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The zero suffix in English and Italian deverbal nouns

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Abstract: In this paper we bring evidence from English and Italian deverbal zero nominals (*to climb* > *the climb-*$\mathbf{Ø_N}$) that zero is a possible spell-out of a nominalizer otherwise overtly instantiated in suffixed nominals (*examin-**ation***). We argue in favor of a Distributed Morphology approach, a separationist theory that recognizes and easily implements zero morphology with underlying syntax-semantics. Abstracting away from other theoretical trends and their foundational reasons to refrain from using zero suffixes, we address three properties that have been argued to fundamentally distinguish zero nominals from overtly suffixed nominals, with the implication that they instantiate a different word formation process: i) realization of verbal argument structure, ii) possibility of embedding verbalizing suffixes, and iii) semantic transparency in relation to the verb. By means of corpus data and two manually collected datasets of 561 English and 174 Italian zero nominals based on lexicographic information, we bring solid evidence against these claims, by arguing that: i) a great proportion of zero nominals do realize verbal argument structure, ii) the zero affix may embed verbalizing affixes within the limits of the selectional restrictions it independently imposes on its base, and iii) zero nominals present the same patterns of polysemy that suffixed nominals display. However, we show that zero nominals also present some idiosyncrasies to the extent that not all of them express compositional event readings with argument structure, a matter that deserves further research within the frame of their competition with suffixed nominals.

Keywords: zero suffix, deverbal nominals, overt suffixes, Distributed Morphology, English, Italian

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1 Zero nominals

Deverbal zero nominals (ZeroNs, also called conversion nouns) such as *the import* in (1) can be viewed as derived by means of a zero suffix, in the same way that the corresponding suffix-based nominals (SuffNs) employ overt suffixes like *-ing* and *-ation*:

(1) *to import* > *the import-**Ø***; *the import-**ing***; *the import-**ation***

In inflectionally rich languages like Italian, ZeroNs bear declension class marking such as *-o* (masculine) and *-a* (feminine), as in (2), even though the nominalizing suffix is phonologically null (see Manova and Dressler 2005; Thornton 2004; Valera 2015 on formal marking).

(2) a. *arriv-are* 'to arrive' > *l'arriv-**o*** 'the arrival'
b. *sost-are* 'to stop' > *la sost-**a*** 'the stop'

In support of a zero-derivation analysis of ZeroNs, Marchand (1969) and later works rely on the functional identity of zero and overt suffixes in turning a verb into a noun that denotes the action of the verb. This argument follows *the overt analogue criterion* (Sanders 1988), by which a zero suffix is motivated in word formations for which overt suffixes fulfill a similar function, as illustrated for zero and *-ing*/*-ation* in (1). However, various theories within and beyond generative linguistics have shown skepsis towards employing meaningful zero morphemes, in general, and ZeroNs inevitably become part of this larger debate.

Within the broader debate on how to approach zero derivation/conversion, various putative differences have been brought forth between zero and overt suffixes. The discussion often concerns denominal verbs (Plag 1999; Lieber 2004), but claims have also been made on ZeroNs, especially following Grimshaw's (1990) proposal that they differ from SuffNs in being unable to realize complex event nominals.

Abstracting away from the various theoretical trends and their foundational reasons to refrain from using zero suffixes (but see the introduction to this volume), we address three properties that have been argued to fundamentally distinguish ZeroNs from SuffNs, with the implication that they instantiate a different word formation process: i) realization of verbal argument structure, ii) possibility of embedding verbalizing suffixes, and iii) semantic transparency in relation to the verb.

First, following Grimshaw (1990), it has been argued that ZeroNs cannot instantiate compositional readings with verbal event and argument structure. Borer (2013: 332) contrasts zero with *-ation* in (3) to illustrate this point, even though

text corpora present counterexamples as in (4-a), and several researchers have provided data as in (4-b) (from Newmeyer 2009; see also Harley 2009; Fábregas 2014; Lieber 2016), which Borer labels as exceptions.

(3) *the **importation**/**import** of goods from China in order to bypass ecological regulations*

(4) a. *Tokyo allowed the continued **import** of South African coal* (COCA)
b. *the frequent **release** of the prisoners by the governor*

Second, Borer (2013: ch. 7) argues that ZeroNs cannot embed verbalizing suffixes such as *-ize* or *-ify* in (5). If they involved a zero suffix that nominalized a verb, this suffix should be able to attach on top of a verbalizing suffix, which it is not, in contrast with *-ation*.

(5) *crystal(l)-**ize**$_V$* > **crystal(l)-**ize**$_V$-Ø$_N$* vs. *crystall-**iz**$_V$-ation$_N$*
*acid-**ify**$_V$* > **acid-**ify**$_V$-Ø$_N$* vs. *acid-**if**$_V$-ication$_N$*

Third, the semantics of zero suffixes has closely been addressed in lexicalist theories. For denominal zero verbs, Plag (1999) and Lieber (2004) argue that zero is more polysemous than its overt analogues, questioning its tenability as a suffix in view of the overt analogue criterion. Manova and Dressler (2005: §3.4) use data from Polish, Bulgarian, and German to argue that SuffNs are more productive and semantically transparent in denoting verb actions, while ZeroNs are less productive and often show result or other concrete readings.

This paper closely examines these three putative differences between ZeroNs and SuffNs by employing two manually annotated datasets of 561 English and 174 Italian ZeroNs derived from syntactic-semantically motivated verb classes (i.e. verbs of change of state, change of possession, removing, creation and transformation, putting, and motion: see VerbNet classes in Kipper Schuler [2005], building on Levin [1993]). Guided by lexicographic resources on their meanings and by their attestation with argument structure in online corpora, we argue that ZeroNs are more similar to SuffNs than currently believed, and we take the empirical picture to suggest the necessity of a zero suffix in the analysis of ZeroNs. Although the claims above have occasionally been challenged before, our study substantially contributes to this discussion by offering an empirically solid investigation based on well-defined verb classes in two languages from different families. This offers an evaluation of ZeroNs for a targeted empirical domain, whose results cannot be refuted as limited exceptions (see Borer 2013: 331), since the picture is more complex and systematic than previously conveyed by less targeted studies.

We start by presenting our lexical resources in Section 2 and continue by addressing each of the three properties above in Sections 3–5: Section 3 examines

the realization of argument structure in ZeroNs, Section 4 focuses on their possibility to morphologically embed verbalizers, and Section 5 investigates the semantic potential of ZeroNs. The conclusions and the theoretical implications of our empirical findings are presented in Section 6.

2 The English and Italian ZeroN databases

We rely on two manually collected databases of English and Italian ZeroNs, which contain 1,202 and 334 ZeroNs, respectively, and are freely available in a data repository upon request (Iordăchioaia and Melloni 2022). Our study targets six representative verb classes, which include a total of 561 ZeroNs in English and 174 in Italian, as described in Section 3.

Both databases gather information from three independent resources: dictionaries, VerbNet, and natural text corpora (see read-me files in Iordăchioaia and Melloni 2022). First, we used the online *Oxford English Dictionary* (OED) for English and the Sabatini Coletti Dictionary (DISC: *Dizionario italiano Sabatini Coletti*) for Italian, from which we gathered various information on etymology, date of first attestation of ZeroNs and their base verbs and, importantly for our purposes here, on the different senses that the ZeroNs receive in their dictionary entries, as detailed below in (6). Second, VerbNet is the largest online resource of English verbs that links their syntactic and semantic patterns of argument realization, following and enriching Levin (1993) (Kipper Schuler 2005; verbs.colorado.edu/verb-index/vn3.3/). From this resource we collected the VerbNet class of the base verb of each ZeroN, since the main purpose of creating the database was to check the properties of ZeroNs depending on the verb class of their base verbs (see Iordăchioaia et al. 2020 for more details). For ZeroNs whose verbs were not available in VerbNet, we approximated with the verb class of close synonyms. Italian lacks a comparable VerbNet resource, so we translated the base verbs into English and provided their verb classes accordingly. Third, we used natural text corpora to search for the availability of ZeroNs with verbal argument structure, as described in Section 3. For this, we consulted the Corpus of Contemporary American English (COCA; Davies 2008–), News on the Web (NOW; Davies 2016–) and Global Web-based English (GloWbE; Davies 2013) for English, and itTenTen16 at www.sketchengine.eu for Italian. More details are offered in Section 3.

Let us start with the dictionary senses of ZeroNs. Following previous literature on SuffNs (Grimshaw 1990; Bierwisch 2009; Melloni 2011, Kawaletz and Plag 2015; Lieber 2016), we distinguished between action/event-related and participant readings as in (6). The most relevant dictionary senses of ZeroNs were col-

lected with respect to these semantic categories, but not all their senses were classified. For a comparison to SuffNs, our interest was to see whether a category is represented for a ZeroN or not, and not to exhaustively classify its senses.

(6) a. Action-related readings: event (the action of V-ing: *fall*, *murder*, *walk*); event instance (an act of V-ing: *click*, *kiss*, *pat*); state (the state of V-ing/being V-ed: *daze*, *shock*, *sorrow*); result state (the state brought about by having V-ed: *collapse*, *decrease*);
b. Participant readings: result entity/product (the thing that is produced/affected by V-ing: *cut*, *crack*, *bruise*); agent (the person who V-s: *cook*, *guide*), cause (the thing that V-s: *surprise*, *wonder*); instrument (the thing to V with: *nudge*, *drill*); location (the place of V-ing: *dump*, *float*); path (the trajectory of V-ing: *getaway*, *drain*).

In the absence of clear distributional tests for these different semantic categories, it often becomes impracticable to reliably record these fine-grained distinctions, especially when working with large amounts of data and highly polysemous items, as in our case. For this reason, we considered states and result states as one category, and grouped products with patients/themes under the cover term "result entities", as readings that involve abstract or concrete objects affected by the verbal event (much as in Grimshaw 1990). Similarly, we grouped agents, causes, and instruments as subject-like participants, as well as location, path, and (the very rare) temporal readings as circumstantial participants. The distinction between event and instance of event is sometimes documented in the OED by means of expressions such as the *action* vs. an *act* of V-ing, but this is unsystematic, and for Italian there is no such contrast, which is why we consider them here to form one semantic category: (instance of) event.

Table 1 illustrates a few English ZeroN entries for the six verb classes that we analyze: verbs of change of state, change of possession, removing, image creation together with creation and transformation, verbs of putting, and motion verbs. These are the classes for which the Italian database has most ZeroN formations (see numbers in Table 2). In Table 1, OED labels like n1 for *brew* indicate the relevant lexeme in case of homonymy. First of all, Table 1 illustrates the morphological diversity of ZeroNs: we find simple (*brew*, *spill*, *lift*, *walk*) but also complex ZeroNs involving prefixes (*exchange*, *release*, *preform*) or particles (*upload*) (see Iordăchioaia et al. 2020: 133 for an overview of complex ZeroNs and Iordăchioaia 2020 for ZeroNs with particles). Second, the entry for *lift* shows that many base verbs are polysemous and belong to several VerbNet classes. In the database, we documented the verb classes most relevant for the ZeroN meanings, but many ZeroNs still show two or three verb classes. In our data overview we counted each

Table 1: Samples of the English database.

ZN	Verbnet class	(Instance of) Event	(Result) State	Result Entity	Agent/ Instr/Cause	Location/Path
upload	verbs of change of state	the action of uploading data	no	a file which has been uploaded or is intended for uploading	no	no
exchange	verbs of change of possession	the action/process of exchanging; an act of reciprocal giving and receiving	no	something offered in exchange	no	a place of exchange
release	verbs of removing	the action of setting free; an act of freeing	the fact of being freed from some burden	the product so released	a button that releases part of a mechanism	no
brew, n1	verbs of creation and transformation	the action of brewing	no	the beverage brewed	no	no
preform	verbs of creation and transformation	no	no	a moulded object requiring further processing	no	no
spill, n4	verbs of putting	a downpouring of liquid	no	no	no	a channel for the escape of surplus water
lift	verbs of removing; verbs of putting	the action of lifting; an act of lifting	no	the thing lifted	a device for lifting; person who lifts	the distance through which anything is lifted
walk, n1	verbs of motion	the action/an act of traveling or wandering	no	a journey; a procession	no	a distance to be walked

ZeroN for each verb class that it represents: i.e., *lift* is counted both for verbs of removing and verbs of putting. Third, as pointed out in the literature and visible in Table 1, ZeroNs are multiply polysemous, beyond the polysemy of their bases: many show readings that belong to three or four semantic classes but some like *preform* show only one reading. We address ZeroN polysemy in Section 5.

3 Argument structure realization

Argument structure (ArgStr) is a property inherent to lexical verbs, which usually require some argument, while among nouns only a few (e.g., relational nouns) do that (Baker 2003). Since Grimshaw (1990), the realization of verbal ArgStr in deverbal nominals has been used as a strong indicator of their inheritance of verbal structure. In approaches that take arguments to identify subevents in the event structure of a verb (Rappaport Hovav and Levin 1998 and later work, Marantz 1997; Alexiadou 2001; Borer 2013; Ramchand 2008; Harley 2009, among others), the implication is that deverbal nominals that realize verbal arguments also preserve the corresponding event structure of the base verb: their usually overt suffix triggers the categorial shift from a verbal structure into a nominal one. In Distributed Morphology (DM), for instance, Grimshaw's example (7-a), where *examination* realizes ArgStr, would receive a structure as in (7-b), where the suffix *-ation* nominalizes the base verb's event structure.

(7) a. [*The examination* ***of the patients***] *took a long time*.
b. [$_{DP}$ *the* [nominal structure [$_{nP}$-*ation* [verbal event structure [$_{vP}$[ROOT]]]]]]

In Borer's (2013) view, the existence of the overt suffix is crucial since it acts as a functor that maps verbal structure onto nominal one. In the absence of an overt suffix, she argues that ZeroNs involve no nominalizing functor. In her Exo-Skeletal Model, she represents the base verb and the ZeroN as roots that get categorially specified in the "categorial complement space" of a higher verbal or nominal extended projection such as T or D in (8-a), (8-b).

(8) a. [$_{T}$ [$_{C=V}$ √IMPORT]]
b. [$_{D}$ [$_{C=N}$ √IMPORT]]

Importantly, such a categorization can only apply to bare roots and would not be possible if there were some categorial functional structure. In that case, a category-changing functor like a suffix would be needed. In line with this approach, Borer brings the purported inability of ZeroNs to realize ArgStr as a decisive argument

in support of her analysis in (8-b). For the few "exceptions" of argument-realizing ZeroNs, as she calls them (e.g., (4-b)), Borer (2013: 331, fn. 13) admits the compromise of a phonologically null suffix, but without further details.

For our English-Italian comparison, we considered ZeroNs based on the verb classes that were best represented in the smaller Italian database (see Table 2). Except for verbs of motion, which are usually unergative, these classes mostly include verbs that show transitive readings. This is important for our purposes, as internal arguments are the least controversial in the debate on ArgStr in nominalizations. An *of*-phrase as in (3), (4) and (7-a) typically realizes the internal argument of a deverbal nominal, provided that contextual factors ensure an event reading of the ZeroN, which would exclude the possibility of the *of*-phrase to act as a nominal modifier. An example of a modifier is given for *upload* in (9-a), where the predication *is still available* indicates that *upload* refers to an object and *of the clip* is a modifier. By contrast, in (9-b), *the upload of the theme* receives an event interpretation from the predicate *timed out*, and *of the theme* then qualifies as an internal argument. Grimshaw (1990) and later literature discuss further tests to disambiguate between result entity and event readings, which we cannot review here but have been considered in the selection of the data in our dataset.

(9) a. ***A 2007 upload of the clip*** *from bluuue is still available on the site*. (COCA)
b. *After a while* ***the upload of the theme*** *timed out*. (COCA)

In contrast to internal arguments, the realization of external arguments has been more controversial: Grimshaw argues that they are always modifiers, Alexiadou (2001) and later work, as well as Borer (2013) take their cooccurrence with internal arguments to be a clear indicator of their true argumental status. For unergative verbs, more research is needed to determine whether the realization of their external arguments in nominalizations indeed represents verbal event structure or just nominal modification.

We focus here on internal argument realization. Table 2 offers an overview of: the total number of ZeroNs per verb class in the English and Italian databases (see column "Total"), the subset of those that allow an event reading (see (6-a)) following their dictionary senses (column "Event"), and the subset of those attested at least once with an internal argument in corpora (column "Internal argument").[1]

1 The two databases, including corpus examples with ArgStr, were collected by student researchers who were trained to consider a ZeroN as realizing ArgStr only if it preserved the ArgStr and the lexical meaning of the corresponding verbal construction: e.g., *your change of name* has the same meaning as *You changed your name*. The final versions were verified by the instructors.

Table 2: Internal argument realization in English and Italian ZeroNs.

Verbnet class	English ZeroNs			Italian ZeroNs		
	Total	Event	Internal argument	Total	Event	Internal argument
Verbs of Change of State	161	116	67 (58 %)	45	29	21 (72 %)
Verbs of Change of Possession	58	53	34 (64 %)	32	25	20 (87 %)
Verbs of Removing	66	58	31 (53 %)	31	26	23 (88 %)
(Image) Creation & Transformation	88	64	37 (58 %)	30	17	13 (76 %)
Verbs of Putting	79	53	31 (58 %)	25	18	8 (44 %)
Verbs of Motion	152	131	41 (31 %)	25	21	9 (43 %)

The potential to show an event reading is relevant, as only these instances realize verbal ArgStr. The percentage of internal argument realization is given with respect to the number of event readings, and we see that more than half of these realize internal arguments in most verb classes (see shaded slots). ZeroNs based on verbs of motion in English show fewer cases, but 31 % is a substantial portion, considering that these verbs are mostly unergative. For Italian, the numbers are small, so the percentage itself may not tell much, but the tendency is clear and can barely be argued to represent just exceptions, as Borer (2013) claims for English.

In (10) and (11) we illustrate the internal argument realization with a ZeroN for each verb class in English and Italian: (10-a)/(11-a) for verbs of change of state, (10-b)/(11-b) for verbs of change of possession, (10-c)/(11-c) for verbs of removing, (10-d)/(11-d) for verbs of (image) creation and transformation, (10-e)/(11-e) for verbs of putting, and (10-f)/(11-f) for verbs of motion. These data come from corpora but have additionally been checked with native speakers. Further ZeroNs attested with internal arguments in our collection are: *breakdown*, *reform*, *crash*, *decrease*, *degrade*, *accumulo* 'accumulation', *consumo* 'consumption', *modifica* 'modification' (change of state), *oversell*, *trade-in*, *find*, *regain*, *seize*, *affido* 'custody', *consegna* 'delivery', *traffico* 'trade' (change of possession), *erase*, *purge*, *rip-*

We counted in also examples of which we were not entirely certain, just to capture the full potential of these ZeroNs in natural corpora. Given the large amount of data, the English corpus examples have not been tested with native speakers, but the Italian ones were collected by native speakers. The databases were built as empirical resources to encourage empirically richer and more targeted studies that could develop further tests for complex tasks such as the non-trivial identification of ArgStr in deverbal nouns.

off, *remove*, *kidnap*, *rinuncia* 'renunciation', *sfratto* 'eviction', *squalifica* 'disqualification' (verbs of removing), *edit*, *makeover*, *replay*, *build*, *take-down*, *disegno* 'drawing', *firma* 'signature', *stampa* 'print' ((image) creation & transformation), *drop-out*, *dump*, *explant*, *spill*, *refill*, *ingorgo* 'obstruction', *posa* 'laying', *semina* 'sowing' (verbs of putting), and *float*, *rundown*, *walk*, *move*, *climb*, *guida* 'driving', *sorvolo* 'overflight', *trasloco* 'move' (verbs of motion). More examples can be found in the databases in Iordăchioaia and Melloni (2022).

(10) a. *a continuation of the* ***drain of capital*** *from the developing world* (COCA)
b. *our* ***surrender of freedom and property*** *under coercion and threat* (COCA)
c. *to continue their* ***plunder of South African resources*** (GloWbE)
d. *encouraging a rapid* ***buildout of renewable energy*** (GloWbE)
e. *the* ***spread of disease*** *by travelers* (COCA)
f. *organizing* [...] *safe* ***return of refugees*** *to the southern province of Serbia* (COCA)

(11) a. *il mancato* ***rinnovo del contratto*** *da parte di Mediaset*
the missed renew the.GEN contract by part of Mediaset
'the non-renewal of the contract by Mediaset'
b. *l'* ***accredito di un bonifico*** *da parte di terzi*
the credit of a bank.transfer by part of thirds
'the crediting of a bank transfer by a third party'
c. *la manovra di* ***scarico del carburante*** *da parte di questi velivoli*
the maneuver of discharge the.GEN fuel by part of these aircrafts
'the maneuver of fuel discharge by these aircrafts'
d. *fare ricerca sullo* ***sviluppo del sistema nervoso*** *negli embrioni di pollo*
do research on.the develop of.the system nervous in.the embryos of chicken
'doing research on the development of the nervous system in chicken embryos'
e. *Aggiungetene uno o due cucchiai durante l'****ammollo dei capi***
add one or two spoons during the.soaking of.the clothes
'add one or two tablespoons when soaking clothes'
f. *in caso di* ***sorpasso di un veicolo*** *molto lento*
in case of overtake of a vehicle very slow
'when overtaking a very slow vehicle'

In the database, the English corpus examples were collected from websites whose domain extensions indicate US, UK, Canadian, Australian and New Zealand origin but they have not been further tested with native speakers to ensure that all would be acceptable outside the context of the corpus. Should they be tested, the numbers may be lower, but what concerns us here is not as much the quantity, as the systematic existence of ZeroNs that potentially realize ArgStr, even if not all of them may do so.[2] From the overall numbers in Table 2 collected from our database and the examples in (10)–(11), we can conclude that a great proportion of the event-related ZeroNs realize ArgStr, which would require an analysis as in (7).[3] In view of Borer's argument that categorial shift must be introduced by a functor/a suffix, these results strongly support the need for a zero suffix to account for the morphologically unmarked deverbal nominals preserving verbal ArgStr. It is true that Borer's main claim is that not *all* eventive ZeroNs realize ArgStr, as confirmed by the percentages in Table 2, and she uses this as the basis for her rejecting the thesis of a zero suffix. While the empirical picture may be incompatible with Borer's model, nothing prevents zero from acting as an allomorph of the competing overt suffixes, possibly conditioned by factors such as etymology or lexical semantics, which would be implementable in a theory like DM (Embick 2010: ch. 3; cf. Section 6). A nominalizer need not always embed event structure to qualify as a derivational suffix.

4 Embedding of verbalizing suffixes

Let us now consider the interplay of zero nominalization and verbal morphology. One empirical fact that has played a crucial role in Borer's (2013: ch. 7) analysis is the inability of $Ø_N$ to attach to overt verbalizers like *-ize* and *-ify*, which nonetheless combine with overt suffixes such as *-(ic)ation* in (5) (see also *to verbalize* >

2 The focus of our study (and of the databases) is not quantitative but qualitative. For this reason, we did not collect or count all the attested corpus examples with internal arguments but just some illustrative examples (up to three in the database) to be able to tell whether the potential of realizing ArgStr is attested in the corpus or not. We hope, however, that, starting from our freely available databases, future studies targeted on subsets of the data can also undertake more systematic quantitative evaluations.

3 Not all "event" readings refer to the verbal process that also licenses ArgStr. Some are idiosyncratic readings about manner or sound (e.g., *her walk* as 'her way of walking'; *crack* as 'rifle-shot'), while others appear with light verbs (e.g., *bid* in *to make a bid*). This explains why we do not find ArgStr in all the event-like ZeroNs.

**the verbalize* vs. *verbalization*, or *to purify* > **the purify* vs. *purification*). This incompatibility has been taken as evidence for the lack of a verbal source in ZeroNs, which would be built upon roots rather than verbs (as in (8)).

A closer inspection of the interplay of overt verbalizers and nominalizing suffixes allows us to mitigate the import of this observation and its theoretical implications. First, $Ø_N$ is not peculiar in its selectional restrictions, as there are overt suffixes that also fail to combine with *-ize* and *-ify* in English: see *-al*, *-age*, *-ance*, *-ment* in Fabb (1988) and Plag (1999). Since these nominalizers do combine with – sometimes, even morphologically marked – verbal bases (e.g., ***en***-*light*-***en***$_V$-*ment*), the reasons for these restrictions must reside in other facts.

Second, similar constraints on zero morphology are observed in other Germanic and Romance languages (Don 2005; Rodrigues 2009; Fábregas 2014; Gaeta 2013). Rodrigues (2009: 103), for instance, argues that Portuguese $Ø_N$ attaches to native and non-erudite bases: "the verbal root must not contain morphological constituents phonologically classified as [+Latinate] and simultaneously prototypical of cultivated usage". This explains why the native suffix *-ej* can be input to ZeroNs as in (12-a), but the Latinate *-ific* in (12-b) cannot; only a SuffN is possible with the latter such as *mitifica**ção*** 'mythification' (see also Gaeta 2013 on German):

(12) a. *boca* 'mouth' > *boc*-***ej***-*ar* 'to yawn' > *boc*-***ej***-*o* 'yawn$_N$'
b. *mito* 'myth' > *mit*-***ific***-*ar* 'to mythify' > **mit**if**ica*/**mit**if**ique*/**mit**if**ico* 'mythify$_N$'

Don (2005) argues that the verbalizing $Ø_V$ suffix attaches to Germanic, but never to Romance stems, while Smith (1972) also observed that the English $Ø_N$ selects native Anglo-Saxon bases.

Third, coming to the English verbalizers *-ize*, *-ify*, and *-ate*, we may note that they are Latinate and specifically form SuffNs with the Latinate nominalizer *-(at)ion* (see (5)). Plag (1999) explains that these verbalizers impose selectional restrictions on the nominalizer they combine with, so that it is a restriction of the base rather than of the suffix.

Within this background, we checked the presence of verbal morphology in the English database of ZeroNs, which confirms the lack of ZeroNs containing the Latinate suffixes *-ize* and *-ify* but attests to the presence of 26 ZeroNs derived from *-ate*-verbs (e.g., *deviate*, *incubate*, *translocate*). However, their occurrence does not disprove the general ban on the combination with overt verbalizers: in fact, unlike *-ize* and *-ify*, *-ate* is unproductive, and such verbs are mostly formed by analogy with *-ation*-nominals (Plag 1999). Moreover, the database shows that *-ate*-Zero-Ns are quite different from other ZeroNs in typically denoting some result entity or patient, and never events. This casts doubt on their deverbal nature

and suggests that they may not be formed with $Ø_N$ but with the Latinate nominalizing suffix *-ate* (as in *acetate*, *episcopate*) by analogy with corresponding borrowings.

Even though this selectional restriction on $Ø_N$ is confirmed by our database, other data *do* attest the presence of a verbal source in ZeroNs. First, $Ø_N$ may attach to a zero-derived verb to form an eventive ZeroN. In a first step, the lexical nouns *taxi* and *guillotine* in (13-a) and (14-a) function as base nouns to derive the verbs *to taxi* and *to guillotine*. Once these verbs are formed, they enter a second zero derivation process as base verbs for the ZeroNs *taxi* and *guillotine* on an event reading illustrated in (13-b)–(14-b), which the original lexical nouns did not have.

(13) a. *taxi*$_N$ (vehicle) > *to taxi*-$Ø_V$ (of airplanes) > *taxi*-$Ø_V$-$Ø_N$ (act of taxiing)
b. Stow curtain *during taxi*, takeoff and landing!

(14) a. *guillotine*$_N$ (instrument) > *to guillotine*-$Ø_V$ > *guillotine*-$Ø_V$-$Ø_N$ (execution in wrestling)
b. A: Are there any famous match finishes with the guillotine that stand out to you?
B: One of the best guillotines I've ever seen, I'd have to say *Marcelo's guillotine of Jake Shields*. (NOW)

Second, $Ø_N$ may also attach to particle verbs with the overt *-en* verbalizer, as shown in (15), whereby the ZeroN also realizes ArgStr in (15-b) (see Iordăchioaia 2020). Considering that zero-derived and particle verbs represent the output of native Germanic morphological processes in English, this confirms the generalization about $Ø_N$'s selection of native/non-erudite bases.

(15) a. I throw all my fitteds [...] in the dryer every couple of months for *a soften up*
b. New towels were provided every day, as well as *a straighten up of the bed*

Third, ZeroNs can be built on verbs that are derived from other verbs by prefixation. Our database presents many recent prefixations with *de-* (e.g., *decoke*, *declutter*, *defreeze*), *dis-* (*disaffiliate*, *disconnect*, *disentail*), *un-* (*undelete*, *unlike*, *unpin*), and *re-* (*redial*, *regrind*, *re-read*, *re-run*, *rewrite*), which cannot be argued to have applied to nouns. Especially the prefix *re-*, which is very productive in verb formation, frequently appears in ZeroNs.

The existence of the ZeroNs illustrated above represents indisputable evidence that $Ø_N$ may attach to a morphological verb, and it would be empirically incorrect to state that ZeroNs in English are only formed from uncategorized roots,

when clear semantic and morphological evidence points to the presence of a verb in their makeup.

The exploration of our Italian database confirms the existence of etymological/morphological constraints along the lines of Portuguese. The overall picture is less definite in Italian, where we find three productive verbalizers, i.e., the native/uncultivated *-eggia*(*re*) and the Latinate *-izza*(*re*), *-ifica*(*re*), which can all be input to zero nominalization (Gaeta 2013). However, the non-erudite verbalizer *-eggiare* is often found in ZeroNs as in (16), while the erudite *-ificare* and *-izzare* are comparatively barely attested (Thornton 2004):

(16) *passo* 'step' > *pass-**eggi**-are* 'to walk' > *pass-**eggi**-o* 'walk$_N$'

Our database presents 10 ZeroNs derived from *-eggiare*-verbs and 3 from *-izzare*-verbs, of which only *util-**izz**-o* 'usage' is common (*smobilizzo* 'disinvestment' and *carbonizzo* 'carbonization' are infrequent technical terms). All these ZeroNs are marked by the inflectional masculine marker *-o*. An apparent exception is represented by a set of 7 feminine ZeroNs ending in *-ific-a* related to *-ificare* verbs. However, Thornton (2004: 518–20) observes that the corresponding SuffN with *-zione* is often attested earlier than the ZeroN in *-a*, and the two are synonyms, as in (17) (cf. Štichauer 2018 on some differences), which indicates that such ZeroNs may involve clipping of *-zione* nominals instead of derivations from *-ificare* verbs:[4]

(17) *bonificare*$_V$ 'reclaim (of land/swamp)' > *bonifica-zione*$_N$ > *bonifica*$_N$ 'reclamation'

Beyond these cases, the database contains other ZeroNs with overt verbal sources, especially prefixed verbs, like in English (e.g., *disgelo* < *dis-gelare* 'unfreeze', *rinvio* < *r*(*e*)*-inviare* 'postpone'), and parasynthetic verbs as in (18), i.e., denominal or deadjectival verbs obtained by adding a prefix (*ad-*/*in-*/*s-*) and a thematic vowel:

(18) *a*(*c*)*-credit-are* 'to credit' > *accredito* 'accreditation'
i(*m*)*-past-are* 'to knead' > *impasto* 'dough'
s-larg-are 'to widen' > *slargo* 'widening/open space'

To conclude, our empirical research on English and Italian suggests that the paucity of overt verbalizing suffixes in ZeroNs cannot be taken as evidence for the lack of a verbal source in their derivation. Both English and Italian ZeroNs contain forms of verbal morphology (i.e., suffixes, particles, prefixes, parasynthesis) and confirm that Ø$_N$ rather attaches to native/nativized overt verbalizers. The

4 In DM such truncated/clipped formations would be derived from the root and not from a vP.

observed constraints on ZeroNs seemingly originate in finer-grained (non-)native stratal conditions in each language, and the covert nature of their suffix does not prevent their analysis as derived from a morphological verb.

5 The semantics of ZeroNs

Morphosemantic opacity is another argument put forward in favor of a treatment of ZeroNs different from that of SuffNs. Both Grimshaw (1990) and Borer (2013) highlight the proneness of ZeroNs to express idiosyncratic readings and relate this to their lack of verbal event structure. Lexicalist approaches investigate the rich polysemy of zero derivations and often use it against the postulation of zero suffixes, especially in English denominal verbs (e.g., *to jail, to bundle*). For instance, Plag (1999: 220) argues that "the variety of meanings that can be expressed by zero affixation is so large that there should be no specific meaning attached to the process of zero derivation". Similarly, Lieber (2004) concludes that (denominal) conversion has a wider and less predictable polysemy compared to overtly affixed forms. She claims that "conversion is not a process of zero affixation, but rather a process of coinage or relisting: items from the nominal lexicon are simply transferred to the verbal lexicon with no formal change" (Lieber 2004: 180).

While Plag (1999) and Lieber (2004) focus on verbs, other scholars have also considered the semantics of ZeroNs and highlighted differences and commonalities with overt SuffNs. Manova and Dressler (2005: §3.4) compare the two in fusional languages (Bulgarian, Polish and German) and find ZeroNs to be systematically less productive, morphosemantically opaque, and prone to result/concrete interpretations; action meanings, they argue, show specialized semantics compared to the compositional SuffNs (see footnote 3). By contrast, Cetnarowska (1993: §3.6) concludes that English ZeroNs primarily denote actions, and their other sense extensions, while frequent and varied, overlap with those of SuffNs. Lieber (2016) also argues that ZeroNs and SuffNs are similar in English and proposes a unitary semantic account for both.

Indeed, polysemy and semantic drifts are not a peculiarity of ZeroNs and, as highlighted by Chomsky (1970) already, idiosyncrasy in interpretation is common to all derived nominals, independently of their covert or overt marking. It also underlies Grimshaw's distinction between the compositional complex event nominals and the idiosyncratic result nominals, whereby the latter comprise both ZeroNs and SuffNs (e.g., *assignment*, *examination* in their concrete interpretations). Therefore, the real question is whether ZeroNs instantiate peculiar senses or polysemy that the SuffNs do not show and whether they more often convey participant meanings compared to the event/action interpretation.

The scrutiny of our databases, which document the different senses of ZeroNs, allows a partial answer to this question, and the contrastive study of English and Italian unveils systematic correspondences between the two languages in terms of types of interpretation and their frequency. Consider the type and sense frequency for each verb class in Tables 3 and 4 (shaded cells highlight the interpretations that are most frequent).

Table 3: The semantics of English ZeroNs.

VerbNet class	ZNs Total	ZN interpretation				
		Event	Result State	Result Entity	Ag/Instr/Cause	Loc/Path
Change of State	161	116 (72 %)	47 (29 %)	96 (60 %)	36 (22 %)	16 (10 %)
Removing	66	58 (88 %)	9 (14 %)	33 (50 %)	32 (48 %)	5 (8 %)
Putting	79	53 (67 %)	13 (16 %)	**59 (75 %)**	21 (27 %)	11 (14 %)
Change of Possession	58	53 (91 %)	2 (3 %)	30 (52 %)	13 (22 %)	4 (7 %)
(Image) Creation & Transformation	88	64 (73 %)	14 (16 %)	**66 (75 %)**	27 (31 %)	7 (8 %)
Motion	152	131 (86 %)	21 (14 %)	67 (44 %)	62 (41 %)	28 (18 %)

Table 4: The semantics of Italian ZeroNs.

VerbNet class	ZNs Total	ZN interpretation				
		Event	Result State	Result Entity	Ag/Instr/Cause	Loc/Path
Change of State	45	29 (64 %)	7 (16 %)	19 (42 %)	12 (27 %)	9 (20 %)
Removing	31	26 (84 %)	8 (26 %)	5 (16 %)	7 (23 %)	5 (16 %)
Putting	25	18 (72 %)	2 (8 %)	12 (48 %)	12 (48 %)	5 (20 %)
Change of Possession	32	25 (78 %)	5 (16 %)	24 (75 %)	8 (25 %)	7 (22 %)
(Image) Creation & Transformation	30	17 (57 %)	1 (3 %)	**24 (80 %)**	10 (33 %)	2 (7 %)
Motion	25	21 (84 %)	1 (4 %)	8 (32 %)	5 (20 %)	5 (20 %)

Table 3 (English) shows that across the VerbNet classes considered the event meaning is most common, and only ZeroNs from verbs of putting and verbs of creation exhibit slightly higher percentages of result entity readings. This supports Cetnarowska's (1993: §3.6) conclusion for English, that ZeroNs express a core event meaning besides the less prototypical participant interpretations. Table 4 confirms this picture in Italian, where event interpretations are again most frequent, except for verbs of creation, which form ZeroNs with a higher number of result entity readings. This challenges Manova and Dressler's (2005) claim on the

relation between productivity and semantic transparency, since, although Italian zero nominalization is not particularly productive, it nonetheless replicates the patterns attested in English. For non-eventive readings, we again observe similar tendencies in the two languages: result entity is the most typical meaning of ZeroNs, followed by agent/instrument/cause senses. The least frequent is the location/path reading.

Let us now closely investigate the interpretative patterns exhibited by ZeroNs: Table 5 illustrates those that are most recurrent in the two databases and highlights the main tendencies in both languages with examples of ZeroNs from our representative VerbNet classes.

Table 5: Monosemy/polysemy patterns of ZeroNs in English and Italian.

Meaning(s)	VerbNet class	English ZeroNs	Italian ZeroNs
Event only	Change of State	*wither*	*rinnovo* 'renewal'
		defreeze	*disgelo* 'thaw(ing)'
	Removing	*kidnap*	*scippo* 'snatch'
		seize	*sloggio* 'dislodgement'
	Motion	*jog*	*volo* 'flight'
		walk-off	*sorpasso* 'overtake'
Result Entity only	Change of State	*cleave*	*grinza* 'crease'
		crumble	*brano* 'shred'
	Putting	*saturate*	*intonaco* 'plaster'
		onlay	*contorno* 'contour'
	(Image) Creation & Transformation	*construct*	*impasto* 'dough'
		roughout	*marchio* 'brand'
Event + Result Entity	Change of State	*melt*	*rammendo* 'mend'
		upload	*trapianto* 'transplant'
	Change of Possession	*relet*	*consegna* 'assignment'
		grab	*rimborso* 'reimbursment'
	(Image) Creation & Transformation	*mark-up*	*firma* 'signature'
		remake	*ricamo* 'embroidery'

First, as shown in the Event only section of Table 5, ZeroNs can be unambiguously eventive (En. *wither*, It. *rinnovo*): both Italian and English exhibit several cases especially with verbs of change of state, removing, and motion. Second, there are ZeroNs that only receive participant readings: the Result Entity only section reports several such examples (En. *construct*, It. *marchio*), which are especially common with verbs of change of state, putting, and creation, but other participants are attested as well. For instance, various Italian feminine ZeroNs in *-a* exclusively refer to instruments: e.g., *garza* 'gauze', *molla* 'spring', *stufa* 'stove'; see also *compress*, *fuse*, *catch-on*, among others, in English. Third, ZeroNs are of-

ten polysemous. The EVENT + RESULT ENTITY polysemy illustrated in the last section of Table 5 is the most frequent and particularly shows up with verbs of change of state, change of possession, and creation verbs. Further cases of polysemy attested in both languages include event+agent/instrument/cause (En. *turn-on*, *purge*, It. *appoggio* 'support', *traghetto* 'ferry'), event+(result) state (En. *burnout*, *hush*, It. *ritiro* 'retirement', *veglia* 'watch/wakefulness'), and event+location/path (En. *dive*, *climb*, It. *spaccio* 'trafficking, outlet', *posteggio* 'parking').

The lack of a comparable database of SuffNs prevents us from carrying out a direct comparison of the two patterns, which we aim to develop in the near future. However, our ZeroN database and previous research on SuffN semantics reveal a strong resemblance between the two processes in terms of types of interpretation, preferred meanings, and patterns of polysemy. As observed by Lieber (2016) for English and by Melloni (2006; 2011) for Italian, derived action nominals are hardly ever monosemic, and their polysemy cannot be simply reduced to the event+result entity cluster. This is especially true for the so called ATK suffixes (-ATion and Kin: *-ence*/*ance, -ment, -al*, etc.) and their Italian counterparts, *-mento*, *-zione*, *-tura*, which can be analyzed as allomorphs of the same abstract nominalizer (on ATK nominals, see Borer 2013). In many such derived nominals, the event meaning combines with other senses such as result entity/product (*construction*), result state (*annihilation*), instrument (*protection*), cause (*amusement*), and location (*exhibition*). These correspond to the polysemy patterns attested for ZeroNs in English and Italian, as discussed above.[5]

Furthermore, the analysis of ZeroNs per VerbNet classes allows us to observe interesting generalizations that seem to hold cross-linguistically: in both English and Italian, ZeroNs from verbs of motion and verbs of removing have higher rates of event-only meaning, while verbs of creation typically form ZeroNs that express an event+result entity polysemy or a result entity reading only. These shared tendencies indicate that verb semantics modulates the polysemy available to ZeroNs along the lines of previous research on SuffNs (Asher 1993; Pustejovsky 1995; Bisetto and Melloni 2007).

There are, however, also potential interpretative differences between ZeroNs and SuffNs that our analysis brings to light. First, some ZeroNs refer to agents, as with *cook* and It. *guida* 'guide', hence conveying the typical interpretation of the English suffix *-er* and the Italian *-tore*.[6] Agentive readings do appear with action

5 In a future study, we will specifically address the interpretative properties of ZeroNs and contrast them with those available to each of the overt nominalization types in English and Italian.

6 We take *guide* and *cook* to be ZeroNs (and not denominal verbs) because they establish an agent relationship with their base verbs, which is not a typical relation for denominal verbs (see Fernández Alcaina 2022 on verbs).

SuffNs but with a collective flavor and in combination with an event reading (and possibly other sense extensions such as location): see *administration*, *government* (Lieber 2016; Melloni 2011). Therefore, ZeroNs exhibit meaning options typically unavailable to action SuffNs. Second, there is a difference in the frequency of monosemic nominals with concrete readings: while our database shows that ZeroNs may lack an event reading and refer instead to a concrete object (e.g., result entity, instrument), it is currently unclear to what extent this may appear among SuffNs. Sense extension to concrete meanings is frequent with SuffNs, but their lack of an event reading is rather sporadic in comparison to ZeroNs: a rare example is It. *appartamento* 'apartment', where the actional meaning of the underlying verb *appartar*(*si*) 'withdraw' is unavailable.

In the next section we conjecture on the theoretical implications of the similarities and differences between ZeroNs and SuffNs and how their both compositional and idiosyncratic behavior could be modeled in linguistic theory.

6 Theoretical implications and conclusions

Most of the literature on nominalization has proposed different analyses for overt vs. covert derivations on the basis of the putative idiosyncratic properties of the latter at the morphological, syntactic, and semantic levels. As critically discussed here, ZeroNs have been claimed to lack argument structure, to show peculiar morphological restrictions and to express unpredictable meanings compared to SuffNs. This behavior has been construed as an argument against a zero suffix (following the overt analogue criterion), but also against the existence of a verbal source in the formation of ZeroNs (Grimshaw 1990; Borer 2013).

Our study aimed to test the validity of these claims about ZeroNs in a well-defined and systematically documented empirical domain for English and Italian. A careful inspection of our two databases partially confirmed some of these previous claims but also revealed a close resemblance between ZeroNs and SuffNs. These results are particularly strengthened by the fact that, despite belonging to different language families and showing different degrees of productivity in forming ZeroNs, the two languages present similar tendencies in the behavior of ZeroNs. On the one hand, we found that a sensible number of ZeroNs show ArgStr (Section 3), they can be derived from morphologically complex verbs but show selectional restrictions, which can also be found with SuffNs (Section 4), and they show monosemy and polysemy patterns that are available with SuffNs (Section 5). On the other hand, unlike what is known about SuffNs, not all ZeroNs realize ArgStr and many display participant meanings, which are not as available with action SuffNs but rather with participant SuffNs (e.g., with *-er*). The

source and the specifics of these differences remain to be addressed in a follow-up study.

The question that arises is how to theoretically model ZeroNs, given their similarity to SuffNs but also their somewhat idiosyncratic behavior. Most recently, Lieber (2016) emphasizes systematic correspondences between English ZeroNs and SuffNs in ArgStr realization and interpretation and offers a unitary analysis that covers both. In her Lexical Semantics Framework, Lieber proposes a double skeleton – made up of largely underspecified semantic functions and arguments – for event and referential/participant nominals, independently of the form of nominalization. Curiously enough, however, Lieber (2016) does not take this similarity to support a zero-derivation analysis for ZeroNs. She resorts to her former relisting analysis (Lieber 2004) instead. In her view, her "treating the semantics of verb to noun conversion as the subordination of a verbal skeleton to a nominal skeletal layer" does not imply the existence of a zero suffix, or of any other structural component (Lieber 2016: 112). She emphasizes, however, that ZeroNs are morphologically complex, like SuffNs, which to our mind best resonates with a zero-derivation account, at least in the absence of another worked out morphosyntactic analysis, which was beyond Lieber's (2016) focus.

Coming back to Borer's (2013) root-categorization analysis in (8), it successfully accounts for the behavior of ZeroNs that disallow ArgStr and/or show only participant readings; in the absence of an event meaning, no relation to a verb needs to be posited. Whatever meaning a ZeroN will develop will be determined by the encyclopedia residing with the root (Marantz 1997; Harley and Noyer 2000; Alexiadou 2001; Borer 2013). The same root underlies both the verb and the ZeroN, which are considered similarly complex, as in (8). However, Borer's analysis cannot account for those ZeroNs that systematically show event readings and ArgStr. While Borer minimalizes the empirical evidence on such cases labeling them exceptional, our English and Italian data show that for verb classes that typically include transitive verbs, about 50 % of their eventive ZeroNs realize ArgStr. If ArgStr comes from verbal event structure, as Borer (2013) also assumes, these ZeroNs must include such structure in their makeup of the kind shown in (7). But such a categorial shift from verbal to nominal structure requires a functor, which could only be a phonologically null suffix, otherwise rejected in Borer's system.[7]

Within this background, it seems to us that a framework that employs zero suffixes can most naturally account for the mixed behavior of ZeroNs (cf. Don

7 Borer's (2013: 331, fn. 13) claim that this suffix is phonologically active and blocks stress shift is dismissed in Iordăchioaia (2020), as many ZeroNs show both stress shift and ArgStr (e.g., *the constant réwrite of the past*).

2005 on verbs). As a separationist theory of morphology, which recognizes the independence between (phonological) form/spell-out and meaning/morphosyntax by dispensing with the one-to-one correspondence adopted (at least for derivational morphology) in Borer (2013), Distributed Morphology employs zero suffixes as possible spell-outs of an abstract nominalizer active in morphosyntax and semantics. This means that DM does not run into the problem of positing infinitely many lexical entries for different zero suffixes (see the introduction to the volume) since suffixes per se are just spell-outs in DM and have no lexical entries. As explained in Embick (2010: ch. 2), the phonological form of an abstract suffix will be spelled out by vocabulary insertion in close connection with the phonology of the corresponding roots and the morphosyntactic/semantic properties of the suffix. While for most roots, the nominalizing suffix *-ing* will spell out only a nominalizer attaching above a *v*P (see *the climbing* in (19-a)), $\emptyset_N$ may spell out both this nominalizer (when realizing ArgStr on an event reading), as in (19-a), and one that attaches to the root to yield the location reading of *the climb*, as in (19-b).

(19) a. $[_{DP}$ the ... $[_{nP}$ n [verbal structure $[_{vP}$ [√CLIMB]]]]]; where n ↔ *ing*/$\emptyset_N$ (event)

b. $[_{DP}$ the ... $[_{nP}$ n [√CLIMB]]]; where n ↔ $\emptyset_N$ (location)

In conclusion, our systematic empirical investigation of the behavior of ZeroNs in comparison with SuffNs from the perspective of the overt analogue criterion offers strong support for postulating a zero suffix in their formation as deverbal nominals. While ZeroNs may indeed present more idiosyncrasy than the typical SuffNs, a quantitative investigation of which is currently missing, we have shown that they also display regular morphosyntactic and semantic properties to such an extent that they cannot be considered mere exceptions, as claimed in Borer (2013). While theories such as Lieber's (2016) recognize these similarities in a unitary semantic analysis, it is yet unclear what implications this analysis has for the morphosyntactic make-up of ZeroNs. We showed how a theory like DM could account for these facts by means of zero suffixes, but it would be exciting to see further implementations of the similarity between ZeroNs and SuffNs by means of a zero suffix or without one.

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