

Is there a meaning hierarchy in verb-forming suffixation? Evidence from English and Modern Greek

Angeliki Efthymiou

This paper focuses on the semantics of Greek and English verb-forming suffixes. It will be illustrated that Modern Greek verb-forming suffixes exhibit more semantic categories than their English counterparts. Furthermore, it will be shown that not all semantic categories are equally possible for all Greek and English suffixes (cf. also Lieber 2004, 2005) and that certain semantic categories imply the presence of others. In addition, it will be argued that the semantics of verb-forming suffixes (in both languages under scrutiny) can offer evidence for proposing a Meaning Hierarchy, which predicts (a) that the order and availability of meanings of verb suffixation is not arbitrary, (b) that verbal suffixes share a core meaning, and (c) that some meanings (i.e. the performative, similitive, etc. meanings) lie outside the core meaning (i.e. a causative, ornative, locative frame) of verb-forming suffixes.*

1. Introduction

Greek and English verb-forming suffixes have been quite extensively studied, because of both their semantic and structural properties and the morphological restrictions on their use (cf. Beard 1995, Plag 1999, Lieber 2004 for English, and Giannakidou & Merchant 1999, Alexiadou & Anagnostopoulou 2004, Charitonidis 2011, Efthymiou 2011, 2013a, Efthymiou *et al.* 2012 for Greek). The wide range of polysemy of these suffixes has been of primary interest. In all these studies an effort is made to examine the extent to which they share a unitary core of meaning. Interestingly enough, although most morphologists generally agree that at the core of the semantic representation of these suffixes there is a causative frame (e.g. Plag, Lieber, Giannakidou & Merchant, Efthymiou,

* I would like to thank Prof. Ingo Plag, Prof. Pavol Štekauer and two anonymous reviewers for their helpful and constructive comments and suggestions that greatly contributed to improving the paper. I would also like to thank the Editors for their generous comments and support during the review process. Finally, I would like to thank Dr. Georgia Fragaki for discussing earlier drafts of this paper.

Charitonidis), Lieber (2004) assumes that some meanings (i.e. the performative and similitive meanings) lie outside the core meaning for the verb-forming suffixes, arising as sense extensions from that core. In this paper, both English and Modern Greek verbal suffixes will be explored within Lieber's (2004) semantic framework. It will be illustrated that Modern Greek verb-forming suffixes exhibit more semantic categories than their English counterparts¹. Furthermore, it will be shown that not all semantic categories are equally possible for all Greek and English suffixes (cf. also Lieber 2004, 2005 and Gottfurcht 2008) and that certain semantic categories imply the presence of others. In addition, it will be argued that the semantics of verb-forming suffixes in both languages can offer evidence for proposing the following Meaning Hierarchy: CAUSATIVE/RESULTATIVE, ORNATIVE, LOCATIVE>>INCHOATIVE>>PERFORMATIVE, SIMULATIVE or INSTRUMENTAL>>STATIVE-ESSIVE. More specifically, this implicational claim for the meaning hierarchy constrains the possible meanings of verb-forming suffixes as follows: the presence of any given meaning implies the existence of all meanings to the left. For example, if a verb-forming suffix is found with similitive, performative or instrumental meanings, then it will also express inchoative, causative, ornative or locative meanings. Finally, it will be suggested that this hierarchy predicts (a) that the order and availability of meanings of verb suffixation is not arbitrary, (b) that verbal suffixes share a core meaning, and (c) that some meanings (i.e. the performative, similitive, etc. meanings) lie outside the core meaning (i.e. a causative, ornative, locative frame) of the verb-forming suffixes, arising as sense extensions from that core.

The paper is organized as follows. The following section is dedicated to a brief overview of Lieber's lexical semantic model. Section 3 focuses on the meanings of the English suffixes under investigation. In section 4 I discuss issues concerning the description of the meaning of Modern Greek verbal suffixes. I also propose a meaning hierarchy for both English and Greek suffixes. Finally, section 5 summarizes the findings of the study.

2. Theoretical framework: Lieber's (2004, 2007) lexical semantic model

Drawing on insights from various semantic models such as Jackendoff (1990), Pustejovsky (1995), Szymanek (1988) and Wierzbicka (1996), Lieber (2004, 2007) has developed a decompositional system of lexical semantic representation which allows characterizing the meanings of both lexemes and affixes. More specifically, the lexical semantic representation of lexemes and affixes is composed of two parts, the

Semantic/Grammatical Skeleton and the Semantic/Pragmatic Body. Along the lines of Jackendoff's Lexical Conceptual Structures, the Skeleton is decompositional, hierarchically arranged and relatively rigid and formal. It only contains semantic information that is of relevance to syntax. As Lieber (2004) points out, the differences between Jackendoff's semantic system and the one that she proposes are (a) that her system is broadly cross-categorical, allowing the lexical semantic description at least of nouns, verbs and adjectives, and (b) that her semantic functions represent smaller atoms of meaning than Jackendoff's.

The other part of the semantic representation, the Semantic/Pragmatic Body is encyclopaedic, non-decompositional and only partially formalizable; it includes many of the aspects of meaning that Pustejovsky encodes in his Qualia Structure, such as information concerning shape, size or dimension, colour, orientation, purpose, etc. Aiming at describing the skeletal representation of lexemes and affixes, Lieber establishes seven semantic features:

- 1 [\pm material]: The presence of the feature [material] indicates the conceptual category of SUBSTANCES/THINGS/ESSENCES, the notional correspondence of nouns. The positive/negative value distinguishes concrete from abstract nouns respectively.
- 2 [\pm dynamic]: The presence of the feature [dynamic] signals the conceptual category of situations. The positive value corresponds to an EVENT or PROCESS, the negative value to a STATE.
- 3 [\pm IEPS]: This feature stands for 'Inferable Eventual Position or State'. [IEPS] adds a path component to the meaning. If it is present, it signals the addition of a path. The positive value implies a directed path, and the negative value a random or undirected path. If it is absent, a path meaning is irrelevant to the lexical item.
- 4 [\pm Loc]: The feature [Loc] stands for 'Location'. If the feature is absent, the notion of position or place is irrelevant. The presence of [Loc] indicates relevance of position or place in time or space for the given lexical item. The positive value asserts position or place, and the negative value signals lack or privation.
- 5 [\pm B]: This feature stands for 'Bounded'. [B] signals the relevance of intrinsic spatial or temporal boundaries, either in a SITUATION or SUBSTANCE/THING/ESSENCE. If the feature is absent, its boundaries are conceptually or linguistically irrelevant.
- 6 [\pm CI]: The feature [CI] stands for 'Composed of Individuals'. The positive value indicates that a lexical item is conceived of as being composed of separable similar units. The negative val-

ue denotes something which is spatially or temporally homogeneous or internally undifferentiated.

- 7 [\pm scalar]: This feature indicates the relevance of a range of values to a conceptual category. With respect to SUBSTANCES/THINGS/ESSENCES it signals the relevance of size or evaluation. With respect to SITUATIONS it signals the relevance of gradability. Those SITUATIONS for which a scale is impossible will be [-scalar].

The above-mentioned semantic features define functions that take arguments. Functions and their arguments are organized hierarchically, as shown in (1):

- (1) a. [F1 ([argument])]
b. [F2 ([argument], [F1 ([argument])])]

Both lexical bases and affixes have skeletons that consist of features that take one or more arguments. According to Lieber, nouns take at least one argument, the so-called 'R' argument,² which establishes referentiality in this class of lexemes (Williams 1981, Higginbotham 1985). (2) presents the skeletons of some typical SUBSTANCES/THINGS/ESSENCES:

- (2) a. *table* [+material ([])]
b. *author* [+material, dynamic ([], [])]

According to Lieber, the feature [dynamic] without [material] defines the class of situations, the notional equivalent of both verbs and adjectives. Both adjectives and stative verbs are characterized by the negative value of this feature; adjectives are differentiated from stative verbs by the presence of the feature [scalar] (cf. Lieber 2009: 81):

- (3) a. *love* [-dynamic ([], [])]
b. *red* [-dynamic, +scalar ([])]

On the other hand, simple activity verbs are characterized by the feature [dynamic]. The addition of the feature [IEPS] to [+dynamic] signals verbal meanings that involve change of state or change of path:

- (4) a. simple activity verb: *eat* [+dynamic ([], [])]
b. change of place: *descend* [+dynamic, +IEPS ([], [])]
c. manner of change: *run* [+dynamic, -IEPS ([])]

In this system, affixes are also characterized by an 'R' argument, which represents the highest argument of the semantic features in their skeleton:

3. Verbal derivation in English

English has four verb-forming suffixes (cf. Plag 1999, Lieber 2004, 2005). These are listed, along with examples, in (8):

- (8) a. *-ize*: *legalize, apologize, hospitalize, despotize*
 b. *-ify*: *purify, glorify, codify*
 c. *-en*: *blacken, darken*
 d. *-ate*: *fluorinate*

According to Plag (1999: 117), only *-ize* and *-ify* seem to be productive in Present-day English (see also Lieber 2004: 77).

As regards their semantics, the above-mentioned suffixes show a wide range of polysemy. Their meanings can be described as causative/resultative, ornative, locative, inchoative, simulative and performative, as seen in Table 1:³

Table 1. Meanings of English suffixed verbs.

VERB	GLOSS AND LABEL
<i>crystallize, purify, blacken</i>	'cause to become x/ make x' (causative/resultative)
<i>apologize, glorify, fluorinate</i>	'make x go to/in/on something' (ornative)
<i>hospitalize, codify</i>	'make something go to/in/on x (locative)
<i>oxidize, acidify</i>	'become x' (inchoative)
<i>despotize</i>	'do/act/make in the manner of x' (simulative)
<i>theorize, boozify</i>	'do x' (performative)

In particular, according to Plag (1999: 124-125), the semantics of *-ize* suffixation can be described as follows:

- (9) a. causative: *randomize*
 b. resultative: *peasantize*
 c. ornative: *patinize*
 d. inchoative: *aerosolize*
 e. locative: *hospitalize*
 f. performative: *anthropologize*
 g. simulative: *powellize*

Concerning the semantics of *-ify*, Plag (1999: 195-196) observes that, although the meanings expressed by verbs in *-ify* appear to be identical to the ones denoted by *-ize*, neologisms with inchoative meaning are rarely attested. Furthermore, he observes that there are no attested neologisms in *-ify* denoting performative or simulative meanings. Therefore, the semantics of *-ify* can be summarized as follows:

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- (10) a. causative: *aridify*
b. resultative: *trustify*
c. ornative: *youthify*
d. inchoative: *mucify*
e. locative: *tubify*
f. performative: –
g. similative: –

Turning to the semantics of *-ate* and *-en*, their meaning seems to be much more restricted than the meaning of *-ize* and *-ify*. According to Plag (1999: 205-219), productive *-ate* expresses only ornative and resultative meanings, whereas attested neologisms involving the suffix *-en* denote only a causative meaning (see examples in 11 and 12):

- (11) a. ornative: *fluorinate*
b. resultative: *gelate*
(12) causative: *crispen*

With regard to how the polysemy of these suffixes arises, Plag (1999: 137), adopting Jackendoff's (1990) framework, claims that the meanings of all *-ize* and *-ify* derivatives arise from a single Lexical Conceptual Structure (LCS):

- (13) LCS of *-ize* and *-ify* verbs (generalized)
CAUSE ([i, [GO ([Property, Thing]_{Theme/Base}; [TO [Property/Thing...]_{Base/Theme}]])])

The dashed line represents the optionality of this part of the LCS.⁴ In other words, Plag proposes that all derivatives share a core meaning represented by a single LCS and that GO can be interpreted not only as a change of position function, but also as a change-of-state function.

3.1. Lieber's analysis of English verb-forming suffixes

As pointed out by Lieber (2004: 80-81), Plag's analysis has the advantage of explaining how polysemy arises in causative, resultative, inchoative, ornative and locative *-ize* and *-ify* verbs, but does not work equally well for performative and similative classes. Accordingly, she proposes her own analysis, building on that of Plag (1999). More specifically, she proposes the skeleton in (14) for *-ize* and *-ify*:

- (14) *-ize, -ify*
[+dynamic ([volitional-i], [j])]; [+dynamic ([i], [+dynamic, +IEPS ([j], [+Loc])))]], <base>

Lieber's formalism has the advantage of treating Plag's causative and resultative classes in the same way. Moreover, according to Lieber (2004: 84), locatives can also receive the same analysis, except that in this case the Goal argument represents a final position, rather than a final state (see example 15). Furthermore, the inchoative interpretation is achieved when the first part of the affixal skeleton is eliminated (see example 16):

(15) *codify, hospitalize*

[+dynamic ([_{volitional-i}], [i])]_i; [+dynamic ([i], [+dynamic,
+IEPS ([j], [+Loc ([_k])]))], [+ material ([_k])]
-ify code
-ize hospital

(16) *solidify* (inchoative)

[+dynamic ([_{volitional-i}], [j])]_i; [+dynamic ([i], [+dynamic,
+IEPS ([j], [+Loc ([])]))], [+ material ([j])]

As regards the ornative meaning, Lieber assumes that it results from a less preferred indexing pattern:

(17) *anesthetize, glorify*

[+dynamic ([_{volitional-i}], [j])]_i; [+dynamic ([i], [+dynamic,
+IEPS ([j], [+Loc ([])]))], [+ material ([j])]
-ify glory
-ize anesthetic

Finally, in Lieber's (2004: 86-89) analysis, the performative and intransitive similitive cases arise from a process of sense extension. Examples of these cases are given in (18) and (19):

(18) *philosophize*

[+dynamic ([_{volitional}], [i]), [-material ([i])]
-ize extension philosophy

(19) *hooliganize*

[+dynamic ([_{volitional-i}], []), [+ material, dynamic ([i])]
-ize extension hooligan

As argued in Lieber (2004: 87), both similitives and performatives are based on the same extended skeleton, but they require a different kind of indexing.

3.2. Meaning Hierarchy of English verbal suffixes

Elaborating on Plag (1999) and Lieber (2004), the meanings of English verb-forming suffixes can be summarized in Table 2.

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Table 2. (Provisional) summary of semantic properties of English verb-forming suffixes⁵.

SUFFIXES				
<i>Meanings</i>	<i>-ize</i>	<i>-ify</i>	<i>-ate</i>	<i>-en</i>
Causative/resultative	Y	Y	Y	Y
Ornative	Y	Y	Y	
Inchoative	Y	Y		
Locative	Y	Y		
Performative	Y			
Similative	Y			

As can be seen in the table, the first two meanings are common in almost all suffixes, while the first one occurs with all. Furthermore, it can be observed that certain semantic categories imply the presence of others. In other words, the data in Table 2 seem to imply that the meanings expressed by English verbal suffixes can be ordered in the following hierarchy:⁶

(19) *Meaning Hierarchy of English Verb-forming suffixes*

CAUSATIVE/RESULTATIVE>>ORNATIVE>> INCHOATIVE>>LOCATIVE>>
PERFORMATIVE OR SIMILATIVE

This scale ranks causative meaning highest, followed by ornative, inchoative, locative, with performative and similative meanings at the bottom. It also predicts that if a verb-forming suffix is found with similative or performative features, then it will express causative or ornative meanings too. Interestingly enough, the ranking proposed in (19) is also in line with Lieber's treatment of performative and similative as sense extensions of the most robust patterns.

In general, there is a relation between the number of suffix meanings and productivity: the more productive a suffix is, the more meanings it exhibits (for discussion on the relation between the variety of suffix meanings and productivity, see e.g. Bauer 1983, Marle 1988, Rappaport & Levin 1992, Aronoff & Anshen 1998, Plag 1998, 1999). For example, *-ize*, which is the most productive suffix in English according to Plag (1999) and Lindsay & Aronoff (2013) can be found with six different meanings, i.e. the highest number of different meanings attested for verb-forming suffixes. On the other hand, the least productive suffixes (*-ate* and *-en*) are used only with two and one meaning respectively (see Table 2). This observation is also in line with Lieber's assumption that the more productive an existing suffix is, the more it is available for paradigmatic extension (Lieber 2004: 96).

Finally, it should be noted that *-ify*, although less productive than *-ize*, is overwhelmingly preferred in words with monosyllabic stems (e.g. *simpl-ify*, *cod-ify*, *pur-ify*). More specifically, as indicated in Lindsay & Aronoff (2013), while *-ize* is found to be more productive than *-ify* (a 5.0 ratio),⁷ overall, in monosyllabic stems *-ify* is favoured over *-ize* by a ratio of nearly 5:1. These findings suggest that *-ify* has developed ‘niche productivity’: being the less generally productive, *-ify* evolved a niche, i.e. a clearly defined phonological domain in monosyllabic stems (Lindsay 2012, Lindsay & Aronoff 2013).

4. Verbal derivation in Modern Greek

Modern Greek has eight well-known verb-forming suffixes (cf. e.g. Giannakidou & Merchant 1999, Alexiadou & Anagnostopoulou 2004, Ralli 2005, Charitonidis 2011, Efthymiou 2011, 2013a, Efthymiou *et al.* 2012). These are listed, along with examples, in (20):

- (20) a. *-ár(o)*: *zumáro* ‘to zoom’ (*zum* ‘zoom’)
b. *-én(o)*: *kondéno* ‘to shorten’ (*kondós* ‘short’)
c. *-év(o)*: *proedréro* ‘to chair/preside’ (*proédros* ‘president’)
d. *-ín(o)*: *oksíno* ‘to sharpen’ (*oksís* ‘sharp, acute’)
e. *-íz(o)*: *kaθarízo* ‘to clean’ (*kaθarós* ‘clean’)
f. *-(i)áz(o)*: *diplasiázo* ‘to double’ (*diplásios* ‘double’)
g. *-jáz(o)*: *ritiðjazo* ‘to wrinkle’ (*ritída* ‘wrinkle’)
h. *-ón(o)*: *vutiróno* ‘to butter’ (*vútiro* ‘butter’)

The above-mentioned Greek verb-forming suffixes generally differ in terms of morphological productivity, forming three main sets: (a) the very productive suffixes, *-ízo* and *-óno*, (b) the moderately productive suffixes, *-évo* and *-áro*, and (c) the least productive or unproductive suffixes, *-jazo*, *-(i)ázo*, *-éno* and *-ino* (for a discussion of the productivity of these affixes, see Efthymiou, Fragaki & Markos’s 2012 corpus study of 4,143,583 words). Moreover, as shown in Efthymiou *et al.* (2012), the two most productive suffixes, *-ízo* and *-óno*, are used in Greek in a more or less complementary way, since they show a different preference for meanings and text types (see also Table 4).⁸

Furthermore, as shown in Efthymiou’s (2011) study of lemmas in the REVERSE DICTIONARY OF MODERN GREEK, the above-mentioned suffixes show a wide variety of meanings (i.e. semantic categories in the sense of Plag 1998, 1999) such as causative, resultative, inchoative, ornative, locative, instrumental, performative, simulative, instrumental (cf. also Charitonidis 2011, Efthymiou *et al.* 2012, Efthymiou 2013a). Examples for these meanings are given in Table 3:⁹

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Table 3. Meanings of Modern Greek suffixed verbs.

VERB	BASE	GLOSS AND LABEL
<i>kaθarízo</i> ‘to clean’, <i>kondéno</i> ‘to shorten’	<i>kaθarós</i> ‘clean’, <i>kondós</i> ‘short’	‘cause to become x/ make x’ (causative/ resultative)
<i>alatízo</i> ‘to salt’, <i>vutiróno</i> ‘to butter’	<i>aláti</i> ‘salt’, <i>vútiro</i> ‘butter’	‘make x go to/in/on something’ (ornative)
<i>filacízo</i> ‘to jail’	<i>filacízo</i> ‘to jail’	‘make something go to/in/on x (locative)
<i>malakóno</i> ‘to soften’, <i>kondéno</i> ‘to shorten’	<i>malakós</i> ‘soft’, <i>kondós</i> ‘short’	‘become x’ (inchoative)
<i>ritiðjázó</i> ‘to wrinkle’	<i>ritída</i> ‘wrinkle’	‘become saturated by many (unwanted) x’ (inchoative-ornative)
<i>piðicízo</i> ‘to imitate ape’s behaviour’	<i>piðikos</i> ‘ape’	‘do/act/make in the manner of x’ (similative)
<i>xorévo</i> ‘to dance’, <i>zumáro</i> ‘to zoom’	<i>xorós</i> ‘dance’, <i>zum</i> ‘zoom’	‘do x’ (performative)
<i>proeðrévo</i> ‘to chair/ preside’	<i>proeðros</i> ‘president’	‘carry out the official activities of x for a certain period’ (stative-essive)
<i>vurtsízo</i> ‘to brush’	<i>vúrtsa</i> ‘brush’	‘use x’ (instrumental)

Although Modern Greek verb-forming suffixes share several meanings, they cannot be considered completely synonymous. As shown in Efthymiou (2011, 2013a)¹⁰ and Efthymiou *et al.* (2012), it seems that not all semantic categories are equally possible for all suffixes and that each suffix tends to develop a semantic category prototype possibly related to the frequency of the meanings expressed by the derivatives. Based on Efthymiou (2011) and Efthymiou *et al.* (2012), the meanings of these Modern Greek verb-forming processes are summarized in Table 4. In particular, Table 4 presents the meanings with which suffixes are employed in the formation of verbs in Greek and their frequency. Frequency here corresponds to type frequency, based on a study of verb derivatives in the REVERSE DICTIONARY OF MODERN GREEK (Efthymiou 2011). Frequent meanings (i.e. meanings that occupy more than two thirds of the total number of types) are noted by Y*, and the rest (i.e. medium frequency or rare meanings) are noted by Y. The absence of Y* (or Y) indicates the absence of any relevant forms. Ambiguous cases in which verbs could have more than one meaning, e.g. *neróno*, ‘add water into a liquid’ or ‘become like water’ (base: *neró* ‘water’), were counted as belonging to all relevant categories¹¹.

Table 4. (Provisional) summary of semantic properties of Modern Greek verb-forming suffixes.

SUFFIXES								
MEANINGS	-ízo	-jázo	-áro	-évo	-(i)ázo	-óno	-éno	-íno
Causative	Y	Y	Y	Y	Y	Y	Y	Y
Ornative	Y	Y*	Y	Y	Y	Y*	Y	Y
Inchoative	Y*	Y*	Y	Y*	Y	Y	Y	
Locative	Y	Y	Y	Y	Y	Y		
Performative	Y*	Y	Y*	Y	Y			
Instrumental	Y*	Y	Y	Y		Y		
Similative	Y*	Y			Y			
Stative/essive			Y	Y*				

As can be seen in the table, the first three meanings are common in almost all suffixes, while the first two occur with all. Furthermore, it can be observed that the meanings of *-éno* and *-íno* are more restricted than the meanings of all other suffixes and that for each morphological process some semantic types appear to be privileged or prohibited. Furthermore, it can be observed that certain semantic categories imply the presence of others. The data in table (4) seem to imply that the meanings of Greek verbal suffixes obey a hierarchical order. At this point, I will not analyze this hierarchy in detail; I will return to this issue in the next section, after exploring the meanings of the suffixes in the light of Lieber’s framework and proposing some modifications of my own previous semantic analysis.

4.1. *The semantics of Modern Greek suffixes revisited*

Given that all suffixes seem to share a common causative/resultative meaning, Efthymiou (2011), following Plag (1999), Lieber (2004) and Gottfurcht (2008), used the theory of lexical conceptual semantics developed by Jackendoff (1983, 1990) and proposed that all Modern Greek verb-forming affixation processes share the same underlying semantic structure, given in (21):

(21) [x BE y LOC z]¹²

However, as pointed out in Efthymiou (2013a), the LCS proposed in (21) does not satisfactorily account for some problematic issues, like for example the instrumental meanings and the difference between similative and essive/stative meanings (see also Charitonidis’s 2011 argumentation¹³ against a unified analysis for Modern Greek).¹⁴ In what follows, I will explore Modern Greek verbal suffixes within Lieber’s (2004, 2007)

theoretical framework, trying to shed some light on the problematic issue of their polysemy.

As pointed out by Charitonidis (2011), the single, bipartite structure which Lieber (2004) assumes for English verbal suffixes adequately represents the semantics of Greek verbal suffixes at the level of denotational meaning and can accommodate Greek data without difficulty. However, Lieber's analysis does not account for the fact that, for each Modern Greek suffix, some semantic types appear to be privileged or prohibited. For example, it does not allow for a convincing interpretation of the fact that *-ízo* is the only suffix in Modern Greek which productively forms verbs with a similitive meaning. Nor can it account for the fact that *-évo* is the only suffix that attaches to stage-level nouns, denoting offices of persons (i.e. nouns that denote temporary characteristics of their referents) in order to derive verbs with the meaning 'carry out the official activities of x for a certain period'. Furthermore, Lieber's structure cannot account for *-óno*'s preference for ornative meanings (for discussion see Efthymiou 2011, Efthymiou *et al.* 2012; see also Charitonidis 2011). Therefore, I would like to suggest that Modern Greek verb suffixes display variation in their skeletal characteristics.¹⁵ In the light of this, the lexical entry for the suffix *-ízo* can be suggested to be like (22):

(22) *-ízo*

Skeleton 1 (CAUSATIVE/RESULTATIVE, ORNATIVE, LOCATIVE, INCHOATIVE)
[+dynamic ([volitional-i], [j]); [+dynamic ([i], [+dynamic, +IEPS ([j], [+Loc]))], <base>]

Extended Skeleton 2 (SIMILATIVE, PERFORMATIVE)¹⁶

2a [+dynamic ([volitional-i], []), [+material, dynamic ([i])]

2b [+dynamic ([volitional], [i]), [-material ([i])]

Extended Skeleton 3 (INSTRUMENTAL)

[+dynamic ([volitional-i], [j], WITH [k]), [+material ([k])]¹⁷

Furthermore, Lieber's structure does not allow for an interpretation of the semantic diversity of Modern Greek suffixed verbs. Interestingly enough, the semantic diversity of Modern Greek verbal suffixes appears to be quite similar or comparable to that of English converted verbs (for details on the semantics of converted verbs see e.g. Plag 1999: 220-221, Lieber 2004: 90-91). For example, in Modern Greek, semantic categories such as instrumental and stative-essive are expressed by suffixation whereas in English the same categories are expressed by conversion: e.g. Gr. *vúrts-ízo* 'to brush' (*vúrtsa* 'brush'), *karf-óno* 'to nail' (*karfí* 'nail'), *proedr-évo* 'to chair/preside' (*próedros* 'president') vs. Eng. *to brush* (*brush*), *to nail* (*nail*), *to chair* (*chair*). Lieber assumes that conversion in English is productive, but not systematic, and that the only systematic way of forming new verbs in English is affixa-

tion (see Lieber 2004: 95; for discussion on the same subject, see also Clark & Clark 1979, Plag 1999). However, it is interesting that the (provisional) hierarchy of the meanings of Greek suffixes presented in Table 4 seems to imply that verbal suffixation is (along with prefixation) an active and systematic means of coining new verbs in Modern Greek. Given this, I would like to suggest that the least preferred meanings of the table can be seen as sense extensions of the most robust patterns.

Moreover, Lieber's framework does not seem to satisfactorily account for the register properties or the expressive parts of the meanings of suffixes, like for example those of the suffix *-jázo* (see Charitonidis 2012). As shown in Efthymiou (2011), (2013a,b), Efthymiou *et al.* (2012) and Charitonidis (2011), *-jázo* is not preferred in formal speech; it usually attaches to [-learned] bases denoting something negative, unpleasant or dangerous and derives mainly [-learned] words with negative connotations. Furthermore, as argued in Efthymiou (2013a), the pejorative meaning of the *-jázo* verbs, which is both selected and assigned by the suffix, reveals the interplay between the meaning of the base, the suffix and the intention of the speaker; the suffix selects the negative side of the meaning of the base, and the base is sensitive to the meaning of the suffix. It must further be pointed out that the negative connotation of the suffix is also related to its [-learned] phonetic shape (Efthymiou 2012, 2013a,b).¹⁸ Given the negative connotation of the suffix, Charitonidis (2011) proposes the integration of socio-expressive meaning into verb structures.

In the light of these facts, the lexical entry for the suffix *-jázo* can be suggested to be like (23):

- (23) *-jázo*
 (provisional) *Skeleton 1* (CAUSATIVE/RESULTATIVE, ORNATIVE, LOCATIVE, INCHOTIVE)¹⁹
 [{-evaluation},+dynamic ([volitional-i], [j])] [{-evaluation},+dynamic ([i], [+dynamic, +IEPS ([j], [+Loc])))] ,<base>
 (provisional extended) *Skeleton 2* (SIMILATIVE, PERFORMATIVE)
 [{-evaluation},+dynamic ([volitional-i], [])] [{-evaluation}, +material, dynamic ([i])]
 [{-evaluation},+dynamic ([-evaluation, volitional], [i])] [{-evaluation}, -material ([i])]
 (provisional extended) *Skeleton 3* (INSTRUMENTAL)
 [{-evaluation},+dynamic ([-evaluation, volitional-i], [j], WITH [k])] [+material ([k])]

A further problem relates to the so-called stative/essive or similitive meaning 'carry out the official activities of x for a certain period' (see Charitonidis 2011, Efthymiou 2011, Efthymiou *et al.* 2012). As men-

tioned in the previous section, this meaning is only exhibited by the suffix *-évo*. Although Charitonidis (2011) assumes a [-dynamic] feature for this suffix, I believe that cases like *pritanévo* ‘be a dean, act as a dean’ and *proedrévo* ‘to chair, to preside’ can be ambiguous, allowing both for a dynamic and a stative interpretation. In Lieber’s view, similar cases like *hostess*, which is a converted verb in English, are regarded as activity verbs (cf. Lieber 2004: 91, fn. 7).

In addition, it appears that these verbs do pass the imperative test—see the well-known example in (24), can occur as complements of ‘force’ (25) or occur with ‘successfully’ or ‘carefully’ (26):²⁰

- (24) *Diéri* *ce* *vasíleve*
 divide_{IMP.2SG} and rule_{IMP.2SG}
 ‘Divide and rule’

- (25) *O* *Próedros* *anagástice* *na* *proedréfsi* *dio*
 The President compel._{PASS.PFV.3SG} to chair_{PFV.3SG} two
foré se *éna* *sinédrio*
 times in a conference
 ‘The president was compelled to preside twice over a conference’

- (26) *I* *simetéxondes* *θα* *borún* *na* *proedrévun* *ton*
 The participants will be_able_{FUT.3SG} to chair_{3SG} the_{GEN}
sinandíseon *apotelesmatiká*
 meetings_{GEN} successfully
 ‘The participants will be able to chair the meetings successfully’

Furthermore, as argued by some scholars (cf. for example Olsen 1994, 1997), states are divided into states (+durative) and stage-level states (+telic, +durative) or, in other words, between non-dynamic non-delimited states and non-dynamic delimited states (for discussion see e.g. Husband 2010). Given that stative/essive *-évo* only combines with stage-level nouns, i.e. nouns that denote temporary characteristics, it follows that [-dynamic] verbs with *-évo* denote stage-level states. In the relevant literature, stage-level predicates are often considered to contain an extra variable in their denotation, which ranges over spatiotemporal locations (for discussion on this subject see e.g. Higginbotham 1985, Kratzer 1995, Maienborn 2007, Husband 2010). Accordingly, I propose that the structure of the stative/essive interpretation should also contain a [+loc] feature. On the basis of all of the above, I would like to suggest the following lexical entry for the suffix *-évo* (see example in 27):

(27) *-évo*

Skeleton 1 (CAUSATIVE/RESULTATIVE, ORNATIVE, LOCATIVE, INCHOATIVE)
[+dynamic ([volitional-i], [j]); [+dynamic ([i], [+dynamic, +IEPS ([j],
[+Loc])))]], <base>]

Extended Skeleton 2 (PERFORMATIVE)
[+dynamic ([volitional], [i]), [-material ([i])]]

Extended Skeleton 3 (STATIVE/ESSIVE)
[+/-dynamic ([volitional-i], [+Loc]), [+material, dynamic ([i])]]

Extended Skeleton 4 (INSTRUMENTAL)
[+dynamic ([volitional-i], [j], WITH [k]), [+material ([k])]]

In what follows I will present a revised version of the semantic properties of Modern Greek verb-forming suffixes given in Table 4, as well as a revised version of the Meaning Hierarchy of Modern Greek verbal suffixes.

4.2. *Meaning Hierarchy of Modern Greek verbal suffixes*

Elaborating on Efthymiou (2011), (2013a), Efthymiou *et al.* (2012) and Charitonidis (2011), I suggest that the meanings of Modern Greek verbal suffixes can be described as follows:

As seen in Table 5, the semantic description is not detailed enough for the purposes of this paper, since it does not contain the feature {-evaluation}. In order to avoid redundancy in the description, given that the denotational meanings of the suffixes *-ízo* and *-jázo* appear to be identical,²¹ with the exception of the feature {-evaluation}, I would like to tentatively propose that this feature can be inferred indirectly from the [-learned] phonetic shape of the suffix, as proposed in Efthymiou (2013a,b).

Accordingly, the meanings of each verb-forming suffix can be summarized in two (slightly different) ways (see Tables 6 and 7). In particular, the difference between the two tables is that in the latter some categories are conflated with others, according to the semantic analysis presented in the previous section:

Is there a meaning hierarchy in verb-forming suffixation?

Table 5. Meanings of Modern Greek suffixed verbs: revised version.

VERB	LABEL	LIEBER'S SKELETON
<i>καθαρίζο</i> 'to clean', <i>κονδένο</i> 'to shorten'	causative/ resultative	[+dynamic ([volitional-i], [j])];[+dynamic ([i], [+dynamic, +IEPS ([j], [+Loc]))],<base>]
<i>αλατίζο</i> 'to salt', <i>υυτιρόνο</i> 'to butter'	ornative	[+dynamic ([volitional-i], [j])];[+dynamic ([i], [+dynamic, +IEPS ([j], [+Loc]))],<base>]
<i>φιλacίζο</i> 'to jail'	locative	[+dynamic ([volitional-i], [j])];[+dynamic ([i], [+dynamic, +IEPS ([j], [+Loc]))],<base>]
<i>κονδένο</i> 'to shorten', <i>ριτιδjάζο</i> 'to wrinkle'	inchoative, inchoative- ornative	[+dynamic ([volitional-i], [j])];[+dynamic ([i], [+dynamic, +IEPS ([j], [+Loc]))],<base>]
<i>πιθicίζο</i> 'to imitate ape's behaviour'	similative	[+dynamic ([volitional-i], []), [+material, dynamic ([i])]]
<i>χορένο</i> 'to dance', <i>zumάρο</i> 'to zoom'	performative	[+dynamic ([volitional], [i]), [-material ([i])]]
<i>προεδρένο</i> 'to chair/ preside'	stative-essive	[+/-dynamic ([volitional-i], [loc]), [+material, dynamic ([i])]]
<i>υυρtsίζο</i> 'to brush'	instrumental	[+dynamic ([volitional-i], [j], WITH [k]), [+material ([k])]]

Table 6. (Revised) summary of semantic properties of Modern Greek verb-forming suffixes (extended version).²²

Meanings	SUFFIXES							
	-ίζο	-jάζο	-άρο	-ένο	-(i)άζο	-όνο	-ένο	-ίνο
Causative	Y	Y	Y	Y	Y	Y	Y	Y
Ornative	Y	Y	Y	Y	Y	Y	Y	Y
Inchoative	Y	Y	Y	Y	Y	Y	Y	
Locative	Y	Y	Y	Y	Y	Y		
Performative	Y	Y	Y	Y	Y			
Instrumental	Y	Y	Y	Y		Y		
Similative	Y	Y			Y			
Stative			Y	Y				

Table 7. (Revised) summary of semantic properties of Modern Greek verb-forming suffixes (reduced version with conflated categories).²³

SUFFIXES								
Meanings	-ízo	-jázo	-áro	-évo	-(i)ázo	-óno	-éno	-íno
Causative, ornative, locative	Y	Y	Y	Y	Y	Y	Y	Y
Inchoative	Y	Y	Y	Y	Y	Y	Y	
Performative, simulative	Y	Y	Y	Y	Y			
Instrumental	Y	Y	Y	Y		Y		
Stative			Y	Y				

As can be seen in Table 6, the data seem to imply the following hierarchy (see 28):

- (28) *Meaning Hierarchy of Modern Greek Verb-forming suffixes*
 CAUSATIVE/RESULTATIVE OR ORNATIVE>>INCHOATIVE>>LOCATIVE>>
 PERFORMATIVE OR INSTRUMENTAL>>SIMILATIVE OR STATIVE-ESSIVE

This scale ranks causative and ornative meanings highest, followed by inchoative and locative, performative and instrumental, with simulative and stative/essive meanings at the bottom. It also predicts that if a verb-forming suffix is found with simulative or stative meanings, then it will also express causative or ornative meanings. The ranking proposed in (28) is quite similar to that proposed for English in (10), with two exceptions: (a) the scale of English ranks causative highest, followed by ornative, and (b) the Greek scale contains more meanings than the English one. The hierarchy in (28) is also in line with Lieber’s treatment of performative and simulative as sense extensions of the most robust patterns. The hierarchy also accords with my proposal that instrumental and stative-essive should also be treated as sense extensions. Finally, it is interesting to note that according to the data of Table 6, the meanings of simulative and stative-essive are found in complementary distribution, an observation which will need to be further investigated in the future.

On the other hand, based on the data found in Table 7, one can propose the hierarchy in (29):

- (29) *Meaning Hierarchy of Modern Greek Verb-forming suffixes*
 CAUSATIVE/RESULTATIVE, ORNATIVE OR LOCATIVE>>INCHOATIVE>>
 PERFORMATIVE, SIMILATIVE OR INSTRUMENTAL>>STATIVE-ESSIVE

Is there a meaning hierarchy in verb-forming suffixation?

If we conflate some English categories with others, as in the case of Modern Greek (see Table 8), we arrive at a similar ranking (at least for the common categories): CAUSATIVE/RESULTATIVE, ORNATIVE OR LOCATIVE >>INCHOATIVE>>PERFORMATIVE OR SIMILATIVE.

Table 8. (Revised) summary of semantic properties of English verb-forming suffixes.²⁴

<i>Meanings</i>	SUFFIXES			
	<i>-ize</i>	<i>-ify</i>	<i>-ate</i>	<i>-en</i>
Causative, ornative, locative	Y	Y	Y	Y
Inchoative	Y	Y		
Performative	Y			
Similative	Y			

Therefore, the meaning hierarchy of both Modern Greek and English can be generalized as follows:

- (30) *Meaning Hierarchy of Verb-forming suffixes (generalized)*
 CAUSATIVE/RESULTATIVE, ORNATIVE OR LOCATIVE>>INCHOATIVE>>
 PERFORMATIVE, SIMILATIVE OR INSTRUMENTAL>>STATIVE-ESSIVE

In my view, what is interesting about this hierarchy is that it predicts (a) that the order and availability of the meanings of verb suffixation is not arbitrary, and (b) that the stative-essive, instrumental, performative and similative meanings are the most highly marked meanings of verbal suffixation. Furthermore, the hierarchy is in line with Plag’s (1999), Lieber’s (2004), Efthymiou’s (2011, 2013a) and Charitonidis’s (2011) proposal that verbal suffixes share a core meaning (i.e. a causative, locative, ornative frame). In addition, it shows that some meanings (i.e. the performative, similative meanings) lie outside the core meaning of verb-forming suffixes, arising as sense extensions from that core.

Correlating the meanings of Modern Greek suffixes (see Tables 6 and 7) with their productivity ranking, it can be observed that, as in English, there is a relation between the variety of suffix meanings and productivity: the more productive a suffix is, the more meanings it exhibits (cf. also 3.2). On the other hand, the least productive suffixes are used only with three or two meanings (Efthymiou *et al.* 2012). Given that these meanings belong to the core meaning (i.e. the less marked meanings) of verbal suffixation, it can be argued that the semantic behaviour of these suffixes corroborates the assumption found in the literature that there are unproductive processes that are nevertheless transparent (Plag 1999: 142).

Finally, it can be observed that less productive suffixes have started developing ‘niche productivity’ (in the sense of Lindsay & Aronoff 2013).

Two of these examples are *-jázo* and *-évo*: *-jázo* is constrained to a specific register, whereas *-évo* is the only Greek suffix that attaches to nouns denoting offices of persons in order to derive stative/essive verbs (see the previous section and Efthymiou 2011, 2013a, Efthymiou *et al.* 2012).

5. Summary and conclusions

This paper has focused on the semantics of Greek and English verb-forming suffixes. It has been demonstrated that Modern Greek verb-forming suffixes exhibit more semantic categories than their English counterparts and it has been proposed that they display variation in their skeletal characteristics. In addition, it was shown that not all semantic categories are equally possible for all Greek and English suffixes and that certain semantic categories imply the presence of others.

Moreover, it was argued that the meanings of both English and Greek verb-forming suffixes seem to obey an Implicational Meaning Hierarchy, which predicts that the order and availability of meanings of verb suffixation is not arbitrary and that verbal suffixes share a core meaning. Furthermore, the hierarchy seems to confirm Lieber's assumption that some meanings lie outside of the core meaning of verb-forming suffixes, arising as sense extensions from that core.

Finally, it was observed that there is a relation between the variety of suffix meanings and productivity, and that the data of this study can offer evidence for confirming Lindsay & Aronoff's hypothesis of 'niche productivity'.

The work developed here has important implications for the issue of suffixal polysemy, especially in the verbal domain. More specifically, it provides evidence that suffixal polysemy does not consist of an unordered set of meanings, but seems to have a hierarchical structure: CAUSATIVE/RESULTATIVE, ORNATIVE OR LOCATIVE >> INCHOATIVE >> PERFORMATIVE, SIMILATIVE OR INSTRUMENTAL >> STATIVE-ESSIVE. This structure is reflected not only in the frequency, but also in the availability of these meanings.

Another implication is that there seems to exist a natural pattern here, such that causative, ornative and locative meanings are more frequent than the meanings that appear in lower positions of the hierarchy. Finally, there are recurrent patterns of derivational polysemy which may be also found in other languages. Crucially, though, what merits further investigation is the cross-linguistic value of our claims. In other words, it remains to be investigated to what extent the hierarchy is language-specific or depends on the properties of the particular languages. Furthermore, it would be important to examine whether this hierarchy is

also reflected in diachrony (i.e. how meanings developed) and in language acquisition (i.e. how the meanings are acquired by children).

Address of the Author

Department of Primary Education, Democritus University of Thrace, Nea Hili, 68100 Alexandroupolis, Greece <aeftym@eled.duth.gr>

Notes

¹ At this point it should be noted that poly-semanticity of derivational processes is not limited to suffixes, as both English and Greek also have other verb-forming processes that exhibit semantic diversity, such as conversion and prefixation: e.g. Eng. *to salt* (*salt*), *to chair* (*chair*), *to jail* (*jail*), MGr. *αγαπό* ‘to love’ (*αγάπι*) ‘love’, *φιλοσόφω* ‘philosophize’ (*φιλόσοφος* ‘philosopher’) – Eng. *be-friend* (*friend*), *be-head* (*head*), Gr. *apo-kefal-ízo* ‘to decapitate’ (*kefáli* ‘head’), *apo-liθ-óno* ‘to petrify’ (*líthos* ‘stone’), *ek-θron-ízo* ‘dethrone’ (*θρόνος* ‘throne’), *eks-aθli-óno* ‘to impoverish’ (*áθlios* ‘miserable’). Furthermore, it should be clarified that in English, the semantic range exhibited by converted verbs is larger than those of affixed verbs (see Clark & Clark 1979, Aronoff 1980, Plag 1999, Lieber 2004).

² R stands for referentiality.

³ For the semantic description of the derived verbs I use the labels and glosses found in Plag (1999) and Lieber (2004).

⁴ Inchoative interpretations are achieved when the outer CAUSE function is not realized.

⁵ Attested meanings are noted by Y.

⁶ This proposal is inspired by the often-cited thematic hierarchy (cf. e.g. Fillmore 1968, Grimshaw 1990, Jackendoff 1990, Van Valin 1990). The thematic hierarchy is often used to encode prominence relations among a set of semantic notions and to explain the mapping between an ordered set of semantic roles and an ordered list of grammatical relations. Fillmore (1968) was the first to formulate a hierarchy of thematic roles (i.e. Agent > Instrument > Theme/Patient). Following his proposal, multiple types of thematic hierarchies have been proposed but, although there is general agreement that the agent role should be the highest ranking role, there is no consensus about the ordering of the rest of the roles. For discussion, see e.g. Grimshaw (1990), Jackendoff (1990), Van Valin (1990), Kiparsky (1997).

⁷ According to the same study, polysyllabic stems (e.g. *emphas-ize*, *hospital-ize*, *hooligan-ize*) favour *-ize*.

⁸ Two of the most frequent meanings of *-ízo* (i.e. the performative and simulative meanings) are not found with *-óno*, while the most frequent meaning of *-óno* (i.e. the ornative meaning) is moderately frequent for *-ízo* (see also see Table 4). Furthermore, *-ízo* is found to be more productive in fiction, while *-óno* in popularized non-fiction texts (Eftymiou *et al.* 2012).

⁹ For the semantic description of the derived verbs I use the labels and glosses found in Plag (1999) and Lieber (2004). The labels/glosses stative-essive ‘carry out the official activities of x’ and inchoative-ornative ‘be saturated/covered by many unwanted x’ were added in Eftymiou *et al.* (2012).

¹⁰ Eftymiou’s (2013) data are extracted from the *Reverse Dictionary of Modern*

Greek as well as from a corpus of Modern Greek schoolbooks.

¹¹ For discussion on the polysemy of denominal verbs, see e.g. Kiparsky (1997), Plag (1999), Lieber (2004).

¹² Following Gottfurcht (2008), it was assumed that in this structure the verb has three arguments (x, y, z) and makes use of the semantic primitives CAUSE, BE, LOC. LOC indicates an underspecified location between two arguments. Note that this formalism differs from the one used by Jackendoff (1983, 1990) although it uses some of the same labels.

¹³ Charitonidis (2011) adopts Lieber's semantic framework in order to give the semantic profile of the Greek verb-deriving suffixes *-íz(o)*, *-én(o)*, *-év(o)*, *-ón(o)*, *-(i)áz(o)*, and *-ín(o)*, with a special account of the ending *-áo/-ó*. More specifically, he intends to detect the interaction between suffixes and bases by means of a series of interviews which the author conducted in Greece with native speakers of Greek.

¹⁴ For discussion on the disadvantages of a unifying analysis, see also Roger's, Namer's, and Tribut's work on French affixed and converted verbs (cf. Roger 2003, Tribut 2010, Namer 2013).

¹⁵ This proposal is reminiscent of Lieber's account of *over-*; her analysis is based on the assumption that *over-* has a single skeleton and at least two variant bodies. For details, see Lieber (2004: 125-133). I believe that one could suggest that Modern Greek suffixes have also bodily characteristics, something which remains to be further examined.

¹⁶ As mentioned in the previous section, according to Lieber (2004: 87), both similatives and performatives are based on the same extended skeleton, but they require a different kind of indexing.

¹⁷ Furthermore, if we assume a skeleton hierarchy in the suffixes based on their meaning preferences, then we can arrive at a different ranking of the skeletons (or their variants).

¹⁸ The suffix follows the so-called glide formation (or synizesis) rule: [ia] is pronounced as one syllable, and the consonant of the base or [i] is palatalized. For discussion, see Efthymiou (2013b).

¹⁹ {-evaluation} is reminiscent of Charitonidis' (2011) {-evaluation} socio-expressive element. It differs from Lieber's feature [+scalar] in that it functions as an index of an emotional involvement of the speaker expressing pejorative meanings.

²⁰ It is generally assumed that stative verbs do not occur in the imperative (see e.g. Lieber 2004: 30). For discussion on diagnostic tests for stativity, see Dowty (1979), among others.

²¹ However, it should be noted that only *-ízo* is productive in forming similative meanings in contemporary Greek.

²² Attested meanings are noted by Y.

²³ Attested meanings are noted by Y.

²⁴ Attested meanings are noted by Y.

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