction: (i) X[AGT] garer Y[vehicle] dans Z ‘X park Y in Z’.

Within an implicational approach to morphology, we have to say that *garage* with meaning (2a)—let us dub it *garage*¹—gets this interpretation in discourse when elements in the linguistic context impose the conception of its referent as an event. In most cases, these elements are predicates such as *interdit* / *forbidden*, that can be predicated of events or actions only. On the other hand, the artifactual object reading (of *garage*²) occurs whenever a predicate in context involves physical dimensions (or properties), as is the case with *s’écrouler* / *collapse*. This type of conditioning has been known a long time (Godard & Jayez, 1995; Pustejovsky, 1995). What it shows is that the cues on which morphological derivational series are elaborated are external and not internal to the form, as in (1) (and in inflection (Ackerman *et al.*, 2016, p. 138)). Capitalizing on the distinction made by Gärdenfors in (3), we could say that in (2a) *garage*¹ denotes an event concept of the kind ‘to park’, whereas in (2b) *garage*² would denote an object (and location) concept of the kind ‘building’, which is noted in a sketchy way in (4).

- (3) Information about an object may be of two kinds: *propositional* and *conceptual*. When the new information is propositional, one learn new *fact* about the object, for example, that *x* is a penguin. When the new information is conceptual, one *categorizes* the object in a new way, for example, *x is seen as* a penguin instead of just a bird. (Gärdenfors, 2000, p. 127)
- (4) a. CAT(*garage*¹): e = X garer Y dans Z
b. CAT(*garage*²): Z = X garer Y dans Z

Other examples of lexemes belonging to the just mentioned series are given in (5).

- (5) a. *garer* ‘to park’ / *gar-age* ‘parking’, *paver* ‘to pave’ / *pav-age* ‘paving’,
virer ‘to bank, to turn’ / *vir-age* ‘banking’...
b. *garer* ‘to park’ / *gar-age* ‘garage’, *paver* ‘to pave’ / *pav-age* ‘pavement’,
virer ‘to bank, to turn’ / *vir-age* ‘bent’...

To make the correlations in force in Type 2 series explicit, we must add the dimensions linked with meaning and syntactics, which makes the picture slightly more complicated (6).

- (6) a. *garer* ‘park’ X[AGT] garer Y[vehicle] dans Z / *gar-age*¹ ‘parking’ e =
X[AGT] garer Y dans Z, ...

- b. *garer* ‘park’ X[AGT] *garer* Y[vehicle] dans Z / *gar-age*² ‘garage’ Z = X[AGT] *garer* Y dans Z, ...

In the talk examples will be given showing how derived lexeme have got a new meaning as a result of being correlated in context with a construction of their base-verb they were not correlated with before (e.g. *encaver* / *encavement*). The phenomenon is similar to what happens for *assistant* in (1), except that meaning and syntactics are involved instead of form only.

4. Derived nouns affixed with the same exponent and correlated with the same verbal lexeme are expected to have the same meaning. To that extent, one would expect that all occurrences of *tronçonnage* in (7) to have the same meaning.

- (7) a. [concrete, trunk-like entities] *Le tronçonnage des (arbres | branches maîtresses | tilleuls)*
 ‘The sawing up of (trees | main branches | lindens)’
 b. [concrete object stretching in space] *Le tronçonnage des (rails | rivières | fichiers)*
 ‘The sawing up of (rails | rivers | files)’
 c. [object or event stretching in time] *Le tronçonnage (des programmes télé | des données | des dialogues)*
 ‘The cutting up of (TV programs | data | dialogues)’
 d. [abstract entity] *Le tronçonnage (de la société française | des compétences | des résultats scientifiques)*
 ‘The cutting up of (French society | competences | scientific results)’

This is the case if we confine ourselves to the core meaning of the verbal construction, namely the fact of doing an action yielding sections (*tronçons*). However at a finer-grained level, what these nouns describe is not exactly equivalent, since the inferences that can be drawn from the phrases these nominalizations occur in are not the same. They can be grouped in distinct clusters. The more examples illustrate a cluster, the more the cluster gains importance and is likely to become entrenched in the language. Somehow, these examples form series more or less widely attested in texts (Web, corpora). The talk will also address the role played by these series of examples in the establishment of new meanings for derived lexemes.

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Titsch and Töitschu are Alemannic dialects spoken in two Walser enclaves in Aosta Valley, respectively Gressoney (GR) and Issime (IS) (cf. Zürrer 2009). These languages are exposed to language shift given their intense contact with Italian, Piedmontese, French and Francoprovençal. In these villages, every speaker is at least bilingual, and many are trilingual, while the usage of Walser German is normally restricted to familiar speech situation and to an oral register. These varieties preserve a rich amount of lexical expressions testifying of the vitality of word-formation at least in the recent past.

In the paper, we will focus on the GR suffix *-etò* and on its IS correspondent *-etu* which form abstract nouns on a nominal or a verbal base, cf. respectively GR *oug* ‘eye’ → *ougetò* ‘glance’ / IS *fannu* ‘pan’ → *fannetu* ‘panful / blow of pan’ and GR *spoue* ‘to spit’ → *spouetò* ‘spit’ / IS *fuetterun* ‘to lash’ → *fuetterutu* ‘lash’, and do not have structural correspondents in standard German, but appear to have been autonomously elaborated in these enclaves. These suffixes apparently go back to a Romance diminutive suffix *-etta* forming feminine nouns in Francoprovençal as witnessed by loans like GR *brotschetò* ‘spigot’ (cf. Francoprovençal *brotsetta*), GR *schärvietò* ‘napkin’ (cf. French *serviette*), GR *tärretò* ‘terrine’ (cf. Francoprovençal *terretta*), etc. which are adapted as feminine nouns following a general pattern (e.g., Italian *gara* ‘competition (fem.)’ > GR *garò* (fem.), cf. *fannò* ‘pan (fem.)’, German *Pfanne*).

Independently of the original value, these suffixes are normally used to form deverbal nouns typically displaying a semelfactive meaning. This has the effect of enlarging the derivational family of the verbs which used to lack any deverbal abstract noun of a semelfactive value. In many instances, the semelfactive noun is accompanied by an action noun generally referring to the event depicted by the verb (cf. GR *erschétte* ‘to shake’ → *erschéttretò* ‘(earth)quake’ / *erschéttròng* ‘vibration’) as well as by other derivatives displaying different suffixes forming agent/instrument nouns (cf. GR *zelle* ‘to tell, count’ → *zelletò* ‘chat, rumor’ / *zeller* ‘abacus’), adjectives (cf. GR *ròtschò* ‘to slip, to slide’ → *ròtschetò* ‘slip; landslide’ / *ròtschég* ‘slippery’), etc. It has to be stressed that these suffixes are largely productive – even if the limits connected to the situation of decay of these varieties apply – and clearly outrank the older Germanic patterns exemplified by apophonic abstracts (cf. GR *trätte* ‘to tread’ → *trét* ‘stride’) or by conversions (cf. GR *bruche* ‘to use’ → *bruch* ‘use’).

Moreover, the enrichment of the derivational paradigm of deverbal derivatives has to be seen in connection with the widespread multilingualism of these communities in which every speaker masters Italian as H-code besides the Walser German mother tongue used as L-code. In this light,

the development of such a semelfactive suffix closely mirrors the productive Italian pattern given by the derivatives based on the feminine past participle either of deverbal (cf. It. *mangiare* ‘to eat’ → *mangiata* ‘binge’, etc.) or of denominal origin (cf. It. *occhio* ‘eye’ → *occhiata* ‘glance’, etc.). The latter serve as semelfactive action nouns and display feminine gender (cf. Author1 2000, 2002, 2017). Thus, in spite of their different origin from a diminutive suffix, *-etò* and *-etu* have been remodeled to cover the functional space which is occupied in the mind of the bilingual speaker by the highly salient Italian pattern based on the feminine past participle, whose value is reproduced in Walser German. The feminine gender is the key for understanding the force of the paradigmatic correspondence between the Italian pattern based on the past participle and the Walser German suffixes which are however not based on the past participle as shown for instance by GR *bissetò* ‘bite’: the derivative clearly selects the infinitive stem *bisse* ‘to bite’ and not the past participle *bésset* ‘bitten’. In this case, the paradigmatic correspondence takes place on a multilingual level and reinforces the weaker L-code by means of the elaboration of a loan pattern (the diminutive suffix *-etta*) on the basis of another pattern which is pretty salient in the stronger H-code and especially frequent in the spoken register (cf. Author1 2015).

On the basis of a large lexical repertoire resulting from the ongoing project DiWaC, data extracted from dictionaries and text corpora of Titsch and Töitschu will be presented with the aim of evaluating the status of *-etò* and *-etu* between native and loan patterns in these multilingual communities (cf. Author2 2012).

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Morphological priming effects within derivational paradigms: A study on series ending with the final sound [o] in French

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1. Introduction

In the domain of linguistics, morphological analysis is conceived according to two antagonist approaches. On the one side, the morpheme-based approach (exemplified by the theoretical framework of Distributed Morphology, see Halle & Marantz, 1993, 1994) integrates morphology with syntax and considers morphemes as basic minimal forms and on the other, the word-based approach postulates that surface word forms are built from sub-word units and assigns a basic status to words (Construction Morphology as proposed by Corbin, 1987; Aronoff, 1994; Booij, 2005). Psycholinguistic research has broadly explored the effects of morphological processing on the underlying processes of lexical access. Forty years of experimental research have been focused on testing the dominant decomposition hypothesis according to which words are systematically decomposed before accessing the mental lexicon (e.g., Taft and Forster, 1975; Taft, 2015). The characteristics of morphological complex words and nonwords (i.e., their form in terms of decomposability and interpretability, their lexical frequency and more rarely their lexical environment) have been manipulated in various perceptive tasks (with nevertheless a large dominance of the lexical decision task which consists in a word/nonword discrimination) and numerous languages (English representing however 50% of these studies). Most of the results have been interpreted as supporting the decompositional data (see the reviews of Amenta & Crepaldi, 2012 and Diependaele, Grainger & Sandra, 2012) without however really questioning the linguistic processes underlying the construction of complex words. An overview of the tested hypotheses and the materials used to explore complex word recognition reveals indeed a lack of consideration of the paradigmatic characteristic of words for understanding the cognitive mechanisms underlying lexical access. Numerous studies mainly focused on the word formal aspects and extended the morphological sensitivity effects observed with complex nonwords to complex words (e.g., Taft & Forster, 1976; Caramazza, Laudanna & Romani, 1988; Laudanna, Cermele & Caramazza, 1997; Crepaldi, Rastle & Davis, 2010) omitting to consider semantic aspects of morphological complexity. Many experimental reports, examined morphological processing using the masked priming paradigm (Forster & Davis, 1984) that is supposed to reflect the automatic and non conscious processes engaged in the very early stages of word recognition. In this paradigm, two visual related items are presented successively and participants are asked to perform a lexical decision indicating if the second item is a word or not. However, because the prime word is masked and presented very briefly¹, the reader is even not aware of its presence before seeing the target item. Hence, the paradigm allows examining the effects of the unconscious processes of the prime processing on the target recognition (see Kinoshita & Lupker, 2003 for a review on masked priming). Many

¹ The *Stimulus Onset Asynchrony* is usually less than 50 milliseconds, it corresponds to a subliminal processing.

masked priming studies demonstrated that when two words are morphologically related (e.g., *singer-sing*), the prior presentation of the prime facilitates the recognition latency of the target relative to both a baseline condition in which the prime is completely unrelated to the target (e.g., *baker-sing*) and an orthographic condition that uses a prime that is only formally related to the target (e.g., *single-sing*). Accordingly morphological priming effects do not result from the mere formal overlap shared by prime-target. Other studies showed that semantic priming effects (e.g., *cello-violon*) only arise when the prime duration is sufficiently high (i.e., > 72 ms, see Rastle, Davis, Marslen-Wilson & Tyler, 2000 for a comparison between morphological, orthographic and semantic priming effects using different SOAs). This general result suggests that priming effects results from morphological relationships shared by prime-target pairs and that morphologically related words are connected by some kind of excitatory links.

2. Psycholinguistic models of morphological processing

The architecture of psycholinguistic models of word recognition is mostly based on symbolic interactive activation models (e.g., McClelland and Rumelhart, 1981). This type of models is organized in hierarchical levels of processing containing symbolic units. Each level corresponds to a linguistic characteristic of words, from letter features to semantics. During word recognition, activation spreads from the lowest to the highest levels. Within-level units are connected by inhibitory links whereas inter-level units by excitatory links. Consequently, the model functions according to a principle of competition between within-level units that is compensated by both bottom-up and top-down excitations. The independency of the morphological effects relative to mere formal and semantic effects being established, morphological informations were usually represented as a separate level of processing. However, its locus relative to the formal level (phonological and orthographic descriptions of the words) and the semantic level is still controversial. Morphological units have been situated either before the formal level and stand as access units to the mental lexicon (e.g., the sublexical model, Taft, 1994), or at the interface of the formal and the semantic level, organizing the word representations in morphological families (e.g., the supralexical model, Giraudo & Grainger, 2001) or at either places, before and after the formal level (e.g., the hybrid/dual route model, Diependaele, Sandra & Grainger, 2009; see also Diependaele, Morris, Serota, Bertrand & Grainger, 2013).

These three options assume nevertheless morpheme representations and by extension, propose a decomposed view of morphology. The sublexical and the hybrid models of morphological processing actually state very clearly that complex words are systematically decomposed into morphemes during lexical access. This decomposition mechanism is reflected by the obligatory activation of morphemes to gain the word representations coded within the mental lexicon. Each time a complex or a pseudo complex word (i.e., a word with a surface morphological structure like for example the word *corner* which comprises a surface stem *corn-* and a surface suffix *-er*) is processed by our cognitive system, it triggers the activation of its constituent morphemes that successively activate the word forms containing it. Lexical access takes place via the obligatory activation of surface morphemes.

One major criticism of this prelexical hypothesis is that this mechanism can only be applied to regular and perfectly segmentable words and more problematic, it reduces the role of morphology to surface/formal effects. The original version of the supralexical model (Giraudo & Grainger, 2001) also integrated morphemes even if it did not suppose a decomposition mechanism by which word representations are

decomposed properly in order to activate their semantic representations. On the contrary, the morphological level contained “emerging” base morphemes, that is base morpheme representations resulting from the acquisition of complex words that are derived from the same base. Accordingly the base morpheme organizes the word level in morphological families, morphologically related words being connected together thanks to a supralexicale representation. Concretely, when the system processes a complex word, it first activates all the word representations that match orthographically with it while at the same time the complex forms activate their base morpheme that feeds back positively these forms. As all units belonging to the same level compete with each other, the activated orthographically related words inhibit each other, but those which are also morphologically related receive facilitation from their shared base. Words from the same family are then less inhibited than the other representations at the word level. In masked priming, the morphological facilitation between two morphologically related words observed relatively to two unrelated words is explained in terms of a reduced inhibition effect compared to a regular inhibition effect for unrelated items.

3. The final sound [o] in French

Recently, Giraudo and Dal Maso (2016) discussed the issue of morphological processing through the notion of morphological salience - as defined as the relative role of the word and its parts - and its implications for theories and models of morphological processing. The issue of the relative prominence of the whole word and its morphological components has been indeed over shadowed by the fact that psycholinguistic research has progressively focused on purely formal and superficial features of words, drawing researchers' attention away from what morphology really is: systematic mappings between form and meaning. While we do not deny that formal features can play a role in word processing, an account of the general mechanisms of lexical access also needs to consider the perceptual and functional salience of lexical and morphological items. Consequently, the existence of morphemes is then recognized, but we claimed that it corresponds to secondary and derivative units of description. Certainly, the notion of salience refers primarily to formal aspects, because the perceptual body of the morpheme is necessarily the starting point of the processing mechanism. However, the notion of salience makes sense for complex word processing only if the form it refers to is associated with a meaning or function.

Focusing on salience from a mere formal point of view led Giraudo (submitted) to consider how a decompositional hypothesis could deal with some phonological endings whose graphemic transcriptions are various. To this end, a distributional study of the final sound [o] in French was carried and suggested that paradigmatic relationships are more suitable to guide morphological processing than morphological parsing.

In French, the final sound [o] can be written according to 9 forms:

- -au like in *noyau*, *préau*, *tuyau*, *bestiau* ('core', 'courtyard', 'pipe', 'cattle')
- -aud like in *noiraud*, *rougeaud*, *crapaud*, *nigaud* ('black + aud', 'red+aud', 'toad', 'idiot')
- -aut, like in *quartaut* ('quarter+aut')
- -eau like in *poireau*, *grumeau*, *tableau*, *drapeau* ('leek', 'lump', 'board', 'flag')
- -od like in *pernod* ('pernod')
- -op like in *galop*, *sirop*, *trop* ('gallop', 'syrup', 'too much')
- -os like in *gros*, *dos*, *enclos*, *chaos* ('big', 'back', 'pen', 'chaos')

- -ot like in *bistrot*, *cachot*, *chiot*, *jeunot* ('pub', 'dungeon', 'puppy', 'youngster')
- -o like in *auto*, *ado*, *mécano*, *fluo* ('car', 'teenager', 'mechanic', 'fluo')

Among these 9 endings, we distinguished semantically transparent complex words (e.g., *drap-eau*) M+, semantically opaque complex words (e.g., *crap-aud*) M-, simple words (e.g., *trop*) and apocopes (e.g., *ado* from *adolescent*), whose distributions in terms of size, i.e., number of different words sharing the same ending (N) and cumulated frequencies of these words (F) revealed to be very heterogeneous. The distributional analyses revealed that the probability for this phonological ending to correspond to a suffix is not only low but the cumulated frequency of suffixed words bearing a semantically transparent construction is weak relative to the non-suffixed words. Consequently, a decomposition hypothesis according to which any item bearing a structured morphological surface is first decomposed into morphemic constituents would lead to numerous useless prelexical mechanisms.

Following this first conclusion, we decided to carry a series of masked priming experiments that examine morphological priming effects (e.g., *drapeau-plumeau* 'flag'-feather duster') vs phonological priming effects (e.g., *galop-plumeau*) using French derived words belonging to the same series. Moreover, we distinguished transparent derivations (e.g., *pruneau* 'plum') vs opaque derivations (e.g., *poireau* 'leek') in order to study the impact of semantic processing on morphological processing. According to a non-decompositional view of morphology, we expect to observe significant morphological priming distinct from phonological effects. Moreover, semantic transparency should interact with priming. Results are currently analysed and will be presented at the conference.

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Morphemes and the paradigm

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Speakers posit grammatical entities and units on the basis of identities or similarities (i.e. partial identities) of form and/or function. In the most transparent cases, a given form appears always in the presence of the same morphosyntactic feature value and conversely, the presence of that particular feature value is always accompanied by the same form. For example, every Spanish 1PL verb form ends in /mos/ and conversely, every Spanish verb form ending in /mos/ is a 1PL form: *ama-mos*, *tendre-mos*, *vivi-mos*, *tenga-mos*, *corri-mos*, *so-mos*, *tuvi-mos*, *fui-mos*, *sea-mos* etc. There is, therefore, a mutual entailment of the formal exponent *-mos* and the feature value(s) 1PL. This is the so-called biunique mapping between form and morphosyntactic feature values. Another property that the Spanish 1PL forms have is that their shared form is easily identifiable and segmentable by linguists. It is clearly *-mos* and not *-os* or *-amos* that all the 1PL forms have in common. This piece of form is also clearly not part of the stem and cannot be said to express any other thing rather than 1PL.

This Spanish example illustrates a transparent mapping within and across languages and maybe as a result, biuniqueness and segmentability have often been assumed to be the default situation in Language. The result was the emergence of the notion of the morpheme: a segmentable form-meaning unit similar in its behaviour to other segmentable form-meaning units such as words. This conception of morphology as a whole (and not just of cases like Sp. *-mos*) has been pervasive and has been incorporated into most theoretical models and has been assumed even in cases where facts do not appear to be so straightforward.

For example, the form 'men' has been analyzed as a concatenation of *man-* and a zero plural allomorph which triggers allomorphy of the base to *men-*. This was regarded by Hockett (1989: 84) as a *reductio ad absurdum* of these models. There is, indeed, ample empirical evidence that casts doubt on both segmentability and (bi)uniqueness as properties of the general architecture of morphology. Segmentability, for instance, is difficult or impossible, not only in cases of non-concatenative exponence like 'men' but also in other cases, such as those where a single exponent or segment seems to be doing a double duty. Some pieces of form, for example, seem to be base and affix simultaneously. For example, all English verbs which remain unchanged in the past end in /t/ or /d/ (e.g. *hit*, *put*, *spread* etc.) which is also the form of the "regular" past tense suffix. This can hardly be a coincidence, as analogous examples in other languages are not difficult to find: German *Fahrer*, *Finger*, *Daumen*, *Wagen* etc. (SG and PL), Spanish *lunes*, *crisis*, *cactus*, *bíceps* etc. (SG and PL), Icelandic *elti*, *gifti*, *fletti*, *bretti* etc. (PRES and PAST). The phenomena usually discussed in the literature as cases of 'haplology' also challenge the segmentability hypothesis and lend support to a resonance-based model of morphology.

The property of (bi)uniqueness between form and morphosyntactic feature values is also jeopardized by a great amount of cross-linguistic findings and phenomena like syncretism, defectiveness, deponency, overabundance etc. Formal differences do not always correspond to differences in morphosyntactic values (e.g. in the case of inflection class distinctions, deponency or overabundance) and conversely, differences in morphosyntactic values do not always align with formal differences (e.g. in syncretism or deponency). And yet it seems hard to disagree with my earlier claim that "speakers posit grammatical entities and units on the basis of identities or similarities of form and/or function.". How can we reconcile this remark with the more deviant morphological facts of language? The answer, I contend, is that we can do so by conceding that the

grammatical entities and units of language cognized by speakers do not always need to have a morpho-syntactically coherent description. They may be morphomic and based only on form.

The existence of morphomic relations within and across paradigms does not necessarily diminish the importance of traditional morphosyntactic features in the architecture of morphology. It might even be argued that, despite some contrary claims and examples (e.g. Maiden 2016), a morphosyntactically coherent distribution and a uniform exponence are probably preferred by speakers over more complex alternatives. Some analogical developments (cited in Wurzel 1989) bear witness as to the importance of these criteria:

	Gabe 'gift'		Zunge 'tongue'	
	SG	PL	SG	PL
NOM	Gabe	Gabe	Zunge	Zunge-n
ACUS	Gabe	Gabe	Zunge	Zunge-n
DAT	Gabe	Gabe-n	Zunge-n	Zunge-n
GEN	Gabe	Gabe-n	Zunge-n	Zunge-n

Table 1: Two MHG feminine declensions

	Gabe 'gift'		Zunge 'tongue'	
	SG	PL	SG	PL
	Gabe	Gabe-n	Zunge	Zunge-n
	Gabe	Gabe-n	Zunge	Zunge-n
	Gabe	Gabe-n	Zunge	Zunge-n
	Gabe	Gabe-n	Zunge	Zunge-n

Table 2: NHG outcomes

Other developments in the evolution of German also served to simplify form-meaning mappings. For example, the number-case umlaut of MHG was replaced by a plural-only umlaut in NHG. Similarly, in Early NHG, the distinction between present and preterite flexives of the 2SG and 3PL was eliminated: MHG du gibest/du gaebe became NHG du gibst/du gabst & MHG sie lebent/sie lebten became NHG sie leben/sie lebten.

Regardless of the possible pressures towards simpler form-meaning mappings, however, synchronic facts often suggest that speakers must be able to cognize and internalize some units on the basis of form alone and despite a lack of morphosyntactic features in common (e.g. Kayardild morphemes, which show complex and unpredictable morphophonological alternations, see Round 2013). Sometimes, diachronic processes also seem to lend support to such form-only units in language. For example, in Acazulco Otomí, as shown in Baerman et al. (forthcoming), a similarity in form and distribution caused speakers to analogically unify what were earlier formally different exponents, thus pointing unequivocally to the speakers' conception of those exponents as inherently "the same thing" at some linguistic level. These findings and similar cases where formal similarities do not align with natural morphosyntactic classes have been relatively neglected in the literature (cf. Luís & Bermúdez-Otero 2016) but are fundamental for our understanding of the architecture of morphology and language by extension.

My purpose will be to analyze these form-only identities (so-called 'morphemes' [Aronoff 1994] or 'meromorphemes' [Round 2013]) from a theoretical as well as an empirical perspective. From the angle of Canonical Typology (Corbett 2005), I will narrow down what precisely counts as a canonical morpheme by paying attention to meaning, phonological or syntactic conditioning, distribution, type of exponent, allomorphy, type frequency etc. On the basis of the analysis of relevant phenomena from a variety of languages, it will be explored which are the most common deviations from the canonical ideal and which properties of morphemes tend to cluster together cross-linguistically and why.

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Our study focuses on morphologically complex words based on proper names of French male and female politicians (henceforth PPN 'politician proper name'). To do so, we have selected 90 PPNs referring to politicians in charge of major political functions (e.g. president, minister) since 1981. We have listed the morpho-phonological constraints applied in word formation (e.g. Plénat, 1997; Lignon & Plénat, 2009) and we have selected a set of 100 French exponents which are involved in construction on the PPNs (cf. Huguin, 2015).

~ 130,000 candidate forms such as (1) were generated from these lists.

(1) NICOLAS SARKOZY_{NPr}¹ > NICOLASIEN, SARKOZYSISER, NICOLASARKOZYTE...

The existence of these forms has been checked on the Web (cf. Hathout & *alii*, 2008; Dal & Namer, 2015 about the use of the Web in morphology) and, when they do exist, their contexts have been collected. In this work, we examine 15 PPNs and their derivational families (1,272 complex words). So as to get a good representativity of word formations on PPNs, we needed a rather heterogeneous sample. Consequently, we selected a diversity of politicians on the bases of gender, notoriety, etc. The collection and the examination of these data in context allow us to make four observations.

(i) PPNs are often used as bases for morphological constructions, in various languages (cf. French (2), Italian (3), English (4)).

(2) EMMANUEL MACRON_{NPr} > MACRONISME_{Nc}

“Le **macronisme** existe-t-il ? Ça bouge au centre gauche. Hier vous tentiez de définir le social-réformisme de Manuel Valls.”

Does (Macron -ism) exist? Left center is on the move. Once you tried to define the social reformism of Manuel Valls.

(3) SILVIO BERLUSCONI_{NPr} > BERLUSCONICRAZIA_{Nc}

“Questi sono ormai i nostri politici. Una volta si accusava la partitocrazia, adesso è nata la **berlusconicrazia**.”

Now they are our politicians. After having accused the politics of the parties came the (Berlusconi -cracy).

(4) DONALD TRUMP_{NPr} > TRUMPISM_{Nc}

“**Trumpism** has two main ingredients. The first is the notion that people of color and women are less than fully human.”

(ii) PPNs are bases of various recurring and expected constructs such as lexical units designating supporters (FRANÇOIS HOLLANDE_{NPr} > HOLLANDISTE_{Nc}) or ideologies (FRANÇOIS HOLLANDE_{NPr} > HOLLANDOCRATIE_{Nc}). They also appear as bases of more unexpected creations, for example lexical units denoting substances (FRANÇOIS HOLLANDE_{NPr} > HOLLANDIUM_{Nc}) or even activities (FRANÇOIS HOLLANDE_{NPr} > HOLLANDAGIE_{Nc}) etc.

¹ We use the abbreviations NPr, Nc, V and Adj respectively for the syntactic categories: proper name, common noun, verb and adjective.

(iii) As illustrated (5) and (6), these complex words can be interpreted in two ways. (5) is defined in relation to the PPN, i.e. with respect to the proper name as such, used as a simple label. By contrast, it is the stereotypes conveyed by the PPN referent which enable the interpretation of (6).

- (5) SÉGOLÈNE ROYAL_{NPr} > SÉGOLÉNISTE_{Nc} → ‘supporter of Ségolène Royal’
 “Cette **ségoléniste** féroce est un peu trop partisane, ce qui ne la sert pas toujours.”
This ferocious (Ségolène -ist) is a little too follower, which does not always serve her.
- (6) PATRICK BALKANY²_{NPr} > BALKANISER_V → ‘to steal, to hide fraudulently’
 “Il aurait **balkanisé** plusieurs millions d'Euros.”
He would have (Balkany -ise) millions of euros.

(iv) A given PPN can occur in different forms (in bold in the example (7)) in the words in which it is the base. These forms (i.e. stems) correspond to the various denominations of the PPN referent (e.g. his first name, his last name).

- (7) NADINE MORANO_{NPr} > NADINIEN_{Adj} ; MORANOIEN_{Adj} ; NADINEMORANIEN_{Adj}

These observations allow us to describe PPN as full lexical unit. Since PPNs are selected as bases of word formation (cf. (i)), they are lexemes (according to Fradin, 2003), and as such characterized by a meaning. This meaning is twofold (cf. (iii)). On the one hand, it contains the denomination of PPN referent as shown by the fact that SÉGOLÉNISTE_{Nc} (5) can be interpreted directly as ‘supporter of Ségolène Royal’. On the other hand, it is based on a set of stereotypic properties associated with the PPN referent. These properties can be relative to appearance (8), political or personal actions (6), or the ideology conveyed (9), etc.

- (8) CHRISTIANE TAUBIRA³_{NPr} > TAUBIRANAIS_{Nc}
 “Qui est raciste ? Mais c'est M. Le Pen qui n'aime pas les **Taubiranaïs** ! Non ?”
Who is a racist ? It is M. Le Pen who does not like the (Taubira -ian) ! No ?
- (9) CHRISTINE BOUTIN⁴_{NPr} > BOUTINNIQUE_{Adj}
 “Et n'oubliez pas ce petit conseil **boutinnique** : pas de boogie woogie avant les prières du soir !”
And do not forget this little (Boutin -ic) advice: no boogie woogie before the evening prayers!

This second point is in line with Frege's (1892) and Russell's (1905) view of proper names as abbreviations of definite descriptions. This semantic duality (*denominative meaning/ meaning of a set of stereotypes*) stands in opposition to Kripke's (1972) view of proper names as meaningless (see Langendonck (2007), Anderson (2007) for a review).

Observation (iv) leads us to analyse the formal dimension of PPNs as stem collection. An analogy can be drawn between this stem collection and the *thematic space*, as defined by Bonami & Boyé (2003) that is a family of indexed stems in dependency relations. However, the PPNs stem collections does not have the same characteristics:

- the stems do not have the same dependency links;

² Patrick Balkany is a Member of Parliament. Known for his setbacks with justice, he was notably prosecuted for tax evasion.

³ Christiane Taubira is a black political woman.

⁴ Christine Boutin is a right-wing politician, she claims Catholic values.

- they are not selected by a word formation rule in particular (cf. Bonami, Boyé & Kerleroux, 2009; Roché & Plénat, 2014);
- they are all syntactically autonomous.

The PPN formal part contains at least three stems (the first name, the last name and the concatenation of both (see example (1)), and up to six for compound names such as NAJAT VALLAUD-BELKACEM_{NPr}, also named by its acronym NVB /ε n v e b e/ (see Figure 1.).

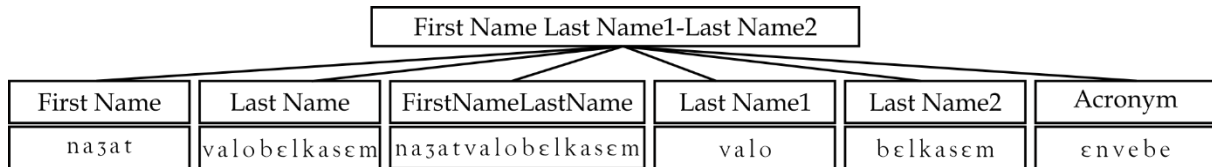


Figure 1. Stem collection of PPN: NAJAT VALLAUD-BELKACEM_{NPr}

The number of stems and their shape can be deduced from the anthroponym graphic form. We will show that the choice between the stems relies on morpho-phonological as well as extra-linguistic constraints.

While the number and the variety of derivatives or compounds built on a given PPN depend on the notoriety of its referent (cf. (ii) and (iii)), its morphological network (i.e. derivational family) architecture, follows a number of invariants. For example, the semantic properties of PPNs prevent them from being used as bases of agent names, contrary to some common nouns denoting activities (e.g. FOOTBALL_{Nc} > FOOTBALLEUR_{Nc}). Yet, all the PPNs of our corpus can be used to build names of political supporters (10), resultative verbs (11), relational adjectives (12), etc.

(10) FRANÇOIS BAYROU_{NPr} > BAYROUNISTE_{Nc}

“Tu feras comment face aux **bayrounistes** pour gagner au second tour ?”

How will you manage to win in the second round over the (Bayrou -ist)?

(11) FRANÇOIS BAYROU_{NPr} > BAYROUISER_V

“À force de pleurnicher, elle risque plutôt de se **bayrouiser**.”

Too much whining may lead her to (Bayrou -ise).

(12) FRANÇOIS BAYROU_{NPr} > BAYROUIEN_{Adj}

“Puis, c’est le rapprochement **bayrouien** avec la gauche qui a fait déborder le vase pour Patrick Boguta.”

It was then the (Bayrou -ian) rapprochement with the left-wing that caused the vase to overflow for Patrick Boguta.

From a formal point of view, we note also that there are no complex words suffixed with the French exponent *-ure* (vs. common nouns, e.g. TOIT_{Nc} > TOITURE_{Nc}). Conversely, all our PPNs can be used to build complex words with *-esque* (EMMANUEL MACRON_{NPr} > MACRONESQUE_{Adj}), *-isation* (EMMANUEL MACRON_{NPr} > MACRONISATION_{Adj}), and *-isme* (EMMANUEL MACRON_{NPr} > MACRONISME_{Nc}), etc.

Consequently, we identify two types of networks. PPNs are at the core of **(A)** a semantic network (see Figure 2.), and **(B)** a formal network (see Figure 3.). These networks contain **paradigmatic links** (dotted lines in the figures) since some are valid for all PPNs (see, among others, Bauer (1997: 244) about the generalizability of paradigmatic relationships).

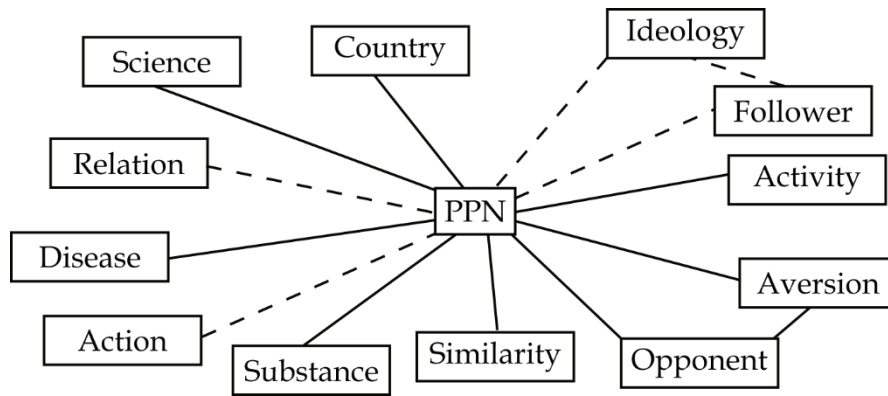


Figure 2. Sample of semantic network

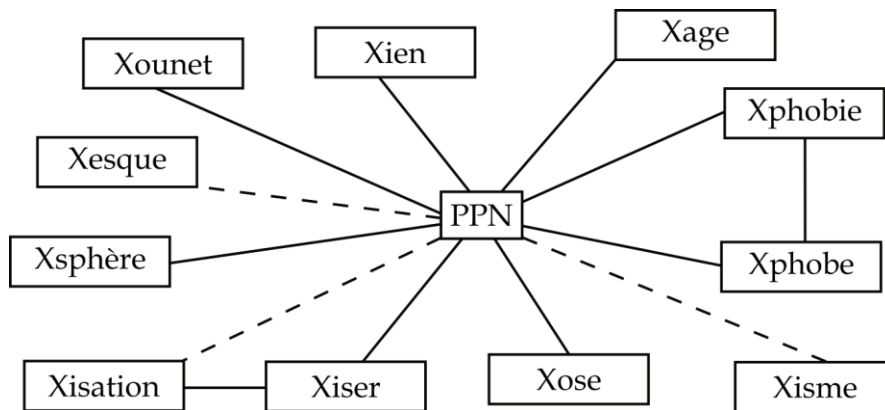


Figure 3. Sample of formal network

These two networks do not overlap entirely, thus justifying separate studies of the two networks. For example, the same suffix can be used to create lexical units of different semantic categories. Thus, the suffix *-isme* is found in lexemes denoting ideologies (2), diseases (13) and even actions (14).

(13) FRANÇOIS BAYROUN_{NPt} > BAYROUNISME_{Nc}

“Une montée de **bayrounisme** ! Faut que j'me soigne !”

A surge of (Bayrou -ism)! I have to cure myself!

(14) NADINE MORANON_{NPt} > MORANOLISME_{Nc}

“Finalement, entre deux macroneries et un **moranolisme** c’est la question salariale qui aura occupé les médias.”

Actually, between two (Macron -ery) and a (Morano -ism) it is the question of wages that will have occupied the media.

As we will argue, the effective creation of these lexemes, i.e. the concrete realisation of the networks, is conditioned by various constraints, both linguistic (morpho-phonological, semantic, lexical) and extra-linguistic.

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Onomasiological evidence on the limits of derivational families

Petr Kos

Štekauer (2014: 363) states that ‘the derivational paradigm in the narrow sense is conceived as an ordered set of all complex words directly derived from a single basic (motivating) word’ and gives the examples of paradigms based on Slovak *škola* ‘school’.

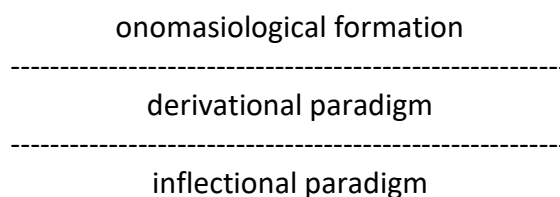
- [1] *škola* ‘school’
 škol-ák ‘schoolboy’ (school_{STEM} + SUFFIX)
 škol-ník ‘school janitor’ (school_{STEM} + SUFFIX)
 škôl-ka ‘kindergarten’ (school_{STEM} + SUFFIX)
 škol-stvo ‘education system’ (school_{STEM} + SUFFIX)
 škol-ička ‘small school’ (school_{STEM} + SUFFIX)

A similar example, inspired by Furdík (2004: 77), is based on Czech *voda* ‘water’:

- [2] *voda* ‘water’
 vod-ák₁ ‘plumber’ (water_{STEM} + SUFFIX)
 vod-ák₂ ‘canoeist’ (water_{STEM} + SUFFIX)
 vodn-ík ‘a mythical character living in ponds and rivers’ (water_{STEM} + SUFFIX)
 vodn-ář ‘Aquarius’ (water_{STEM} + SUFFIX)

In this paper I aim to argue that the above mentioned derivational families are based on the form of the motivating word only and fail to meet the requirement of systematic, regular, and predictable relationships within the paradigm. Thus I come to the conclusion that such word-families should not be considered as part of paradigmatic word-formation but as instances of onomasiological formation.

Derivational paradigms need to be distinguished from onomasiological formation of new complex naming units. Within the onomasiological formation, the new complex naming units are formed by the combination of the onomasiological base and onomasiological mark, which are based on the conceptualization of local and global features, respectively (cf. Štekauer 1998 and Grzega 2005). In accordance with Horecký et al. (1989:42) who ‘point out that new complex words do not come into existence as isolated units but rather as complete paradigms’ (Štekauer 2014: 360), I see a derivational paradigm to be a subsequent stage that the new naming unit enters after its creation. The individual stages are as follows:



The three stages can be described on Czech *vodník* (a mythical character living in ponds and rivers), taken from the set of examples [2]. Within the onomasiological formation, this green-looking character is first conceptualized as someone or something (the onomasiological base expressed by a suffix) whose distinguishing (local) feature is water as a living environment (the onomasiological mark expressed in the stem). This new naming unit then enters the derivational paradigm of the types of lexical derivation described in Beard and Volpe (2005: 189), namely feature value switches [3], transposition [4], and expressive derivations [5]. These derivational families are fully systematic, regular, and predictable.

- [3] *vodni-ce* (*vodník*_{STEM} + SUFFIX, feature value switch – a change of gender - female)
- [4] *vodni-cký* (*vodník*_{STEM} + SUFFIX, transposition - a change of word-class - adjective)
- [5] *vodní-ček* (*vodník*_{STEM} + SUFFIX, expressive derivation – a change of expressive value - diminutive)

Each member then enters its own inflectional paradigm (e.g. declension).

As has been mentioned above, within the derivational paradigm both the stem and the suffix are fully systematic, regular, and predictable. This, however, is not the case of the derivatives formed within the onomasiological formation. Its non-predictability will be demonstrated on the stem and suffix separately.

The non-predictability of the meaning of the suffix

On the onomatological level of the onomasiological model, the onomasiological base may be linguistically expressed either by a suffix or by a compounding base. My analysis of the Czech, Slovak, and English names of natural organisms, such as birds, butterflies, plants, and mushrooms, from an onomasiological perspective makes it apparent that in Czech and Slovak the predominant manner of expressing the onomasiological base is a suffix, while in English it is a compounding base. Functionally, the derivatives and compounds in the respective languages are of an equal status.

Examples of Czech names for natural organisms derived from a single motivated word *modrý* (blue):

- [6] *modř-enec* 'grape hyacinth' (flower) (*blue*_{STEM} + SUFFIX)
- modř-ín* 'larch' (tree) (*blue*_{STEM} + SUFFIX)
- modř-inka* 'blue tit' (bird) (*blue*_{STEM} + SUFFIX)
- modr-ásek* 'blue' (butterfly) (*blue*_{STEM} + SUFFIX)
- modr-ák* 'dotted stem bolete' (mushroom) (*blue*_{STEM} + SUFFIX)

As an analogical example, the following are English names for natural organisms with *blue* as a single motivating compounding base:

- [7] *blue jay* (bird)
- blue tit* (bird)
- blue* (butterfly)
- bluebell* (flower)
- blue milkcap* (mushroom)

In Czech the suffix is a formal means of expressing the onomasiological base, whose semantic variability is apparent from the meaning of the right-hand compounding bases of the English examples, thus lacking the required predictability.

This equivalence of suffixation and compounding in the onomasiological formation is also demonstrated on the examples in [1] in which the Slovak suffixal derivatives *škol-ák* and *škol-ník* find their equivalents in the English compounds *schoolboy* and *school janitor*, respectively.

I agree with Štekauer (2014:369) that 'the idea of a derivational paradigm, constituted by all word-formation processes, is paradigmatically vacuous because it does not lead to a predictable and regularly organized system of complex words. A system of complex words produced by all the word-formation processes and related by a common stem is an open system, different from the closed system of paradigm.' However, I argue that the Czech and

Slovak suffixal derivatives which have their functional equivalents in English in the form of compounds also belong to the open system of onomasiological formation and not to the closed system of paradigm.

The non-predictability of the meaning of the stem

In all the instances in [6] and [7] the 'blueness' is the onomasiological mark. It is the linguistic representation of the local feature (cf. Grzega 2005) from the conceptual/perceptual level of the onomasiological model. In its very nature, the local feature is metonymical, focusing only on some aspect(s) of the whole. Within the domain of natural organisms, we can postulate the following metonymical pattern, which is an inherent part of the local feature:

Onomasiological mark	Onomasiological base
ASPECT of the SCOPE (QUALITY) for	the ORGANISM

This can be illustrated by a specimen of onomasiological marks expressing the same referent, the long-tailed tit (*Aegithalos caudatus*):

- | | | |
|-----|--|---|
| [8] | CZ <i>mlynařík</i> (miller _{STEM} + SUFFIX) | the COLOUR of the HEAD (WHITE) for the BIRD |
| | CZ <i>ocasáč</i> (tail _{STEM} + SUFFIX) | the SIZE of the TAIL (LONG) for the BIRD |
| | EN <i>long-tailed tit</i> | the SIZE of the TAIL (LONG) for the BIRD |
| | EN <i>bottle tit</i> | the SHAPE of the NEST (BOTTLELIKE) for the BIRD |
| | EN <i>creak mouse</i> | the SOUND of the BIRD (CREAKY) for the BIRD |
| | etc. | |

On the onomasiological level of the onomasiological model, some of these three metonymical aspects (ASPECT, SCOPE, QUALITY) are often left unexpressed, which allows for a higher economy of expression and a greater variability, cf. CZ *ocasáč* (tail_{STEM} + SUFFIX; only the SCOPE is expressed) and EN *long-tailed tit* (the SCOPE and the QUALITY are expressed).

If we apply this model on the examples [6], we get:

- | | | |
|-----|-------------------------------------|--|
| [9] | <i>modř-enec</i> 'grape hyacinth' | the COLOUR of the FLOWER (BLUE) for the PLANT |
| | <i>modř-ín</i> 'larch' | the COLOUR of the WOOD (BLUE) for the TREE |
| | <i>modř-inka</i> 'blue tit' | the COLOUR of the HEAD (BLUE) for the BIRD |
| | <i>modr-ásek</i> 'blue' | the COLOUR of the WINGS (BLUE) for the BUTTERFLY |
| | <i>modr-ák</i> 'dotted stem bolete' | the COLOUR of the FLESH (BLUE) for the MUSHROOM |

In all these cases, it is only the QUALITY which is expressed, with the ASPECT and SCOPE being unexpressed. It follows that although the motivating word is formally identical the onomasiological marks are different, with little predictability of what they refer to.

If we apply the metonymical understanding of onomasiological marks on the derivational family [2], we also see different, unpredictable, metonymical aspects of *water*:

- | | |
|------|---|
| [10] | <i>vod-ák₁</i> 'plumber' (drinking water in the plumbing system) |
| | <i>vod-ák₂</i> 'canoeist' (water surface on rivers) |
| | <i>vodn-ík</i> 'a mythical character living in ponds and rivers' (living environment) |
| | <i>vodn-ář</i> 'Aquarius' (abstract element) |

This also applies to examples in [1], in which *škola* is metonymically understood as a building (*škol-ník* 'school janitor') or as an educational institution (*škol-ák* 'schoolboy').

Therefore, if we take the common stem as a point of departure (cf. Štekauer 2014: 368), we should consider not only its form but also its semantic structure. In examples [1] and [2] the motivating word is identical only formally.

The non-predictability of meaning becomes even more apparent when the onomasiological mark is expressed metaphorically. Compare the three, formally identical, derivatives of Czech *zvon* 'bell':

- [11] *zvon-ek*₁ 'greenfinch' (bell_{STEM} + SUFFIX)
- [12] *zvon-ek*₂ 'bluebell' (bell_{STEM} + SUFFIX)
- [13] *zvon-ek*₃ 'diminutive of bell' (bell_{STEM} + SUFFIX)

*Zvon-ek*₁ is a metaphorical expression of the bird's vocalization, *zvon-ek*₂ is a metaphorical expression of the shape of the flower, both being instances of onomasiological formation. *Zvon-ek*₃, however, belongs to the derivational paradigm of *zvon*, being its diminutive.

Štekauer (2014: 368) concludes that 'it may be assumed that the concept of the derivational paradigm is restricted to affixation in terms of word-formation processes participating in its constitution.' As was shown above, in Czech and Slovak, it is also the onomasiological formations that are expressed predominantly through suffixation. However, the processes of onomasiological formation and derivational paradigm should not be confused.

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Paradigmatic relations as a trigger for morphological change

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This talk examines the correlation between derivational paradigms and morphological doublet formation. Various studies have examined the factors responsible for doublet formation mainly in inflection, but also in derivation (see for example, Aronoff 1976, 2017, Kroch 1994, Dal & Namer 2010, Thornton 2011, 2012, Fradin 2016, among many others). I will examine two specific case studies and argue that morphological change is highly motivated in cases where the forms that undergo a change are part of a derivational paradigm. In contrast, words that are not part of such a paradigm are less likely to undergo change. This is demonstrated in Palestinian Arabic and Hebrew. Semitic morphology relies highly on non-concatenative morphology, where words are formed in patterns (Berman 1978, Bolozky 1978, Bat-El 1994a, Benmamoun 2003, Ussishkin 1999). I examine two cases where words in certain patterns receive an additional form in another pattern, with no change of meaning. The two forms can be used interchangeably in the same semantic-syntactic contexts.

It is important to note that some of the examples in this study are doublets that coexist in the language, while others are instances of diachronic change. The claim made here is that the diachronic morphological change of one form to another is motivated by the same factors as synchronic change occurs. The analysis proposed below thus aims to integrate synchronic and diachronic perspectives on morphological change and variation. Examples of change across a range of times and situations seem to obey similar constraints; that supports the idea that there are systematic principles governing preferred directions of change. I now turn to the two case studies.

Doublet formation of Hebrew location nouns

There are several strategies of forming location nouns (hereafter LNs) in Hebrew. This study examines LNs that are formed in patterns. Most of them are formed in the *miCCaCa* pattern, e.g. *mispara* 'hairdresser shop'. Such nouns receive an additional form in the *maCCeCa* pattern with no change in their meaning (1).

(1) Alternating location nouns

<i>mispara</i> ~ <i>maspera</i>	'barber shop'
<i>mixbasa</i> ~ <i>maxbesa</i>	'laundromat'
<i>mišxata</i> ~ <i>mašxeta</i>	'slaughterhouse'

The change is always from the *miCCaCa* pattern into *maCCeCa* and never the other way around. *maCCeCa* is used mainly for the formation of instrument nouns, which do not change into *miCCaCa* (e.g. *maclema* ~ **miclama* 'camera'). The reasons for this change have been addressed in previous studies by Bolozky (1999, 2003). It has to do mainly with the fact that the vowel *a* is less marked in comparison to *i* and hence it is preferred as a prefix. The question that this study addresses is different. While the LNs in (1) undergo such variation, some LNs in (2) do not.

(2) Non-alternating location nouns

midšaʔa ~ *madšeʔa	'lawn'
mizbala ~ *mazbela	'garbage dump'
mixlala ~ *maxlela	'college'
mifkada ~ *mafkada	'headquarter'

Why do only some LNs undergo variation? If the motivation for such change were only phonological, we would expect to occur in all LNs. In addition, there is no difference in the frequency of the LNs that do and do not undergo such variation. I argue that the existence of variation is based on to the semantic relation between a location noun and a corresponding verb. Specifically, only LNs that are part of a verb-LN derivational paradigm undergo such a change. All the LNs in (3) are related to a verbal counterpart in the sense that they denote the location where the action that the verb denotes is performed. For example, *mispara/maspera* 'barber shop' is related to the verb *siper* 'cut hair' as this is the place where people get their haircut.

(3) Morphological change of LNs

Location noun		Corresponding verb	
mispara ~ maspera	'barber shop'	siper	'cut hair'
mixbasa ~ maxbesa	'laundromat'	kibes	'laundry'
mišxata ~ mašxeta	'slaughterhouse'	šaxat	'slaughter'
mitpara ~ matpera	'sewing workshop'	tafar	'sew'

The change from *miCCaCa* into *maCCeCa*, and specifically, the change into a pattern that begins with *a*, marks the LN as part of a derivational paradigm and as related to a verb. The tendency to select a pattern that begins with *a* is not surprising. In general, *a* has a morpho-lexical status in Hebrew. It is the most frequent vowel in word formation processes (Plada 1959, Bolozky & Becker 2006) and it is part of various word formation processes. Bolozky (1999, 2003), Schwarzwald (2002, 2012) and Schwarzwald & Cohen-Gross (2000) show that *a* is the most common vowel in Hebrew patterns, and Bat-El (1994) and Bolozky (1999) show that it is the default vowel in acronym formation. Assuming that derivation of LNs applies in the lexicon, the morphological mechanism marks LNs as derivationally related to verbs.

In contrast, LNs that are not related to any verb do not undergo variation. The LN *midšaʔa* 'lawn', for example, is not related to any verb. There is no need to mark the location noun as part of a derivational paradigm. In addition, there are cases where the LN and the verb share the same consonantal root, but there is no semantic relation between them, or the semantic relation between them is not transparent. *mixlala* 'college', for example, could be historically related to the verb *kalal* 'include', but there is no synchronic relation between them. *mifkada* 'headquarters' is semantically related to the verbs *piked* 'command' and *pakad* 'order', but the semantic relation is not transparent; headquarters is not necessarily the place where one commands/orders. This suggests that in order for LNs to undergo a morphological change, they need to be a part of a verb-to-noun paradigm and the semantic relation has to be transparent and systematic. Semantic transparency in general has been shown to play an important role in morphology (Aronoff 1976, Spencer 1991, Anderson 1992, Baayen 1993, Libben et al. 2003, Plag et al. 2008, among others).

To conclude, the existence of morphological variation in LNs also depends on the paradigmatic relations between LNs and verbs and the degree of semantic transparency.

Doublet formation in the verbal system of Palestinian Arabic

There are ten verbal patterns in Palestinian Arabic, where every verb that enters the language must conform to one of these patterns and their inflectional paradigms. There are cases where the same consonantal root occurs in two patterns with the same meaning (4).

- (4) a. rijli **wirmat** wu-alam šadi:d tʿabʕan, ma ruħt la-l-mustašfa
 ‘My leg became swollen, and great pain of course, I didn’t go to the hospital’
 (<http://www.alhilalclub.com/vb/archive/index.php/t-223078.html>)
- b. wu-lyo:m **twarramat** rijli wu-ruħt la-l-mustašfa
 ‘today my leg became swollen and I went to the hospital’
 (<http://www.66n.com/forums/showthread.php?p=2801899>)

The on-line examples in (4) consist of the past third person feminine form of the verbs *wirem* (4a) and *twarram* (4b). Both verbs share the *w-r-m* root and denote 'become swollen'. However, they are formed in different patterns: *CiCeC* and *tCaCCaC*. Examining more such doublets reveals that the change is from *CiCeC* verbs that tend to receive an additional form in *tCaCCaC*.

Why does this change take place? The *CiCeC/CaCaC* pattern is considered prosodically more marked than other patterns because its prosodic structure alternates within its inflectional paradigm (see Schwarzwald 1996 and Bat-El 2001 for Hebrew)¹. In contrast to the rest of the patterns, it does not preserve its syllabic structure throughout its inflectional paradigm. Examine the prosodic structure of the uniform patterns (5). For example, all forms in the inflectional paradigms of *CaCCaC* share a CVCCVC stem (e.g. *rattab* ‘arrange’), with the addition of a prefix in some of the conjugations (e.g. *yiratteb* ‘arrange-Fut.’). Other patterns have different prosodic structure, but in any event, the same prosodic structure remains intact throughout the entire paradigm.

(5) Uniform verbal paradigms

	CaCCaC	tCaCCaC	istaCCaC
Past	rattab	twassax	istaʕmal
Present	mratteb	mitwassax	mistaʕmel
Future	yiratteb	yitwassax	yistaʕmel
	‘arrange’	‘become dirty’	‘use’

In contrast, this uniformity of prosodic structure does not exist in the inflectional paradigms of *CaCaC/CiCeC* (6). The prosodic structure of the past and present forms is different from those in the future forms. The past and present forms share a CVCVC/CV:CVC structure with no consonant cluster (e.g. *sakan* ‘live’), while only the future forms share a CCVC structure preceded by a prefix, where a consonant

¹ *CiCeC* and *CaCaC* are two different melodic patterns of the same pattern with the same prosodic structure. The term 'prosodic structure' is used here to relate to the syllabic structure of the different patterns.

cluster emerges (e.g. *yuskun* 'live-Fut.). In some cases, there is also segmental alternation, where one of the root consonants do not surface in all forms (6b).

(6) CaCaC/ CiCeC paradigm

	a. CaCaC	b. CiCeC
Past	sakan	wiqeʃ
Present	sa:ken	wa:qeʃ
Future	yuskun	yugaʃ
	'live'	'fall'

Because of the lack of uniformity of the inflectional paradigm of *CiCeC/CaCaC* patterns, many of them change into other patterns. Specifically, I examine cases of intransitive *CiCeC* verbs that change into *tCaCCaC*, as shown in (1). While this change reflects a strong tendency, it does not apply to all *CiCeC*. For example, *riʃeb* 'become frightened' does not alternate with **traʃʃab*. This suggests that there is something beyond avoiding alternation in the inflectional paradigms. I claim that morphological change (and lack thereof) is also related to the derivational relations between the verbal patterns. The relation between Arabic patterns is manifested in terms of transitivity alternations, e.g. *wassx* 'make dirty' (*CaCCaC*) and *twassax* 'become dirty' (*tCaCCaC*). Note that each pattern has its own inflectional paradigm, but the relations between the patterns themselves form derivational paradigms. Examining cases of variation of *CiCeC* into *tCaCCaC* reveals that verbs that undergo this change are only intransitive verbs that have a transitive alternate in the *CaCCaC* pattern. The *CaCCaC-tCaCCaC* paradigm is the most productive transitive-to-intransitive paradigm in Arabic, and it is used almost exclusively in new verb formation. *CiCeC* intransitive verbs that are related to *CaCCaC* transitive verbs, change their form in order to adhere to the most common paradigm. In contrast, *CiCeC* intransitive verbs with no *CaCCaC* transitive alternates do not change their form, as there is no motivation for it in terms of derivational paradigms.

Conclusions

Both cases studies show that in addition to phonological factors that trigger morphological variation, derivational relations also play an important role. In both cases, doublet formation is primarily motivated by morpho-phonological criteria like favoring an unmarked vowel or avoiding prosodic alternation. However, examining the scope of variation reveals that these are not the only criteria. Words demonstrate greater tendency to undergo variation when they are part of a derivational paradigm. The morphological change establishes more uniform and steady paradigms, in which there is a clear morphological association between their members. The study provides evidence to the important role of derivational paradigms in word formation, highlighting the strong correlation between form and meaning in the domain of paradigmatic relations.

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A MULTI-LAYERED MODEL FOR MORPHOLOGICAL CONSTRUCTIONS

The example of Italian prefixed verbs

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It is current in several widespread morphological models to view derivational ‘rules’ as patterns of correspondence between lexemes. The latter are generally seen as complex (tripartite) units including (at least) formal, syntactic and semantic information. Derivational patterns are consequently viewed as sets of parallel correspondences between these three levels of information. An issue for such views is the identification of which sets of correspondences should count as distinct morphological patterns, and which ones should, on the contrary, be considered as ‘variants’ of the same pattern. In (1), we present various cases of noun-verb derivation in Italian using different morphological operations:

- | | | | | | |
|-----|----|-----------|---|---------------|--------------------------|
| (1) | a. | stiva | → | stivare | ‘hold / stow’ |
| | b. | magazzino | → | immagazzinare | ‘warehouse / store’ |
| | c. | ospedale | → | ospedalizzare | ‘hospital / hospitalize’ |
| | d. | trono | → | intronizzare | ‘throne / enthrone’ |

All the examples above share both the categorial relation between the base and the derivative (noun → verb), and the semantic instruction (roughly, ‘put something in X’). From a purely onomasiological perspective, thus, they could be considered as being ‘variants’ of the same morphological pattern. From a more general point of view, on the other hand, they are more likely considered as separate patterns, since in each case a distinct formal operation is involved: a conversion (1a), a prefixation (1b), a suffixation (1c), or a combination of the two former (1d). The latter point of view corresponds to what would be admitted in most morphological treatments, where a pattern (or, in more traditional terms, a Word Formation Rule) is viewed as an association of a uniform semantic instruction with a stable formal operation. Even in this case, however, the examples above are not unproblematic, since each of the formal operations involved may, in fact, correspond to different semantic instructions; in (2) we give some examples where the same formal operations as in (1) are used to express a qualitative meaning:

- | | | | | | |
|-----|----|----------|---|------------------------------|------------------------|
| (2) | a. | emozione | → | emozionare | ‘emotion / excite’ |
| | b. | voglia | → | invogliare ¹ | ‘desire / tempt’ |
| | c. | terrore | → | terrorizzare | ‘terror / frighten’ |
| | d. | bastardo | → | imbastardizzare ² | ‘bastard / bastardize’ |

The data above may be analysed in two manners: either i) we consider that each of the derivatives in (2) is constructed by means of the same pattern of the corresponding derivative in (1), or ii) we consider that all the derivatives in (1) are constructed by means of the same pattern and all the derivatives in (2) are constructed by means of another pattern, which shares the same formal means. Note that the issue presented here is crucial also for those models, such as Construction Morphology (Booij 2010) that view various morphological patterns as possibly linked by hierarchical relationships. According to hypothesis (i), in fact, patterns (1a) and (2a) could be linked to a more general, underspecified, ‘conversion’ pattern, patterns (1b) and (2b) could be linked to a more general [in-N]_v prefixation pattern, and so on. According to hypothesis (ii), on the other hand, all the patterns in (1) could be linked to a more general pattern expressing a spatial relation, whereas all the patterns in (2) could be linked to a more general pattern expressing the transfer or the acquisition of a property.

¹ The alternation between the forms *in-* and *im-* for the prefix is phonologically driven and is of no relevance for the present discussion.

² IMBASTARDIZZARE has been found in the ItWac corpus (Baroni et al. 2009), in the following context, according to which no doubt is possible on the fact that the writer constructed this lexeme with the meaning indicated: “l’horror [...] è passato attraverso mille mutazioni, andando via via imbastardizzandosi” (‘horror movies [...] underwent thousands of mutations, becoming more and more hybrid’). More in general, all the lexemes exemplified in the text are attested at least once in ItWac (http://nl.ijs.si/noske/all.cgi/corpus_info?corpusname=itwac) with the meaning indicated.

Another trend of research on morphology and the lexicon that emerged recently proposes to analyse derivational processes not in terms of one-to-one relations between a base lexeme and a derived one, but in terms of ‘family’ and ‘series’ relations, i.e. lexemes constructed from the same base or via the same derivational process. According to these approaches, family and series relations play as an important role in the shaping of a derivative as, for instance, semantic or phonological constraints. Phenomena of morphological ‘overmarking’ (i.e. the presence of an affix apparently not playing semantically any role), such as suffix combination have been analysed in this way (cf. Roché 2009; Lignon et al. 2014). In such analyses too, however, a precise characterization of morphological patterns, of their precise content and of their perimeter, is an important issue. In Figure 1 we present a section of the morpholexical network expressing spatial relations in Italian, exemplified by means of the network organised around the lexeme CORNICE (‘frame’):

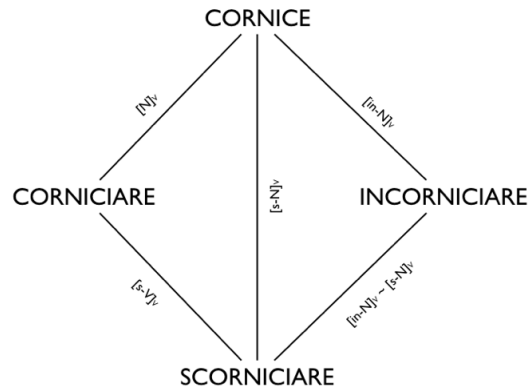


Figure 1: morpholexical network of CORNICE (‘frame’)

The network in question includes two verbs with a neutral meaning denoting a converging movement between a Figure and a Ground (i.e. ‘put something into a frame’/‘put a frame around something’, see below), as well as a verb with a reversative meaning denoting a diverging movement (‘get something off a frame’). Each link in the network corresponds to a derivational construction which is available in Italian (this is the reason why CORNICIARE and INCORNICIARE are not linked by a direct connection). The representation in Figure 1 also accounts for the fact that not all derivatives need to be present in the actual lexicon in order for a connection (and thus a morphological construction) to be available. Thus, for instance, we should not pose the existence of an intermediate neutral verb between COPERCHIO (‘lid’) and SCOPERCHIARE (‘uncover’). Interestingly, the construction of denominal (and deadjectival) verbs having a qualitative reading takes place, in Italian, within networks which are isomorphic with the spatial ones exemplified in Figure 1. Figure 2 presents the two networks organised around, respectively, FIDUCIA (‘confidence’) and CORAGGIO (‘courage’):

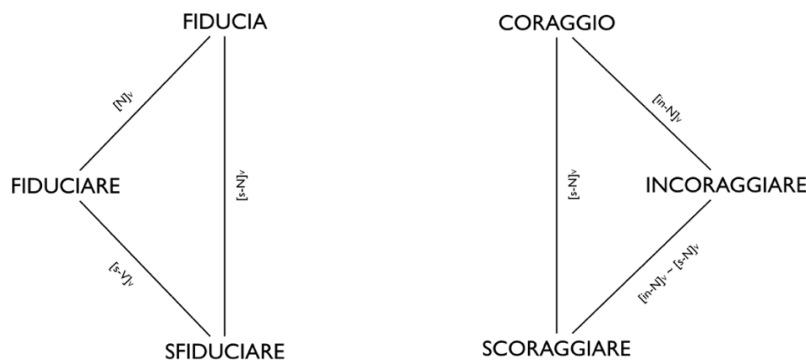


Figure 2: morpholexical network of FIDUCIA (‘confidence’) and CORAGGIO (‘courage’)

As the examples show, both networks contain a neutral verb, roughly meaning ‘arouse / inspire X’, and a negative counterpart, roughly meaning ‘remove / reduce X’. It should be noticed, moreover, that the formal operations involved are exactly parallel to those used for spatial denominal verbs exemplified above, conversion, *in*- prefixation and *s*- prefixation.

In the light of the examples presented, the question arises if the morphological operations defining the network in Figure 1 and those defining the networks in Figure 2 are the same or correspond to distinct processes fortuitously sharing the same formal representation. A close look to the data suggests that the first solution is preferable. In fact, the formal properties that the constructions corresponding to spatial and qualitative denominal verbs have in common are more complex than those exemplified above. Both types of verbs can be constructed with a larger set of prefixes, which includes *a-* and *s-* for the positive / neutral meaning and *dis-* and *de-* for the reversative / negative meaning. (*s-* is thus the only prefix that can build both types of verbs, which in some cases may then be ambiguous). Some other factors, however, clearly distinguish spatial denominal verbs from those with a qualitative reading. First, whereas spatial verbs only belong to the first verbal class (infinitive ending in *-are*, like the ones exemplified), qualitative verbs may belong to the first or to the third class (infinitive in *-ire*). Second, spatial verbs are only denominal, while qualitative verbs may be either denominal or deadjectival. Table 1 sums up the situation of the different types of verbs constructed by prefixation in Italian by taking into account the semantic parameter, as well as other parameters such as the prefix involved and the class of the derived verb (the symbols + and – refer, respectively, to the neutral / positive and to the reversative / negative meaning).

		qualitative				spatial			
		+		–		+		–	
		N	A	N	A	N	A	N	A
a-	-are	✓	✓			✓			
	-ire	✓	✓						
in-	-are	✓	✓			✓			
	-ire	✓	✓						
s-	-are	✓	✓	✓	✓				✓
	-ire	✓	✓	✓	✓				
de-	-are			✓	✓				✓
	-ire								
dis-	-are			✓	✓				✓
	-ire								

Table 1: attested types denominal / deadjectival prefixed verbs in Italian

The goal of our talk is to present a unified analysis of denominal and deadjectival prefixed verbs in Italian which takes the variety exemplified above into account. Our claim is that Construction Morphology is a suitable model for dealing with such multifaceted data. In such a framework, in fact, we can consider that each of the cases in Table 1 corresponds to a subtype of a general, underspecified construction that we represent in (3):

$$(3) [\text{pref-}X_{N/A}]_{V_I/III} \leftrightarrow \text{CAUSE} (z, \text{BECOME} (y, (\neg) X))$$

The semantic representation in (3) states that an entity (*y*) undergoes a change (that can be determined by an external agent (*z*) or not), represented by the predicate *BECOME*. The variable *X* represents the endpoint of the change, and can also correspond to a predicate (e.g. *BE_WITH_coraggio*, cf. (4a) below). A spatial meaning may be represented as a predicate linking two entities, a Figure and a Ground (cf. (4b)) (cf. Heusinger & Schwarze 2006).³ The change may have a positive or a negative polarity, a fact which is represented by the optionality of the operator \neg .

The formal representation of the construction (3) contains several variables, corresponding to the parameters listed above (prefix, input category, verbal class). Each individual sub-construction results from the combination of the choices made among the possible values of each variable. In (4) we give, as an example, the constructions corresponding to *INCORAGGIARE* and to *INCORNICIARE*:

$$(4) \text{ a. } [\text{in-}X_N]_{V_I} \leftrightarrow \text{CAUSE} (z, \text{BECOME} (\text{BE_WITH_coraggio} (y, d_1)))$$

³ Note that the base noun of the derived word often corresponds to the Ground, as in *IMMAGAZZINARE*, but may also correspond to the Figure (cf. *IMBurrare* ‘butter_V’). In this respect, *INCORNICIARE* (see Figure 1) is indeed ambiguous, as the frame can be interpreted either as the Figure or as the Ground of the spatial relation. Cf. Aurnague (2011) for a unified analysis of spatial motion and change of state.

$$b. [in-X_N]_{V_I} \leftrightarrow \text{CAUSE} (z, \text{BECOME} (\exists x \text{ cornice} (x) \& \text{LOC} (y, \text{cornice})))$$

A verb like INCORAGGIARE instantiates the formal set of values: {Pref:in-; Base:N; Class:I} and the semantic set of values {Quality Change; +reading}. Of course, not all combinations of value sets are attested with the same frequency, and some are completely excluded. Figure 3 illustrates all the productive verb-forming prefixal constructions in Italian decomposed in their properties. Each level corresponds to a (formal or semantic) variable and contains all the possible values.⁴ Formal variables instantiate what Booij (2010: 41-42) calls schemas; individual constructions are determined by the combination of formal and semantic value sets.

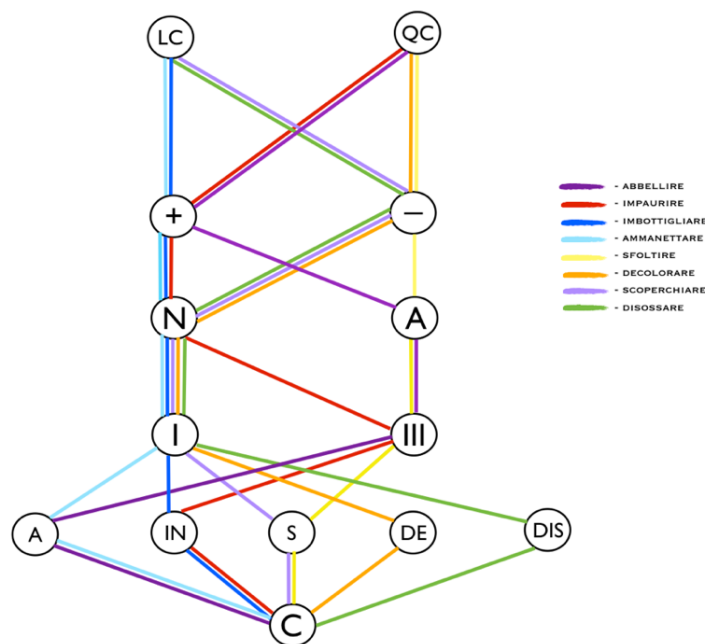


Figure 3: decomposition of the productive verb-forming prefixal constructions in Italian

The advantages of Construction Morphology for analyzing the data in question consist in the possibility of treating each property of such multifaceted constructions as parasynthetic verbs in Romance languages separately. Individual properties correspond to choices made over a set of values for a specific (formal or semantic) variable. At the most abstract level, this allows achieving a unified representation for a set of constructed words that, undoubtedly, display a large set of common properties.

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⁴ First level (node C) = prefixal construction; second level (nodes A, IN, S, DE and DIS) = possible prefixes; third level (nodes I and III) = inflectional classes; fourth level (nodes N and A) = category of the base; fifth one (nodes + and -) = positive/negative meaning; last level (nodes LC and QC) = local change / quality change.

Paradigmatic word formation

Word-formation relations in the Pattern-and-Restriction Theory

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In a paradigmatic approach to word formation like the one informally outlined in the work of Becker (1990 a, 1990 b, 1993, 1994), lexical motivation relations between word-formation products and bases are not encoded in terms of syntagmatic word structures; rather, they are described by means of directional, though possibly overlapping, word-formation rules relating products and bases. This general idea is axiomatically formalised in the *Pattern-and-Restriction Theory* (PR; Nolda 2012, forthcoming, under review) and computationally implemented by a companion computer program (PPR; <http://andreas.nolda.org/software.html#ppr>), which are presented here on the example of German.

The major task of word-formation descriptions in the PR framework is to explain or predict *word-formation relations* between existing or possible *lexical units* in a linguistic system. Word-formation relations, in turn, underlie lexical motivation relations insofar as they are based on word formation (for an overview, cf. Marzo 2015). Albeit directional in nature, word-formation relations may overlap in various ways, giving rise to indirect motivation, multiple motivation, reciprocal motivation, and the like.

As to lexical units, PR adopts the view of Integrational Linguistics (Lieb 2005) which models them as pairings of *paradigms* and *lexical meanings*. Paradigms relate *forms* – in particular, word or stem forms – to *paradigmatic categorisations* thereof in terms of inflectional or word-formation-related categories (for the latter, cf. Fuhrhop 1998). Lexical units, in turn, are members of lexical categories in *lexical categorisations*. Lexical meanings are taken to be concepts of a certain type (cf. Lieb 1985 for details).

Word-formation relations between lexical units are described in PR by means of *formation patterns* and associated *base restrictions*. A formation pattern is conceived as a combination of four *formation means*:

1. a *formal means*, operating on forms;
2. a *paradigmatic means*, operating on paradigmatic categorisations;
3. a *lexical means*, operating on lexical categorisations;
4. a *semantic means*, operating on concepts.

The formation means in a formation pattern do not operate on lexical units themselves, but on *formation instances* thereof, each consisting of a form, a paradigmatic categorisation, a lexical categorisation, and a (possibly underspecified) concept. A word-formation relation is established between a lexical product and one or more lexical bases in a linguistic system if, and only if, at least one formation instance of the product can be determined through a word-formation process by means of a formation pattern from formation instances of the base(s), provided that the latter comply with the base restriction which is associated with the pattern in the system.

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Formal and semantic transparency in bound stem processing

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Psycholinguistic research on morphological processing conducted on a number of different languages has been able to provide evidence for the role of morphological paradigms in the organization of the mental lexicon, mainly by investigating the relationships between words belonging to the same morphological family, i.e. sharing the same free stem (e.g., *dark* / *darkness*). However, morphologically complex words could be considered as members of the same family even when they do not share a proper segmentable stem, as in the case of the so-called ‘bound stems’ (e.g., *deceive* / *receive*), i.e., stems made up of a lexical root that cannot occur in isolation, but needs to have a derivational affix (either a prefix or a suffix) attached to it.

The present work focuses precisely on the processing of such words and aims at clarifying the type of lexical connections establishing in paradigms involving bound stems compared to those existing in paradigms involving free isolable stems.

Since no overt morpheme segmentation can be assumed, morpheme-based approaches have traditionally considered words containing bound stems (e.g., *survive*) as monomorphemic. On the other hand, in word and paradigm approaches (e.g., Bybee 1985; Booij 2010), where morphological connections among words are established on the basis of simultaneous semantic and formal similarities, bound stems are recognized a status since, «even though they have no corresponding base word, the meaning of one member of a pair can be defined in terms of that of the other member» (Booij 2010:29). Therefore, the fact that *-vive* can appear in other derived words maintaining the same semantic value (e.g., *revive*) could suffice to qualify it to be a morpheme, defined as the smallest meaningful element. However, not all bound stems behave alike, since segments in which there is no clear shared semantics, neither by itself, nor on the basis of other verbs containing that same root, can also be found (e.g., *-ceive* in *deceive* and *receive*). While such entities pose a theoretical problem – as it is hard to reconcile the lack of a stable meaning to the definition of morphemes as meaningful units – paradigm-based approaches explore the possibility that a morpheme could be perceived as such not solely

on the ground of meaning (Bybee 1988; but see also Aronoff 1976), but also on the fact that they can be recognized by speakers. Within the architecture of such models, units such as *-ceive* hold a specific status, since their existence is likely to emerge because of their occurrence in more than one word (in combination with other affixes) and because a great number of them show the same phonologically arbitrary variant before the nominalizing suffix (e.g., *deception*, *reception*, *conception*). As a consequence, «a minor pattern of which most speakers probably are aware» (Bybee & Beckner 2010:838) would be likely to emerge.

The issue of the representation of bound stems has been investigated in a number of psycholinguistic studies, mainly by means of lexical decision tasks combined with the masked priming paradigm (Forster & Azuma 2000; Taft & Kougious 2004; Pastizzo & Feldman 2004; Giraudo & Voga 2015; but see also the seminal study of Taft & Forster 1975, using a simple lexical decision task). The findings of such studies seem to be compatible with the assumptions of paradigm-based approaches, in that they confirm that no significant difference is found between the processing of bound and free stems, corroborating the hypothesis that bound stems can indeed be recognized by virtue of their appearance in more than one word and of the consequent network of relations establishing among them. However, the role of shared semantics does not seem to be clarified in any of these studies, since this variable was not taken into account (either by excluding those stems which lacked a clear meaning, or by failing to distinguish between those and the semantically transparent ones).

In this work, we investigate precisely how this difference could influence the way in which bound stems are processed in Italian. In this language, we can identify two kinds of bound stems: on the one hand, there are a number of bound stems which appear in ‘suffixed words’ and whose meaning is clearly identifiable and held constant in the derived words in which they are shared (e.g. *terrore* ‘terror’ – *terribile* ‘terrible’); on the other hand, another set of bound stems typically appears in ‘prefixed words’ and has a much vaguer meaning (e.g. *consistere* ‘to consist’ – *resistere* ‘to resist’).

In order to understand whether these two types of stems are processed differently, we designed two experiments which exploit a masked priming lexical decision task.

In Exp. 1, we investigate whether derived words sharing a bound stem (i.e. suffixed words) whose meaning is kept constant prime each other like derived words with a free stem generally do (Giraudo & Grainger 2000). We therefore verified the facilitation effect

of a derived word (e.g., *terribile* ‘terrible’) on the recognition of a morphologically related target word containing the same bound stem (e.g., *terrore* ‘terror’), comparing it to the effect yielded on the recognition of the same target word by an unrelated (e.g., *recita* ‘recital’/ *TERRORE* ‘terror’) and an orthographic prime (e.g., *terrazza* ‘terrace’ / *TERRORE* ‘terror’). This pattern of effects has been then observed with respect to that obtained with free stems in the same conditions. The experimental design is summarized in table (1).

CONDITION	FREE STEM	BOUND STEM
Exp. 1		
Identity	apparente/APPARENTE	terrore/TERRORE
Morphological	apparenza/APPARENTE	terribile/TERRORE
Orthographic	apparato/APPARENTE	terrazza/TERRORE
Unrelated	supremo/APPARENTE	recita/TERRORE

Table 1: Experimental design of Exp.1

In Exp. 2, on the other hand, we focused on ‘prefixed’ words containing a semantically opaque bound stem and verified whether this kind of forms (e.g., *consistere* ‘consist’) yield a facilitation on the recognition of a morphologically related target word (e.g., *RESISTERE* ‘resist’) when compared to the effect obtained by an unrelated (e.g., *tracciare* ‘trace’) or an orthographically related prime (e.g., *smettere* ‘stop’). Again, the pattern of results obtained with prefixed opaque bound stems have been compared with those obtained with free and transparent stems, as summarized by the table below:

CONDITION	FREE STEM	BOUND STEM
Exp. 2		
Identity	esportare/ESPORTARE	resistere/RESISTERE
Morphological	importare/ESPORTARE	consistere/RESISTERE
Orthographic	dubitare/ESPORTARE	smettere/RESISTERE
Unrelated	stupire/ESPORTARE	tracciare/RESISTERE

Table 2: Experimental design of Exp. 2

The preliminary results of ongoing experimentation show significant priming effects for both bound and free stem prime-target pairs. On the other hand, the effect triggered by prefixed opaque bound stems on their morphological relatives so far has failed to emerge in a clear way, indicating that during lexical access morphological effects are modulated by semantic transparency. Such results seem to be compatible with paradigm-based models, where connections are established among words without the need of decomposing words into constituent parts. When meaning is clearly identifiable, as with

transparent suffixed bound stems, shared parts which hold a constant relation between form and meaning emerge even if they cannot occur in isolation.

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Paradigm Relative Entropy and Discriminative Learning

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Introduction

The interactive role of intra-paradigmatic and inter-paradigmatic distributions has been investigated in accounting for differential effects on visual lexical recognition for both inflected (Milin et al., 2009a, 2009b) and derived words (see Kuperman et al., 2010; Bertram et al., 2005; Schreuder et al. 2003 among others). In particular, Milin and colleagues focus on the divergence between the distribution of inflectional endings within a single paradigm (measured as the entropy of the distribution of paradigmatically-related forms, or Paradigm Entropy), and the distribution of the same endings within their broader inflectional class (measured as the entropy of the distribution of inflectional endings across all paradigms, or Inflectional Entropy). They conclude that both entropic scores facilitate visual lexical recognition, but if the two distributions differ, a conflict arises, resulting in slower word recognition. Similar results are reported by Kuperman and colleagues (2010) on reading times for Dutch derived words, and are interpreted as reflecting an information imbalance between the family of the base word (e.g. *plaats* in *plaatsing*) and the family of the suffix (-*ing*).

The difference between Paradigm Entropy and Inflectional Entropy can be expressed in terms of Relative Entropy, or Kullback-Leibler divergence (D_{KL} , Kullback 1987), as follows:

$$1) D_{KL}(p(e | s) || p(e)) = \sum_e p(e | s) \log \frac{p(e | s)}{p(e)},$$

where $p(e | s)$ represents the probability of having a specific inflected form (an ending e) given a stem s , and $p(e)$ the probability of encountering e . For any specific paradigm being selected, the larger D_{KL} , the more difficult is, on average, the visual recognition of members of that paradigm.

Although these effects are clear in broad outline, no computational models of lexical processing we know of have been able to simulate them and bring them down to some underlying mechanisms of *discriminative learning* (Rescorla & Wagner 1972, Ramscar & Yarlett 2007, Baayen et al. 2011, Blevins 2016). In the present contribution, we show that principles of discriminative learning of symbolic time series go a long way in accounting for these effects, thus making an important contribution to our understanding of the human lexical processor and its sensitivity to word distributions both within and across paradigms.

Background

In Temporal Self-Organising Maps (or TSOMs: Ferro et al. 2011; Marzi et al. 2014; Pirrelli et al. 2015), a family of neural networks based on Kohonen SOMs (Kohonen

2001), weights on a layer of temporal inter-node connections encode how strongly the currently most highly activated node or Best Matching Unit at time t (BMU(t)) is predicted by the BMU($t-1$) at the previous time tick. A weight close to 0 on the connection between BMU($t-1$) and BMU(t) indicates that the activation of BMU(t) is unexpected and thus somewhat surprising, given BMU($t-1$). A weight close to 1 means that the activation is highly expected, and thus poorly informative. In TSOMs, connection weights are tuned as the result of training the map on input data, according to principles of correlative learning that are strongly reminiscent of Rescorla & Wagner (1972) discriminative equations. Given the input bigram 'AX', for example,

- (i) the connection between BMU('A') at time $t-1$ and BMU('X') at time t is strengthened (entrenchment);
- (ii) the connections to BMU('X') from all the other nodes are weakened (competition).

The interaction between entrenchment and competition accounts for effects of context-sensitive specialisation of map nodes for input strings. If the bigram 'AX' is repeatedly input to a TSOM, the map tends to develop a specialised BMU('X') for 'X' in 'AX' and a highly-weighted outward connection from BMU('A') to BMU('X'). Since node specialisation propagates through time, a TSOM is thus biased in favour of memorising input strings through BMUs structured in a word-tree, as opposed to a word-graph (Figure 1).

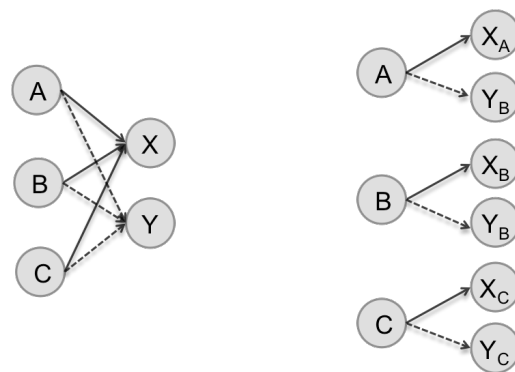


Figure 1: A TSOM trained on the three mini-paradigms 'AX', 'AY', 'BX', 'BY', 'CX', 'CY' will tend to progressively move away from a graph-like allocation of nodes to symbols (left panel) towards a tree-like allocation (right panel). The extent to which context-sensitive specialisation takes place is a function of intra-paradigmatic and inter-paradigmatic word distributions (see main text for details).

Relative entropy and paradigm learning: an experiment on mini-paradigms

The relatively simple dynamic expressed by the two learning rules (i, ii) accounts for facilitatory effects of paradigm entropy and inflectional entropy on word learning.

To illustrate, we trained a TSOM on three mini-paradigms, whose forms are obtained by combining three stems ('A', 'B' and 'C') with two endings (symbols 'X' and 'Y'). Mini-paradigms were administered to the map on six training regimes (R1-R6, see Table 1), whose distribution was intended to control the comparative probability distribution of 'X' and 'Y', and the comparative probability distribution of the stems 'A', 'B' and 'C' relative to each ending. Across regimes 1-3, we kept the frequency

distribution of X constant (but let it vary across paradigms), while increasing the distribution of Y both within each paradigm (R2), and across paradigms (R3). Across regimes 4-5, the frequency of Y was held constant, while X frequencies were made vary. Finally in R6 all word frequencies were put to 100. Note that, in R3 and R6, $p(e | s) = p(e)$, i.e. the distribution of each inflected form within a paradigm equals the distribution of its ending (given its inflection class).

Results of the different training regimes are shown in Figure 2, where we plotted weights on the connection between stems ('A', 'B' and 'C') and endings ('X' and 'Y') by learning epochs, averaged over 100 repetitions of the same experiment on each regime. Results were analysed with linear mixed-effects models, with stem-ending connection weights as our dependent variable and the following three fixed effects: 1) the word probability $p(s, e)$, expressed as a stem-ending combination; 2) the probability $p(e | s)$ of a stem selecting a specific ending (or intra-paradigmatic competition), and 3) the conditional probability $p(s | e)$ of a given ending being selected by a specific stem (inter-paradigmatic competition). Experiment repetitions were used as random effects. Here, we shortly summarise the main results observed.

paradigm id	items	training regimes					
		R1	R2	R3	R4	R5	R6
A	#,A,X,\$	5	5	5	5	5	100
A	#,A,Y,\$	5	50	50	333	333	100
B	#,B,X,\$	10	10	10	10	100	100
B	#,B,Y,\$	10	100	100	333	333	100
C	#,C,X,\$	85	85	85	85	850	100
C	#,C,Y,\$	10	100	850	333	333	100

Table 1: Frequency distribution of mini-paradigms for 6 training regimes.

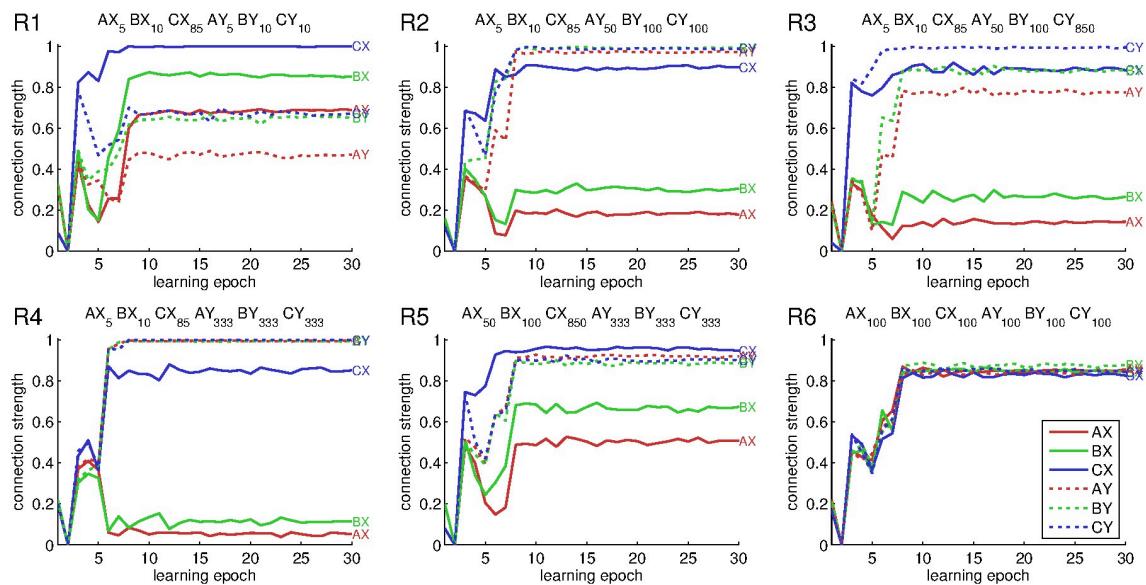


Figure 2: Developmental trends of connection strength at the stem-ending boundary under different training regimes with three mini-paradigms (R1-R6, see Table 1). Weights are plotted against the first 30 learning epochs.

Due to entrenchment (rule i), the strength of each connection at the morpheme boundary tends to be a direct function of the probability of each word form, or $p(s,e)$ (see panel R3). However, other distributions interact with word frequency: connection strengths are affected by the probability of each ending $p(e)$, with low-frequency words that contain high-frequency endings showing a stronger boundary connection than low-frequency words that contain less frequent endings (panel R1). This boosting effect is modulated by two further interactions: the conditional probability distribution $p(e | s)$, with connections to 'X' suffering from an increase in the probability mass of 'Y' (panels R2 and R4), and the competition between words selecting the same ending (rule ii), modulated by the entropy of the conditional probability distribution $p(s | e)$, or $H(s | e)$ (panels R4 and R5). In particular, if we control $H(s)$, i.e. the distribution of paradigms in the input data, the entropy $H(s | e)$ is expressed analytically by the following equation:

$$2) H(s | e) = H(s) - \sum_{s,e} p(s,e) \log \frac{p(s,e)}{p(s)p(e)},$$

where $\sum_{s,e} p(s,e) \log \frac{p(s,e)}{p(s)p(e)}$ is known as Mutual Information. Using the Bayesian equality $p(s,e) = p(s)p(e|s)$, we can rewrite equation (2) above as follows:

$$3) H(s | e) = H(s) - \sum_s p(s) \sum_e p(e | s) \log \frac{p(e|s)}{p(e)},$$

where $\sum_e p(e | s) \log \frac{p(e|s)}{p(e)}$ is the Kullback-Leibler divergence $D_{KL}(p(e|s)||p(e))$ between $p(e | s)$ and $p(e)$ (Eq. 1 above). Equation (3) shows that $H(s | e)$ is maximised by minimising the average divergence between the intra-paradigmatic distribution $p(e | s)$ of the endings given a stem, and the marginal distribution $p(e)$ of the endings. In other words, verb paradigms are learned more accurately by a TSOM when, on average, the distribution $p(e | s)$ of the forms within each paradigm approximates the marginal distribution of each ending in the corresponding conjugation class (compare R4 and R6). This behaviour, accounted for by the interaction of entrenchment and competition in discriminative learning, is in line with the facilitation effects reported for visual lexical recognition of inflected words and reading times of derived words. Besides, the evidence is compatible with more extensive experiments on German and Italian verbs (Marzi et al. 2014), showing that, for comparable cumulative frequencies, uniform distributions in training data (R6) facilitate paradigm acquisition.

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ATAP compounds in French and Italian: a paradigmatic approach

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Noun-Noun (N-N) structures such as *mot clé* (“key word”) or *temps record* (“record time”) in French – and in Romance languages in general – represent a modern and dynamic pattern lying on the edge between morphology (i.e. “compounding”) and syntax (“N-N noun phrase”). In modern French, N-N structures represent a very productive pattern (Villoing, 2012:41) characterized by an exponential growth (Noailly, 1990:12-13), though they have played only a marginal role in Old French. Indeed, Rainer-Buridant (2015:1977) point out that Old-French constructions such as *Hôtel-Dieu* (“pilgrim hostel”, lit. “hostel God”) or *bain-marie* (“water bath”, lit. “bath Mary”) that look like N-N constructions from the present perspective were in reality “syntactic combinations of a noun followed by a noun in the oblique case”. Genuine N-N constructions have begun to appear in Romance languages more systematically since the second half of the 19th century and the pattern has developed in a dynamic way especially in the past 50 years (cf. Dardano, 2009:228). This situation makes the study of N-N structures particularly interesting in that the data are more likely to reflect actual regularities and tendencies in the N-N pattern, with little interference from anomalies resulting from the diachronic evolution of the languages.

It is still a matter of dispute whether N-N constructions in Romance languages pertain rather to the morphology or to the syntax. The fact remains that attempts to split N-N constructions into two groups, the morphological and the syntactic one, yield inconclusive results, as Villoing (2012:36) points out (cf. Voghera, 2004:63, for the same conclusion about Italian data). A stimulating discussion on the topic emerged recently in the theoretical framework of (mainly lexeme-based) morphology (cf. the collective monographs Lieber-Štekauer (2009) or Scalise-Vogel (2010) among many others) that considers Romance N-N constructions as compounds, though – as Scalise-Vogel (2010:2) put it – “[compounds, defined in this way] constitute an anomaly among grammatical constructions because they are ‘words’, but at the same time exhibit a type of ‘internal syntax’”. An important point in this conception of compounding has been explicitly formulated by Gaeta-Ricca (2009) who argue that compounds have the feature [+] morphological, regardless of the feature [+/-] lexical – i.e. regardless of the fact whether they are idiomatic or whether they express a socially stable concept. This innovative conception, shared in part by Fradin (2009) or Villoing (2012) and defended also already in a brilliant analysis of Corbin (1992), goes against the mainstream concept of “compounding” in French literature that was supported in the last 30 years of the 20th century by many studies made within the framework of Lexicon-Grammar approach (cf. Gross, 1996, or Mathieu-Collas, 1996, among many others). Thus, an important benefit of the proposal of Gaeta-Ricca (2009) consists in the fact that it provides a unitary framework for the analysis of (almost) all kinds of Romance N-N constructions.

The two nouns involved in the Noun+Noun compound may have a wide range of relationships, including coordination, attribution and subordination with various subtypes for each category. The type of the relationship is triggered only by the semantics of the constituents and by their order, since it is not spelled out by any lexical or grammatical item. Previous studies on Romance N+N compounds that refer to the ‘Bisetto-Scalise classification’ of compounds (Bisetto-Scalise, 2005; Scalise-Bisetto, 2009) suggest that while some types (such

as “subordinate grounding” compounds) appear to be irregular and unpredictable, other types (such as ATAP compounds or subordinate ARG compounds) display regular patterns whose properties can be described and explained as paradigms.

This paper focuses on Attributive-Appositive (ATAP) compounds, defined by Scalise-Bisetto (2009) as formations featuring an attributive relationship between the head and its modifier, the latter expressing a “property” or “quality” of the head. Following a recent discussion concerning N-N ATAP compounds in Italian (Baroni-Guevara-Pirrelli, 2009; Grandi, 2009; Grandi-Nissim-Tamburini, 2011; Arcodia-Grandi-Montermini, 2009; Radimský, 2015; Radimský, 2016) we will assume that the interpretation of ATAP compounds is triggered by a specific nominal modifier (N2) that can be interpreted metaphorically (as the Fr. *clé* – “key” in *mot clé* – “keyword”) or literally (as *modèle* – “model” in *filles modèle* – “model daughter”). Compounds with the metaphorical modifier will be referred to as “appositive”, while those with a non-metaphorical modifier will be referred to as “attributive”.

Given that the interpretation of ATAP compounds is triggered by the modifier “N2”, ATAP compounds tend to form paradigms using the same N2, such as *mot clé* (“keyword”), *élément clé* (“key element”), *point clé* (“key point”), *facteur clé* (“key factor”), *rôle clé* (“key role”), etc. These paradigms may be viewed as constructions (in the sense of Booij, 2010) formalized as $[[X]_{N1} [clé]_{N2}]_N$ or, in general, as $[[X]_{N1} [MOD]_{N2}]_N$. This paper aims at collecting representative data about French ATAP compounds, in order to find out which N2s typically appear in these constructions and what their collocability with N1s (i.e., with head nouns) looks like. Data will be gathered from the FrWac corpus as manually filtered frequency lists corresponding to the pattern “Article+Noun+Noun”, where particular attention will be paid at N2s that combine with many different N1s, in order to obtain the most complete set of typical N2 modifiers with the largest collocability. The results will be compared to a similar study made on Italian ATAP compounds by Radimský (2015, 2016). Interestingly, the data gathered by the same method from two comparable corpora (FrWac and ItWac) suggest that in French, ATAP compounds are much rarer than in Italian and they do not display the same paradigmatic regularity.

Previous analyses of Italian data have also shed light on the principles underlying the inflection of ATAP compounds and their internal modification. As for the inflection, a preliminary analysis suggests that French ATAP compounds display a different behavior, since they usually bear inflection marks on both components, while Italian ATAP compounds bear inflection marks on the leftmost element only (Villoing, 2012:53; Radimský, 2015:174-186). On the other hand, the principles underlying the possibility of internal modification might be similar, giving birth to structures with a complex modifier (such as $[[personnes]_{N1} [victimes\ de\ discrimination]_{N2}]$ – “persons that are victims of discrimination”), structures with a noun phrase at the head position (such as $[[indicateur\ financier]_{N1} [clé]_{N2}]_N$ – “key financial indicator”), and simple structures modified as a whole (such as $[[pays]_{N1} [membre]_{N2}]_N [d'origine]_{PP}$ – “member state of origin”). A paradigmatic approach, such as the Construction morphology, appears to be a powerful tool that allows for explaining the principles that govern these phenomena.

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Inflectional and derivational paradigm of verbs in Czech: the role of the category of aspect

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Abstract:

1 The present paper deals with verbal paradigms with respect to inflectional and derivational morphology of Czech, and its aim is to contribute to the discussion on the absence of clear boundaries between inflection and derivation (Štekauer 2014, Booij 2006). In Czech grammars, the inflectional paradigm of a verb includes both synthetic and analytical forms inflected according to six morphological categories (of person, number, tense, mood, voice, and gender); in the description of Czech as well as in other Slavic languages (see Sect. 2), the theoretical status of the seventh category of aspect is far from clear. In Section 3 of the paper, we propose the aspect to be considered a grammatical (inflectional) category of verbs that is, notably enough, expressed by derivational means; this approach has only a weak support in the Czech linguistics but is in line with respectable approaches, cf. already Dokulil (1962, p. 15ff), Comrie (1976), Dahl (1985), Esvan (2007), or the recent paper by Mel'čuk (2016). The consequences to be drawn from the inflectional interpretation of aspect for the delimitation of derivational families of Czech verbs and, possibly, for the inner organization of the families into derivational paradigms are exemplified in Section 4.

2 In grammatical descriptions of Czech, the inflectional paradigm of a verb includes forms of three persons (1st, 2nd, 3rd), two numbers (sg, pl), three tenses (past, present, future), three moods (indicative, conditional, imperative), two voices (active, passive), and – with some verbal forms – three genders (masculine anim/inan, feminine, neuter). For instance, all forms listed in (1) and another app. 200 forms are members of the inflectional paradigm of the imperfective verb *kreslit* ‘to draw’.

- (1) *kreslím* (1st sg. ind. pres. act.), *kreslila jsi* (2nd sg. ind. past fem. act.), *budeme kreslit* (1st pl. ind. fut. act.), *kreslili byste* (2nd pl. cond. pres. masc. anim. act.), *bylo by kreslilo* (3rd sg. cond. past neut. act.), *byli bychom bývali kreslili* (1st pl. cond. past masc. anim. act.), *kresli* (2nd sg. imp. act.), *je kreslena* (3rd sg. ind. pres. fem. pass.), *byly kresleny* (3rd pl. ind. past fem. pass.), *budeš kreslena* (2nd sg. ind. fut. fem. pass.), *bylo by kresleno* (3rd sg. cond. pres. neut. pass.), *byli byste bývali kresleni* (2nd pl. cond. past. masc. anim. pass.), *bud'te kresleni* (2nd pl. imp. masc. anim. pass.), *kreslíc* (transgressive pres. sg. fem./neut. act.), *byvše kresleni* (transgressive past pl. masc. anim. pass.)

3 On the contrary, no consensus has yet been achieved on the category of verbal aspect. In the paper, the aspect is considered one of the grammatical categories of verbs along with the person, number, tense, mood, and voice (Kopečný 1962). We thus turn away from the vague, obscure classification of aspect as a “lexico-grammatical” category, which is prevailing in the literature on Czech grammar (e.g. Komárek et al. 1986, Komárek 2006).

We propose to handle the aspect as a grammatical category covering imperfectivness and perfectivness as two basic values in Czech. If an imperfective verb and its perfective counterpart share the same lexical meaning and differ just in the continuous vs. complex representation of the same action (Panevová et al. 1971), they are called a pure aspectual pair.

Two basic types of pure aspectual pairs are differentiated: In aspectual pairs of the first

type, the imperfective member is interpreted as being formally derived from its perfective counterpart by a suffix (2); the derivation of the aspectual counterpart is understood as a grammatical process deriving two sets of forms belonging to the same lexical unit. The second type includes pairs the perfective member of which is formally derived from the imperfective verb by a prefix (3). Within our grammatical approach, both the suffixed imperfective counterparts of verbs in the first type and the prefixed perfective counterparts of the second type are proposed to be described as forms of the given verbs, and thus included – together with all forms inflected according to person, tense etc. – into the inflectional paradigm of the verb.¹ The inflection of the particular verb might be substantially changed through suffixation (changes in the conjunction class of the verb are left aside in the paper).

- (2) *dát* ‘to give.pf’ – *dávat* ‘to give.impf’
skočit ‘to jump.pf’ – *skákat* ‘to jump.impf’
- (3) *psát* ‘to write.impf’ – *napsat* ‘to write.pf’
dělat ‘to do.impf’ – *udělat* ‘to do.pf’
chválit ‘to praise.impf’ – *pochválit* ‘to praise.pf’

In Czech, it is mostly the case that just one prefix with a pure perfectivizing function appears for each verb with prefixed perfectives. However, the pure perfectivizing function is fulfilled with a formally different prefix with different verbs (see *na-* with *psát* ‘to write’ vs. *u-* with *dělat* ‘to do’ vs. *po-* with *chválit* ‘to praise’) and, furthermore, the pure perfectivizing prefix (as in (4)) is usually only one out of many prefixes that are compatible with the same base verb, cf. (5). In contrast to the pure perfectivizing prefix, which expresses an inflectional feature, the prefixes *do-*, *za-*, *pode-* etc. in the given examples do not only change the aspect to the perfective one but, moreover, modify the lexical meaning of the base verb *psát* ‘to write’ and are considered to be the means that coin new lexical units. These prefixed verbs with a modified lexical meaning are proposed to be described as a part of the derivational family of the particular verb.

- (4) *psát* ‘to write.impf’ – *napsat* ‘to write.pf’
- (5) *psát* ‘to write.impf’ – *dopsat* ‘to finish writing’, *zapsat* ‘to write down’, *podepsat* ‘to sign’, *přepsat* ‘to rewrite/ overwrite’, *nadepsat* ‘to entitle’, *vypsát* ‘to excerpt’, *vepsat* ‘to inscribe’, *přípsat* ‘to add in writing’, *předepsat* ‘to prescribe’, *odepsat* ‘to write back / to amortize’ etc.

Distinguishing the pure perfectivizing prefixes from the other (derivational) ones is crucial for drawing the line between the inflectional and derivational domain of a verb. The tricky relations between the two types of prefixes are further complicated by the fact that most of the prefixes are ambiguous, namely that they belong to the first type with some bases and to the second type with other ones (cf. *na-* as the pure perfectivizing prefix in (6) but as the derivational prefix in (7)). Formation of aspectual pairs by prefixes is a matter of dispute in the aspectology for nearly 100 years. The traditional arguments based on material from the diachrony thus have not been omitted in the paper. Criteria for classifying the prefixes into pure perfectivizing and derivational ones were proposed by Vey (1952) and Poldauf (1954, 1964), and discussed by Kopečný (1962) and Komárek (2006), most recently by Nübler et al. (2016). A reliable test seems to be to form another (secondary) imperfective verb from the prefixed perfective by using a suffix: it can be derived from verbs with a derivational prefix (8), but not from a verb with a pure perfectivizing prefix (9). Nevertheless, secondary imperfectivization is highly productive so that it cannot be used as a criterion to decide

¹ The proposed interpretation contradicts a frequent classification of the imperfective verb to be the unmarked member of the aspectual opposition.

whether the particular prefixed perfective fulfills the pure perfectivizing function with respect to the unprefixed base verb.

- (6) *kreslit* 'to draw.impf' – *nakreslit* 'to draw.pf'
psát 'to write.impf' – *napsat* 'to write.pf'
- (7) *brát* 'to take' – *nabrat* 'to take up'
růst 'to grow' – *narůst* 'to become bigger'
- (8) *psát* 'to write.impf' – *dopsat* 'to finish writing.pf' – *dopisovat* 'to finish writing.impf'
kreslit 'to draw.impf' – *zakreslit* 'to plot.pf' – *zakreslovat* 'to plot.impf'
brát 'to take.impf' – *nabrat* 'to take up.pf' – *nabírat* 'to take up.impf'
růst 'to grow.impf' – *narůst* 'to become bigger.pf' – *narůstat* 'to become bigger.impf'
hradit 'to cover.impf' – *nahradit* 'to compensate.pf' – *nahrazovat* 'to compensate.impf'
- (9) *psát* 'to write.impf' – *napsat* 'to write.pf' – **napisovat*
kreslit 'to draw.impf' – *nakreslit* 'to draw.pf' – **nakreslovat*
vařit 'to cook.impf' – *uvařit* 'to cook.pf' – **uvařovat*

4 The scope and complexity of a derivational family based on the criteria discussed above will be demonstrated on selected verbs in the full version of the paper. A derivational family of the verb *psát* 'to write' is given here as an example illustrating the following words listed under (a) to (c):

- (a) verbs derived from the verb by prefixes (except for the pure perfectivizing *na-*) – only five out of the prefixed verbs are listed in the line (i) due to a limited space,
(b) words of other part-of-speech categories derived directly and indirectly both from the imperfective verb *psát* 'to write.impf' and the perfective *napsat* 'to write.pf' (cf. the 1st column of Table 1),
(c) words derived both directly and indirectly from each of the prefixed verbs listed in the line (i) (see the rest of the table).

	psát					
(i)		dopsat 'to finish writing'	zapsat 'to write down'	podepsat 'to sign'	přepsat 'to rewrite/ to overwrite'	nadepsat 'to entitle'
(ii)	psaní, napsání	dopsání	zapsání	podepsání	přepsání	nadepsání
(iii)	psaný, napsaný	dopsaný	zapsaný	podepsaný	přepsaný	nadepsaný
(iv)		dopisovat	zapisovat	podepisovat	přepisovat	nadepisovat
(v)		dopisování	zapisování	podepisování	přepisování	nadepisování
(vi)	nápis	dopis	zápis	podpis	přepis	nadpis
(vii)	pisatel	dopisovatel	zapisovatel	pod(e)pisovatel	přepisovatel	
(viii)		dopisovaný	zapisovaný	podepisovaný	přepisovaný	nadepisovaný
(ix)	píšící	dopisující	zapisující	podepisující	přepisující	nadepisující

Table 1: A segment of the derivational family of the verb *psát* 'to write'

The items were distributed in the columns of the table according to the form of the prefix; the particular columns represent the sub-families which are built analogously following the form-meaning correlations. Each sub-family includes a verbal noun with the suffix *-ní* expressing the particular action (line (ii)) and an adjective in *-ný* with passive resultative meaning (expressing a feature resulting from being affected by the particular action; line (iii)). The prefixed verbs (except for *napsat*) form secondary imperfectives (line

(iv)) which serve again as bases for derivation, namely of a verbal noun in *-ní* (line (v)), a deverbal noun expressing mostly the action or its result (line (vi)), a noun in *-tel* with agentive meaning (line (vii)), an adjective in *-ný* with passive resultative meaning (line (viii)), and an adjective in *-cí* with processual meaning (line (ix)).

The following issues are of relevance for a discussion on the inner organization of the derivational family into a derivational paradigm. First, special attention is to be paid to the items *nápis*, *pisatel*, and *píšící* since there is no secondary imperfective available in the 1st column that is the direct base for analogous items in the other columns (cf. *dopis*, *dopisovatel*, and *dopisující* are directly motivated by *dopisovat*). Second, the empty slot of the agent noun in the last column (since the noun *nadepisovatel* is not documented in corpus data; Křen et al. 2015) is an instance of potential words discussed by Pounder (2000, p. 662). Last but not least, in addition to the regularly formed derivatives, there are several coinages that are undoubtedly in a derivational relation to the verb *psát* ‘to write.impf’ but are – both formally and semantically – unique within the whole paradigm, their position has yet to be clarified; see ex. (10).

- (10) *psaníčko* ‘small letter/clutch’, *písař* ‘typist’, *psací* ‘writing (materials)’, *písmo* ‘font’, *písemný* ‘written’, *písemnictví* ‘literature’, *dopisní* ‘writing (paper)’, *zápisník* ‘writing pad’, *podpisový* ‘signing (procedure)’

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Cross-paradigms or word formation patterns in interface: evidence from Portuguese

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Our aim is to demonstrate with Portuguese word-formation data collected from corpora (*Linguateca*, *Corpus de Referência do Português Contemporâneo* and *Corpus do Português*) and based on experiments with Portuguese native speakers that derivational paradigms are mental patterns dynamically organized around more than one axis in what we call cross-paradigms. Cross-paradigms are structured by affixes which may put different base-organized paradigms into interface.

This hypothesis is supported by recent psycholinguistic approaches to the mental lexicon such as Libben (2014) (cf. Libben's concepts on morphological transcendence and morphological superstates), according to whom the mental lexicon is not as an «inert knowledge store, [but] as a dynamic cognitive system that allows for lexical activity.» (Libben 2014: 209). Our hypothesis is also founded on linguistic works such as Corbin (1987), which, as demonstrated by Booij (2007), presents a paradigmatic perspective on word-formation, and on Blevins (2016).

Following Štekauer (2014: 359), we consider derivational paradigms as «based on formal realization of a cognitive category by an affixation process.».

According to Pounder (2000), different materials can organize each paradigm. It is not just a specific morpheme that functions as the axis of a certain paradigm. The axis may correspond also to the word-class, to semantic rules, and to other features labelled under 'lexical paradigm' by Pounder. Our work sticks to two main different paradigm relationships: the lexeme-base-class-organized paradigm and the affix-organized one.

Giving examples from Portuguese, a lexeme-base-class organized paradigm is illustrated by deverbal nouns with different suffixes such as *avaliação* 'evaluation', *matança* 'slaughter', *congelamento* 'freezing', *aterragem* 'landing' and *soldadura* 'soldering'. The axis of this paradigm corresponds to the base lexeme the nouns correlate with, which is a verb (*avaliar* 'to evaluate', *matar* 'to kill', *congelar* 'to freeze', *aterrar* 'to land', *soldar* 'to solder').

An affix-organized paradigm is illustrated by nouns such as *medievalismo* 'medievalism', *espiritualismo* 'spiritualism', *luteranismo* 'Lutheranism', *newtonianismo* 'Newtonianism' and *figurativismo* 'figurativism'. The axis of this paradigm is the suffix *-ism(o)*.

Models that propose separated paradigms like those collide with empirical data. In Table 1, we show three suffixes (*-ism(o)*, *-eir(a)* and *-agem*) that work with different lexeme-base classes. We may exemplify this assumption by means of the suffix *-ism(o)*. This suffix may form nouns correlated with lexeme classes other than adjectives: correlated with verbs (*bisbilhotar* 'to gossip' ⇔ *bisbilhotismo* 'habit of gossiping') and

correlated with nouns (*sigilo* ‘stealth’ ⇔ *sigilismo* ‘secretiveness’). The fact that nouns with the suffix *-ismo* correlate with verbs, nouns and adjectives creates an interface between the three lexeme-base-class paradigms (Table 1).

	Axis of the paradigm: lexeme class of the correlated base		
	Adjective	Noun	Verb
Axis of the paradigm: affix <i>-ism(o)</i>	<i>medieval</i> ‘medieval’ ⇔ <i>medievalismo</i> ‘medievalism’	<i>sigilo</i> ‘stealth’ ⇔ <i>sigilismo</i> ‘secretiveness’	<i>bisbilhotar</i> ‘to gossip’ ⇔ <i>bisbilhotismo</i> ‘habit of gossiping’
Axis of the paradigm: affix <i>-eir(a)</i>	<i>maluco</i> ‘crazy’ ⇔ <i>maluqueira</i> ‘craziness’	<i>flor</i> ‘flower’ ⇔ <i>floreira</i> ‘pot of flowers’	<i>cansar</i> ‘to tire’ ⇔ <i>canseira</i> ‘tiredness’
Axis of the paradigm: Affix <i>-agem</i>	<i>frio</i> ‘cold’ ⇔ <i>friagem</i> ‘coldness’	<i>pelo</i> ‘hair, fur’ ⇔ <i>pelagem</i> ‘pelage’	<i>alunar</i> ‘to land on the moon’ ⇔ <i>alunagem</i> ‘landing on the moon’

Table 1. Cross-paradigms constructed by the interface between affix-organized paradigms and lexeme-base-class paradigms.

This implies that an affix may function as the axis of several lexeme-base-class paradigms. Because of the action of the affix, paradigms of one level (lexeme-base-class-organized) are in interface with paradigm(s) of another level (affix-organized), forming cross-paradigms.

Our explanation for data like the one in Table 1 and for the hypothesis of cross-paradigms is based on our experiments with Portuguese native speakers (lexical decision task with priming) and it is theoretically supported on the following assumptions based on Libben’s (2014; 2015) concepts of morphological transcendence and morphemes as superstates:

- Affixes may intervene in different paradigms, because, following Libben (2014), lexical representations in the mind are not fixed. Instead, they result from the lexical experience of the speaker/listener (Libben 2014: 9).

- This experience enables speakers to adequately interpret words such as *bisbilhotismo*, which does not follow the generalized lexeme-base-class paradigm where *-ism(o)* works (ADJ ⇔ N).

- Assuming that affixes have features of different structures (phonological, semantic, syntactic, morphological, etc.) (following Booij and Lieber (2004) and Lieber (2004), and denying the separationist hypothesis (Beard 1995)), when operating in a parallel paradigm, the affix may be operating only with a part of those structures. For instance, suffix *-agem* contains information about the lexeme-class of the base it can correlate with to form a new noun. When operating in a word such as *alunagem* ‘landing on the moon’ (whose base is the verb *alunar* ‘to land on the moon’), suffix *-agem* was

not particularly selected because of the selectional feature [correlate with verb]. It operates there because of its semantic feature [composed of individuals] (cf. Lieber (2004), Rodrigues (2008; 2014); Rodrigues & Rio-Torto (2013)).

-In this sense, a different mental representation of *-agem* is created in the mind, which does not attain to the [correlation with verb] feature. This corresponds to a variable of *-agem* that is able to correlate with nouns and adjectives. This is explainable with the concept of morphological superstates by Libben (2014).

-Since the production of different variables of affixes depends on the size of the morphological family, it is expected that affixes lowly represented, such as *-or* (e.g. *ardor* ‘burning’), do not awaken the formation of cross-paradigms. This is in accordance with Mosco del Prado et al. (2004), Kroot et al. (2001) and Baayen (2007).

-When a new word coinage, corresponding to the different level paradigm, is represented in the mind, it creates cross-paradigms. A cross-paradigm results from the intersection of paradigms organized around different axes, when derivatives of parallel paradigms are organized around the same semantic patterns by means of the same affix.

-Our experiments with native speakers demonstrate that created words containing the affixes *-agem*, *-eir(a)* and *-ism(o)*, which work in cross-paradigms, show a higher acceptancy rate than those containing affixes that are not cross-paradigmatic.

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Participles: inflectional paradigms, derivational paradigms or something else?

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I argue that paradigms for inflection and derivation ('Word Formation', WF) are logically distinct types of relation, only superficially similar. However, there are a number of types of lexical relatedness that seem to be intermediate between inflection and derivation: a-structure alternations ((anti)passive, causative, ...), evaluative morphology, and especially transpositions. I focus on **participles**, (inflected) word forms with the external morphosyntactic properties of an adjective but the internal morphosyntax of the base verb.

In Paradigm Function Morphology ('PFM2', Stump 2016) inflectable lexemes are associated with FORM and CONTENT paradigms, linked by a **Corr(espondence)** function. The distinction is motivated by mismatches (syncretism, deponency, periphrasis, etc.). An inflectional paradigm is a space comprising intersecting sets of attribute-value pairings, defined by a paradigm function, PF. This defines the 'realized paradigm': pairings of word forms/periphrases with feature values. Typically, inflection is obligatory and complete (no defectiveness). 'WF', by contrast, relates lexemes. In word-and-pattern or 'paradigmatic' approaches generally, there is no 'formation' so we are in fact modelling *lexemic relatedness*, using a relation (not a function!). Both paradigmatic inflection and 'WF' presuppose some theory of lexical representation (lexeme/dictionary entry), and both demand a solution to the '**lexeme individuation**' problem: when do two concrete forms belong to the same lexeme rather than distinct lexemes?

'WF' paradigms share almost none of the properties of inflectional paradigms, being typically (i) incomplete (defective) (ii) non-compositional (iii) not fully productive (note: we rarely speak of the 'productivity' of inflectional properties) (iv) not formalizable as functions. I therefore distinguish an **inflectional-type paradigm**, Π_i , from a **derivational-type paradigm**, Π_d . There are two types of Π_d : a 'chain- Π_d ' operates by so-called 'recursive' application (syntagmatic process!): *employ* \rightarrow *re-employ* \rightarrow *re-employable* \rightarrow *re-employability*. A 'radial- Π_d ' defines sets of complex lexemes all related directly to a single base: *employ* \rightarrow {*employer*, *employee*, *employable*, *employment*, *re-employ*, ...}.

We generally don't find chain- Π_i s even where intermediate forms can function as independent word forms: Spanish *cantaremos* 'we will sing' is not a periphrase, therefore it is *not* derived from the infinitive *cantar*, but from a stem homophonous with the infinitive form. Radial- Π_i s *appear* to occur with complex paradigms built on 'screeves' but this resemblance is superficial. The inflectional paradigm interfaces primarily with syntax while the WF paradigm interfaces almost exclusively with lexical semantics/conceptual structure.

Paradigmatic lexemic relatedness may be formally regular but semantically indeterminate/probabilistic, e.g. English *-ee* suffixation (Barker 1998) or it may be formally very diverse but semantically very regular: Dutch feminine noun formation (van Marle 1985), or English ‘Personal Noun’ formation of the kind *baroque flautist*, *electrical engineer* (Spencer 1988), or both, e.g. English Subject (‘Agent’) Nominal formation: DRIVE → DRIVER, but CLAIM → CLAIMANT, COOK → COOK, FLY → PILOT (form), and BROILER, MIXER (drink), etc.

Some lexemic relatedness looks as regular/productive as inflection so Stump (2001) defines a Π_i for it, but over ‘derivational’ features (δ): $\text{PF}(\langle \text{frënd}, \{\text{PrivAdj}\} \rangle) =_{\text{def}} \langle \text{frëndlæs}, \{\text{PrivAdj}\} \rangle$ (cf also Spencer 2013). Brown and Hippisley (2012) define a Lexeme Formation Template (LFT) with a similar effect. However, Stump/Spencer derivational relatedness requires a non-standard type of paradigm function (PF). Whereas an inflectional PF defines a set of $\langle \text{form}, \text{feature} \rangle$ cells, the derivational PF defines a stem (set of stems) for a derived lexical entry, to which a distinct instance of the PF applies to define its inflectional paradigm. For Spencer (2013) the derivational PF maps a complete lexical entry to another lexical entry, rather like a *wfr* in Aronoff (1976) or the LFT in Network Morphology. But the ‘paradigm’ $\{\text{DRIVE}, \text{DRIVER}\}$ is algebraically a different kind of object from a true inflectional paradigm $\{\langle \text{drive}, \text{bse} \rangle, \langle \text{drove}, \text{pst} \rangle, \langle \text{drives}, \text{3sg} \rangle, \dots\}$: the lexeme DRIVER is not a form of the lexeme DRIVE, and thus there is no FORM/CONTENT paradigm distinction for derivation, hence, no FORM/CONTENT mismatches. Allomorphy, including suppletion (*pace* Pounder 2000, p. 86) is found but this is a relation between root/stem forms of lexemes, not between lexemes as such.

This reasoning suggests that there is a complete break between the Π_i and Π_d types, but there are various intermediate types of lexical relatedness which have so far received very little formal discussion. I illustrate with Russian participles (Spencer 2017). Participles are the ‘adjectival representation’ (Haspelmath 1996) of a verb, canonically functioning as attributive modifiers, and thus heading a participial relative clause. They are prototypical ‘mixed categories’: their external syntax is that of an attributive adjective, while their ‘internal syntax’ retains a subset of verb properties, including aspect, argument structure and quirky case marking (but not tense or subject agreement) (see example (1)). I present the FORM/CONTENT paradigms for verbs: CONTENT includes properties such as [TENSE], [MOOD:cond] with no direct FORM correspondent, while FORM has purely morphomic properties, notably [Vform:l-participle], e.g. *pisa-l* from PISAT’ ‘write’. The four participles have the external morphosyntax of attributive modifiers but retain various verb properties in their internal syntax (argument structure, case assignment). They also realize the CONTENT properties {VOICE, ASPECT} (not TENSE!). (See Appendix) I briefly compare them to the Abkhaz ‘non-finite’ paradigms, in which almost every finite form has a corresponding participial form used to head relative clauses

(Hewitt 1979).

Since the participles inflect exactly like an adjective they appear to form Π_i but that paradigm appears to result from a radial- Π_d . This raises a serious problem for models of inflection: how can a verb paradigm include an adjective paradigm as a proper subpart (the ‘**paradigm-within-a-paradigm**’ problem)?

Following Spencer (2017) I assume an attribute REPR, with the value for participles REPR(V,A). The set of CONTENT and FORM properties for which a lexeme inflects is declared by an attribute MORPHOLEXICAL SIGNATURE (MORSIG). Where $\sigma \supset \text{REPR(V,A)}$, PF($\langle \text{VERB}, \sigma \rangle$) defines a new MORSIG. The PF ‘transfers’ the [ASPECT, VOICE] properties from the MORSIG of the base verb’s lexical representation, but fails to transfer certain other verb properties such as tense or subject agreement (in Russian, but not e.g. Abkhaz). Given the REPR(V,A) specification the PF defines the attribute CONCORD to be a member of the participial MORSIG attribute, but with the CONCORD sub-attributes NUM, GEND, CASE underspecified, giving effectively the lexical entry of an (uninflected) adjectival lexeme. However, the PF does not alter the lexemic index of the base verb, so that the participle remains an adjectival representation of the verb. Moreover, the model correctly distinguishes between participles (transposition of V to A) and predicative adjectives (transposition of A to V).

The machinery of PFM2 is thus able to account for the ‘paradigm-within-a-paradigm’ effect without committing us to the claim that the participle is derivational. The notion of lexemic index plays a crucial role in the analysis. The question then remains whether *any* derivational morphology can be described as Π_i , as claimed by Stump, Spencer, or whether all ‘WF’ is of type Π_d . Extremely regular/productive derivation such as English *-able* suffixation, adjective-to-person noun conversion in many languages and some other instances may be cases in point. Thus, Russian participles whose highest argument denotes a person can be used to denote that person (*interesovat’sja* ‘be interested in’, *interesujuščiesja* ‘those interested’) and this is a completely regular phenomenon with Abkhaz participles. (This is a Π_i but defined by a chain- Π_d .) But this then raises the question of why any derivational morphology should be definable as any kind of Π_i .

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Appendix

Example sentences

- (1) a. general komanduet vos'moj armiej
 general commands eighth.INSTR.F.SG army[F].INSTR.SG
 'The General is commanding the Eighth Army'
- b. komanduj-ušč-emu vos'moj armiej
 command-PRSPTCP-DAT.M.SG eighth.INSTR.F.SG army[F].INSTR.SG
 general-u
 general[M].DAT.SG
 'to the General (who is) commanding the Eighth Army'

Tables

Russian participles of the verb UPRAV'IT'/UPRAVL'AT' 'control':

Active		Passive	
<i>imperfective</i>	<i>perfective</i>	<i>imperfective</i>	<i>perfective</i>
upravl'aju-šč-	uprav'i-všč-	upravl'a-em-	upravl'-on(n)-

Russian verb paradigms (ignoring true participles):

CONTENT paradigm for UDAR'IT'/UDAR'AT' 'hit'

ASPECT	<i>imperfective</i>	<i>perfective</i>
INFINITIVE	udar'a-t'	udar'i-t'
GERUND	udar'a-ja	udar'i-v(ši)
IMPERATIVE	udar'a-j(te)!	udar'(te)!
TENSE		
present	udar'a-ju, -eš, ...	<none>
future	bud-u, -eš, ...udar'at'	udar'-u, -iš
past	udar'a-l, -a, -o, -i	udar'i-l, -a, -o, -i
CONDITIONAL	udar'a-l, -a, -o, -i + by	udar'i-l, -a, -o, -i + by
PASSIVE	udar'at'-s'a, etc	(byl) udaren, -a, -o, -y

FORM paradigm for UDAR'IT'/UDAR'AT' 'hit'		
Aspect	<i>imperfective</i>	<i>perfective</i>
inf	udar'a-t'	udar'i-t'
ger	udar'a-ja	udar'i-v
imper	udar'a-j(te)!	udar'(te)!
Tense		
pres-fut	udar'a-ju, -eš, ...	udar'-u, -iš
l-ptcp	udar'a-l, -a, -o, -'i	udar'i-l, -a, -o, -'i
refl	udar'at'-s'a, etc	<none>

Feature sets for Russian verbs:

CONTENT feature array		FORM feature array	
ASPECT	{ipfv,pfv}	Aspect	{ipfv,pfv}
VFORM	INF	Vform	inf
	TNS:{prs, fut, pst}		Tns:{prs-fut}
	IMPER:{sg, pl}		imper:{sg, pl}
	COND:{yes, no}		l-ptcp
REFL	{yes, no}	Refl	{yes, no}
AGRSUBJ	PER:{1, 2, 3}	AgrSubj	Per:{1, 2, 3}
	NUM:{sg, pl}		Num:{sg, pl}
	GEND:{m, f, n}		Gend:{m, f, n}
VOICE	{ACT, PASS}		
REPR	{⟨V,A⟩, ⟨V,Adv⟩}	REPR	{⟨V,A⟩, ⟨V,Adv⟩}

Missing links in derivational paradigms

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As the properties of inflectional paradigms have become a focus of intensive interest, the role of paradigmatic structure in the domain of word formation has come under increasing scrutiny (van Marle 1985, Bauer 1997, Pounder 2000, Booij 2008). A fundamental architectural difference between inflectional paradigms and derivational paradigms is one of hierarchy. The inflectional paradigm of a lexeme L may be seen as a set of cells, where each cell is the pairing $\langle w, \sigma \rangle$ of a word form w with a morphosyntactic property set σ : σ is a property set with which L may be associated in syntax, and w is the word form realizing both L and σ . For example, the inflectional paradigm of the French verbal lexeme *INVENTER* (Table 1) is a set of cells whose members include pairings such as $\langle inventons, \{1 \text{ pl prs ind}\} \rangle$.

Table 1. The synthetic inflectional paradigm of French *INVENTER* ‘invent’

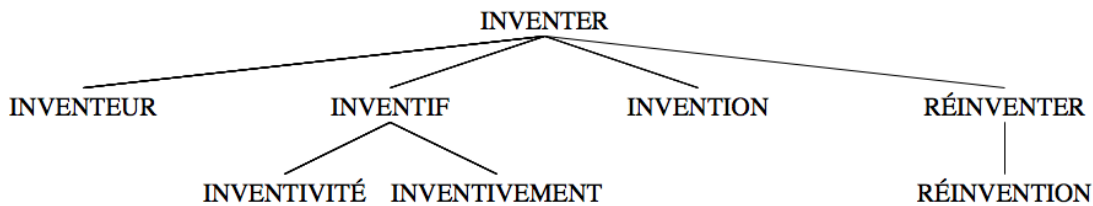
	Indicative				Conditional	Subjunctive		Imperative
	Present	Imperfect	Simple past	Future		Present	Imperfect	
1SG	<i>invente</i>	<i>inventais</i>	<i>inventai</i>	<i>inventerai</i>	<i>inventerais</i>	<i>invente</i>	<i>inventasse</i>	
2SG	<i>inventes</i>	<i>inventais</i>	<i>inventas</i>	<i>inventeras</i>	<i>inventerais</i>	<i>inventes</i>	<i>inventasses</i>	<i>invente</i>
3SG	<i>invente</i>	<i>inventait</i>	<i>inventâ</i>	<i>inventera</i>	<i>inventerait</i>	<i>invente</i>	<i>inventât</i>	
1PL	<i>inventons</i>	<i>inventions</i>	<i>inventâmes</i>	<i>inventerons</i>	<i>inventerions</i>	<i>inventions</i>	<i>inventassions</i>	<i>inventons</i>
2PL	<i>inventez</i>	<i>inventiez</i>	<i>inventâtes</i>	<i>inventerez</i>	<i>inventeriez</i>	<i>inventiez</i>	<i>inventassiez</i>	<i>inventez</i>
3PL	<i>inventent</i>	<i>inventaient</i>	<i>inventèrent</i>	<i>inventeront</i>	<i>inventeraient</i>	<i>inventent</i>	<i>inventassent</i>	

Infinitive:	<i>inventer</i>
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Participles	Present:	<i>inventant</i>
	Past:	<i>inventé</i>

By contrast, the derivational paradigm of a lexeme L has a hierarchical structure dominated by L (Figure 1): each node in this structure is a lexeme that derives from the nodes that dominate it. Thus, there is a fundamental asymmetry among the lexemes in the derivational paradigm of a lexeme L : every node other than L has a derivational history consisting of one or more other lexemes in the paradigm. Inflectional paradigms do not, in general, exhibit this sort of asymmetry. It is true, of course, that it is often possible to predict one form in an inflectional paradigm from another form in that paradigm; this fact is the basis for the use of principal parts in language pedagogy and accounts for the validity of the Low Conditional Entropy Conjecture (Ackerman & Malouf 2013). But predicting Y from X is not the same thing as deriving Y from X .

Figure 1. The derivational paradigm of French INVENTER 'invent'



Here, I discuss a canonical property of derivational paradigms and one kind of apparent deviation from this property. I will say that a derivational paradigm P is canonical with respect to the property of RULE-BASED HIERARCHY if and only if it satisfies the criterion in (1).

- (1) For any two lexemes L_1 and L_2 that stand in a mother-daughter relation in P , there is a rule of derivation R such that $R(L_1) = L_2$.

The derivational paradigm of *INVENTER* in Figure 1 satisfies this criterion. Many other paradigms, however, seem not to, and that fact reveals important characteristics of the architecture of morphology. On one hand, there are cases in which, for one or another reason, a mother-daughter relation seems not to conform straightforwardly to the expected rule of derivation. For instance, the agent noun deriving from English *INVENT* is *INVENTOR*; but should *OPERATOR* or *SURGEON* be seen as the agent noun corresponding to *OPERATE* (in the sense 'perform surgery')? If *OPERATOR* is chosen, then the semantic relation between base and derivative doesn't conform to any rule, since an operator is not one who performs surgery; but if *SURGEON* is chosen, then the morphological relation between base and derivative doesn't conform to any rule, but is one of gross suppletion.

My focus here will be on a different sort of apparent deviation from (1): the fact that in some derivational paradigms, the mother-daughter relation between two lexemes is seemingly mediated by two rules rather than one. These are instances in which there is a "missing link" between base and derivative, as in each of the examples in (2).

- (2) **Missing links:**

a.	N	A	A
	HISTORY	HISTORIC	HISTORICAL
but	WHIMSY	*WHIMSIC	WHIMSICAL
b.	N	N	A
	ART	ARTIST	ARTISTIC
but	CHARACTER	*CHARACTERIST	CHARACTERISTIC
c.	N	V	N
	POLLEN	POLLENATE	POLLENATION
	V	V	N
but	EXPLAIN	*EXPLANATE	EXPLANATION

Cases of this sort have been seen as problematic because they seem to require reference to a nonexistent form for the derivation of an existing form. I argue, however, that such instances are problematic only if one adopts the assumption—largely unquestioned—that affixes are themselves morphologically unanalyzable. If one instead makes the assumption (quite widespread among descriptive grammarians) that an affix may itself have internal morphological structure, then it is perfectly possible to analyze the stems of WHIMSICAL, CHARACTERISTIC and EXPLANATION as arising directly from those of WHIMSY, CHARACTER and EXPLAIN through the suffixation of *-ical*, *-istic* and *-ation*. The rules introducing these complex suffixes are confluations of other, simpler rules. In some instances, the properties of a complex affixation rule are directly deducible from those of the simpler rules of which it is a conflation (as in the case of the *-ical* rule); but once they are grammaticalized as autonomous rules, conflated rules may diverge in various ways from the simpler rules on which they were originally based (as in the case of the *-ation* rule, whose domain is very different from that of the *-ate* rule; Tables 2, 3).

Table 2. Some members of the *-ate* rule's domain

Noun or Adjective	<i>-ate</i> verb	<i>-ion</i> noun
<i>active</i>	<i>activ-ate</i>	<i>activ-at-ion</i>
<i>alien</i>	<i>alien-ate</i>	<i>alien-at-ion</i>
<i>assassin</i>	<i>assassin-ate</i>	<i>assassin-at-ion</i>
<i>captive</i>	<i>captiv-ate</i>	<i>captiv-at-ion</i>
<i>liquid</i>	<i>liquid-ate</i>	<i>liquid-at-ion</i>
<i>motive</i>	<i>motiv-ate</i>	<i>motiv-at-ion</i>
<i>note</i>	<i>not-ate</i>	<i>not-at-ion</i>
<i>oxygen</i>	<i>oxygen-ate</i>	<i>oxygen-at-ion</i>
<i>pulse</i>	<i>puls-ate</i>	<i>puls-at-ion</i>
<i>saliva</i>	<i>saliv-ate</i>	<i>saliv-at-ion</i>
<i>sublime</i>	<i>sublim-ate</i>	<i>sublim-at-ion</i>
<i>ulcer</i>	<i>ulcer-ate</i>	<i>ulcer-at-ion</i>
<i>vaccine</i>	<i>vaccin-ate</i>	<i>vaccin-at-ion</i>
<i>valid</i>	<i>valid-ate</i>	<i>valid-at-ion</i>

Table 3. Some members of the *-ation* rule's domain

Verb	* <i>-ate</i> verb	<i>-ation</i> noun
<i>accuse</i>	* <i>accus-ate</i>	<i>accus-ation</i>
<i>cease</i>	* <i>cess-ate</i>	<i>cess-ation</i>
<i>consult</i>	* <i>consult-ate</i>	<i>consult-ation</i>
<i>declare</i>	* <i>declar-ate</i>	<i>declar-ation</i>
<i>deport</i>	* <i>deport-ate</i>	<i>deport-ation</i>
<i>evoke</i>	* <i>evoc-ate</i>	<i>evoc-ation</i>
<i>examine</i>	* <i>examin-ate</i>	<i>examin-ation</i>
<i>expect</i>	* <i>expect-ate</i>	<i>expect-ation</i>
<i>form</i>	* <i>form-ate</i>	<i>form-ation</i>
<i>manifest</i>	* <i>manifest-ate</i>	<i>manifest-ation</i>
<i>represent</i>	* <i>represent-ate</i>	<i>represent-ation</i>
<i>reveal</i>	* <i>revel-ate</i>	<i>revel-ation</i>
<i>usurp</i>	* <i>usurp-ate</i>	<i>usurp-ation</i>
<i>visit</i>	* <i>visit-ate</i>	<i>visit-ation</i>

I demonstrate that there is strong independent motivation for postulating an operation of rule conflation; this includes evidence of a formal nature (apparent anomalies in the sequencing of morphological rules and in their paradigmatic opposition; cf. Bauer 1988, Bochner 1992, Luís & Spencer 2005) as well as psycholinguistic evidence (the role of affix sequences in the processing of morphologically complex words; cf. Bilgin 2016, Durrant 2013, Frauenfelder & Schreuder 1992). As I show, the introduction of rule conflation into morphological theory has important consequences for modeling rule interactions. One such consequence is that derivational paradigms containing such mother-daughter pairs such as WHIMSY-WHIMSICAL, CHARACTER-CHARACTERISTIC and EXPLAIN-

EXPLANATION are not in fact deviations from the canonical property of rule-based hierarchy: in such cases, the mother-daughter relation is mediated by a conflated rule of derivation.

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French converted nouns/verbs as a paradigm: how did the verbal suffixation with *-é* in Creole emerge?

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The talk will focus on the creation of the *-é* suffixation in Creole, which derives verbs on the bases of nouns (cf. ex. (1.)) by analogy to noun/verb pairs inherited from French (cf. ex. (2)).

- (1) a. bwanné ‘to move’ ← bwann ‘movement’
 chiktayé ‘to crumble’ ← chiktay ‘crumbling’
 b. faké ‘to dig’ ← fak ‘spade’
 grajé ‘to grate’ ← graj ‘grate’
 c. miganné ‘to mix’ ← migan ‘purée’

- (2) a. anons ‘announcement’ / anonsé ‘to announce’
 blag ‘joke’ / blagé ‘to joke’
 karès ‘stroke’ / karésé ‘to stroke’
 b. bròs ‘brush’ / brosé ‘to brush’
 savon ‘soap’ / savonné ‘to soap’
 gòm ‘eraser’ / gomé ‘to erase’

In this talk we will argue that the creation of this suffix in creole is not due to the inheritance of an univocally oriented morphological rule but to the reanalysis of inherited noun/verb morphological pairs (as in (2)), that are viewed as a paradigm. This paradigmatic approach is specific to creole language: these inherited noun/verb pairs are originally formed in French by two oriented conversion rules, the verb to noun conversion (as in 2a) or the noun to verb conversion as in (2b). Our study will lead us to question the conditions for a paradigm approach to these pairs in creole.

Guadeloupean Creole has seldom been studied from the point of view of morphology. Like all languages that do not have a long-standing written tradition, it is difficult to constitute a corpus (Brousseau 2011). Our study is based on a corpus collected by a native speaker, based on dictionaries (Ludwig et al. 2012, Pouillet et al. 1984, Tourneux & Barbotin, 1990) and field surveys of native speakers: forty native speakers from all the islands (Marie Galante, Les Saintes, La Désirade, Grande-Terre, Basse-Terre), aged between 45 and 80, who work in different professions (agriculture, fishing, crafts, education, executives, computer scientists). These surveys were organized around various themes and conducted as point-blank conversations. On the one hand, they made it possible to inventory the lexicon of specific fields such as fauna, flora, cooking, field work, fishing, life in the early 20th century etc. And, on the other hand, they made it possible to specify the uses and semantic values of the lexical units identified). The corpus is composed of 7045 lexemes of Guadeloupe Creole, including

1731 verbs, which enabled a specific study of Noun / Verb morphological relations. The analysis was conducted within the theoretical framework of lexematic morphology (cf. for example, Aronoff 1994, Anderson 1992, Booij 2010, Fradin 2003).

Although the creole derivatives in (1) are formed by analogy with inherited conversion pairs, they cannot be analyzed in the same way in creole language as in French: the final *-é* of the verb, inherited from an inflected form (the infinitive or past participle) has no inflexion value in Creole (Creole doesn't inflect its lexemes for the morpho-syntactic values of infinitive and past participle cf. Mufwene & Dijkhoff 1989). It belongs to the verb lexeme. Consequently, it appears as additional phonological material relative to the phonological form of the noun base. As this *-é* ending is associated with syntactic and semantic changes, it must be analyzed as a verbal suffix on a nominal base (the suffix *-é*). Any other hypothesis –nominalization by deleting the ending *-é*, or verbal thematic vowel - doesn't hold.

This suffixal creation in Creole follows from a process of “degrammaticalization” or “deinflectionalization” (Rainer 2015: 1768-69, Norde 2009: 179-181), that is to say, “inflectional endings end up as derivational suffixes” (Rainer 2015: 1768-69).

The analogy with the French inherited converted noun/verb has therefore focused on the noun/verb pairs taken as a paradigm without distinguishing the categorical orientation of the rule from which they were derived.

The semantic relation between the nominal bases and the verbal derivatives with *-é* in Creole is one of the consequences of this paradigmatic approach to the converted noun/verb pairs inherited from French. Indeed, the nominal base in a noun to verb derivational rule (whether it is conversion (see Tribout 2010) or suffixation (see Plag 1999)) usually denotes a concrete object (Corbin 2004, Huyghe 2012) and refers either to certain typical arguments of the verb (see 2b), to the displaced entity (*figure-verbs*), to the place (*grounds-verbs*) or to the result of the event. On the other hand, a noun to verb derivational rule never selects an event noun as a base because event nouns in relation with verbs are usually deverbals (cf. 2a.) (cf. for instance, Grimshaw 1990, Alexiadou 2001). But the creole suffixation with *-é* can select an event noun as a derivative base. This property seems to be quite original to French (and also European languages). This is due to the fact that this suffixation was created by analogy on the noun/verb converted pairs, and that these pairs were reanalyzed as a non-oriented paradigm. Consequently, the *-é* suffixation has inherited the semantic relations of both conversion rules, the noun to verb and the verb to noun one. So, the nominal base of the creole *-é* suffixation may refer to an instrument (1a and 3a.), an agent (3b.), the displaced entity (3c), the place (3d), the result of the event (1c and 3e) but also to the event itself (1a. and 4).

- (3)
- a. fak ‘spade’ / faké ‘to dig’
 graj ‘grate’ / grajé ‘to grate’
 bwa ‘arm’ / bwaré ‘to embrace’
 zyé ‘eyes’ / zyété ‘to survey’
 - b. makrèl ‘gossip’ / makrélé ‘to survey’
 mandyan ‘beggar’ / mandyanné ‘to beg’
 - c. bonda ‘buttock’ / bondaté ‘to sit’
 pyé ‘foot’ / pyété ‘to set foot’
 - d. balkon ‘balcony’ / balkonné ‘to be on the balcony’
 kabann ‘bed’ / kabanné ‘to lie in’
 - e. flang ‘notch’ / flangé ‘to notch’

fifin ‘drizzle’ / fifiné ‘to drizzle’

- (4) bonbans ‘feast’ / bonbansé ‘to celebrate’
chikann ‘contestation’ / chikanné ‘to contest’
chiktay ‘crumbling’ / chiktayé ‘to crumble’
dousin ‘stroke’ / dousiné ‘to stroke’
driv ‘walk’ / drivé ‘to go for a walk’
kalbann ‘tumble’ / kalbanné ‘to tumble’

This analysis leads us to question the criteria for the constitution of a derivational paradigm, that is to say, how morphological families are grouped into paradigms. For the data examined here, it seems that the semantic relation (associated with the phonological change) was decisive: any morphological noun/verb-ending-in-é pairs that maintain a semantic relation typical of a conversion rule (noun to verb or verb to noun conversion) can be form a paradigm. Thus, even if the semantic relations between the base and the derivatives vary considerably (which led Stump 1991 to reject a semantic foundation of derivational paradigms), we consider this criterion reliable, because semantic relations can only vary within a limited set of possibilities, those between converted nouns and verbs. Admittedly, word formation is not as systematic as inflexion is, but following the proposal of Stekauer, “the neologism is experienced as an actualization of existing possibilities, just as is the case in inflectional paradigms” (Stekauer 2014: 361).

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