

A two-dimensional semantic analysis of falling in Modern Greek: A typological and corpus-based approach*

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Abstract. This paper investigates the semantic domain of FALLING in Modern Greek as it is reflected in its system of FALLING terms. Drawing from the frame-based methodology for lexical typology and based on a corpus-based analysis, it offers a description that covers two dimensions: an onomasiological and a semasiological. This two-dimensional analysis shows that the Modern Greek system should be classified as dominant, since the same lexeme, i.e. the Modern Greek equivalent of *fall*, is used to encode all four frames within this domain. It further reveals that the Modern Greek FALLING system, albeit dominant, gives space to other encoding strategies to emerge. As a matter of fact, 13 additional motion verbs can be used to describe the various situation types. However, these verbs are confined within the boundaries of each frame. The very fact that each verb belongs to only one frame supports indirectly the existence of the four different frames. The analysis also indicates that the use of the basic lexeme is ruled out only in a few cases that involve the motion of a substance out of a container under the effect of gravity (parameter of fluidity) as well as the collapse of a floor or of an ice layer. Additionally, the study establishes the prototypical sense of the basic lexeme and allows the identification of certain collocation patterns associated with it. Finally, it offers the opportunity to cluster the senses of this basic verb into groups on the basis of their distributional (dis)similarity. To provide visual representations of the results, the current paper uses semantic maps, whereby nodes stand for both frames and micro-frames, as well as cluster hierarchies displayed as a dendrogram. Overall, the paper contributes to the typological analysis of the expression of FALLING. It offers insights on how the whole domain is carved up by the FALLING terms in a particular language and its results add to the body of typological literature investigating this domain.

Keywords: semantics of falling; frame-based methodology; lexical typology; onomasiology; semasiology; corpus-based; behavioral profile; Modern Greek.

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Двусторонний семантический анализ поля падения в новогреческом языке: типологический и корпусный подход

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Аннотация. В статье рассматриваются принципы лексикализации семантического поля падения в новогреческом языке. Глаголы падения рассматриваются с двух точек зрения: ономазиологической (с опорой на фреймовую анкету, разработанную Московской лексико-типологической группой) и семасиологической (на основе корпусного анализа). Такое двустороннее исследование показывает, что: (а) греческая система глаголов падения является доминантной, поскольку выделяется лексема, используемая для описания всех фреймов поля; (б) имеется ряд лексем, конкурирующих с доминантной внутри каждого фрейма, не нарушая при этом границ между фреймами; (в) использование доминантной лексемы в зоне падения невозможно только в небольшом числе случаев, включающих ситуации перемещения субстанций из контейнера под воздействием силы тяжести, а также проваливание опорной поверхности (например, льда). Кроме того, анализ позволяет определить, какое значение доминантного глагола является для него прототипическим, выявить особенности сочетаемости доминантной лексемы и разбить ее значения на кластеры в зависимости от особенностей контекстов, в которых эти значения реализуются.

Ключевые слова: глаголы падения, фреймовый подход, лексическая типология, ономазиология, семасиология, новогреческий.

1. Introduction

This paper investigates the semantic domain of FALLING in Modern Greek (henceforth Greek) as it is reflected in its system of FALLING terms. By resorting to a variety of tools, namely dictionaries, corpora and dynamic visual stimuli, and by juxtaposing literature on lexical typology and corpus-based linguistics, it tries to (a) identify the strategy that structures the semantic domain of FALLING in Greek. The important question in this respect is whether there is a single dominant verb covering all situations in the

particular domain or there are two or more verbs; (b) provide an account of the semantics of the basic verb within the domain. To this end, the present study adopts both an onomasiological and a semasiological perspective (see Geeraerts, 2010). First, it lists all lexical items belonging to the domain of FALLING in Greek and shows which items can be used for which set of situations. In order to identify which expression matches which situation, the study uses a set of visual stimuli developed by the Moscow Lexical Typology Group. Second, it singles out the most important, i.e. the unmarked and most frequent (namely the one used in the majority of situations), verb in the domain and carries out a semasiological analysis. The method for this second analysis is dictionary- as well as corpus-based. As a result of performing such an analysis, not only direct, literal meanings — that refer to MOTION — but also figurative ones are taken into consideration. Although the semasiological part is not meant to be exhaustive, this two-dimensional analysis gives a semantically holistic view.

Specifically, the present study contributes to the typological analysis of the expression of FALLING. It offers insights on how the whole domain is carved up by the FALLING terms in a particular language and its results add to the body of typological literature investigating this domain (see [Reznikova, Vyrenkova 2015]; also the articles in this special issue). Given that languages demonstrate diversity in this domain, individual studies can shed light on the degree of this diversity. Additionally, the current paper employs a variety of methods including the use of visual recordings. However, implementing such tools as visual stimuli to elicit responses from native speakers suffers from a few shortcomings [Reznikova, Vyrenkova 2015]; [Rakhilina, Reznikova 2016]. What is important for our purposes is the fact that such tools are not appropriate for studying subjective experiences (e.g. mental activities). The semasiological step compensates for this shortcoming, as it takes into account semantic extensions of the FALLING meanings to other domains. Furthermore, the semasiological dimension provides quantitative information about the problem of prototypicality and allows the identification of certain collocation patterns associated with the basic FALLING verb in Greek. Finally, the semasiological analysis offers the opportunity to cluster the senses of this verb into groups on the basis of their distributional (dis)similarity.

The structure of the paper is as follows: *Section 2* provides the theoretical background with a brief overview of the frame-based methodology. *Section 3* gives the details about the different methodologies employed in the present paper. *Section 4* presents the results of the onomasiological analysis

and identifies the strategy that structures the semantic domain of FALLING in Greek. *Section 5* completes the onomasiological analysis with a semasiological one, which gives an account of the semantics of the basic FALLING verb in Greek. *Section 6* concludes.

2. Theoretical background

Drawing upon the frame-based methodology for lexical typology [Rakhilina, Reznikova 2014; 2016], I assume that a description of a semantic domain is only possible when one lists all frames relevant to this domain. In this context, frames are defined as sets of prototypical situations, as meaningful clusters of features, which are often closely intertwined. Frames are revealed by analyzing the sets of contexts in which they occur, which comes as a logical consequence of the basic premise of the approach that a lexeme's complete meaning is always contextual (see also Firth 1957; Apresjan 2000; among many others).

From the semantic point of view, within the general FALLING domain we may distinguish four main frames [Reznikova, Vyrenkova 2015]; [Rakhilina et al. 2019]:

- (a) falling from an elevated surface (Frame 1)
- (b) losing of vertical orientation (Frame 2)
- (c) detachment (Frame 3)
- (d) crashing down (Frame 4)

These frames can be thought of as *etic comparative concepts* (see [Haspelmath 2018: 87–88]), namely components of a comparative methodology that can be used for cross-linguistic generalizations. This is the kind of comparative concepts used, for example, in semantic map studies ([Haspelmath 2018]; on the notion of *comparative concepts*, see [Haspelmath 2010]; for an overview on semantic maps, see [Georgakopoulos, Polis 2018]; [Georgakopoulos 2019]).

All the aforementioned frames have a common semantic denominator. They indicate — by and large — the motion of an entity from a higher to a lower level, which is without control (and typically rapid).¹ An additional

¹ In Concepticon, the concept set FALL is defined as “to descend in free fall due to the effect of gravity” [List et al. 2018].

important feature is the fact that the entity in motion should not be in contact with the surface while motion is in progress [Reznikova, Vyrenkova 2015: 6].

Languages differ from one another as to which strategies they use to encode these frames. In general, there are three types of lexical systems found in the languages of the world: dominant, distributed, and binary systems [Maisak, Rakhilina 2007]; [Reznikova, Vyrenkova 2015]. Dominant systems can use one lexeme for all situations. Distributed systems use a different lexeme for each situation (or at least more than two). Finally, binary systems carve up the semantic domain in a different way, as two separate lexemes are used for the different situations. As far as the FALLING domain is concerned, Reznikova and Vyrenkova (2015) report that dominant systems prevail in their sample. Before proceeding to the analysis, in which the Greek FALLING system will be classified, I provide a detailed description of the methods used in the present paper and a brief sketch of the Greek verbal system.

3. Data and Methods

3.1. Introductory remarks

The onomasiological analysis of the FALLING domain in Greek involves two steps. First, I checked previous studies on Greek motion verbs (mainly [Antonopoulou 1987]; also [Bassea-Bezantakou 1992]) in order to identify those verbs fitting the definition of FALLING given in *Section 2*. Second, using the visual stimuli developed by the Moscow Lexical Typology Group at the Higher School of Economics, I matched these verbs to the different situations depicted in the clips. Note, however, that for the different situations some additional verbs were used, which did not appear in the initial list of verbs found in the relevant studies. Finally, as far as the semasiological analysis is concerned, I consulted two Greek monolingual dictionaries [IMT 1998]; [Babinotis 2002] as well as the Corpus of Greek Texts [Goutsos 2010].

3.2. Identification of FALLING terms

Antonopoulou (1987) provides taxonomies for the full set of Greek motion verbs. In these taxonomies, on the basis of certain criteria (e.g. unmarkedness), the most general verb in a set of verbs assumes the role of a taxonomic

head and the remaining verbs in the set appear as subordinate categories. In the taxonomy of the FALLING conceptual area, the inclusive term is the lexeme *péfto* ‘fall’. Three main subordinate categories for *péfto* are identified, which are distinguished according to (a) whether the moving entity has control or not over the motion (parameter of “cause”; cf. category 2 vs. category 1 respectively) and (b) whether the motion ends up into a liquid or not (parameter of “fluidity”; cf. category 3 vs. categories 1 and 2 respectively) [Antonopoulou 1987: 217]. Table 1 lists these lexemes classified in the three categories.

Table 1. Hyponyms of the basic Greek falling verb *péfto*
(based on [Antonopoulou 1987: 217])

Category 1: Downward motion due to gravity	Category 2: Fall on sb. with force	Category 3: Downward motion into liquid
<i>katapípto</i> ‘fall down’	<i>prospéfto</i> ‘get on one’s knees’	<i>vutáo</i> ‘dive’
<i>katrakiláo</i> ‘roll down’	<i>ríxnome</i> ‘throw oneself upon’	<i>kataðiome</i> ‘dive’
<i>kutruvaláo</i> ‘roll down’	<i>χimáo</i> ‘fall violently’	
<i>sorjázome</i> ‘fall flat on the ground’	<i>enskýpto</i> ‘charge’	
<i>katolisθéno</i> ‘slide down’	<i>ormáo</i> ‘dash, fall violently on’	
<i>gremízome</i> ‘fall down / to pieces’	<i>eformó</i> ‘dash, fall violently on’	
<i>kataréo</i> ‘collapse’	<i>epipípto</i> ‘dash, fall violently on’	
<i>tubáro</i> ‘fall upside down, overturn’	<i>xínome</i> ‘dash, fall violently on’	
<i>anatrépome</i> ‘fall upside down, overturn’		

Although it is true that all these hyponyms belong to the FALLING domain and that in almost all cases the inclusive term *péfto* can replace² — at least in some contexts— the subordinate term, not all lexemes listed here adhere to the definition given in *Section 2*. Specifically, all lexemes in the categories “Fall on sb. with force” and “Downward motion into liquid”

² For example, *kataðiome* ‘dive’, which cannot replace the general verb, is such an exception.

should be excluded, since they involve a self-moving Trajector,³ who has control over his/ her action and whose motion is intentional. In the category “Downward motion due to gravity”, the verbs *katrakiláo*, *kutruvaláo*, and *katolisθέno* are not considered further, because the moving Agent is in contact with the surface while motion is in progress. In addition, *tubáro* and *anatrépome* were disregarded, because the motion does not take place from a higher to a lower point and because their use is limited to a specific class of LMs, i.e. vehicles. In Table 1, the verbs that fit the FALLING definition are colored grey. Interestingly, these are exactly the items — with the exception of *katolisθέno* — that Antonopoulou (1987: 218) considers the closest to the general verb *péfto*.

Beyond the lexemes that Antonopoulou puts under the rubric of *péfto*, I also took into consideration items that appear in her general exhaustive list of Greek verbs of motion [Antonopoulou 1987: 326–331]. I checked the list for verbs that match the definition of FALLING adopted here. This process returned one additional verb, i.e. *A xínete*⁴ *se C* ‘A is poured/ spilled, flows to C’.

To sum up, the first step of the onomasiological procedure revealed six verbs that describe the uncontrolled, unintentional, and (typically) rapid movement of an entity from a higher to a lower point: *péfto* ‘fall’, *kata-pípto* ‘fall down’, *sorjázome* ‘fall flat on the ground’, *gremízome* ‘fall down/ to pieces’, *kataréo* ‘collapse’, and *A xínete* ‘A is poured/ spilled, flows’.

3.3. Video stimuli

The visual stimuli consist of a set of 23 video clips showing different types of FALLING.⁵ Table 2 presents the full list of the clips used (and catego-

³ Following [Langacker 2008: 70], I use the term Trajector (henceforth TR) to refer to the most prominent participant within a profiled relationship and the term Landmark (henceforth LM) to refer to the entity that receives secondary focus in the relationship. In the domain of localization, the TR is the entity perceived as being located, whereas the LM is the location with respect to which the TR is located.

⁴ Note that *A xínete se C* describes the unintentional motion, non-self propelled motion of an inanimate entity (e.g. of a liquid) and it thus contrasts with *xínome* ‘dash, fall violently on’, which refers to the controlled motion of an animate entity (although it is the same verb).

⁵ The different event types can be thought of as micro-frames in the sense of [Rakhilina, Reznikova 2016]. Micro-frames (a) are more specific than typical word meanings; (b) are often grouped similarly (across languages); and (c) are not expected to be expressed by a dedicated lexical unit [Rakhilina, Reznikova 2016: 107].

rizes these clips according to the frame they describe; see below). It should be noted that the stimuli appear in small capitals in order to distinguish them from the actual examples describing the different events. All FALLING events scenes involved different motion types which cover the four frames mentioned in *Section 2*: type A showed an entity falling from an elevated surface (event types 2, 4, 5, 6, 8, 9, 10, 11, 12, 14, 16, 20, 21). Type B showed an entity losing its vertical orientation (event types 7, 17, 19). Type C consisted of events in which an entity is getting detached from a LM (event types 1, 3, 13, 15, 18). Type D comprised events in which an entity falls down suddenly because of pressure or because of having no strength or support (event types 22, 23).

Table 2. Event types as represented in the video stimuli

EVENT TYPE	FRAME
THE RING FALLS OFF THE FINGER	Frame 3
THE RAIN FALLS	Frame 1
THE HAT FALLS FROM SOMEBODY'S HEAD	Frame 3
THE LEAVES FALL FROM THE TREE	Frame 1
THE BALL FALLS FROM ABOVE IN FRONT OF SOMEBODY'S FEET	Frame 1
THE BOTTLE FALLS AND THE LIQUID IS POURED	Frame 1
THE TREE FALLS DOWN	Frame 2
THE WALLET FALLS FROM THE BAG	Frame 1
THE WATER FALLS INTO THE SEA	Frame 1
A SUBSTANCE IS POURED OUT OF A SEALED BAG (AND TO THE GROUND)	Frame 1
THE APPLE FALLS ONTO THE HEAD OF A MAN (FROM A TREE)	Frame 1
THE PLANE FALLS TO THE SEA	Frame 1
THE ROPE FALLS OFF THE NAIL (IT IS DETACHED FROM ITS BASE)	Frame 3
THE CANDLE MELTS (AND PART OF IT FALLS DOWN)	Frame 1
THE MAN'S HAIR FALL	Frame 3
THE MAN FALLS FROM THE BRANCH	Frame 1
A SHOTS B AND B FALLS TO THE GROUND	Frame 2
(IT'S RAINING) PART OF A ROCK IS DETACHED FROM THE MOUNTAIN AND FALLS INTO THE SEA	Frame 3
A HITS B (A WOMAN) AND B FALLS TO THE GROUND	Frame 2
THE TABLE OVERTURNS AND THE GLASSES FALL TO THE SAND	Frame 1
THE CHICK FALLS FROM THE NEST	Frame 1
THE ICE LAYER COLLAPSES (AND THE GIRL FALLS INTO THE WATER)	Frame 4
THE BUILDING COLLAPSES (E.G. AFTER AN EARTHQUAKE)	Frame 4

Four native speakers (all linguists), who were aware of the goals of the study, provided descriptions for the whole set of the stimuli. The informants' responses showed variation with respect to style or with respect to the bulk of information they packaged in one sentence, but no variation was observed in the choice of the predicate(s) describing each event type, namely in the critical factor of the current study (see below in *Section 4*).

3.4. Corpus

The data for the corpus analysis of the prototypical FALLING verb in Greek, i.e. *péfto*, come from the freely available Corpus of Greek Texts (CGT; see [Goutsos 2010] for a detailed description; cf. www.sek.edu.gr). The Corpus includes ca. 30 million words, but the size of the corpus used in the current study is ca. 14,500,000, since I did not take into account all text types of CGT (text types included in the current study: *spoken mode*: public speech; *written mode*: academic texts, literature, news, literature, and opinion articles). All the instances of *péfto* were first retrieved from CGT in the form of a concordance and this process resulted in 2,806 extractions. Second, for practical reasons (given that the annotation involved a wide range of variables; see *Table 3*), I did not examine the whole dataset, but I selected a representative random sample which corresponded to the 20% of the total extractions, i.e. 561 tokens. The random sorting of the tokens was performed by using the random number generator formula “=rand()” in MS Excel 2016. Following the methodology of Behavioral Profiles (see [Hanks 1996]; [Divjak, Gries 2006]; [Gries 2006; 2010]; [Berez, Gries 2009]; [Gries, Divjak 2009]; [Divjak 2010]; [Janda, Lyashevskaya 2011]; [Jansegers et al. 2015]; among others), each token was coded for certain semantic, morphological, and syntactic properties. The resulting spreadsheet consisted of 561 rows of occurrences of the verb and 18 annotated variables. *Table 3* shows the variables (called ID tags after [Atkins 1987]) and their levels. Note that the coding schema included an additional variable, namely that of SENSE, which in fact is a paraphrase of *to fall's* meaning in the concordance line. The SENSE variable comprises 30 ID tag levels, which correspond to 30 different dictionary senses as identified in [IMT 1998] and [Babiniotis 2002]. The 561 tokens were categorized as belonging to one of these ID tag levels, i.e. senses. The ID tag levels of this variable are presented in *Section 5*.

Table 3. ID tags and their levels

Type of variable	Variable (ID tag)	ID tag level
Morphological	TENSE	non past, past
	MODE	indicative, subjunctive, imperative, gerund
	ASPECT	imperfective, perfective
	NUMBER OF TRAJECTOR	singular, plural
	NUMBER OF LANDMARK	singular, plural
Syntactic	SENTENCE TYPE	declarative, imperative, interrogative
	CLAUSE TYPE	main, dependent
	PRESENCE OF A PREDICATIVE NOUN OR ADJECTIVE	yes, no
	PRESENCE OF ADVERBIAL ADJUNCT	yes, no
	TYPE OF ADVERBIAL ADJUNCT	adverb, prepositional phrase
Semantic	USE	literal, non-literal
	TRAJECTOR	animate, inanimate
	LANDMARK	animate, inanimate
	INANIMATE TRAJECTOR	concrete, non concrete
	CONCRETE INANIMATE TRAJECTOR	body part, man-made thing, substance, group or organization, vegetal entity, physical entity, location, action, food
	TYPE OF LANDMARK	concrete, non concrete, representation (e.g. unit of measurement)
	SEMANTICS OF THE PP	source, goal, source-goal, other

The different morphological ID tag levels give some hints about the verbal system of Greek. In Greek, each verb consists of a stem and inflectional ending, e.g. *péft-o* ‘I fall/ I am falling’. In this example, the stem *péft-* encodes the main meaning of the verb, but the use of this stem also indicates that the verb is in the imperfective aspect. The ending *-o* tells us that the verb is in the first singular of a non past tense in active voice. In general, the Greek verb is inflected for person (1st, 2nd, 3rd), number (singular, plural), tense (non past, past), aspect (imperfective, perfective), voice (active, passive), and mood (indicative, subjunctive, imperative) (cf. [Holton et al. 2012: 129]). Specifically for the category of mood, it has to be noted that imperative

uses different verbal endings from indicative and subjunctive, while indicative and subjunctive are differentiated from each other with regard to the verbal particles which accompany the verb. For example, the subjunctive is expressed by the use of the particles *na* or *as* [Holton et al. 2012: 263–264].

After the detailed annotation, the next step was to convert *Table 3* into a co-occurrence table that indicates which sense co-occurs with each feature (ID tag level). This is illustrated in *Table 4*, which shows such cross-tabulations for three senses (for two ID tags). Note that the percentages in the ID tag levels should sum up to 1.

Table 4. Examples of Behavioral Profile vectors

Variable (ID tag)	ID tag level	dash	enterState	fail	...
trajector	animate	0.87	0.95	0.08	...
	inanimate	0.13	0.05	0.92	...
tense	non past	0.41	0.25	0.17	...
	past	0.59	0.75	0.83	...
...					...

In *Section 5*, this Table including the Behavioral Profile vectors will be evaluated through the Hierarchical Agglomerative Clustering analysis, which assists the process of finding communities in data (for an explanation of the method, see [Divjak, Gries 2006]; [Divjak, Fieller 2014]; [Robinson 2014]; [Levshina 2015]). The statistical analyses and graphs in *Section 5* were performed and created using the R statistical software package [R Core Team 2015].

4. Onomasiological dimension: The domain of FALLING in Greek

4.1. Introductory remarks

The first part of the analysis is devoted to the onomasiological dimension. In this part, the main goal is to identify the strategy that structures the semantic domain of FALLING in Greek. *Table 5* shows which verbs can be used in which event type, based on the descriptions of the four native speakers.

Table 5. Event types as represented in the video stimuli and the lexemes used by the informants

EVENT TYPE	VERBS USED
THE RING FALLS OFF THE FINGER	<i>péfto, févgo, ylistráo</i>
THE RAIN FALLS	<i>péfto</i>
THE HAT FALLS FROM SOMEBODY'S HEAD	<i>péfto, févgo</i>
THE LEAVES FALL FROM THE TREE	<i>péfto</i>
THE BALL FALLS FROM ABOVE IN FRONT OF SOMEBODY'S FEET	<i>péfto</i>
THE BOTTLE FALLS AND THE LIQUID IS POURED	<i>A xinete se C</i>
THE TREE FALLS DOWN	<i>péfto</i>
THE WALLET FALLS FROM THE BAG	<i>péfto</i>
THE WATER FALLS INTO THE SEA	<i>péfto, A xinete se C</i>
A SUBSTANCE IS POURED OUT OF A SEALED BAG (AND TO THE GROUND)	<i>A xinete se C, tréxo</i>
THE APPLE FALLS ONTO THE HEAD OF A MAN (FROM A TREE)	<i>péfto</i>
THE PLANE FALLS TO THE SEA	<i>péfto, katapípto</i>
THE ROPE FALLS OFF THE NAIL (IT IS DETACHED FROM ITS BASE)	<i>péfto, apokolóme, févgo, ksekoláo</i>
THE CANDLE MELTS (AND PART OF IT FALLS DOWN)	<i>stázo, péfto</i>
THE MAN'S HAIR FALL	<i>péfto, χáno</i>
THE MAN FALLS FROM THE BRANCH	<i>péfto</i>
A SHOTS B AND B FALLS TO THE GROUND	<i>péfto, sorjázome</i>
(IT'S RAINING) PART OF A ROCK IS DETACHED FROM THE MOUNTAIN AND FALLS INTO THE SEA	<i>péfto, apokolóme</i>
A HITS B (A WOMAN) AND B FALLS TO THE GROUND	<i>péfto, sorjázome</i>
THE TABLE OVERTURNS AND THE GLASSES FALL TO THE SAND	<i>péfto</i>
THE CHICK FALLS FROM THE NEST	<i>péfto</i>
THE ICE LAYER COLLAPSES (AND THE GIRL FALLS INTO THE WATER)	<i>kataréo</i>
THE BUILDING COLLAPSES (E.G. AFTER AN EARTHQUAKE)	<i>péfto, gremízome, kataréo, katakrimnízome</i>

The first observation based on the data reported in *Table 5* is that all six lexemes identified in the first step of the onomasiological process were used by the informants to describe the 23 event types. The tool used elicited, however, an additional eight verbs that are not included in the initial list (in *Section 3*): *ylistráo* 'slip', *févgo* 'leave', *χáno* 'lose', *katakrimnízome*

‘crumble, collapse’, *apokolóme* ‘become detached’, *ksekoláo* ‘become detached’, *stázo* ‘drip’, and *tréxo* ‘run’.

Most importantly, *Table 5* provides a direct answer to the question as to which strategy structures the semantic domain of FALLING in Greek. Given that the same lexeme, namely *péfto*, can be used to encode all four frames, the Greek system is classified as dominant. It is quite striking that this general verb is used in 20 out of the 23 event types, the only exceptions being when a substance is poured out of a container (event types 6, 10) and when the ice layer or a floor collapses (event type (22)). The usage of *péfto* in the four different frames is illustrated in the examples (1)–(4). The (a) parts in each example come from the native speakers’ responses,⁶ whereas the (b) or (c) parts are examples collected from the corpus sample under investigation that match as closely as possible the event types of *Table 5*.

(Frame 1; Event type 2)

- (1a) *Péfti vroxi*
 fall.3SG.PRS rain.NOM.SG.F
 ‘The rain falls’

(Frame 1; Event type 8)

- (1b) *Péfti apó tin tsépi tu i*
 fall.3SG.PRS from DEF.ACC.SG.F pocket.ACC.SG.F his.GEN DEF.NOM.SG.F
taftiótitá tu
 ID_card.NOM.SG.F his.GEN
 ‘His ID card falls from his pocket’ [CGT: WFBG10-0003]

(Frame 2; Event Type 7)

- (2a) *To dédro épese*
 DEF.NOM.SG.M tree.NOM.SG.N fall.3SG.PST
 ‘The tree fell down’

- (2b) *I bares tha péftun, i oðiyi*
 DEF.NOM.PL.F bar.NOM.PL.F fall.3PL.FUT DEF.NOM.PL.M driver.NOM.PL.M
tha stamatún
 stop.3PL.FUT
 ‘The bars will fall, the drivers will stop’ [CGT: WRPG16-9229]

⁶ In general, if there is no specific reference citing the source of the example, the example comes from the speakers’ responses.

- (Frame 3; Event Type 15)
- (3a) *Tu épesan ta maljá*
 him.GEN.CL fall.3PL.PST DEF.NOM.PL.N hair.NOM.PL.N
 ‘His hair fell’
- (Frame 3; Event Type 1)
- (3b) *To ðaxtiliði épese sti stérna*
 DEF.NOM.SG.N ring.NOM.SG.N fall.3SG.PST at:DEF.ACC.SG.F tank.ACC.SG.F
 ‘The ring fell in the tank’ [CGT: WABG13-0154]
- (Frame 4; Event Type 23)
- (4a) *To ktírio épese apó to sizmó*
 DEF.NOM.SG.N building.NOM.SG.N fall.3SG.PST from DEF.ACC.SG.M
 earthquake.ACC.SG.M
- (4b) [...] *se mia fási i polikatikía, épese*
 at INDEF.ACC.SG.F point.ACC.SG.F DEF.NOM.SG.F
 apartment_block.NOM.SG.F fall.3SG.PST
 ‘At some point, the apartment block collapsed’ (CGT: WFCG33-5001.txt)

Examples (1a) and (1b) describe the typical situation in which an entity (the rain and the ID card, respectively) falls from a surface that is located at a higher point than the entity in motion (in (1a), this source of motion remains unexpressed, whereas in (1b) the LM *bag* fills in the source slot). Similarly, examples (2a) and (2b) show a prototypical case of an entity losing its vertical orientation: a tree falls down after being cut (2a) and a toll bar falls in order to prevent vehicles from passing through (2b). The detachment frame is exemplified in (3a) and (3b), which describe the loss of hair from the head (3a) and the fall of a ring off the finger (3b). Finally, in examples (4a) and (4b) *péfto* is used to refer to the collapse of a building.

Fig. 1 visualizes the frames encoded by *péfto*. This representation is akin to semantic maps, which comprise nodes standing for meanings (frames in our case). However, the representation in *Fig. 1* differs from a typical (graph-based) semantic map in that there are no edges connecting the nodes and in that the arrangement of frames is not meaningful. The arrangement of the frames is arbitrary, as it is not the result of cross-linguistic comparison (cf. [Anderson 1982]; [Haspelmath 2003: 216–217]). Although one can build a preliminary semantic map for a given domain based on data from one

language, which will later be tested against cross-linguistic data, there are certain conditions under which this is possible: (a) there should be different lexemes encoding different senses in the domain and (b) these lexemes should exhibit polysemy within this domain. Both conditions should be satisfied. It is not possible to build such a map for the FALLING domain in Greek, because, although 14 motion verbs are used to describe the different event types, 13 out of 14 verbs do not transcend the boundaries of the frame in which each of them is attested. As a matter of fact, *gremízome*, *kataréο*, and *katakrimnízome* were found only in the ‘crashing down’ frame; *apokolóme*, *ksekoláo*, *févgo*, *ylistráo*, and *χáno* were used only in the ‘detachment’ frame; *sorjázome* was used only in the ‘losing of vertical orientation’ frame; and *xínete*, *tréχο*, *ríχno*, *katapípto*, and *stázi* were attested only in the ‘falling from an elevated surface’ frame. The very fact that each verb belongs to only one frame supports indirectly the existence of the four different frames. The only verb that exhibits polysemy within the FALLING domain is the general verb *péfto*, which however, as already pointed out, covers all frames. Thus, there is no principled way to decide on a certain configuration by relying on this verb’s polysemy.

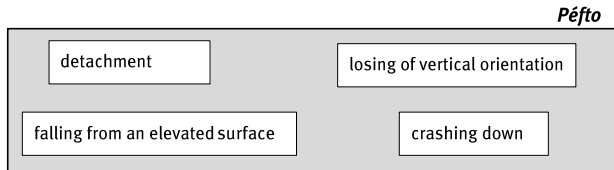


Figure 1. FALLING system in Greek: dominant/ The boundaries of *péfto*

In the following, I discuss mainly those cases in which a particular situation is lexicalized through a specialized lexeme as well as those instances in which along with the dominant verb alternative lexemes are also available. This discussion is structured on the basis of the four different frames.

4.2. The ‘falling from an elevated surface’ frame

In this frame, the dominant verb *péfto* is accessible in 11 out of the 13 event types. In the two situations in which this general verb is not available, the relevant property leading to the lexical opposition seems to be that of fluidity (a concept that refers to ‘powders, such as flour, and liquids’ [Reznikova, Vyrenkova 2015]). When the event involves (a) a container (LM), (b) a contained substance in liquid or solid form (TR), and

(c) a motion of the substance out of the container under the effect of gravity, then the verb *xínete* ‘is poured/ spilled, flows’ is normally used. In such cases, the ‘type of object’ moving, i.e. the substance, is profiled. Consider (5)–(6), in which the use of the dominant *péfto* is ruled out.

(Frame 1; Event type 6)

- (5a) *To bukáli épese ke to néro xíthike*
 DEF.NOM.SG.N bottle.NOM.SG.N fall.3SG.PST and DEF.NOM.SG.N
 water.NOM.SG.N pour.3SG.AOR.PASS

‘The bottle fell and the water flowed out’

- (5b) *alá kápjos fónakse o kafés xínete*
 but someone.NOM.SG.M shout.3SG.PST DEF.NOM.SG.M coffee.NOM.SG.M
 pour.3SG.PRS.PASS

‘But someone shouted that the coffee is boiling over’ [GCT: WFBG09-0001]

(Frame 1; Event type 10)

- (6) *Éna ilikó xínete apó ti sakúla*
 INDEF.NOM.SG.N substance.NOM.SG.N pour.3SG.PRS.PASS from
 DEF.ACC.SG.F bag.ACC.SG.F

‘A substance is poured out of the bag’

In some instances of fluidic motion, the dominant verb is also possible. This is illustrated in (7) and (8a), which describe the same situation but in a different way through the use of different verbs (respectively *xínete* and *péfti*). The different verbs provide an alternative way of framing the situation. *Xínete* evokes the frame of (Fluidic motion], whereas *péfto* evokes the frame of (Falling from an elevated surface). The latter imposes an interpretation in which both before and after the event the subject is in loose, unrestricted, uncontained form. Example (8b) from the GCT shows another situation in which the dominant verb can be employed to refer to fluidic motion.

(Frame 1; Event type 9)

- (7) *To neró xínete sti thálasa*
 DEF.NOM.SG.N water.NOM.SG.N pour.3SG.PRS.PASS at:DEF.ACC.SG.F
 sea.ACC.SG.F

‘The water is poured (in)to the sea’

(8a) *To* *neró* *péfti* *sti* *thálasa*
 DEF.NOM.SG.N water.NOM.SG.N fall.3SG.PRS at:DEF.ACC.SG.F sea.ACC.SG.F
 ‘The water falls (in)to the sea’

(8b) *To* *píra* *ke* *évala* *ta* *chéria*
 CL.ACC.N take.1SG.PST and put.1SG.PST DEF.ACC.PL.N hand.ACC.PL.N
mu *káto* *apó* *to* *neró,* *pu* *arhiká*
 my.GEN under from DEF.ACC.SG.N water.ACC.SG.N REL initially
épefte *kókin-o* *san* *éma* *stin*
 fall.3SG.PST red-NOM.SG.N like blood.NOM.SG.F at:DEF.ACC.SG.F
porceláni *tu* *niptíra*
 porcelain.ACC.SG.F DEF.GEN.SG.M washbasin.GEN.SG.M
 ‘I took it and put my hands under water, which initially was falling
 red like blood to the porcelain of the sink’ [GCT: WFBG08-500]

The lexical opposition between *péfto* and *xínete* as a result of the parameter of fluidity poses a problem when it comes to the representation of the boundaries of the lexemes in semantic space. Specifically, a representation which would include the nuance ‘substance falls out of a container’ within the boundaries of *péfto* would have not been accurate. Thus, although the nodes on a map should be frames and not micro-frames [Rakhilina, Reznikova 2016: 107], Fig. 2 includes a (non exhaustive) list of the micro-frames belonging to the frame ‘falling from an elevated surface’. In doing so, the difference between the two lexemes becomes apparent. The lexeme *xínete* encodes the three micro-frames ‘the water falls into the sea’, ‘the bottle falls

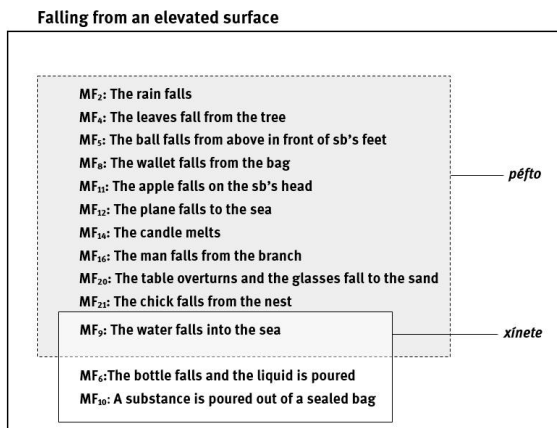


Figure 2. A micro-semantic map of the ‘falling from an elevated surface’ frame. The opposition between *péfto* and *xínete* (FALLING domain in Greek)

and the liquid is poured' and 'a substance is poured out of a sealed bag', whereas *péfto* encodes only the micro-frame 'the water falls into the sea'.

Finally, in the context of falling from a great height (thus, when the relevant parameter is the source of motion) and when great speed is involved, the specialized verb *katapípto*⁷ can substitute for *péfto* [cf. Reznikova, Vyrenkova 2015]. Note that *katapípto* is highly marked for restricted use and high register. In addition, it is attested mostly in the past and in perfective aspect. Consider examples (9) and (10).

(Frame 1; Event type 12)

- (9) *To* *aeropláno* *épepe* *sti* *thálasa*
 DEF.NOM.SG.N plane.NOM.SG.N fall.3SG.PST at:DEF.ACC.SG.F sea.ACC.SG.F
 'The plane fell into the sea'

- (10) *To* *aeropláno* *kat-épepe* *sti*
 DEF.NOM.SG.N plane.NOM.SG.N down-fall.3SG.PST at:DEF.ACC.SG.F
thálasa
 sea.ACC.SG.F
 'The plane plummeted in the sea'

4.3. The 'losing of vertical orientation' frame

In this frame, the only relevant parameter that blocks the use of a verb and allows the use of another is that of Animacy. If the TR is inanimate, only *péfto* is possible (see examples (2a) and (2b)), but when the TR is animate both *péfto* and *sorjázome*⁸ 'fall flat on the ground' can be used. This is illustrated in (11) and (12).

(Frame 2; event type 17)

- (11) *Ton* *pirovólise* *ke* *épepe* *sto*
 him.ACC.CL shoot.3SG.PST and fall.3SG.PST at:DEF.ACC.SG.N
édafos
 ground.ACC.SG.N
 'He shot him and he fell to the ground'

⁷ This verb is inherited from Ancient Greek (it is attested already in Homer). It consists of the prefix *katá-*, which refers to motion downwards, and the verb *pípto*, which in Ancient Greek denoted the motion from a higher to a lower point (the Ancient Greek form is *píptō*). In Modern Greek, the form *pípto* is found only in stereotypical expressions.

⁸ The verb is etymologically related to the ancient Greek noun *sōrós* 'heap'.

- (12) *Ton pirovólise ke sorjástike sto*
 him.ACC.CL shoot.3SG.PST and collapse.3SG.PST.PASS at:DEF.ACC.SG.F
édafos
 ground.ACC.SG.N

‘He shot him and he fell to the ground [lit. he collapsed to the ground]’⁹

4.4. The ‘detachment’ frame

The falling down of TRs that are tightly attached to a LM is encoded by means of the general FALLING verb, as in (13)–(17).

- (Frame 3; event type 1)**
 (13) *Tu épese to ðaxtilíði*
 him.GEN.CL fall.3SG.PST DEF.NOM.SG.N ring.NOM.SG.N
 Lit. ‘The ring *fell* from him’

- (Frame 3; event type 3)**
 (14) *Tu épese to kapélo*
 him.GEN.CL fall.3SG.PST DEF.NOM.SG.N hat.NOM.SG.N
 Lit. ‘The hat *fell* from him’

- (Frame 3; event type 13)**
 (15) *To sxini épese apó ti*
 DEF.NOM.SG.N rope.NOM.SG.N fall.3SG.PST from DEF.ACC.SG.F
vási tu
 base.ACC.SG.F POSS.GEN
 ‘The rope fell from its base’

- (Frame 3; event type 15)**
 (16) *Tu épesan ta maljá*
 him.GEN.CL fall.3PL.PST DEF.NOM.PL.N hair.NOM.PL.N
 ‘His hair fell’

- (Frame 3; event type 18)**
 (17) *O vráxos épese sti thálasa*
 DEF.NOM.SG.M rock.NOM.SG.M fall.3SG.PST at:DEF.ACC.SG.F sea.ACC.SG.F
 ‘The rock fell into the sea’

⁹ Cf. the unacceptable sentence **To ðédro sorjástike sto édafos* (lit. ‘The tree collapsed to the ground’).

It is worth noting that all situations in this frame allow also for different construals. Specifically, instead of being construed as motion events that include a TR performing a downward motion as a result of a detachment, these situations can be conceptualized as genuine processes of detachment, in which the downward motion remains in the background. If speakers adopt such a perspective, then they may pick lexical units belonging to domains that foreground the source of motion, such as *slip*, *leave*, *detach* (the Greek lexemes: *apokolóme*, *ksekoláo*, *féngo*, and *ylistráo*). Some of these units are exemplified in (18)–(20).

(Frame 3; event type 1)

- (18) *Tis ylistrise to ðaxtilíði*
 her.GEN.CL slip.3SG.PST DEF.NOM.SG.N ring.NOM.SG.N
 ‘The ring slipped off her (i.e. off her finger)’

(Frame 3; event type 3)

- (19) *Tu éfiye to kapélo*
 him.GEN.CL leave.3SG.PST DEF.NOM.SG.N hat.NOM.SG.N
 ‘His hat fell off’ (Lit. The hat left from him)

(Frame 3; event type 18)

- (20) *O vráxos apokolíthike*
 DEF.NOM.SG.M rock.NOM.SG.M detach.3SG.PST.PASS
 ‘The rock was detached’

Fig. 3 zooms in the ‘detachment’ frame. It visualizes its micro-frames and shows the different situations in which each verb can be used.

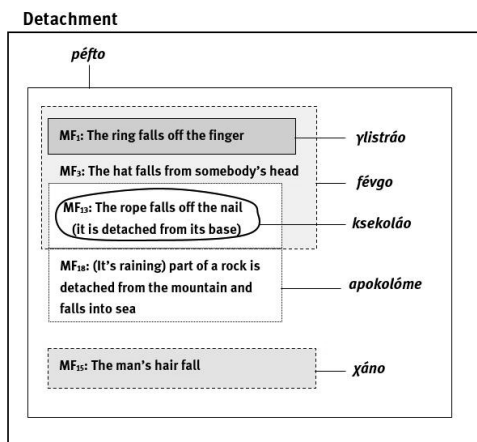


Figure 3. A micro-semantic map of the ‘detachment’ frame (FALLING domain in Greek)

4.5. The ‘crashing down’ frame

The ‘crashing down’ frame allows the use of the dominant verb but other encoding strategies are also possible. When the crashing event involves the collapse of the ice layer or of the floor, *kataréo* ‘collapse’ is chosen (see (21)) and the use of the dominant strategy is ruled out.

(Frame 4; event type 22)

- (21) *O* *lept-ós* *páyos* *katérefse* *ke*
 DEF.NOM.SG.M thin-NOM.SG.N ice.NOM.SG.N collapse.3SG.PST and
i *kopéla* *épese* *sto*
 DEF.NOM.SG.F lady.NOM.SG.F fall.3SG.PST at:DEF.ACC.SG.N
neró
 water.ACC.SG.N

‘The ice collapsed and the girl fell in the water’

When the event involves a building (or other constructions such a bridge) falling into pieces (with the goal of motion usually being the ground), several verbs can be employed, namely *gremízome* ‘fall down/to pieces’, *kataréo* ‘collapse’, and *katakrimnízome* ‘crumble’. Consider (22)–(24).

(Frame 4; event type 23)

- (22) *To* *ktírio* *gremístike*
 DEF.NOM.SG.N building.NOM.SG.N pull.down.3SG.PST.PASS
 ‘The building was pulled down’
- (23) *To* *ktírio* *katérefse*
 DEF.NOM.SG.N building.NOM.SG.N collapse.3SG.PST
 ‘The building collapsed’
- (24) *To* *ktírio* *katakrimnístike*
 DEF.NOM.SG.N building.NOM.SG.N crumble.3SG.PST.PASS
 ‘The building was pulled down’

In event type 23, the cause of the event is an inanimate entity (a non-prototypical agent), namely the earthquake. In the condition of an inanimate cause, *péfto*, *gremízome*, *kataréo*, and *katakrimnízome* are accessible. Conversely, if a prototypical agent, e.g. a fireman, is considered to be the cause of the collapse, only *gremízome* is acceptable (cf. [Antonopoulou 1987: 182–183]).

5. Semasiological dimension: Polysemy of *péfto* in Greek

The onomasiological analysis demonstrated the predominance of *péfto* within the FALLING domain. This section sets out to give an account of the semantics of this basic verb. Table 6 lists all the senses (as a paraphrase) found in the sample of CGT (as well as the labels used in the coding), along with their frequencies, and further divides the senses into literal and non-literal ones.¹⁰

Table 6. Frequency of lexical senses of *péfto* in CGT

Paraphrase	Label	Literal	Frequency
'vertical downward motion (uncontrolled)'	vert.down.unctrl	yes	95 (16,93 %)
'to become lower in level, amount or value'	lower	no	87 (15,5 %)
'sb is coincidentally faced with a situation' (e.g. to be obtained or to be caught by someone [by chance])	faced.with.situation	no	50 (8,91 %)
'lose of vertical orientation (uncontrolled)'	lose.vert.unctrl	yes	41 (7,3 %)
'vertical downward motion (metaphorical)'	vert.down.met	no	41 (7,3 %)
'dash, fall violently on'	dash	yes	39 (6,95 %)
'be affected'	be.affected	no	29 (5,16 %)
'lose of vertical orientation (controlled)'	lose.vert.ctrl	yes	21 (3,74 %)
'to change into another state, condition or mood'	enter.state	no	19 (3,38 %)
'be killed'	killed	no	18 (3,20 %)
'vertical downward motion (controlled)'	vert.down.ctrl	yes	17 (3 %)
'focus (emphasis falls on sth)/ devote myself to doing sth'	focus	no	12 (2,13 %)
'go to bed'	go.bed	yes	10 (1,78 %)
'hang down'	hang.down	no	8 (1,42 %)

¹⁰ Examples of the senses that are not discussed in this Section are provided in the Appendix.

Paraphrase	Label	Literal	Frequency
'go over/ onto a surface (extend/cover; metaphorical)'	over.surface.met	no	8 (1,42 %)
'commit'	commit	no	7 (1,24 %)
'where or when is X'	where.when	no	7 (1,24 %)
'is the responsibility of'	responsibility	no	6 (1 %)
'crashing down'	crashing.down	yes	6 (1 %)
'estimate'	estimate	no	6 (1 %)
'repeated action'	repeat.action	yes	6 (1 %)
'go over/ onto a surface (extend/cover partly or fully)'	over.surface	no	6 (1 %)
'to lose a position of power or surrender'	lose.power	no	4 (0.7 %)
'detachment (metaphorical)'	detach.met	no	4 (0.7 %)
detachment'	detach	yes	4 (0.7 %)
'fit'	Fit	no	3 (0.5 %)
'dash, fall violently on (metaphorical)'	dash.met	no	3 (0.5 %)
'crashing down on (metaphorical)'	crashing.down.met	no	2 (0.35 %)
'tease'	tease	no	1 (0.17 %)
'surprise (and catch)'	surprise	no	1 (0.17 %)
			Total 561 (100 %)

A first remark about Table 6 is that a high proportion of tokens of *péfto* is used non-literally. In fact, the non-literal uses prevail over the literal ones (Use_{non-lit}: 322 (57,4 %) vs. Use_{lit}: 239 (42,6 %)). It should be noted though that the total of 322 tokens used non-literally belongs to 20 different senses (i.e. one different sense per 16,1 tokens), whereas the total of 239 tokens used literally belongs to 10 senses (i.e. one different sense per 23,9 tokens).

The second observation is that the four frames discussed in *Section 4* are all attested in the sample:

- (a) Frame 1: Paraphrase 1 ('vert.down.unctrl'; ex. 1b)
- (b) Frame 2: Paraphrase 4 ('lose.vert.unctrl'; ex. 2b)
- (c) Frame 3: Paraphrase 25 ('detach' ex. 3b)
- (d) Frame 4: Paraphrase 19 ('crashing.down'; ex. 4b)

Interestingly, the sense corresponding to frame 1, i.e. that of ‘vert. down.unctrl’, is the most frequent one in the corpus ($N=95$). This is also the sense with the highest number of different ID tags, i.e. ID tags with non-zero values ($N=39$; cf. the number of different ID tags of ‘lower’, i.e. of the second most frequent sense: $N=33$), which evidences its unmarked status (cf. [Gries, Divjak 2009: 64]). Thus, from the point of view of frequency and markedness, ‘vert.down.unctrl’ is the prototypical sense (on the relation between frequency of occurrence and prototypicality, see [Gilquin 2008]; [Arppe et al. 2010]; [Schmid 2010]; [Jansegers et al. 2015]; among others). It should be noted that frequency and markedness are not the only indicators for prototype identification. Establishing the prototype of a linguistic item is a rather complex process, which often requires the identification of the historically earliest attested sense or the order of acquisition of the various senses by children (see [Tyler, Evans 2003]; [Gries 2006]; [Arppe et al. 2010]; among many others). However, these various ways of approaching prototypicality fall beyond the scope of the current study.

The full annotation scheme presented in Table 3 revealed additional interesting patterns as far as the verb’s collocation patterns is concerned. Specifically, *péfto* in all senses that involve a (non-abstract) TR’s motion towards a LM (irrespective of the orientation, which can be either vertical or horizontal) favors the explicit expression of the goal of motion. Table 7 shows the distribution of the PPs accompanying *péfto* in the sample. Goal PPs prevail over source PPs ($N_{\text{goal}}=115$ vs. $N_{\text{source}}=20$). Given that both the source and the goal should be considered core frame elements of *péfto*,¹¹ this imbalance in frequency between the two might seem unjustifiable. It fits, however, particularly well with what has been claimed about the predominance of goals in the encoding of motion events, a phenomenon which has been referred to as ‘source-goal asymmetry’.¹² Specifically in discourse, it has been shown that motion verbs display preferences for

¹¹ cf. the annotation of the English *fall* in FrameNet; <https://framenet2.icsi.berkeley.edu/fnReports/data/lu/lu6257.xml?mode=annotation>

¹² The phenomenon has also been termed ‘goal bias’, ‘goal-over-source bias/ principle’, and ‘goal-over-source-predominance’. For an early formulation of the hypothesis, see Ikegami, 1987; for motivating factors for this asymmetry, see [Dirven, Verspoor 2004], [Stefanowitsch, Rohde 2004, Regier, Zheng 2007]; for an overview, see [Papafragou 2010: 1064–1066]; for a recent large-scale corpus-based study of motion verbs in English, see [Stefanowitsch 2018].

goal paths (see [Stefanowitsch, Rohde 2004]; [Ishibashi 2010]; [Georgakopoulos 2018]).

Table 7. Frequencies of the PPs co-occurring with *péfio* in the sample of the CGT corpus

Sense	Goal	Source	Source & Goal	Other
crashing.down	4			
dash	37			
detach		1		
go.bed	4			
lose.vert.ctrl	9			4
lose.vert.unctrl	10			1
vert.down.unctrl	42	15	3	1
vert.down.ctrl	9	4		
Total	115	20	3	6

Beyond the distribution of goal and source elements, the full annotation scheme allows us to explore in more detail further aspects of the semantics of *péfio*. Specifically, through multivariate exploratory statistical methods (in particular, hierarchical agglomerative cluster analysis), it is possible to represent (dis)similarities between senses in the form of a dendrogram. In order to obtain a more coherent picture, only those senses that were attested more than 10 times in the sample, namely 12 items, were submitted to a hierarchical cluster analysis (see [Berez, Gries 2009] and [Glynn 2014] for a similar methodological decision to exclude rare senses).¹³ The resulting cluster dendrogram, which is based on all features included in the annotation scheme (18 ID tags across 450 sentence data), can be seen in *Fig. 4*. It is clustered with the Ward clustering method and shows how the different senses are grouped together. Note that these results should be approached with caution due to the limited corpus size. However, some interesting preliminary observations can be made.

In *Fig. 4*, we see two main branches. The first branch contains the senses ‘vert.down.met’, ‘enter.state’, ‘focus’, ‘faced.with.situation’, and ‘lower’, whereas the second branch comprises the senses ‘go.bed’, ‘lose.vert.unctrl’,

¹³ All the citations of the sense ‘be affected’ described a situation in which somebody falls victim to something (e.g., to the flu, to a scam) and appeared in the formulaic construction ‘X falls victim to Y’. This sense was therefore also excluded from further investigation.

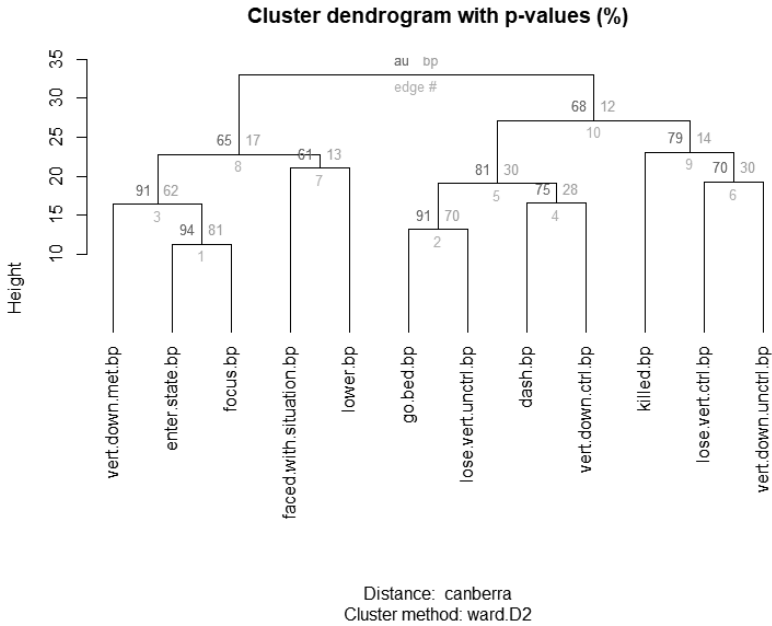


Figure 4. Hierarchical cluster analysis of 12 lexical senses of *πέφο* in CGT
Distance metric: Canberra; amalgamation rule: 'Ward'

'dash', 'vert.down.ctrl', 'killed', 'lose.vert.ctrl', and 'vert.down.unctrl'. This means that the analysis has grouped together most figurative senses (in fact, the left branch shows a clear structure as a whole, as evidenced by the fact that it contains only figurative senses) and all cases of literal motion (right branch). The senses that show the maximum distance and that are in turn merged higher on the tree are the senses 'lose.vert.ctrl' and 'enter.state' (max(pefto.dist): 26.76), an intuitively logical result. The minimum distance between the items is observed between 'enter.state' and 'focus' (min(pefto.dist): 11.50 (distances were computed with the function `dist()` in R). These senses are merged lower on the tree.¹⁴ Their grouping is intuitively reasonable, since both seem to emerge from the spatial scheme of downward vertical movement. They presuppose going into some abstract substance and remaining there (i.e. both place particular importance on the goal). This grouping can be further explained with reference to their distributional

¹⁴ Note that this grouping reaches statistical significance as shown by its AU (Approximately Unbiased) *p*-value (94%; alpha set at .10). The figures in green show the BP (bootstrap probability) value, which is less accurate than the AU value.

similarity. In order to identify those features that are distinctive of this cluster, I explored the absolute differences between the proportions of each value of every variable (cf. [Levshina 2015: 313–315]). Specifically, I computed the differences between the average values of the <enter.state, focus> cluster and all other senses and then sorted them. This process demonstrated that the <enter.state, focus> cluster has a much higher proportion of abstract LMs than the other senses (average diff.=93 %).¹⁵ Further, it indicated that the factor USE is the second most important factor discriminating between <enter.state, focus> and the other senses (in the ID tag level USE.FIGURATIVE: average diff.=61 %). The third distinctive feature is LM_NUM.singular (average diff.=21 %), and the fourth their co-occurrence with an adverbial (average diff.=19 %). All these features are present in examples (26) and (27).

Sense 12 ‘focus’

- (26) *Θα peso me ta mútra sti*
 fall.1SG.FUT with DEF.ACC.PL.N face.ACC.PL.N at:DEF.ACC.SG.F
δουλιά από σήμερα
 work.ACC.SG.F from today

‘Starting from today, I will binge on work’ [CGT: WFBG08-5003]

Sense 9 ‘enter.state’

- (27) *Από τότε ο Νικολός έπεσε σε*
 from then DEF.NOM.SG.M Nicolos.NOM.SG.M fall.3SG.PST at
δίσμηνια ...
 disfavor.ACC.SG.F

‘Since then Nicolos has fallen into disfavor...’ [GCT: WFBG08-5007]

In (26), an entity who is engaged in a process accords special importance to an event or state of affairs that has an impact on the success of the process. In (27), an entity ends up in a final situation, which it was not in before (cf. the frame [Transition_to_a_state] in FrameNet; <https://framenet2.icsi.berkeley.edu>). This example constitutes a linguistic realization of the metaphorical mappings CHANGE OF STATE IS A CHANGE OF A LOCATION and CHANGE IS MOTION (cf. [Radden 1996]).

The sense ‘vert.down.met’, which clusters with ‘enter.state’ and ‘focus’, involves an abstract TR undergoing an abstract motion which ends

¹⁵ This percentage is the average difference within the ID tag LM_TYPE between the cluster <enter.state, focus> (Group 1) and the group comprising all other senses (Group 2). Within this ID tag, all entities (100 %) in Group 1 are abstract, whereas only 7 % of all entities in Group 2 are abstract. Hence the 93 % difference.

up in a — typically — unpleasant situation that is difficult to escape from (e.g., an ambush, a vacuum; see (28)). As such, it is conceptually similar to ‘enter.state’.

Sense 5 ‘vert.down.met’

- (28) *I* *prospáthia* *épe* *sto*
 DEF.NOM.SG.F effort.NOM.SG.F fall.3SG.PST at:DEF.ACC.SG.M
kenó
 vacuum.ACC.SG.N

‘The effort fell into the vacuum’ [CGT: WACG13-0028]

The second sub-cluster of the first branch merges ‘lower’ and ‘faced_with_situation’. These two senses are exemplified in (29) and (30), respectively.

Sense 2 ‘lower’

- (29) *O* *plithorismós* *den péfti* *γρίγورا* ...
 DEF.NOM.SG.M inflation.NOM.SG.M NEG fall.3SG.PRS rapidly

‘The inflation does not fall rapidly...’ [WOPG16-0748]

Sense 3 ‘faced_with_situation’

- (30) *Ksafniká péfti* *to* *máti* *tu*
 Suddenly fall.3SG.PRS DEF.NOM.SG.N eye.NOM.SG.N POSS.GEN
se éna *árthro*
 at INDEF.ACC.SG.N article.ACC.SG.N

‘Suddenly, his eye fell on one article’ [CGT: WFCG33-5001]

Example (29) describes the change of an item’s position on a scale (cf. the frame [Change_position_on_a_scale] in FrameNet; <https://framenet2.icsi.berkeley.edu>). The initial as well as the final value of the item can be explicitly expressed, but this is not necessarily the case as (29) shows. Example (30) in turn involves a process in which an entity is being found/ discovered/ recovered. The three most distinctive ID tag levels for this sub-cluster are: the USE.FIGURATIVE (average diff.=61 %), the TR.IN-ANIMATE (average diff.=55 %) and the LM_TYPE.REPRESENTATION (average diff.=30 %). It should be added here that the factor ranked third, namely the feature LM_TYPE.REPRESENTATION, is not found in the behavioral profile of ‘faced_with_situation’, but only in that of ‘lower’. Crucially, this feature, which includes LMs that express the position on the scale where an item (e.g. a share) ends up, follows from the frame the sense ‘lower’ evokes, i.e. [Change_position_on_a_scale].

As has already been mentioned, the branch on the right of Fig. 4 shows also some structure, since it consists mainly of cases of literal motion.

More specifically, the first sub-branch on the right edge of *Fig. 4* contains the senses ‘lose.vert.ctrl’ and ‘vert.down.unctrl’. The former involves a TR changing its initial vertical orientation while falling. In the relevant examples, the movement from point A to point B takes place on the same surface, see (31)–(32). The latter sense describes an entity falling from an elevated surface, see (33). The most distinctive ID tag level for this sub-cluster is the USE.LITERAL one (average diff.=58 %), followed by the properties LM_TYPE.concrete (average diff.=32 %) and CLAUSE.main (average diff.=19 %).

Sense 8 ‘lose.vert.ctrl’

- (31) *I mána épese sta*
 DEF.NOM.SG.F mother.NOM.SG.F fall.3SG.PST at:DEF.ACC.PL.N

γόνata
 knee.ACC.PL.N

‘The mother fell on knees’ [GCT: WFBG08-5011]

- (32) *Emís pésame sto xjóni akínit-i*
 we fall.1PL.PST at:DEF.ACC.SG.N snow.ACC.SG.N still-NOM.PL

‘We fell to the snow and we stood still’ [GCT: WFBG10-0001]

Sense 1 ‘vert.down.unctrl’

- (33) *Péftane ta fila apó ta*
 fall.3PL.PST DEF.NOM.PL.N leave.NOM.PL.N from DEF.ACC.PL.N

ðédra
 tree.ACC.PL.N

‘The leaves were falling from the trees’ [GCT: WFBG08-0001]

Given that the analysis has merged two senses in which the moving entity either has control over the motion (‘lose.vert.ctrl’) or has no control over it (‘vert.down.unctrl’), it stands to reason that the parameter of cause (see *Section 3.1*) is not a crucial factor in grouping the senses together. This is also clear in the sub-branch <go.bed, lose.vert.unctrl>, which comprises a sense involving a self-moving Trajector who has control of their action and whose motion is intentional (see (34)) as well as a sense in which the motion is without control (see (35)).

Sense 13 ‘go.bed’

- (34) *Apópse tha protimúsa na péso noris*
 Tonight FUT prefer.1SG.PST MODAL fall.1SG.NON_PST early

‘I would prefer to go to bed early tonight’ [GCT: WFBG08-0003]

Sense 4 ‘lose.vert.unctrl’

- (35) ... *éxase* *tin* *isoropía* *tu* *ke*
 lose.3SG.PST DEF.ACC.SG.F balance.ACC.SG.F his.GEN and
épese *káto*
 fall.3SG.PST down

‘He lost his balance and fell down’ [GCT: WFBG09-5007]

The most distinctive ID tag level of this sub-branch is again the USE.LITERAL one (average diff.=50 %), followed by the features TR.animate (average diff.=32 %), LM_TYPE.concrete (average diff.=32 %) and the absence of an adverbial (average diff.=32 %). The comparison between the sub-branch <go.bed, lose.vert.unctrl> and the <dash, vert.down.ctrl> one reveals that the most important feature explaining their difference is the presence vs. absence of an adverbial (average diff.=41 %). Specifically, in the latter group 88,5 % of the citations explicitly express an adverbial (see (36) in which the TR runs towards an animate LM very quickly and (37) which describes a scene in which paratroopers jumped out of an airplane and landed on a mountain), whereas in the former an adverbial is found in 48 % of the tokens (see, e.g., (34)).

Sense 6 ‘dash’

- (36) *Xarúmen-os* *péfti* *páno* *stin* *Evanthúla*
 happy-NOM.SG.M fall.3SG.PRS on at:DEF.ACC.SG.F Evanthula.ACC.SG.F

‘He was happy and he fell on Evanthula’ [GCT: WFBG08-5006]

Sense 11 ‘vert.down.ctrl’

- (37) *Apó* *tin* *óra* *pu* *epesan* *i*
 from DEF.ACC.SG.F time.ACC.SG.F that fall.3PL.PST DEF.NOM.PL.M
Ágl-i *aleksiptotistés* *stin* *Gíona*
 English-NOM.PL.M paratrooper.NOM.PL.M at:DEF.ACC.SG.F Gíona.ACC.SG.F

‘Since the English paratroopers fell to Gkiona’ [GCT: WFBG10-0001]

6. Conclusions

Building on the insights of the frame-based methodology for lexical typology and through an additional corpus-based behavioral profile analysis, this study has examined various aspects of the semantics of the FALLING domain in Greek. The main points made above can be summarized as follows.

First, the onomasiological analysis has shown that the Greek system should be classified as dominant, since the same lexeme, i.e. *péfto*, can be used in all frames and in a wide range of situation types within these frames. Its use is ruled out only in a few cases one of which involves the motion of a substance out of a container under the effect of gravity, in which cases the construction ‘*A χίνετε σε C*’ is used. We observed that the lexical opposition between the two antagonistic verbs as a result of the parameter of fluidity poses a problem when it comes to the representation of the boundaries of the lexemes in semantic space. A representation that visualizes micro-frames (and not only frames) as nodes provides a possible solution to this problem. Additionally, the Greek FALLING system, albeit dominant, gives space to other encoding strategies to emerge. As a matter of fact, 13 additional motion verbs can be used to describe the various situation types. However, these verbs are confined within the boundaries of each frame. This is illustrated in *Fig. 5*, which is a geometrical representation of the micro-frames in the FALLING domain in Greek.

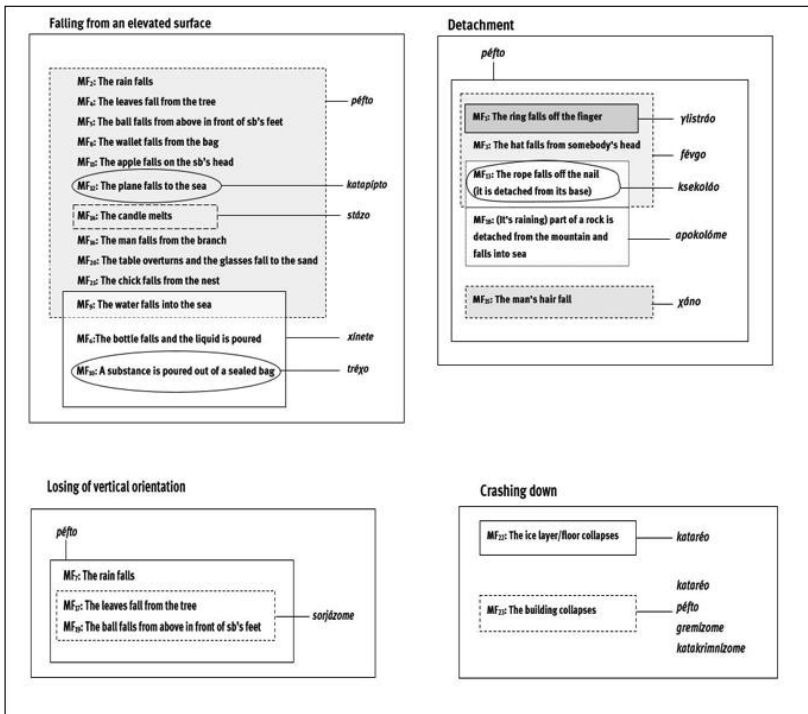


Figure 5. A micro-semantic map of the FALLING domain in Greek

Second, the semasiological analysis has provided an account of the semantics of *péfto*. Specifically, it offers corpus-based evidence concerning the prototypical sense of the lexeme. According to the criteria of frequency and markedness, it turns out that the prototypical sense of *péfto* refers to the motion of a TR from a higher to a lower level. Besides the establishment of the prototype identification, the semasiological analysis has also assisted the identification of some preferred patterns of this lexeme. In particular, it reveals that *péfto* in all senses that involve a TR's motion towards a LM favors the explicit expression of the goal of motion. Finally, through a cluster analytic approach, it was possible to represent (dis)similarities between senses in the form of a dendrogram. Although the classification of senses based on dictionaries might be considered a subjective process, the annotation of distributional and semantic ID tags enabled us to group senses in a less subjective way. Finally, in some cases, the specific morpho-syntactic and semantic properties that were found to correlate with the various senses of *péfto* appear to follow from the frames (in the Fillmorean sense) these senses evoke.

Future research could take into account discourse-pragmatic information and explore the possibility that some discourse-pragmatic features are particular relevant for particular senses of *péfto*. Such an approach will expand the scope of corpus-based analyses by representing senses as enriched lexical constructions, which are not being exclusively fed with morpho-syntactic and semantic features (see [Georgakopoulos et al. 2020]). In addition, the full list of senses that appear in Table 6 may be considered (see also the Appendix). In doing so, further questions related to polysemy could be addressed, e.g. “how can one determine whether two meanings are clearly different or merely shades of meaning” [Jansegers et al. 2015: 390]. Finally, a semasiological analysis of the whole set of verbs belonging to the FALLING domain will determine the range of senses associated with each verb and will unravel shared patterns of polysemy. This will conclude the cycle of analysis, which takes the sense-to-form approach as a point of departure, then proceeds adopting a form-to-sense approach, and in a final step returns to the sense-to-form approach.

Abbreviations

ACC — accusative; CL — clitic; DEF — definite article; INDEF — indefinite article; F — feminine; FUT — future; GEN — genitive; LM — landmark; M — masculine; MODAL — modality; N — neutral; NOM — nominative; NON_PST — non past; PASS — passive; PL — plural; POSS — possessive; PRS — present; PST — past; SG — singular; TR — trajectory.

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Appendix

Lexical senses of *péfto* in CGT: additional examples.

Paraphrase	Example (made-up)	Translation
‘be affected’	<i>Épese thíma listías</i>	They robbed him (Lit. He fell victim to robbery)
‘killed’	<i>Épese nekrós</i>	He fell dead
‘hang down’	<i>Ta maljá tis épeftan páno stus ómus tis</i>	Her hair fell over her shoulders
‘go over/ onto a surface (extend/cover; metaphorical)’ ¹⁶	<i>O staθmós tus péfti páno se álon staθmó</i>	Their broadcasting station falls on another broadcasting station (i.e., it covers its signal).
‘commit’	<i>Tríti forá pu épese se paráptoma</i>	That was the third time he committed a crime

¹⁶ Other collocates in subject position: *siopí* ‘silence’, *payómára* ‘chilliness’, *murmúrisma* ‘murmur’.

Paraphrase	Example (made-up)	Translation
‘where or when is X’	<i>a. Pu péfti to xorjó su?</i> <i>b. Ta Xristúryena péftun Tetárti fétos</i>	a. Where is your village? b. This year Christmas falls on Wednesday
‘is the responsibility of’	<i>I eþþini péfti stin kivérnisi</i>	The responsibility falls onto the government
‘crashing down’	<i>I yéfira épese</i>	The bridge collapsed
‘estimate’	<i>Épese mesa stin próvlepsi aftí ti forá</i>	He predicted correctly this time
‘repeated action’	<i>Épeftan sfères vroxí</i>	Bullets were thrown like rain
‘go over/ onto a surface’ (extend/cover partly or fully) ¹⁷	<i>To fos péfti páno sto trapézi</i>	The light falls on the table
‘to lose a position of power or surrender’	<i>I ðiktatoría epese</i>	The dictatorship has fallen
‘detachment (metaphorical)’	<i>Θa pésun kefálja</i>	Heads will fall [i.e. Someone will be fired]
‘detachment’	<i>Ta fterá tu puljú épesan</i>	The bird’s feathers fell off
‘fit’	<i>Tu péfti kalá to padelóni</i>	The trousers fits him well
‘dash, fall violently on (metaphorical)’	<i>Me ton érota péftis sti fotjá</i>	When it comes to love, you fall into the fire
‘crashing down on (metaphorical)’	<i>Ta tíxi tu paljú katestiménu ðen péftun éfkola</i>	The walls of the old establishment do not fall easily
‘tease’	<i>Afú epiménis na mu tin péftis étsi, θa ta apokalípso óla</i>	Since you keep up teasing/ annoying me, I will reveal everything
‘surprise (and catch)’	<i>Tus épiaσε o eforiakós</i>	They were caught by the taxman

¹⁷ Other collocates in subject position: *omíxli* ‘fog’, *skotáði* ‘darkness’.