

VERBS OF COMMUNICATION: VALIDATION OF SEMANTIC FRAMES IN CORPUS DATA

Svetlozara Leseva, Ivelina Stoyanova

Institute for Bulgarian Language, Bulgarian Academy of Sciences

zarka@dcl.bas.bg, iva@dcl.bas.bg

Abstract. The chapter outlines the properties of the semantic class of verbs of communication in terms of the most representative FrameNet frames of higher frequency and the syntactic realisation of the frame elements in different valence patterns in English and Bulgarian. For the purposes of the study we employ two large lexical-semantic resources: (a) the Princeton WordNet (Fellbaum 1998b), and the Bulgarian WordNet (Koeva 2021), and (b) FrameNet (Baker et al. 1998). In particular, the analysis is centred on the information included in each of the resources and how it can be used towards their mutual enrichment and the extension of their coverage.

We discuss the general organisation of the verb lexis representing the domain of communication: the prototypical frame **Communication** and frames inheriting from it, focusing on the frames **Statement** and **Telling** as two of the most representative frames of verbal communication. The objective is to validate the realisation of semantic frames in corpus data using the semantically annotated corpora SemCor (Miller et al. 1993b) and BulSemCor (Koeva et al. 2006). While we use resources for English and Bulgarian, we discuss the universal and language-specific aspects of this description and the transferability of knowledge across languages.

The observations made on the valence patterns and the syntactic expression of the core frame elements are used to verify the validity of the assigned frame, while also highlighting the similarities and differences both between verbs from the same domain in one language (Bulgarian) and between equivalent/similar senses across languages (Bulgarian and English).

Keywords: *verbs of communication, WordNet, FrameNet, valence patterns, corpus*

* Svetlozara Leseva, Ivelina Stoyanova. Verbs of Communication: Validation of Semantic Frames in Corpus Data. – In: Koeva, Sv. (Ed.) *Semantic studies. Syntactic and semantic description of Bulgarian verbs*. Sofia: BAS Press „Prof. Marin Drinov“, pp. 74 – 116. <https://doi.org/10.7546/SemanticStudies2024.04>

1. Motivation

We focus on the complex semantic description of verbs as represented in lexical semantic resources (such as WordNet and FrameNet) containing complementary semantic and valence information. We discuss both the language-independent and the language-specific aspects of conceptual description with a view to the transferability of knowledge between the two languages. We illustrate our findings through a case study on verbs of communication in English and Bulgarian. Further, we compile a corpus of illustrative examples in English and Bulgarian in order to observe the semantic and syntactic properties determining the realisation of each verb and the core frame elements in its evoked frame.

The class of verbs of communication comprises a diverse set of verbs with high frequency in the language, thus particularly suitable to illustrate the relations of inheritance between the prototypical frame **Communication** and the frames that inherit from it, such as **Communication manner**, **Statement**, **Telling**, etc. Moreover, the verbs belonging to the domain of communication are characterised by typical frame elements exhibiting certain semantic properties, e.g. the **Communicator** and the **Addressee** are sentient beings able to take part in communication. The frame elements are realised in typical syntactic positions. The observations on the corpus data aim to identify any configurations for the realisation of the verbs in English and Bulgarian that are confirmed for both languages or are valid for only one of them.

For the purposes of the study we employ two main lexical-semantic resources: (a) the Princeton WordNet (PWN) (Fellbaum 1998b), and the Bulgarian WordNet (Koeva 2021), and (b) FrameNet (Baker et al. 1998; Ruppenhofer et al. 2016). Illustrative examples are extracted from various sources: (i) annotated examples on English verbs from FrameNet; (ii) examples from the semantically annotated corpora SemCor (Miller et al. 1993b) for English and BulSemCor (Koeva et al. 2006) for Bulgarian; (iii) parallel examples from the Bulgarian-English Sentence- and Clause-Aligned Corpus (BulEnAC) (Koeva et al. 2012a).

The chapter is organised as follows. Section 2 presents the resources employed in the study with a focus on lexical-semantic resources (WordNet and FrameNet) and the corpus data from which illustrative examples are extracted and annotated. Section 3 provides an overview of related works focusing on other similar lexical-semantic resources and their relevance for the study. Section 4 describes the principle of universality of semantic features in conceptual resources. Section 5 presents the domain of communication and the frames that are used to describe aspects of it, focusing on the prototypical, “basic” frame **Communication**, and some of the most representative ones – **Statement** and **Telling**. More detailed observations on Bulgarian verbs from the communication domain are offered in Sections 6 and 7. The final section draws conclusions and discusses directions for future work.

2. Resources

Below we describe the lexical semantic resources and the corpora used to obtain data for the study.

2.1. Lexical-semantic resources

WordNet¹ (Miller et al. 1993a; Miller 1995; Fellbaum 1998b) is a large lexical database that represents comprehensively conceptual and lexical knowledge in the form of a network whose nodes denote synonym sets (synsets) linked by means of a number of semantic and lexical relations such as hypernymy, meronymy, antonymy, etc. We use both the Princeton WordNet and the Bulgarian WordNet (Koeva 2014; Koeva 2021), which are aligned at the synset level by means of unique synset identifiers.

In WordNet a coarsely-grained semantic division has been introduced in terms of a set of language-independent semantic primitives (semantic classes) assigned to all the nouns and verbs in the resource (Miller et al. 1993a). The verbs fall into 15 groups (Fellbaum 1998a: 70 – 71), such as verb.change (verbs describing change in terms of size, temperature, intensity, etc.), verb.cognition (verbs of mental activities or processes), verb.motion (verbs of change in the spatial position), verb.communication (verbs describing communication and information exchange), etc.²

Verb synsets are interrelated and form a hierarchical structure according to a troponymy relation (corresponding to hyponymy among nouns and representing a ‘manner’ relation); for example, in *talk – whisper*, the second member of the pair refers to a particular, semantically more specified, manner of performing the action referred to by the first verb (Fellbaum 1999: 94).

Communication verbs in WordNet are labelled with the semantic primitive verb.communication and cover primarily hyponyms (troponyms) of the synset {communicate, intercommunicate}, ‘transmit thoughts or feelings’.

WordNet is constructed according to principles governing human lexical memory in that it organises lexical information in terms of word meanings, rather than word forms, and uses an inheritance system reflecting a psycholinguistic judgement about the mental lexicon (Miller et al. 1993a: 14). The language-independent structure of word meanings allows the creation of wordnets for various languages linked to the Princeton WordNet through a set of interlingual indices, in essence representing a multilingual lexical semantic resource with comprehensive semantic description and a rich set of semantic relations.

WordNet provides extensive lexical coverage; the verbs represented in it are organised in 13,766 synsets (with additional 337 verb synsets specific for Bulgarian).

¹ <https://wordnet.princeton.edu/>

² The division of the nouns and verbs into WordNet lexicographic files (reflecting the semantic primitive distinction) along with short definitions of the primitives is available at: <https://wordnet.princeton.edu/documentation/lexnames5wn>.

However, it does not offer information on the realisation of the predicates and their arguments, and the syntactic information is limited to generic sentence frames illustrating simple sentences in which the verbs in the synset can be used (Miller et al. 1993a: 55, 80).

FrameNet³ (Fillmore 1982; Baker et al. 1998; Baker 2008) is a lexical semantic resource which couches lexical and conceptual knowledge in the apparatus of frame semantics. Semantic frames are conceptual structures describing types of objects, situations, or events along with their components (frame elements). Frame elements (FEs) may be core, peripheral or extra-thematic (Ruppenhofer et al. 2016: 23 – 24). In terms of the conceptual description, we deal primarily with core FEs, which instantiate conceptually necessary components of a frame, and which in their particular configuration make a frame unique and different from other frames.

FrameNet frames are organised into a hierarchical network by means of a number of hierarchical and non-hierarchical frame-to-frame relations (Ruppenhofer et al. 2016: 79 – 85). Here we list the hierarchical relations, which bear most relevance to the internal structure of thematic verb classes. These are: **Inheritance** – a relationship between a parent frame and a more specific (child) frame, such that the child frame elaborates the parent frame; **Uses** (also called ‘weak inheritance’) (Petrucci 2015: 33) – a relationship between two frames where the first one makes reference in a very general kind of way to the structure of a more abstract, schematic frame; **Perspective** – a relation indicating that a situation viewed as neutral may be specified by means of perspectivised frames that represent different possible points-of-view on the neutral state-of-affairs; **Subframe** – a relation between a complex frame referring to sequences of states and transitions, each of which can itself be separately described as a frame, and the frames denoting these states or transitions.

FrameNet also offers a set of annotated examples for lexical units evoking the corresponding frames (Ruppenhofer et al. 2016: 7 – 8). The annotation includes the verb, the frame elements and the syntactic component through which the frame element is realised. The annotation provides information both for the explicit and the implicit frame elements (non-overt but conceptually present frame elements retrievable from the immediate or the more general context, so-called null instantiations) (Ruppenhofer et al. 2016: 28 – 29; Petrucci 2019: 121). The set of examples supplies empirical evidence about the syntactic realisations of frame elements particularly valuable not only for linguistic generalisations about the target language (English) but as a point of departure for making observations cross-linguistically. However, FrameNet does not explicitly define the relevant selectional restrictions imposed by predicates on each frame element and its coverage is limited both in terms of the lexical units included in the frames (i.e. there are lexical units pertaining to a frame that are not listed in it) and in terms of the parts of the lexicon encompassed by the system of frames, i.e. there are many

³ <https://framenet.icsi.berkeley.edu/fndrupal/>

lexical units that cannot be described properly by the existing frames (Koeva 2020: 11 – 12).

Frames covering the class of communication verbs are related to the prototypical frame **Communication** and are presented in more detail in section 5.

2.2. Corpora

In order to explore the syntactic expression of the verbs and their participants, we study the usage examples available in two semantically annotated corpora – the English SemCor and the Bulgarian semantically annotated corpus, BulSemCor, both of which are annotated with WordNet senses. SemCor (current version 3.0) (Miller et al. 1993b, 1994; Landes et al. 1998) is compiled by the Princeton WordNet team and covers texts excerpted from the Brown Corpus. SemCor is supplied with part-of-speech and grammatical tagging and all open class words (both single words and multiword expressions, as well as named entities) are semantically annotated by assigning each word a unique WordNet sense (synset ID). The corpus is the largest manually annotated corpus of this kind and amounts to a total of 226,040 sense annotations.

BulSemCor (Koeva et al. 2006, 2011) is designed according to the general methodology of the original SemCor and criteria for ensuring an appropriate coverage of contemporary general lexis. The size of the corpus is close to 100,000 annotated units. The two corpora are not sufficient to provide enough evidence for many of the studied verbs so examples from other corpora have also been employed.

The Bulgarian-English Sentence- and Clause-Aligned Corpus (BulEnAC) (Koeva et al. 2012a) is a parallel corpus of aligned Bulgarian and English sentences and clauses with annotation of the syntactic relation between clauses. The corpus contains 366,865 tokens (176,397 tokens in Bulgarian and 190,468 tokens in English). The syntactic annotation of BulEnAC involves: a) sentence and clause splitting; b) annotation of the type of syntactic relation (coordinate or subordinate) between clauses. c) marking of the elements that introduce the clause: conjunctions, complementisers, and punctuation. BulEnAC is suitable for extracting parallel sentences illustrating the use of particular verbs evoking the frames under study. Further, it facilitates the identification of corresponding translation equivalents within aligned clauses.

The Bulgarian National Corpus is the largest corpus for Bulgarian: it consists of a monolingual (Bulgarian) part and 47 parallel corpora and amounts to 5.4 billion words. The Bulgarian part includes about 1.2 billion words of running text distributed in 240,000 text samples. The texts in the corpus reflect the state of the Bulgarian language predominantly in its written modality from the middle of the 20th century (1945) until the present day (Koeva et al. 2012b).

BulEnAC does not have semantic annotation, and the annotation in the Bulgarian National Corpus is supplied with all possible meanings of each verb, so the use of these resources requires disambiguation of the selected examples

by assigning the verb to a particular WordNet synset. Further, to enable the analysis of the semantic properties of frame elements, noun phrases also require disambiguation.

3. Related work

There are several other resources relevant to our study. VerbNet (Kipper-Schuler 2005; Kipper et al. 2008) provides substantial coverage of the English verb inventory and defines syntactic-semantic relations in an explicit way by means of predicate-argument structures. However, the existing mappings between WordNet synsets and VerbNet classes is limited.

VerbAtlas (Fabio et al. 2019) is a lexical-semantic resource representing the semantic description of the verb synsets in BabelNet. BabelNet is a very large, richly populated multilingual semantic network (covering more than 500 languages) which integrates lexicographic and encyclopaedic knowledge from WordNet and Wikipedia (Navigli, Ponzetto 2010). Each verb synset in VerbAtlas is assigned a frame corresponding to its prototypical predicate-argument structure. Obligatory components are described using 26 semantic roles and the semantic properties governing their compatibility (116 types).

Predicate Matrix (de Lacalle et al. 2014) is a lexical resource resulting from the integration of several sources of predicate information: FrameNet, VerbNet, PropBank and WordNet, that have been previously aligned in SemLink (Palmer 2009). Predicate Matrix is compiled using advanced graph-based algorithms to extend the mapping coverage between resources.

Framenets have been developed for many languages, including Bulgarian. The original concept of the Bulgarian FrameNet was laid out by Koeva and Dekova (Koeva, Dekova 2008) and Koeva (2010) and further elaborated and implemented in later work (Koeva, Doychev 2022), resulting in the design of BulFrameNet – a web-based system for the comprehensive description of the semantic and the syntactic properties of verbs determining their syntactic realisation in text.

Combining the semantic description of verbs from different resources to enhance their representation has been proposed by Uresova et al. (Uresova et al. 2020a, 2020b). The result is a multilingual dictionary encoding a comprehensive description of the semantic classes of verbs and the semantic roles and syntactic properties of their arguments⁴. The project also aims at creating an ontology of events, processes and states, and for this purpose each dictionary entry is linked to its correspondences in FrameNet, WordNet, VerbNet, Ontonotes and PropBank, as well as the Valence Dictionary of Czech Verbs (Lopatkova et al. 2016), which represents the predicate-argument structure of each verb, its semantic class and the syntactic transformations (diatheses) in which it participates.

⁴ <https://ufal.mff.cuni.cz/synsemclass>

It has also been acknowledged that combining WordNet (and lexical semantic features) with resources such as FrameNet results in a more comprehensive semantic and syntactic representation of the lexical entries, thus expanding the possible applications of the resources for the purposes of syntactic and semantic parsing (Baker, Fellbaum 2009; Schneider et al. 2012; Das et al. 2014). A discussion on the strengths and shortcomings of the different kinds of lexical semantic resources has been offered by Shi and Mihalcea (Shi, Mihalcea 2005).

The possible alignment and mutual enrichment of the two resources have been the focus of research in the past decades (Baker, Fellbaum 2009; Tonelli, Pighin 2009; Palmer 2009; Laparra, Rigau 2010; Palmer et al. 2014; Leseva, Stoyanova 2020, among others).

One of the challenges in mapping resources developed according to different methodologies is the coverage of the alignment between the units represented in them. Our mapping uses as a point of departure three previously developed sources of lexical mappings: direct mappings provided within FrameNet (Baker, Fellbaum 2009), eXtendedWordFrameNet (Laparra, Rigau 2010), and MapNet (Tonelli, Pighin 2009), complemented with additional indirect mapping through VerbNet (Palmer 2009; Palmer et al. 2014). This resulted in 4,306 unique WordNet synsets to FrameNet frame mappings, achieving coverage of 30.5% out of all verb synsets (Leseva, Stoyanova 2020: 110).

Methods have been proposed to increase the coverage by discovering suitable literals based on semantic relations with literals already described in semantic frames (Burchardt et al. 2005) or by applying graph-based algorithms to identify relevant senses of verbs evoking certain semantic frames (de Lacalle et al. 2014). The main procedure we apply to improve and extend mapping coverage is based on exploration of the structural properties of WordNet and FrameNet. Verbs in a WordNet synset generally exhibit the same or very similar meaning, which implies that they are associated with the same semantic frame. Moreover, both resources are hierarchically organised based on the notion of inheritance from a more general to a more specific synset or frame. The alignment between the resources reflects the notion of inheritance – in general, more specific concepts should be associated with the frame of their hypernym(s) or with more specific frames elaborating on (and possibly inheriting from) this frame, although in practice this is not borne out consistently. The procedure we apply involves: (1) manual assignment of semantic frames to root verb synsets; (2) automatic assignment of the hypernym's frame onto hyponyms which were not previously mapped; and (3) validation and improvement of assignments with respect to precise and accurate representation of the situation. Using these procedures we have gradually increased the coverage of the mapping – achieving 94% coverage of the automatic mapping (Leseva, Stoyanova 2020: 115 – 116). It should be noted, however, that due to different reasons, such as specifics in the structure of WordNet, or lack of appropriate frames in FrameNet (where part of the lexis has not yet been described by frames) the automatic assignment needs expert verification. We thus have performed

manual validation, so far covering almost 50% of the mapping. The relatively language-independent description and the organisation principles underlying the design of both WordNet and FrameNet allows for the transfer of information both between resources and across languages.

The rich frame-to-frame relations employed in the structure of FrameNet are also reflected in the greater granularity and specification of the frame elements (as compared with VerbNet, VerbAtlas and other resources). The granularity is handled, where necessary, by applying a shallow hierarchy derived from the hierarchical organisation of the frames and the inheritance relations defined between them (Litkowski 2014). For example, the taxonomy of frame elements **Communicator** > **Speaker** > **Interlocutor** is derived from the frame hierarchy **Communication** > **Statement** > **Chatting** built on the frame-to-frame relation of weak inheritance (FrameNet relation **Uses**) between the three frames. The **Communicator** is the most generally defined frame element describing the agentive participant involved in either a verbal or non-verbal act of communication; the **Speaker** is constrained to a participant in spoken communication; the **Interlocutor** is more specific and refers to cases where the **Speaker** is one of a group in which the participants alternate between the roles of a **Speaker** and an **Addressee**. By maintaining different levels of granularity, FrameNet frames provide a more robust semantic description that is relatively resource- and theory-independent. In particular, this enables us to identify and refer to the frame elements' counterparts in other resources, as well as to adopt a more specific description or to resort to a more general one, depending on the particular task.

4. Language-independent semantic features in conceptual resources

The procedures for mapping FrameNet frames to WordNet synsets are based on the inheritance of semantic features in hypernym trees (Leseva et al. 2019: 281 – 282; Leseva, Stoyanova 2020: 110 – 111). In particular, we manually assign frames on root verb synsets and then rely on the assumption that the hyponyms either inherit the semantic frame of their hypernym directly or further elaborate on the frame of the hypernym.

Figure 1 illustrates a hypernym—hyponym pair of synsets, with the appropriate FrameNet frames assigned to them, which are themselves related by means of an inheritance relation (**Questioning** being an elaboration of the parent frame **Communication**).

Further, FrameNet frame elements are supplied with general semantic types (e.g., Sentient, Physical object, Time, etc.) defining the general noun semantic classes that may take the positions of the respective frame elements in the semantic frame (Ruppenhofer et al. 2016: 85 – 93). The semantic classes as part of the conceptual description are largely language-independent and can be transferred cross-linguistically.

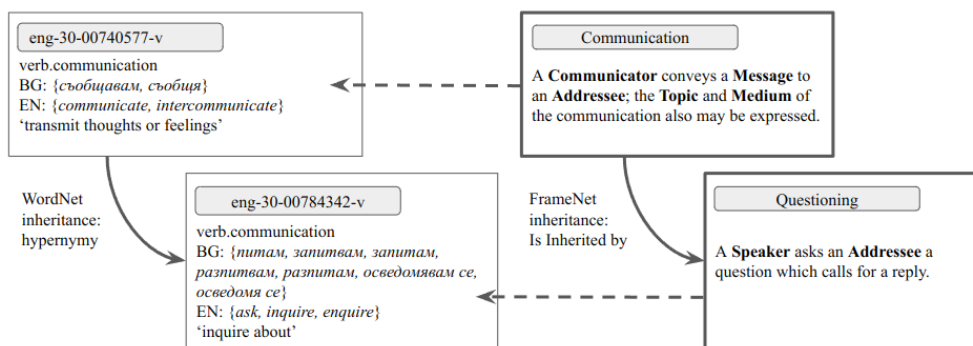


Figure 1. Frames inheritance (**Communication** → **Questioning**) reflected in synset hypernym / hyponym relations (*communicate* → *ask*)

The semantic classes can be modelled as a taxonomy using the WordNet structure (Koeva 2010: 48 – 51); they can be defined as (a combination of) WordNet substructures, i.e. hypernym-hyponym trees.

FrameNet provides a number of possible valence patterns for each lexical unit evoking a frame. While the general configuration of core frame elements could be proven to be to a great degree language-independent, the syntactic properties of the verbs and their realisation (as represented by the set of valence patterns) are more language-specific.

This work is grounded in the following assumptions: (a) cross-resource correspondence of facets of the semantic description stemming from similar semantic generalisations; (b) cross-lingual correspondence of semantic description; (c) relative cross-lingual syntactic correspondences of frame element realisations.

The first aspect is carried out through the linking of WordNet synsets and FrameNet frames whereby the synsets are assigned a schematic representation of the situation, the elements involved and their relationship to each other and the situation as described by the frame.

The second aspect is realised through the transfer of the semantic frame and valence patterns assigned to English verbs onto their counterparts in Bulgarian (using the linking between the Princeton WordNet and the Bulgarian WordNet).

The third aspect concerns the information about the lexical units evoking the FrameNet frames as reflected in the annotated examples in the FrameNet corpus. These reflect Fillmore's theory (Fillmore 1982: 376) on distinguishing 'case frames' as the structures in actual individual sentences in which the verbs could appear from 'case frame features' as representations of the class of 'case frames' into which particular verbs could be inserted, where 'cases' can be obligatory or optional and associated with some selectional dependencies. Each example for the realisation of a lexical unit in the FrameNet corpus of examples is supplied with annotation of the syntactic components expressing the relevant frame elements. In such a way

additional information is obtained about: (i) the combinatorial properties observed for a lexical unit through the so-called valence patterns, i.e. the particular combinations of both core and non-core frame elements that actually occur in the examples; (ii) the syntax-semantic interface, or the regularities in the syntactic projection of frame elements into the syntactic positions in clauses/sentences; (iii) the syntactic groups whereby each frame element is realised, along with their morpho-syntactic properties, lexical items that introduce them (prepositions, complementisers), etc.

The semantic frames are relatively invariable cross-linguistically in terms of the semantic information as they are grounded in human cognition and the conceptualisation of situations. To some extent generalised valence patterns are also valid across many languages. Observed variations cross-lingually are even more interesting as they point to potential language-specific properties of individual lexical units that may capture important cross-lingual contrasts. While being much more language-specific, the level of the syntax-semantics interface may be used as a point of departure in observing the syntactic realisation within and across languages, especially with a view to cross-lingual comparison and insights into the causes for variation. In FrameNet the projection of frame elements into syntactic positions is implemented in a straightforward manner by associating each frame element with a syntactic category that is further specified for its grammatical function – e.g. subject (NP.Ext) and object (NP.Obj). This declarative linking enables the direct observation of the syntactic properties and behaviour of lexical units.

While there certainly are mismatches in the syntactic categories whereby frame elements are expressed across languages, differences are found particularly at the level of grammatical features, categories and constructions. For instance, Bulgarian lacks *-ing* and infinitive clauses, so propositional complements will be realised as finite clauses; Bulgarian has impersonal verbs so there are impersonal sentences, whose English counterparts would involve a dummy subject, etc. In addition, languages may also differ in terms of the overtness of syntactic information, i.e. the possibility to leave an obligatory element non-explicit (null instantiations retrievable from the context or the grammatical construction); the language-specific diatheses, constructions, word order, morphosyntactic features, etc. The specific inventories of linguistic means serving to introduce certain frame elements such as prepositions, conjunctions, *wh*-words, etc. is to a great degree language-specific.

The semantic and syntactic annotation undertaken within the FrameNet project provides valuable observational data, whose validity we test for the Bulgarian counterparts of the verbs in the selected frames as represented in the dataset of annotated Bulgarian examples. In particular, we check the applicability of the valence patterns attested for the English verbs included as lexical units in FrameNet to their Bulgarian counterparts. This is possible due to the fact that part of the English synsets (and by virtue of the interlingual correspondence between equivalent senses, the Bulgarian synsets as well) have been mapped to FrameNet frames (Leseva, Stoyanova 2020). The analysis of valence patterns may be extended to members of Princeton WordNet synsets and their Bulgarian counterparts which do not have a correspondence in FrameNet but have been

assigned a suitable frame automatically within some of the efforts at aligning FrameNet and WordNet described in Section 3. This is particularly applicable to the analysis of examples extracted from SemCor, BulSemCor or other annotated resources, where other verbs evoking a given frame but not included in FrameNet may be found.

For instance, the synset {announce, denote}, ‘make known; make an announcement’ is assigned the semantic frame **Statement** by virtue of the fact that the synset member *announce* has a counterpart with a matching sense among the lexical units in FrameNet evoking the frame **Statement**. By extension, initially the same frame has been assigned to the synset {blare out, blat out}, ‘announce loudly’, neither member of which has a matching lexical units in FrameNet⁵, through an automatic procedure making use of the fact that it is a hyponym of {announce, denote} and shares its central meaning component. Our assumption⁶ is that since the meaning of the hyponym is a concretisation of the meaning of the hypernym, then the frame evoked by the hyponym will either be the same as that of the hypernym, or be a more concrete frame related to the frame of the hypernym. From this assumption, we proceed to analyse whether the sense of this synset is indeed appropriately described by this semantic frame and whether the syntactic realisation of its members follows the valence patterns typical for the frame. Once the validity of assignment of the semantic frame is established, using the correspondence between the equivalent synsets in the Princeton WordNet and BulNet, the assignment of the **Statement** frame to {blare out, blat out} is straightforwardly transferable to the respective Bulgarian synset and to the instantiations of its members in the Bulgarian annotated dataset.

In examining the semantic and syntactic properties of individual verbs, we take into account both the most frequent valence patterns for the relevant frame obtained by aggregating the valence patterns for all the verbs that evoke it (Table 1) and the valence patterns typical of the individual verb, or if it does not have a counterpart in FrameNet, its closest match.

⁵ The verb *blare* is found as a lexical unit evoking the frames **Make noise** (as in FN: *Some-where behind her a horn blared*) and **Cause to make noise** (FN: *A nearby car blared its horn loudly*), but these frames involve the production of noises and sounds without a communicative aspect.

⁶ The idea has been already introduced by Koeva (2020: 15 – 16): “Inheritance is important in the way that all noun synsets that are hyponyms of a synset representing a particular semantic class should inherit the properties of this class, and also all verb synsets that are hyponyms of a synset associated with a particular conceptual frame should inherit the properties of this frame ... As for the conceptual frames (if they are correctly defined) within a fine-grained WordNet structure of inheritance relations we can expect that the daughter verb synsets will inherit the conceptual frame assigned on the top of the tree and deviations are expected in two directions: a reduction of a core frame element and a reduction of the members of the set of nouns eligible to express a particular frame element”.

Pattern	#	verbs
[NP.Ext] _{Speaker} [Clause] _{Message}	281	<i>declare, remark, announce</i>
[NP.Ext] _{Speaker} [NP.Obj] _{Message}	191	<i>explain, note, declare, announce</i>
[NP.Ext] _{Speaker} [Quote] _{Message}	143	<i>explain, insist, propose, announce</i>
[NP.Ext] _{Speaker} [PP] _{Topic}	83	<i>explain, gloat, preach, report</i>
[NP.Ext] _{Medium} [Clause] _{Message}	39	<i>note, declare, allege, announce</i>

Table 1. A sample of the most frequent valence patterns in the frame **Statement**

The comparison between the aggregated valence patterns for the semantic frame and the individual valence patterns for a given verb shows the similarities and differences between the observations for the verbs in the frame in general and the observations for the particular verb. In Section 5 we present a case study on communication verbs and illustrate their general semantic and syntactic properties and behaviour as represented in the FrameNet corpus and the Bulgarian annotated dataset. In Section 6 we zoom in on several high frequency Bulgarian verbs evoking the frames **Statement** and **Telling**. We analyse their semantic and syntactic features, pointing out certain specificities, in comparison with each other and against the characteristics of their English counterparts retrieved from the data in the FrameNet corpus.

5. A case study: verbs of communication

Below we discuss verbs of communication with the objectives to: (a) validate the conceptual description available in the lexical-semantic resources against corpus data for Bulgarian; and (b) demonstrate the language-independent principles and the cross-lingual validity of the semantic frames **Communication**, **Statement** and **Telling**, the attested valence patterns and (partly) the syntactic description of frame elements for the pair English-Bulgarian. Speech act verbs have been discussed by many authors with a particular focus on their semantic and syntactic properties and classification (Wierzbicka 1987; Levin 1993: 202 – 211; Levin et al. 1997; Urban, Ruppenhofer 2001; Boas 2010, among others).

Our observations are performed on a dataset of 4,525 annotated illustration examples containing verbs of communication representing 863 different valence patterns in English extracted from FrameNet, and additional 890 manually

annotated sentences representing 136 different valence patterns in Bulgarian. The annotation of the Bulgarian sentences follows the FrameNet annotation guidelines (Ruppenhofer et al. 2016: 19 – 52) and consists in labelling the sentence components with the frame elements they realise. We should also note that the data presented reflect the distribution in our datasets. Some valence patterns that are missing from the data for Bulgarian are actually represented in the language but are either less frequent or the selection of examples may have been skewed towards certain patterns.

5.1. Organisation of FrameNet frames within the class of verbs of communication

The prototypical frame characterising the studied domain is the frame **Communication**. It describes the general scenario of people or entities interacting to the end of imparting or exchanging information in terms of the participants and circumstances involved and the relations between them. This scenario is then elaborated in various ways in more specific frames. The frames in this class form a shallow hierarchical structure branching from **Communication** mainly through the frame-to-frame relations of inheritance (FrameNet relation **Inherits from**) and weak inheritance (FrameNet relation **Uses**). The structure is shown in Figure 2.

For each such frame discussed below (**Communication**, **Statement** and **Telling**), we present: (i) its semantics in terms of the semantic frame definition, constellation of core frame elements that represent the main participants in the situation, and the relations among them as described in FrameNet, together with (ii) the syntactic expression of the frame elements in English (according to the annotation in the FrameNet corpus) and Bulgarian (as observed in the annotated dataset), and (iii) the specifics of their realisation in Bulgarian as compared to English.

5.2. The prototypical frame of the communication domain: Communication

5.2.1. General description

Communication is the prototypical frame that represents the basic conceptual structure of the activity of communication. It describes a directed act of communication where a **Communicator** produces a **Message** (on a **Topic**) and directs it towards an **Addressee**⁷. It includes various forms of communication,

⁷ The frame elements are defined as follows: **Communicator**: “The sentient entity that uses language in the written or spoken modality to convey a **Message** to the **Addressee**.”; **Medium**: “The physical or abstract setting in which the **Message** is conveyed.”; **Message**: “**Message** is a proposition or set of propositions that the **Communicator** wants the **Addressee** to believe or take for granted.”; **Topic**: “The **Topic** is the subject matter to which the **Message** pertains. It is normally expressed as a PP Complement headed by “about”, but in some cases it can appear as a direct object.”; **Addressee** (non-core): “The **Addressee**

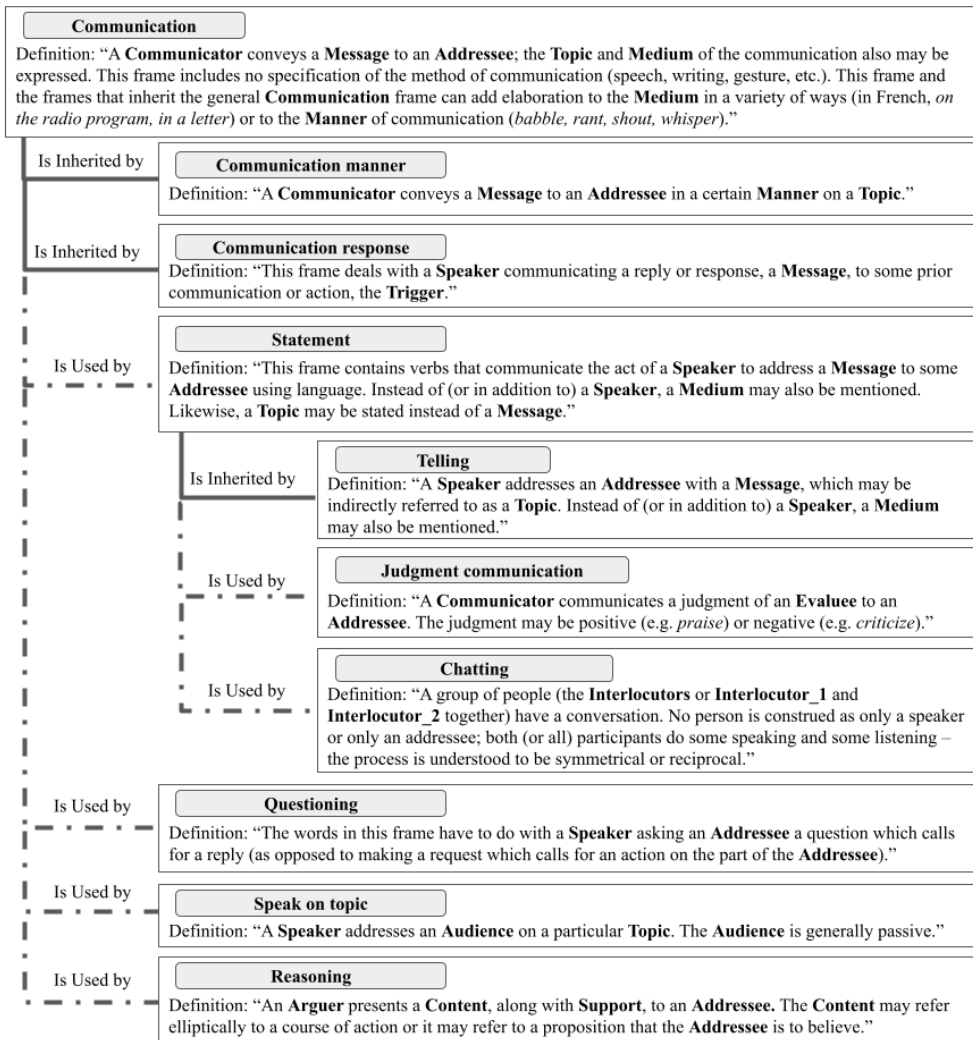


Figure 2. Hierarchical structure of the semantic frames describing communication verbs

both verbal and non-verbal. This basic structure is further elaborated (narrowed down, profiled or otherwise specialised) in the frames that inherit it. The FrameNet frame **Communication** is evoked by a limited number of verbs – *communicate, convey, indicate, share*. Although pertaining to the prototypical frame, these verbs

receives a **Message** from the **Communicator**". For the relevant definitions in the remaining frames discussed herein, see the respective representation in FrameNet: https://framenet.icsi.berkeley.edu/framenet_search.

are not the most frequent ones associated with the activity of communicating, which are in fact described in more elaborate semantic frames inheriting from **Communication**, such as **Statement**, **Telling**, **Communication noise**, etc.

The prototypical frame presents a generalised communication scenario elaborated by more concrete semantic frames in the following ways:

- (i) by limiting the scope of the method of communication. For instance, while the frame **Communication** covers the general scenario of either verbal or non-verbal communication, some frames are constrained in this respect, e.g. **Statement**, evoked by verbs such as *say*, *state*, *declare*, involves speech;
- (ii) by specifying the instrument (**Means**), i.e. the physical entity, channel, medium, form or technology required or involved to carry out the communication, as in the frame **Communication means** (e.g., *fax*, *phone*, *radio*);
- (iii) by specifying the manner of verbal communication according to various criteria such as loudness (e.g., *shout*, *whisper*); volubility and/or mood (e.g., *babble*, *rant*), distinctness (e.g., *slur*, *stutter*, *mutter*), among many others (**Communication manner**);
- (iv) by elaborating or specialising on the meaning of the **Communication** frame in such a way that the more concrete frames inherit only part of its frame elements, do not inherit them in a straightforward manner or introduce additional frame elements. For instance, the frame **Judgment communication**, which Uses **Statement**, does not conceptualise the **Message**. The lexical units evoking this frame, such as the verbs *criticise*, *praise*, *belittle*, express positive or negative judgement, which is incorporated in the lexical unit and may be viewed as a proxy of the message. Besides, the frame introduces the frame elements **Evaluee**, i.e. the object being judged, **Expressor** (the body part expressing the judgement) and **Reason** (the state-of-affairs that describes the justification or reason for the judgement);
- (v) by narrowing down the semantic class of the frame elements. For instance, in some frames the **Communicator** is specialised as a **Speaker** who delivers a message verbally (e.g., the frame **Statement**), or as an **Interlocutor**, who switches between the roles of a speaker and an addressee (e.g., the frame **Chatting**).

The incorporation of frame elements (Jackendoff 1990: 164 – 165) is a specific type of frame specialisation whereby a certain frame element is integrated in the meaning of a verb as a result of which this frame element is usually left unexpressed (Ruppenhofer et al. 2016: 30). For example, the frame **Communication means** describes situations that are characterised by concrete means with the aid of which communication takes place; the various **Means** are incorporated in the meaning of the respective verbs, e.g. *fax*, *telephone*, *email*.

5.2.2. Syntactic realisation of the frame elements in the **Communication frame**

Below we describe the syntactic realisation of the most essential frame elements in the **Communication** frame as both their definition and their syntactic characteristics and behaviours determine to a great degree the specificities of the frame elements in the more concrete frames. Koeva (Koeva 2020) gives a general overview of the syntactic realisation of verb frame elements and the representation of syntactic information in various semantic resources. Koeva (Koeva 2019: 60 – 61) presents the complements that transfer of information verbs take in Bulgarian, among other verb classes. These are relevant for the analysis of the syntactic realisation of frame elements in the frames evoked by communication verbs.

As the annotated FrameNet examples show, the **Communicator** is expressed as the subject of the respective sentence or clause. According to the annotation conventions adopted in the resource (Ruppenhofer et al. 2016: 71 – 72), the subject is marked with the label NP.Ext (standing for external argument). The frame element may be syntactically unexpressed. In such cases, it is annotated as a definite null instantiation (DNI) if its referent is retrievable from the previous context, or as a constructional null instantiation (CNI), when it remains implicit by virtue of the grammatical construction, e.g. in passive or infinitive clauses.

The analysis of the FrameNet valence patterns shows that the **Message** is realised as a direct object (NP.Obj) (1.c.), as a complement clause (Clause) (1.a.) or as a quote (Quote) (1.e.). Quotes represent the content of the **Message** as directly stated by the **Communicator** in their own words, while clauses denote it as being retold by someone (as reported speech). A **Message** realised as a direct object constitutes a nominalisation which rephrases its content in a more concise way or as a generalised idea. In a considerable portion of the cases (around a third) the **Message** is annotated as an indefinite null instantiation (INI). This means that the verb is used intransitively, the **Message** remains syntactically unexpressed and receives a certain typical interpretation without a specific discourse referent (Ruppenhofer et al. 2016: 19 – 21).

The FrameNet examples show that the **Topic** is rarely expressed, with a limited number of annotated examples for all of the studied frames. It is usually realised as a prepositional phrase most often headed by ‘about’, but this may vary from verb to verb (1.b., 1.d.). An alternative way of realising the **Topic** is as a modifier of a noun expressing the **Message**; such cases corroborate syntactically its semantic dependence on the **Message** communicated. In the absence of an overt **Message**, the **Topic** may be expressed as an independent phrase (1.d.); this is one of the typical valence patterns of its realisation as attested in the more specific communication frames. Rarely, such a phrase appears in the presence of a **Message** (1.e.).

The **Medium** is expressed either as a prepositional phrase, or as the subject in the case of a non-overt **Communicator**.

The **Addressee** is either realised as a prepositional phrase or is left unexpressed, although its presence is always required conceptually as any act of communication

is directed to someone. Predominantly, the non-overt **Addressee** frame elements are marked as indefinite null instantiations (INI).

- 1.a. [*Iranian officials*]_{Communicator} **INDICATE** [*that Iran would honor its safeguards agreement with the IAEA*]_{Message} []_{Addressee-INI}.
- 1.b. [*They*]_{Communicator} *can easily* **COMMUNICATE** []_{Message-INI} [*with one another*]_{Addressee}.
- 1.c. [*The letter*]_{Communicator} **COMMUNICATED** [*nothing*]_{Message} [*of her pleasure*]_{Topic}.
- 1.d. [*I*]_{Communicator} **COMMUNICATED** [*with the Minister*]_{Addressee} [*on that issue*]_{Topic}.
- 1.e. [*“That was an incredible experience!”*]_{Message} [*he*]_{Communicator} **SHARED** []_{Addressee} [*about the trip*]_{Topic}.

The following clarifications should be made. FrameNet accounts for the conceptual interdependence observed among some semantic arguments of verbs, specifically the fact that “the presence of any member of the set is sufficient to satisfy a semantic valence of the predicator” by grouping the relevant frame elements in the so-called coreness sets, or Core Sets (Ruppenhofer et al. 2016: 25 – 26). The correlations in the syntactic expression of different frame elements outlined above follow from such semantic dependencies. In particular, two Core Sets are specified in the **Communication** frame: {**Communicator, Medium**} and {**Message, Topic**}. The former one {**Communicator, Medium**} captures the generalisation that, while the **Medium** is the “setting” used by the **Communicator** to deliver the **Message**, some types of **Medium** may be construed as the sources or expressors of the **Message** independently in the absence of an expressed **Communicator**, who is nonetheless conceptually present. This enables the realisation of either or both elements in the set. The latter Core Set accounts for the intrinsic dependence that holds between the **Topic** and the **Message**, stemming from the fact that the **Topic** is the subject matter of the **Message** and therefore it is always predicated on the existence of a **Message**. This dependence presupposes the variants in the expression of the two frame elements, as discussed in Sections 5 and 6. Core Sets are also inherited among frames (although not always in a straightforward manner, see Ruppenhofer et al. 2016: 27), reflecting the preservation of the semantic dependencies among frame elements. In the frames discussed below this observation is fully confirmed.

In Bulgarian the core frame elements are expressed in similar configurations of frame elements realised by means of mostly the same syntactic categories as in English (Table 2) as illustrated in Example 2. In particular, the **Communicator** is most frequently the subject; the **Message** is realised as an NP object (2.a. – 2.c.) or more rarely (although varying from verb to verb) as a complement clause (2.d.) or a quote (2.e.). When overt, the **Addressee** is expressed as a prepositional phrase (2.b.). Example (2.a.) shows the **Topic** realised as a prepositional phrase that modifies the **Message** head noun. However, as noted earlier, it may also be

expressed as an independent phrase even in the presence (but most often in the absence) of the **Message** (2.e., which is a translation of 1.e.).

2.a. [Te]_{Communicator} СЪОБЩАВАТ [съответната информация]_{Message} [за дейността си]_{Topic}.

They COMMUNICATE relevant-DEF information about activity-DEF REFL.POSS.

‘They communicate relevant information about their activity.’

2.b. [Te]_{Communicator} СЪОБЩАВАТ [на Комисията]_{Addressee} [текста на разпоредбите]_{Message}.

They COMMUNICATE to Commission-DEF text-DEF of measures-DEF.

‘They communicate to the Commission the text of the measures.’

2.c. [Органите]_{Communicator} СЪОБЩАВАТ [цялата информация]_{Message} []_{Addressee}.

Authorities-DEF COMMUNICATE all-DEF information.

‘The authorities communicate all essential information.’

2.d. [Страните]_{Communicator} ПОСОЧВАТ, [че поверителната информация не може да бъде резюмирана]_{Message} []_{Addressee}.

Parties-DEF INDICATE that confidential-DEF information cannot be summarised.

‘The parties indicate that the information cannot be summarised.’

2.e. [– Невероятно преживяване!]_{Message} – СПОДЕЛИ [той]_{Communicator} []_{Addressee} [за пътешествието си]_{Topic}.

– Quite an experience! – SHARED he about trip-DEF REFL.POSS.

‘‘That was quite an experience!,’’ he shared about the trip.’

The summary of the most frequent valence patterns attested for **Communication** verbs in the FrameNet corpus and in the Bulgarian annotated dataset (Table 2) shows the distribution of these patterns across verbs in the two languages with the corresponding number of examples. The corpus occurrences in both English and Bulgarian fall into several valence patterns that involve basically the **Communicator** and the **Message**, while the **Addressee** is more frequently non-overt. Valence patterns involving the **Medium** and the **Topic** are quite rare, possibly due to the relatively small dataset.

Valence patterns	#	EN verbs	#	BG verbs
[NP.Ext] _{Communicator} [NP.Obj] _{Message} [PP] _{Addressee}	11	<i>communicate,</i> <i>signal</i>	50	<i>предавам / предам,</i> <i>споделям / споделя,</i> <i>съобщавам /</i> <i>съобщя</i>
[NP.Ext] _{Communicator} [PP] _{Addressee} [] Message-INI	7	<i>communicate</i>		

[NP.Ext] _{Communicator} [] _{Addressee-INI} [NP.Obj] _{Message}	5	<i>communicate</i>	9	<i>споделям / споделя, предавам / предам</i>
[NP.Ext] _{Communicator} [] _{Addressee-INI} [] _{Message-INI}	4	<i>communicate</i>		
[NP.Ext] _{Communicator} [Clause] _{Message} [] _{Addressee-INI}	4	<i>indicate, say, signal</i>	2	<i>съобщавам / съобща</i>
[NP.Ext] _{Message} [PP] _{Addressee} [] Communicator-CNI	3	<i>communicate</i>		
[NP.Ext] _{Communicator} [] _{Addressee-DNI} [NP.Obj] _{Message}	3	<i>communicate, indicate</i>	9	<i>споделям / споделя, предавам / предам</i>
[NP.Ext] _{Communicator} [PP] _{Addressee} [NP.Obj] _{Message} [PP] _{Topic}	2	<i>communicate</i>	1	<i>съобщавам / съобща</i>
[NP.Ext] _{Medium} [] _{Addressee-INI} [Clause] _{Message}	2	<i>indicate</i>		

Table 2. FrameNet valence patterns of **Communication** verbs, with their frequency in the FrameNet corpus and the verbs they appear with, compared with the Bulgarian data

Table 3 summarises the generalised semantic classes of the nouns representing the frame elements with a particular syntactic realisation. Frame elements also form a shallow hierarchical structure based on the inheritance relations between the corresponding frames (as illustrated for the elements Communicator > Speaker > Interlocutor in Section 3), where the subordinate elements possess additional or more specific semantic properties.

Frame	Frame element	Syntactic realisation	Most typical semantic class
Communication	Communicator	NP	{person}
Statement, Telling	Speaker	NP	{person}
Telling	Addressee	NP	{person}
Communication, Statement	Addressee	PP	<i>to</i> + {person}
Communication, Statement, Telling	Message	NP	{message}
		Clause	N/A
		Quote	N/A
Communication, Statement, Telling	Topic	NP	{entity}
		PP	<i>about</i> + {entity}

Table 3. A summary of the semantic classes and the syntactic specificities of the main frame elements in the frames of the communication domain

5.3. Statement

5.3.1. General description

The semantic frame **Statement** inherits from the prototypical frame **Communication** via the weak-inheritance relation **Uses** and specifies communication involving the expression of a verbal (written or oral) message. In terms of the number of verbs it evokes, including many general lexis verbs, such as *say, state, declare, speak, report, note*, etc., it may be considered the most representative frame of verbal communication.

The core frame elements in terms of which the frame is described include: **Speaker, Message, Medium** and **Topic**. While conceptually implied in the act of communication, the **Addressee** is not specified as a core element of the frame. This reflects the fact that the semantic core of the lexical units evoking the frame **Statement** is considered to be the process or event of the **Message** being conveyed by the **Speaker**. This may be observed in the valence patterns common for the frame (Table 4), where the various combinations of the **Speaker** and the **Message** account for most of the frequent valence patterns (the **Message** can be substituted by its **Topic**). The (intended) receiver of the **Message**, i.e. the **Addressee**, is semantically backgrounded and thus considered optional and often left syntactically non-overt. When it is expressed, it is usually together with the **Message** (Table 4). Even when non-overt, we take the **Addressee** into account in the process of annotation.

5.3.2. Syntactic realisation of the frame elements in the Statement frame

The fact that **Statement** represents an elaboration of **Communication** involving language and the faculty of speech is reflected in FrameNet through the reconsideration of the frame element **Communicator** of the parent frame as the more specific **Speaker**, which denotes the person who produces the message. Likewise, the **Speaker** is realised as the external NP.

The **Medium** and the **Speaker** share the same relation of interdependence as the **Medium** and the **Communicator** in the **Communication** frame, forming a CoreSet, meaning that the expression of only one of them is sufficient to realise the semantic valence of the verb. This results in the possibility for the **Medium**, which in the presence of an overt **Speaker** is expressed as a prepositional complement, to occupy the subject position if the **Speaker** has an implied, non-specified reading and is left unexpressed (3.f.).

According to the data, the **Message** is most often expressed either as a subordinate clause, an NP object, or a direct quote rendering the content being conveyed (Example 3.a. – 3.c.). The possible realisations vary across verbs: some of them have a stronger tendency to take a complement subordinate clause (e.g., *claim, suggest, note*), while others favour an NP object (e.g., *profess, reiterate, relate*) or a quote (e.g., *exclaim*); in some cases the three realisations are relatively equally represented (e.g., *caution*).

The **Topic** is usually expressed as a prepositional phrase headed by various prepositions depending on the particular verb (e.g. *speak about him, speak of him, preach of heaven, comment on the protests, comment upon the economic conditions*). The nature of the relation existing between the **Message** and the **Topic**, as explained in the subsection on the **Communication** frame, is one of interdependence, which allows only one of the two frame elements to be present for an utterance to be semantically and grammatically felicitous. Indeed, in most examples in the dataset either the one or the other is expressed overtly, although the two may also co-occur. In the latter case, the **Topic** is usually syntactically dependent on the **Message** (3.b.). Though rarely, as attested for some verbs, it can even be projected as a direct object (3.d.). This is possible when the **Topic** stands for the **Message** in its absence.

When expressed, the **Addressee** is realised as a prepositional phrase usually headed by the preposition *to* (3.d.) or as an indirect object (3.e.); as shown in Table 4, the valence patterns involving this frame element are quite infrequent.

- 3.a. [*North Korea*]_{Speaker} CLAIMED [*it had no intention of producing nuclear weapons*]_{Message}.
- 3.b. [*He*]_{Speaker} SAID [*little*]_{Message} [*about the case*]_{Topic}.
- 3.c. [*He*]_{Speaker} ADDED: [*'Eldorado is a brave venture'*]_{Message}.
- 3.d. [*The doctor*]_{Speaker} EXPLAINED [*the injuries*]_{Topic} [*to the police*]_{Addressee}.
- 3.e. [*The agency*]_{Speaker} WROTE [*me*]_{Addressee} [*that you had moved*]_{Message}.
- 3.f. [*The letter*]_{Medium} ALLEGED [*serious breaches of the law*]_{Message}.

The syntactic realisation of the frame element configurations in Bulgarian closely resembles that in English. The **Speaker** is usually realised as the external NP and can be a person, a group or an organisation (4.a., 4.b.). In some cases the **Medium** can take the position of the external argument (4.c.).

The types of complements selected by communication verbs have been described by Koeva (Koeva 2019: 60 – 61). More specifically, she divides ‘transfer of information verbs’ into three groups according to their general meaning and complements: (i) verbs with a direct object addressee (these cover the verbs in the **Telling** frame); (ii) verbs with an indirect object addressee (introduced by the preposition *na* (*to*), which cover **Statement** verbs and possibly verbs evoking some other frame); (iii) verbs with an unexpressed addressee. In the first case, (i), the information transferred (i.e. the message) is expressed by a PP headed by the preposition *za* (*about*) and/or a complement *ue*-clause (*that*-clause) or an embedded *wh*-question; in the second, (ii), the message is rendered as an object NP alternating with a complement *ue*- or *wh*-clause or as a PP headed by *za* (*for, about*) and/or a complement *ue*- or *wh*-clause; in the third, (iii), the information transferred may be projected as a complement *ue*- or *wh*-clause alternating with an object NP, or as a PP headed by *za* (*for, about*) and a complement *ue*- or *wh*-clause. The valence pattern where the **Message** is realised as a *za*-PP and a complement clause is not represented in our dataset.

In this Section as well as in Sections 5.4, 6 and 7 we elaborate on these observations and look into the distribution and possibly at certain specifics of the different types of complements as compared with English.

The **Message** is likewise realised as a finite clause, an object NP or a direct quote (4.a., 4.b., 4.f.). The **Topic** (4.d.) and the **Addressee** (4.b.) have the same syntactic behaviour as expected: they are frequently non-overt, and when they are explicit, they are expressed as prepositional phrases. The **Topic**'s dependent or independent expression follows the same valence patterns as in English.

4.a. [*Панайотов*]_{Speaker} *ДОБАВИ*, [*че лидер на партията ще е Симеон*]_{Message}.

Panayotov ADDED that leader-DEF of party-DEF will be Simeon.

'Panayotov added that Simeon will be the leader of the party.'

4.b. [*Кредитните институции*]_{Speaker} *ДОКЛАДВАХА* [*на Алън Грийнспан*]_{Addressee} [*повишено ниво на покупки*]_{Message}.

Credit institutions REPORTED to Alan Greenspan increased level of purchases.

'Credit institutions reported to Alan Greenspan increase in purchases.'

4.c. [*Неофициалните статистики за 1999 г.*]_{Medium} *СОЧАТ* [*5000 посетители*]_{Message}.

Unofficial-DEF statistics for 1999 REPORT 5000 visitors.

'The unofficial statistics for 1999 report 5000 visitors.'

4.d. [*Тези лица*]_{Speaker} *ИЗКАЗВАТ* [*пред нас*]_{Addressee} [*неприятни истини*]_{Message} [*за смъртните ни врагове*]_{Topic}.

These people REPORT to us unpleasant truths about mortal-DEF our enemies.

'These people report to us unpleasant truths about our mortal enemies.'

4.e. [*В интервюто*]_{Medium} [*Симеон*]_{Speaker} *ОБЯВИ* [*промяна на политическата посока*]_{Message}.

In interview-DEF Simeon ANNOUNCED change of political-DEF direction.

'In the interview Simeon announced a change in the political direction.'

4.f. [*Тя го каза просто така*]_{Message} – *ДОБАВИ* [*Дженифър*]_{Speaker}.

She it said just so – ADDED Jennifer.

“She said it just like that,” added Jennifer.'

The various specific configurations of frame elements as expressed by verbs in the **Statement** frame are shown in Table 4.

Valence patterns	#	EN verbs	#	BG verbs
[NP.Ext] _{Speaker} [Clause] _{Message}	281	<i>explain, note, declare, maintain, remark, mention, conjecture, reiterate, assert, preach, claim, attest, state, caution, write, add, allege, exclaim, say, suggest, insist, propose, announce, confirm, acknowledge, proclaim, reaffirm, report, pronounce</i>	67	<i>казвам / кажа, добавям / добавя, коментирам, заявявам / заявя, обявявам / обявя, обяснявам / обясня, отбелязвам / отбележа, пиша, твърдя, посочвам / посоча, предлагам / предложа</i>
[NP.Ext] _{Speaker} [NP. Obj] _{Message}	191	<i>explain, note, declare, tell, conjecture, reiterate, assert, preach, claim, speak, talk, state, caution, write, add, al lege, exclaim, say, suggest, propose, announce, confirm, acknowledge, refute, proclaim, reaffirm, report</i>	29	<i>казвам / кажа, коментирам, обявявам / обявя, оповестявам / оповестя, повтарям / повторя, посочвам / посоча, предлагам / предложа, съобщавам / съобщя</i>
[NP.Ext] _{Speaker} [Quote] _{Message}	143	<i>explain, gloat, declare, remark, observe, mention, reiterate, hazard, assert, preach, speak, attest, state, caution, write, add, allege, exclaim, say, pout, suggest, insist, propose, announce, proclaim, reaffirm, report</i>	48	<i>казвам / кажа, добавям / добавя, коментирам, заявявам / заявя, обявявам / обявя, обяснявам / обясня, пиша, твърдя, отбелязвам / отбележа, повтарям / повторя, съобщавам / съобщя</i>
[NP.Ext] _{Speaker} [] Message-INI [PP] _{Topic}	83	<i>explain, gloat, preach, report, comment, remark, speak, talk, write</i>		
[NP.Ext] _{Medium} [Clause] _{Message}	39	<i>note, declare, allege, say, suggest, propose, announce, confirm, acknowledge, proclaim, report, claim, state</i>		
[NP.Ext] _{Speaker} [PP] Addressee [NP.Obj] _{Message}	28	<i>reiterate, declare, report, say, speak, state, suggest, propose, announce, mention</i>	2	<i>обяснявам / обясня</i>
[NP.Ext] _{Speaker} [PP] Addressee [Quote] _{Message}			5	<i>казвам / кажа, заявявам / заявя</i>

[NP.Ext] _{Speaker} [PP] Message	28	<i>profess, declare, preach, say, speak, de scribe, insist, caution</i>		
[NP.Ext] _{Speaker} [PP] Addressee [Clause] _{Message}	25	<i>add, explain, declare, allege, suggest, insist, propose, announce, mention, confirm, preach</i>	9	<i>заявявам / заявя, обяснявам / обясня, предлагам / предложи, съобщавам / съобща</i>

Table 4. FrameNet valence patterns of **Statement** verbs, with their frequency in the FrameNet corpus and the verbs they appear with, compared with the Bulgarian data

5.4. Telling

5.4.1. General description

The frame **Telling** is evoked by a small number of frequently occurring verbs such as *tell, advise, inform, notify*, etc. The frame inherits from **Statement** and its specialisation consists in describing the speech act as directed to a specific **Addressee**. This shift of focus from the production of the **Message** to the recipient who is addressed with the message, results in the promotion of the frame element **Addressee** to core status, and with most of the verbs (*inform, advise, confide, notify*) it is the one favoured for the direct object position.

The core frame elements are: **Speaker, Addressee, Message, Medium, Topic**. The frame elements generally have the same characteristics as the ones in the **Statement** frame from which they inherit their properties.

The most frequent valence patterns observed in the data are shown in Table 5 in a comparative perspective between English and Bulgarian. Some patterns, although rare (and thus not present in the annotated data for Bulgarian), are still possible (pattern [NP.Ext]_{Speaker} [NP.Obj]_{Addressee} [PP]_{Message?} 6.f.). More data are needed to ensure reliable cross-lingual comparative analysis.

5.4.2. Syntactic realisation of the frame elements in the Telling frame

The **Speaker** (or in its absence, the **Medium**) usually takes the position of the subject (external NP). As clearly shown in Table 5, most often the **Addressee** is expressed as an NP object (5.b.), and it can be the indirect object NP in a double-object construction (5.c.). With some verbs the **Addressee** may only be expressed as a PP, e.g. *confide* (5.a.), or, as with *tell*, may alternate with an NP object (compare 5.c. and 5.f.). The **Message** is most often realised as a subordinate clause (5.d., 6.c.), a prepositional phrase (5.e., 5.g.) or as a quote, and more rarely as an object NP (cf. Table 5). In the latter case the **Addressee** is expressed as a PP (5.a., 5.f.) or as an indirect object NP (in a double-object construction). Instead of the **Message** or alongside it, the **Topic** may be realised as a prepositional phrase (5.b.).

5.a. [A doctor]_{Speaker} *must not CONFIDE* [personal details]_{Message} [to a patient]_{Addressee}.

- 5.b. [They]_{Speaker} *must INFORM* [patients]_{Addressee} [about the side effects]_{Topic}.
 5.c. [My mom]_{Speaker} *TOLD* [the girls]_{Addressee} [a lot of scary stories]_{Message}.
 5.d. [We]_{Speaker} *NOTIFIED* [his cousin]_{Addressee} [that he was in hospital]_{Message}.
 5.e. [He]_{Speaker} *INFORMED* [them]_{Addressee} [of his decision]_{Message}.
 5.f. [_{Speaker}] *TELL* [that]_{Message} [to our teacher]_{Addressee}.
 5.g. [You]_{Speaker} *should NOTIFY* [them]_{Addressee} [of your wish]_{Message}.

In Bulgarian the **Addressee** is expressed as an object NP (6.b., 6.c.) or as a PP (6.a., 6.d.), depending on the particular verb. The **Message** is most often realised as a subordinate clause (6.c.) or a quote (6.a.), and only some verbs realise it as an object NP, in which case the **Addressee** is expressed as a PP (6.d.). Verbs that take an NP **Addressee** may also express the **Message** as a PP (6.e.), but such cases are missing in the Bulgarian corpus data. Instead of the **Message** or alongside it, the **Topic**, may be realised as a prepositional phrase (6.b.).

6.a. [- Днес излизате на свобода]_{Message} – КАЗВА [директорът на затвора]_{Speaker} [на затворника]_{Addressee}.

– Today you go out free – TELLS warden-DEF to convict-DEF.

‘‘Today you are being released,’’ the warden tells the convict.’

6.b. [Той]_{Speaker} *незабавно УВЕДОМЯВА* [за това]_{Topic} [програмния директор]_{Addressee}.

He immediately INFORMS about that programming-DEF director.

‘He shall immediately inform the programming director about that.’

6.c. [Лиман]_{Speaker} [го]_{Addressee} *УБЕРИ*, [че ще успеят]_{Message}.

Leman him ASSURED that they will succeed.

‘Leman assured him that they will succeed.’

6.d. [Момичето]_{Speaker} [й]_{Addressee} *ДОВЕРИ* [най-съкровените си тайни]_{Message}.

The girl to her CONFIDED deepest-DEF REFL.POSS secrets.

‘The girl confided her deepest secrets in her.’

6.e. [_{Speaker}] *УВЕДОМИ* [гу]_{Addressee} [за желанието си]_{Message}.

NOTIFY them about wish-DEF REFL.POSS.

‘You should notify them of your wish.’

6.f. [Тя]_{Speaker} [гу]_{Addressee} *УВЕДОМИ* [за напускането си]_{Message}.

She them NOTIFIED about resignation-DEF REFL.POSS.

‘She notified them about her resignation.’

The prevalent valence patterns for the verbs in the FrameNet frame **Telling** are illustrated in Table 5. The data shows considerable variation in the valence patterns in English and Bulgarian, in particular with respect to the realisation of the **Message** as an object, a clause or a quote, or with respect to allowing null-instantiations of the **Addressee**.

Valence patterns	#	EN verbs	#	BG verbs
[NP.Ext] _{Speaker} [NP.Obj] _{Addressee} [Clause] _{Message}	53	<i>inform, advise, tell, assure, notify</i>	32	<i>уверявам / уверя, уведомявам / уведомя, осведомявам / осведомя</i>
[NP.Ext] _{Speaker} [NP.Obj] _{Addressee} [Quote] _{Message}			9	<i>уверявам / уверя, уведомявам / уведомя</i>
[NP.Ext] _{Speaker} [NP.Obj] _{Addressee} [PP] _{Topic}	30	<i>apprise, inform, advise, tell, notify</i>	5	<i>осведомявам / осведомя, уведомявам / уведомя</i>
[NP.Ext] _{Speaker} [] _{Addressee-DNI} [Clause] _{Message}	26	<i>advise, confide, tell, assure</i>		
[NP.Ext] _{Speaker} [NP.Obj] _{Addressee} [] _{Message-DNI}	20	<i>inform, tell, assure, notify</i>	3	<i>осведомявам / осведомя, уведомявам / уведомя</i>
[NP.Ext] _{Speaker} [NP.Obj] _{Addressee} [PP] _{Message}	20	<i>inform, advise, tell, notify</i>		
[NP.Ext] _{Speaker} [] _{Addressee-DNI} [NP.Obj] _{Message}	16	<i>advise, confide, tell</i>		
[NP.Ext] _{Speaker} [PP] _{Addressee} [NP.Obj] _{Message}	16	<i>advise, confide, tell, notify</i>	14	<i>казвам / кажа, съобщавам / съобщия</i>
[NP.Ext] _{Speaker} [PP] _{Addressee} [Clause] _{Message}			15	<i>казвам / кажа, съобщавам / съобщия</i>
[NP.Ext] _{Speaker} [PP] _{Addressee} [Quote] _{Message}			6	<i>казвам / кажа</i>

Table 5. FrameNet valence patterns of **Telling** verbs, with their frequency in the FrameNet corpus and the verbs they appear with, compared with the Bulgarian data

6. A closer look at Statement verbs

Below we take a more in-depth look at several high-frequency verbs of speech communication in Bulgarian (verbs evoking the frame **Statement**), focusing on the valence patterns and the syntactic expression of each of the considered aspect pairs as reflected in the Bulgarian annotated dataset.

We provide data and comparison among the Bulgarian verbs, on the one hand, and between each of them and its closest English counterpart, on the other. The observations reflect the distribution in the annotated datasets and may be skewed due to the limited number of instances and, possibly, selection bias. The data for English are taken from the lexical entries of the relevant verbs in FrameNet.

Tables 6a – 12a summarise the observations for the Bulgarian verbs. The members of an aspect pair are considered together. Tables 6b – 12b represent a comparison between the Bulgarian verb pairs and their correspondences in English. For a more comprehensive overall picture of the valence patterns across the discussed Bulgarian verbs, a compiled version of the monolingual Bulgarian data in Tables 6a – 12a is provided as Table 15 in the Appendix.

The pair *казвам / кажа* (Table 6a) is represented by several valence patterns involving the **Speaker** and the **Message**, with only a few instances where the **Addressee** is also expressed. Examples including realisations of the **Medium** or the **Topic** have not been found in the data. The comparison with the instances of *say* in FrameNet shows that the number of occurrences of these three frame elements is also very limited (6%, 3% and less than 2.5% of the examples for **Medium**, **Topic** and **Addressee**, respectively). While bearing out this general observation to a considerable degree, some of the verbs represented below (Tables 6a – 12a) show more prominent preference for one or another of these frame elements as compared with the rest of the predicates in the selection. For instance, *обяснявам / обясня* (explain) and *заявявам / заявя* (state) express the **Addressee** much more readily. The verbs differ with respect to the preferred syntactic expression for the individual elements as well.

The **Speaker**, as expected from the aggregated data across the semantic frames in the communication domain, is the subject, to the exception of passive sentences, where most often it remains non-overt (rarely, expressed as a prepositional phrase), and examples where the **Medium** is projected in the subject position.

Below we sum up the observations on the expression of complements. For the **Message** we observe several different valence patterns (see Section 5.3. for a synopsis of Koeva’s findings presented in Koeva 2019).

Казвам / кажа (*say, state*) and *обявявам / обявя* (*announce*) tend to express this frame element in all three possible ways: as a clause (introduced by the complementiser *че* (*that*)), as a direct quote or as an object NP. In the available dataset, the former pair, which represents the prototypical speech communication verbs, gives a slight preference to quotes (~40%) over complement clauses (33%). Both outnumber the realisation as an NP (23.5%), which most often is a non-specific expression, e.g. *нещо* (*thing, something, anything*), *нищо* (*nothing, anything*), *злуноцту* (*nonsense*), which makes a general reference to a proposition, while nominalisations and other types of nouns are not possible. By comparison, with *say*, the distribution of the valence patterns is reversed in favour of finite clauses (about half of the examples), as compared with direct quotes (about a third of the examples). Object NPs are less represented (roughly a tenth of all the instances); similarly to Bulgarian, they denote non-specific nominalised propositions expressed as *thing, anything, something, nothing*, pronouns (e.g. *what*), nominalised quantifiers (e.g. *little*) and the like.

<i>казвам / кажа</i> (<i>say</i>) / No. sentences 51											
	NP.Ext	NP.Obj	PP	AdvP	NI	<i>че</i> -cl	<i>да</i> -cl	Intrg-cl	Quote	Other	Total
Speaker	49				2						51
Message	1	12				17	1		20		51
Addressee			5								5

Table 6a. Valence patterns of *казвам / кажа*

казвам / кажа No. sentences 51 / say No. sentences 371																
	NP.Ext		NP.Obj		PP		NI		Fin-cl		Quote		Other		Total	
	Bg En		Bg En		Bg En		Bg En		Bg En		Bg En		Bg En		Bg En	
Speaker	49	335					2	24							51	359
Message	1	14	12	32					18	178	20	124		37	51	371
Topic						11								2		13
Medium		11				11								1		23
Addressee					5	9									5	9

Table 6b. Comparison of the valence patterns of *казвам / кажа* and *say*

With respect to *обявявам / обявя* the favoured expression of the **Message** is as a subordinate clause (about half of the examples), while object NPs and direct quotes are represented on a par (22.5%). Unlike *казвам / кажа*, the NPs are often nominalisations such as *решение (decision)*, *желание (wish)*, *намерение (intention)*, or nouns unrelated to verbs, e.g. *данни (data)*. *Announce* expresses the **Message** as a subordinate clause also in around half of the occurrences, but favours NP objects (a little over a quarter of the examples) over direct quotes (~15%).

обявявам / обявя (announce) / No. sentences 49											
	NP.Ext	NP.Obj	PP	AdvP	NI	че-cl	да-cl	Intrg-cl	Quote	Other	Total
Speaker	45		1		3						49
Message	2	11				23			11	2	49
Medium			1								1
Addressee			1								1

Table 7a. Valence patterns of *обявявам / обявя*

обявявам / обявя No. sentences 49 / announce No. sentences 85																
	NP.Ext		NP.Obj		PP		NI		Fin-cl		Quote		Other		Total	
	Bg En		Bg En		Bg En		Bg En		Bg En		Bg En		Bg En		Bg En	
Speaker	45	68			1	3	3	9					1	49	81	

Message	2	8	11	22			23	42	11	12	2	1	49	85
Medium		3			1	3							1	6
Addressee					1	7						1	1	8

Table 7b. Comparison of the valence patterns of *объявям / объяв* and *announce*

Заявляюм / заявя (state), добавям / добавя (add), допълвам / допълня (add), отбелязвам / отбележа (note, observe) show preference for expressing the **Message** as a finite subordinate clause or as a direct quote over object NP.

More specifically, *заявляюм / заявя (state)* realises the **Message** as a subordinate *че*-clause in approximately half of the instances (47%), with individual examples of *да*-clauses and interrogative clauses, or as a quote (33%). The numbers for *state* are quite similar with respect to the proportion of finite clauses (48%) and are a little bit smaller for quotes (27%). Object NPs, although rarer, are not limited to words and expressions referring to propositions in a general way (e.g. *thing, something, nothing*), and the examples include words such as *несъгласие (disagreement), позиция (point of view)*, etc.

<i>заявляюм / заявя (state, say, tell) / No. sentences 48</i>											
	NP.Ext	NP.Obj	PP	AdvP	NI	<i>че</i> -cl	<i>да</i> -cl	Intrg-cl	Quote	Other	Total
Speaker	45				3						48
Message		5				21	1	1	15	5	46
Medium			3								3
Addressee			13								13

Table 8a. Valence patterns of *заявляюм / заявя*

<i>заявляюм / заявя No. Sentences 48 / state No. sentences 48</i>																			
	NP.Ext		NP.Obj		PP		NI		Fin-cl		Intrg-cl		Quote		Other		Total		
	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	
Speaker	45	38					3											48	38
Message		3	5	8					22	24	1	1	15	13	5	5		46	48

Medium		9		3	1		4						3	4
Addressee				13	3								13	3

Table 8b. Comparison of the valence patterns of *заявявам* / *заявя* and *state*

The verbs *добавям* / *добавя* and its synonym *допълвам* / *допълня* (*add*) show a similar valence pattern, with prevalence of quotes (53% and 67%, respectively) over *че*-clauses (28% for both verbs). By contrast, in the English dataset we work with, its counterpart the verb *add* also selects predominantly either one or the other type of propositional complement, but the distribution is much more even (36% and 42%). NP objects constitute a small number in both languages and usually refer to words related to information content: *comments*, *details*, *information*, *words*, etc., or in the more general case, *something*, *anything* or the like.

<i>добавям</i> / <i>добавя</i> (<i>add</i>) / No. sentences 42											
	NP.Ext	NP.Obj	PP	AdvP	NI	че-cl	да-cl	Intrg-cl	Quote	Other	Total
Speaker	41										41
Message		6			1	12		1	23		43
Medium	1										
<i>допълвам</i> / <i>допълня</i> (<i>add</i>) / No. sentences 35											
	NP.Ext	NP.Obj	PP	AdvP	NI	че-cl	да-cl	Intrg-cl	Quote	Other	Total
Speaker	35										35
Message		2				10			24		36

Table 9a. Valence patterns of *добавям* / *добавя* / *допълвам* / *допълня*

<i>добавям</i> / <i>добавя</i> / <i>допълвам</i> / <i>допълня</i> No. sentences 76 / <i>add</i> No. sentences 64																		
	NP.Ext		NP.Obj		PP		NI		Fin-cl		Intrg-cl		Quote		Other		Total	
	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En
Speaker	76	61						2							1		76	64
Message		1	8	7			1		22	25	1		47	29	2	3	79	64

Topic					4								4
Medium	1	1										1	1
Addressee					1								1

Table 9b. Comparison of the valence patterns of *добавям / добавя / допълвам / допълня* and *add*

Обяснявам / обясня (explain) selects rather equally a *че*-finite clause, an interrogative clause or a quote (~26%, 23%, 21% of the examples). This goes along with the meaning of the verb as it refers to giving details or elaborating on a certain subject and respectively on the various aspects and circumstances involved (*how, when, where, etc.*). By contrast, at least in the available data, *explain* favours finite clauses (60%) over quotes (25%) and interrogative clauses are represented by a single example. In addition, the verbs show a marked tendency to express the **Topic** (63%) over the **Message** (39%), i.e. to refer to the message by means of elaborating on its subject matter rather than on stating the message itself. For Bulgarian, this number is much smaller (10%). Judging from the examples, this may be due to differences in the construal of what the content of the **Topic** and the **Message** may be, as part of the interrogative complement clauses are annotated as **Topics**.

обяснявам / обясня (explain) / No. sentences 49											
	NP.Ext	NP.Obj	PP	AdvP	NI	че-cl	да-cl	Intrg-cl	Quote	Other	Total
Speaker	45				3						48
Message	2	6			3	11		10	9	2	43
Topic		5									5
Medium	1		3								4
Addressee			19								19

Table 10a. Valence patterns of *обяснявам / обясня*

обяснявам / обясня No. Sentences 49 / explain No. sentences 51																		
	NP.Ext		NP.Obj		PP		NI		Fin-cl		Intrg-cl		Quote		Other		Total	
	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En
Speaker	45	45				2	3	3								1	48	51
Message	2		6	2			3		11	12	10	1	9	5	2		43	20
Topic		3	5	16		6						5					5	32

Medium	1	1		3	4						4	5
Addressee				19	15					1	19	16

Table 10b. Comparison of the valence patterns of *обяснявам / обясня* and *explain*

Отбелязвам / отбележа (*note, remark*) select **Messages** expressed by a *че*-clause or a quote in even proportions. As there are two suitable verbs in the English data (*note* and *remark*) we consider them both. The two verbs show distinct valence patterns: *note* has a preference for finite clauses (85%) and *remark* for quotes (61%).

<i>отбелязвам / отбележа</i> (<i>note, observe, remark</i>) / No. sentences 49											
	NP.Ext	NP.Obj	PP	AdvP	NI	<i>че</i> -cl	<i>да</i> -cl	Intrg-cl	Quote	Other	Total
Speaker	40				5						45
Message	1	4				21			20	3	49
Medium	4		6								10
Addressee			2								2

Table 11a. Valence patterns of *отбелязвам / отбележа*

<i>отбелязвам / отбележа</i> No. sentences 49 / <i>note</i> No. sentences 40, <i>remark</i> No. sentences 39																
	NP.Ext		NP.Obj		PP		NI		Fin-cl		Intrg-cl		Quote		Total	
	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En
Speaker	40	28,37			1	5	9,1								45	37,39
Message	1		4	5,				21	34,6		,3	20	,19	49	40,31	
Topic		1,		1,		,12										2,12
Medium	4	5,1			6	5,1									10	12,2
Addressee					2	,3									2	,3

Table 11b. Comparison of the valence patterns of *отбелязвам / отбележа* and *note, remark*⁸

⁸ The values for *note* and *remark* are separated by a comma.

Настоявам / настоя (insist⁹) select for a **Message** that is a clause (33%), a PP (29%) or a quote (27%); while *insist* favours clauses (51% for clauses, 30% for PPs and 19% for quotes). The Bulgarian verbs are the only ones in this sample that take predominantly a subordinate clause introduced by *да* (non-factitive clauses), whose counterparts in English, strictly speaking, should be subjunctive clauses. In both languages the verbs may also take a prepositional instead of a clausal **Message**.

<i>настоявам / настоя (insist) / No. sentences 48</i>											
	NP.Ext	NP.Obj	PP	AdvP	NI	<i>че</i> -cl	<i>да</i> -cl	Intrg-cl	Quote	Other	Total
Speaker	48										48
Message			14		5	4	12		13		48
Addressee			1								1

Table 12a. Valence patterns of *настоявам / настоя*

<i>настоявам / настоя No. sentences 48 / insist No. sentences 57</i>														
	NP.Ext		NP.Obj		PP		NI		Fin-cl		Quote		Total	
	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En
Speaker	48	54				2		1					48	57
Message		2			14	17	5		4+12	29	13	11	48	57
Addressee					1	3							1	3

Table 12b. Comparison of the valence patterns of *настоявам / настоя* and *insist* (The clauses introduced by *че* (4) and *да* (12) are given separately for reference.)

With respect to the **Addressee**, as noted above, some verbs, such as *заявявам / заявя* and especially *обяснявам / обясня* favour the expression of the (intended) recipient of the message, as their semantics imply the presence of an **Addressee** to whom the content (explanation or statement) is directed. The same goes for *announce* and *explain* in English, and to a lesser extent to both *казвам / кажа* and *say*. The remaining verbs only select for an overt **Addressee** occasionally.

⁹ We discuss the sense corresponding to the FrameNet lexical unit evoking the **Statement** frame and defined as ‘demand or state forcefully, without accepting refusal or contradiction’. The relevant sense is not described in WordNet.

The small number of examples for **Medium** and **Topic** do not allow us to make reliable conclusions. The extension of the datasets would help corroborate or correct the observations.

7. The Addressee as a core frame element in the frame Telling

As already discussed above, the frame **Telling** inherits from **Statement** and elaborates on it by moving the focus of the situation from the **Speaker** and the **Message** onto the **Addressee** receiving the message. This results in the promotion of the **Addressee** to a core status and consequently, its more often than not, overt expression.

In both English and Bulgarian, the frame **Telling** is evoked by two groups of verbs with respect to the realisation of the **Addressee**: (1) verbs that require the **Addressee** to be realised as a direct object NP, and (2) verbs that realise the **Addressee** as an indirect object (as a prepositional phrase, or as a dative pronominal clitic). Tables 13a and 14a show the valence patterns of example verbs from each group; Tables 13b and 14b present a comparison between the Bulgarian verb pairs and their correspondences in English.

Verbs such as *inform, notify, advise, assure* in English, and *уведомявам / уведомя (notify, inform), известявам / известя (notify), информирам (inform), осведомявам / осведомя (inform)* in Bulgarian, belong to the first group for which the **Addressee** is realised as an NP object and the **Message** is expressed as an indirect object, a clause or a quote.

уведомявам / уведомя (inform) / No. sentences 16											
	NP.Ext	NP.Obj	PP	AdvP	NI	ce-cl	da-cl	Intrg-cl	Quote	Other	Total
Speaker	16										16
Message					5	4		1	3		13
Topic			4								4
Addressee			15		1						16

Table 13a. Valence patterns of *уведомявам / уведомя*

уведомявам / уведомя No. sentences 16 / inform No. sentences 39														
	NP.Ext		NP.Obj		PP		NI		Fin-cl		Quote		Total	
	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En
Speaker	16	39											16	39
Message						9	5	3	5	19	3	6	13	37

Topic					4	4						4	4
Addressee			15	37			1	2				16	39

Table 13b. Comparison of the valence patterns of *уведомявам / уведомя* and *inform*

The second group includes verbs such as *confide* in English and *казвам / кажа* (*tell*), *съобщавам / съобщя* (*inform*), *доверявам / доверя* (*confide*) in Bulgarian, for which the **Addressee** is also compulsory but assumes the position of the indirect object as the receiver to whom the message is directed; the **Message** is realised as a direct object, a clause or a quote.

In Bulgarian the aspectual pair *казвам / кажа* (among others) is ambiguous and can correspond to a number of synsets, out of which we are interested in {state, say, tell}, ‘express in words’ (evoking the frame **Statement**) and {tell}, ‘let something be known’ (evoking the frame **Telling**). While in English the verb *tell* can have as a direct object either the **Message** or the **Addressee**, or even express them in a double object construction (5.c.), the verb pair *казвам / кажа* always realises the **Message** in the direct object position and the **Addressee** as an indirect object.

казвам / кажа (tell) / No. sentences 32 (frame Telling)											
	NP.Ext	NP.Obj	PP	AdvP	NI	че-cl	да-cl	Intrg-cl	Quote	Other	Total
Speaker	32										32
Message		11				15			6		32
Topic			6								6
Addressee			32								32

Table 14a. Valence patterns of *казвам / кажа* (frame **Telling**)

казвам / кажа No. sentences 32 / tell No. sentences 104 (frame Telling)																
	NP.Ext		NP.Obj		PP		NI		Fin-cl		Quote		Other		Total	
	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En	Bg	En
Speaker	32	90				9		14							32	104
Message			11	11		9		33	15	35	6	6		10	32	104
Topic					6	31									6	31
Addressee				59	32	3		42							32	104

Table 14b. Comparison of the valence patterns of *казвам / кажа* and *tell* (frame **Telling**)

This is a notable syntactic difference between the corresponding verbs in the two languages, which results in a language specificity of the syntactic expression that needs to be accounted for in the description of the **Telling** frame in English and Bulgarian.

8. Conclusions and future work

The analysis of the conceptual and syntactic properties of English and Bulgarian verbs as attested in the corpora of annotated examples, have helped confirm the applicability of the description provided in the FrameNet frames and annotated dataset to the analysis of Bulgarian verbs by employing the aspects of the semantic and syntactic representation that are relatively language-independent and transferrable cross-linguistically and making the necessary adjustments, where needed.

A study based on corpus analysis and statistical observations on the frequency of valence patterns could provide more reliable evidence for the behaviour of verbs, in particular in view of cross-linguistic studies. Moreover, this will confirm the validity of the cross-linguistic analysis and the universality of semantic and syntactic features.

For Bulgarian and English we have demonstrated substantial correspondence both in terms of the valence patterns and the syntactic categories and grammatical functions whereby frame elements are expressed. A more comprehensive study involving other languages (Slavic and Balkan languages, in particular) may provide a solid theoretical and methodological foundation for comparative/contrastive research into syntax and semantics.

Acknowledgments: This study is carried out as part of the scientific programme under the project *Enriching the Semantic Network WordNet with Conceptual Frames* funded by the Bulgarian National Science Fund (Grant Agreement No. KP-06-N50/1 of 2020).

References

- Baker 2008: Baker, C. F. FrameNet: Present and Future. – In: Webster, J., N. Ide, A. C. Fang (Eds.). *The First International Conference on Global Interoperability for Language Resources*. Hong Kong: City University.
- Baker et al. 1998: Baker, C. F., C. J. Fillmore, J. B. Lowe. The Berkeley FrameNet project. – In: *COLING-ACL '98: Proceedings of the Conference*. Montreal, Canada, pp. 86 – 90.
- Baker, Fellbaum 2009: Baker, C. F., C. Fellbaum. WordNet and FrameNet as Complementary Resources for Annotation. – In: *Proceedings of the Third Linguistic Annotation Workshop (ACL-IJCNLP '09)*. Stroudsburg: Association for Computational Linguistics, pp. 125 – 129.
- Boas 2010: Boas, H. The syntax-lexicon continuum in Construction Grammar: A case study of English communication verbs. – *Belgian Journal of Linguistics*, 24, pp. 54 – 82.

- Burchardt et al. 2005: Burchardt, A., K. Erk, A. Frank. A WordNet detour to FrameNet. – In: *Sprachtechnologie, mobile Kommunikation und linguistische Ressourcen, vol. 8 (Computer Studies in Language and Speech)*. Frankfurt: Lang.
- Das et al. 2014: Das, D., D. Chen, A. F. T. Martins, N. Schneider, N. A. Smith. Frame-Semantic Parsing. – *Computational Linguistics*, 40(1), pp. 9 – 56.
- de Lacalle et al. 2014: de Lacalle, M. L., E. Laparra, G. Rigau. Predicate Matrix: extending SemLink through WordNet mappings. – In: *Proceedings of the Ninth International Conference on Language Resources and Evaluation (LREC'14)*. Reykjavik: European Language Resources Association (ELRA), pp. 903 – 909.
- Fabio et al. 2019: Fabio, A. Di, S. Conia, R. Navigli. VerbAtlas: a Novel Large-Scale Verbal Semantic Resource and Its Application to Semantic Role Labeling. – In: *Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing and the 9th International Joint Conference on Natural Language Processing (EMNLP-IJCNLP)*. Hong Kong: Association for Computational Linguistics, pp. 627 – 637.
- Fellbaum 1998a: Fellbaum, C. A Semantic Network of English Verbs. In: Fellbaum, C. (Ed.). *WordNet: an electronic lexical database*. Cambridge, MA: MIT Press, pp. 69 – 104.
- Fellbaum 1998b: Fellbaum, C. (Ed.). *WordNet: an electronic lexical database*. Cambridge, MA: MIT Press.
- Fellbaum 1999: Fellbaum, C. The Organization of Verbs and Verb Concepts in a Semantic Net. – In: Saint-Dizier, P. (Ed.). *Predicative Forms in Natural Language and in Lexical Knowledge Bases. Text, Speech and Language Technology, vol. 6*. Dordrecht: Springer.
- Fillmore 1982: Fillmore, C. Frame semantics. – In: *Linguistics in the Morning Calm*. Seoul: Hanshin Publishing Co.
- Jackendoff 1990: Jackendoff, R. *Semantic structures*. MIT Press.
- Kipper et al. 2008: Kipper, K., A. Korhonen, N. Ryant, M. Palmer. A large-scale classification of English verbs. – *Language resources and evaluation. Communications*, 42(1), pp. 21 – 40.
- Kipper-Schuler 2005: Kipper-Schuler, K. *VerbNet: A broad-coverage, comprehensive verb lexicon. PhD Thesis*. Philadelphia, PA: Computer & Information Science Dept., University of Pennsylvania.
- Коева 2010: Коева, С. *Българският ФреймНет*. София: Институт за български език Проф. Любомир Андрейчин. (Коева, S. *Balgarskiyat FreymNet*. Sofia: Institute for Bulgarian Language.)
- Коева 2014: Коева, С. WordNet и БулНет. – В: Коева, С. (съст.). *Езикови ресурси и технологии за българския език*. София: Академично издателство „Проф. Марин Дринов“, с. 154 – 173. (Коева, S. *WordNet i BulNet*. – In: Коева, S. (sast.). *Ezikovi resursi i tehnologii za balgarskiya ezik*. Sofia: Prof. Marin Drinov Publishing House of BAS, pp. 154 – 173.)
- Коева 2019: Коева, С. Комплементите в български. – В: Сборник с доклади от Международната годишна конференция на Института за български език „Проф. Любомир Андрейчин“. София: Издателство на БАН „Проф. Марин Дринов“, с. 57 – 68. (Коева, S. *Komplementite v balgarski*. – In: *Proceedings of the International Annual Conference of the Institute of Bulgarian Language*

- Prof. Lubomir Andreychin*. Sofia: Prof. Marin Drinov Publishing House of BAS, pp. 57 – 68.)
- Koeva 2020: Koeva, S. Semantic relations and conceptual frames. – In: Koeva, S. (Ed.). *Towards a Semantic Network Enriched with a Variety of Semantic Relations*. Sofia: Institute for Bulgarian Language, pp. 7 – 20.
- Koeva 2021: Koeva, S. The Bulgarian WordNet: Structure and specific features. – *Papers of Bulgarian Academy of Sciences*, 8(1), pp. 47 – 70. <https://www.papersofbas.eu/images/Papers_2021-1/Koeva_optimized.pdf> [18.01.2024]
- Koeva et al. 2006: Koeva, S., S. Leseva, M. Todorova. Bulgarian sense tagged corpus. – In: *Proceedings of the Fifth International Conference on Language Resources and Evaluation (LREC'06)*. Genoa: European Language Resources Association (ELRA), pp. 79 – 86.
- Koeva et al. 2011: Koeva, S., S. Leseva, B. Rizov, E. Tarpomanova, T. Dimitrova, H. Kukova, M. Todorova. Design and development of the Bulgarian sense-annotated corpus. – In: Carry Pastor, M. L., M. A. Candel Mora (Eds.). *Information and communications technologies: present and future in corpus analysis: Proceedings of the III International Congress of Corpus Linguistics*. Valencia: Valencia Polytechnic University, pp. 143 – 150.
- Koeva et al. 2012a: Koeva, S., B. Rizov, E. Tarpomanova, T. Dimitrova, R. Dekova, I. Stoyanova, S. Leseva, H. Kukova, A. Genov. Bulgarian-English sentence- and clause-aligned corpus. – In: *Proceedings of the Second Workshop on Annotation of Corpora for Research in the Humanities (ACRH-2)*. Lisboa: Colibri, pp. 51 – 62.
- Koeva et al. 2012b: Koeva, S., I. Stoyanova, S. Leseva, R. Dekova, T. Dimitrova, E. Tarpomanova. The Bulgarian National Corpus: Theory and Practice in Corpus Design. – *Journal of Language Modelling*, (1), pp. 65 – 110.
- Koeva, Dekova 2008: Koeva, S., R. Dekova. Bulgarian FrameNet. – In: Tadic, M., M. Vulchanova, S. Koeva (Eds.). *Proceedings from The Sixth International Conference Formal Approaches to South Slavic and Balkan Languages*. Dubrovnik: Croatian Language Technologies Society, Faculty of Humanities and Social Science pp. 59 – 67.
- Koeva, Doychev 2022: Koeva, S., E. Doychev. Ontology supported frame classification. – In: *Proceedings of the Fifth International Conference on Computational Linguistics in Bulgaria*. Sofia: Department of Computational Linguistics, Institute for Bulgarian Language – Bulgarian Academy of Sciences, pp. 203 – 214. <<https://aclanthology.org/2022.clib-1.23>> [18.01.2024]
- Landes et al. 1998: Landes, S., C. Leacock, R. Tengi. Building Semantic Concordances. – In: C. Fellbaum (Ed.). *WordNet: An Electronic Lexical Database*. Cambridge, MA: MIT Press, pp. 199 – 216.
- Laparra, Rigau 2009: Laparra, E., G. Rigau. Integrating WordNet and FrameNet using a knowledge-based Word Sense Disambiguation algorithm. – In: *Proceedings of Recent Advances in Natural Language Processing (RANLP09), Borovets, Bulgaria*, pp. 208 – 213.
- Leseva, Stoyanova 2019: Leseva, S., I. Stoyanova. Enhancing Conceptual Description through Resource Linking and Exploration of Semantic Relations. – In: *Proceedings of the Tenth Global Wordnet Conference, 23 – 27 July 2019, Wrocław, Poland*. Oficyna Wydawnicza Politechniki Wrocławskiej, pp. 280 – 289. <<https://aclanthology.org/2019.gwc-1.36.pdf>> [18.01.2024]

- Leseva, Stoyanova 2020: Leseva, S., I. Stoyanova. Towards a Conceptual Description of Verbs. – *Cybernetics and Information Technologies*, 20, 4 (Nov 2020), pp. 108 – 124.
- Levin 1993: Levin, B. *English verb classes and alternations: A preliminary investigation*. Chicago & London: The University of Chicago Press.
- Levin et al. 1997: Levin, B., G. Song, B. T. S. Atkins. Making sense of corpus data: a case study of verbs of sound. – *International Journal of Corpus Linguistics*, 2, pp. 23 – 64.
- Litkowski 2014: Litkowski, K. The FrameNet Frame Element Taxonomy. <<http://www.clres.com/online-papers/FETaxonomy.pdf>> [18.01.2024]
- Lopatkova et al. 2016: Lopatková, M., V. Kettnerová, E. Bejček, A. Vernerová, Z. Žabokrtský, Valenční slovník českých sloves VALLEX, Nakladatelství Karolinum, Praha, 2016.
- Miller 1995: Miller, G. A. WordNet: A lexical database for English. – *Communications of the ACM*, 38(11), pp. 39 – 41.
- Miller et al. 1993a: Miller, G., R. Beckwith, C. Fellbaum, D. Gross, K. Miller. Introduction to WordNet: an On-line Lexical Database. – In: *Five Papers on WordNet*. Princeton, NJ: Princeton University.
- Miller et al. 1993b: Miller, G. A., C. Leacock, R. Teng, R. T. Bunker. A Semantic Concordance. – In: *Human Language Technology: Proceedings of a Workshop Held at Plainsboro, New Jersey, March 21-24, 1993*. <<https://aclanthology.org/H93-1061>> [18.01.2024]
- Miller et al. 1994: Miller, G. A., M. Chodorow, S. Landes, C. Leacock, R. G. Thomas. Using a Semantic Concordance for Sense Identification. – In: *Human Language Technology: Proceedings of a Workshop held at Plainsboro, New Jersey, March 8-11, 1994*. <<https://aclanthology.org/H94-1046>> [18.01.2024]
- Navigli, Ponzetto 2010: Navigli, R., S. P. Ponzetto. BabelNet: Building a Very Large Multilingual Semantic Network. – In: *Proceedings of the 48th Annual Meeting of the Association for Computational Linguistics*. Uppsala: Association for Computational Linguistics, pp. 216 – 225.
- Palmer 2009: Palmer, M. Semlink: linking PropBank, VerbNet and FrameNet. – In: *Proceedings of the 5th International Conference on Generative Approaches to the Lexicon. Sept. 2009, Pisa, Italy: GenLex-09*. Pisa, pp. 9 – 15.
- Palmer et al. 2014: Palmer, M., C. Bonial, D. McCarthy. SemLink+: FrameNet, VerbNet and event ontologies. – In: *Proceedings of Frame Semantics in NLP: A Workshop in Honor of Chuck Fillmore (1929–2014)*. Baltimore, Maryland USA: Association for Computational Linguistics, pp. 13 – 17.
- Petruck 2015: Petruck, M. *The Components of FrameNet. Tutorial at NAACL-HLT 2015*. <<http://naacl.org/naacl-hlt-2015/tutorial-framenet-data/FNComponentsMRLP.pdf>> [18.01.2024]
- Petruck 2019: Petruck, M. Meaning Representation of Null Instantiated Semantic Roles in FrameNet. – In: *Proceedings of the First International Workshop on Designing Meaning Representations*. Association for Computational Linguistics, pp. 121 – 127.
- Ruppenhofer et al. 2016: Ruppenhofer, J., M. Ellsworth, M. R. L. Petruck, C. R. Johnson, C. F. Baker, J. Scheffczyk. *FrameNet II: extended theory and practice*.

- Berkeley: International Computer Science Institute. <<https://framenet2.icsi.berkeley.edu/docs/r1.7/book.pdf>> [18.01.2024]
- Schneider et al. 2012: Schneider, N., B. Mohit, K. Oflazer, N. A. Smith. Coarse Lexical Semantic Annotation with Supersenses: An Arabic Case Study. – In: *Proceedings of the 50th Annual Meeting of the Association for Computational Linguistics (Volume 2: Short Papers)*. Association for Computational Linguistics, pp. 253 – 258.
- Shi, Mihalcea 2005: Shi, L., R. Mihalcea. Putting Pieces Together: Combining FrameNet, VerbNet and WordNet for Robust Semantic Parsing. – In: Gelbukh, A. (Ed.). *Computational Linguistics and Intelligent Text Processing. CICLing 2005. Lecture Notes in Computer Science*, vol. 3406. Berlin, Heidelberg: Springer.
- Tonelli, Pighin 2009: Tonelli, S., D. Pighin. New Features for Framenet – Wordnet Mapping. – In: *Proceedings of the Thirteenth Conference on Computational Natural Language Learning (CoNLL'09)*. Boulder, USA.
- Urban, Ruppenhofer 2001: Urban, M., J. Ruppenhofer. Shouting and Screaming: Manner and Noise Verbs in Communication. – *Literary and Linguistic Computing*, 16, pp. 77 – 97.
- Uresova et al. 2020a: Urešová, Z., E. Fučíková, E. Hajičová, J. Hajič. SynSemClass Linked Lexicon: Mapping Synonymy between Languages. – In: *Proceedings of the Globalex Workshop on Linked Lexicography, Language Resources and Evaluation Conference (LREC 2020), Marseille, 11–16 May 2020*. European Language Resources Association, pp. 10 – 19.
- Uresova et al. 2020b: Urešová, Z., E. Fučíková, E. Hajičová, J. Hajič. Syntactic-Semantic Classes of Context-Sensitive Synonyms Based on a Bilingual Corpus. – In: Vetulani, Z., P. Paroubek, M Kubis (Eds.). *Human Language Technology. Challenges for Computer Science and Linguistics*. Springer International Publishing, pp. 242 – 255.
- Wierzbicka 1987: Wierzbicka, A. *English Speech Act Verbs: A Semantic Dictionary*. Sydney Academic Press.

Appendix

казвам / кажа (say) / No. sentences 51											
	NP.Ext	NP.Obj	PP	AdvP	NI	че-cl	да-cl	Intrg-cl	Quote	Other	Total
Speaker	49				2						51
Message	1	12				17	1		20		51
Addressee			5								5
обявявам / обявя (announce) / No. sentences 9											
	NP.Ext	NP.Obj	PP	AdvP	NI	че-cl	да-cl	Intrg-cl	Quote	Other	Total
Speaker	45		1		3						49
Message	2	11				23			11	2	49

Medium			1								1
Addressee			1								1
<i>заявявам / заявя (state, say, tell) / No. sentences 48</i>											
	NP.Ext	NP.Obj	PP	AdvP	NI	<i>че-cl</i>	<i>џа-cl</i>	Intrg-cl	Quote	Other	Total
Speaker	45				3						48
Message		5				21	1	1	15	5	46
Medium			3								3
Addressee			13								13
<i>добавям / добавя (add) / No. sentences 42</i>											
	NP.Ext	NP.Obj	PP	AdvP	NI	<i>че-cl</i>	<i>џа-cl</i>	Intrg-cl	Quote	Other	Total
Speaker	41										41
Message		6			1	12		1	23		43
Medium	1										
<i>допълвам / допълня (add) / No. sentences 35</i>											
	NP.Ext	NP.Obj	PP	AdvP	NI	<i>че-cl</i>	<i>џа-cl</i>	Intrg-cl	Quote	Other	Total
Speaker	35										35
Message		2				10			24		36
<i>обяснявам / обясня (explain) / No. sentences 49</i>											
	NP.Ext	NP.Obj	PP	AdvP	NI	<i>че-cl</i>	<i>џа-cl</i>	Intrg-cl	Quote	Other	Total
Speaker	45				3						48
Message	2	6			3	11		10	9	2	43
Topic		5									5
Medium	1		3								4
Addressee			19								19
<i>отбелязвам / отбележа (note, observe, remark) / No. sentences 49</i>											
	NP.Ext	NP.Obj	PP	AdvP	NI	<i>че-cl</i>	<i>џа-cl</i>	Intrg-cl	Quote	Other	Total
Speaker	40				5						45
Message	1	4				21			20	3	49
Medium	4		6								10
Addressee			2								2

настоявам / настоя (<i>insist</i>) / No. sentence 48											
	NP.Ext	NP.Obj	PP	AdvP	NI	че-cl	џа-cl	Intrg-cl	Quote	Other	Total
Speaker	48										48
Message			14		5	4	12		13		48
Addressee			1								1

Table 15. Aggregated data for the valence patterns across the discussed Bulgarian verbs of the frame **Statement** (a compiled version of the data in Tables 6a – 12a)

СЕМАНТИЧНИ ФРЕЙМОВЕ ПРИ ГЛАГОЛИТЕ ЗА КОМУНИКАЦИЯ: КОРПУСНО ИЗСЛЕДВАНЕ

Светлозара Лесева, Ивелина Стоянова

Институт за български език „Проф. Любомир Андрейчин“, Българска
академия на науките

zarka@dcl.bas.bg, iva@dcl.bas.bg

Резюме. В студията се изследват свойствата на глаголите за комуникация с фокус върху предикатите, принадлежащи към няколко основни семантични фрейма за комуникация във Фреймнет. Анализът е съсредоточен върху семантичното описание на глаголите и валентните модели, представящи комбинаториката и синтактичната реализация на фреймовите елементи (елементи на семантичното описание, които в своята конфигурация представят основната семантика на даден фрейм), описващи тези глаголи в английски и български. За целите на изследването се използват два големи типа семантични ресурси: а) Принстънският уърднет (Fellbaum 1998b) и Българският уърднет, Булнет (Коева 2021), от една страна, и б) Фреймнет (Baker et al. 1998), от друга.

В изследването се дискутира общата организация на глаголната лексика, служеща за изразяване на (речево) общуване. Семантичното поле е йерархично организирано в система от семантични фреймове, които наследяват и по различен начин детайлизират или специализират основните елементи на прототипния семантичен фрейм **Комуникация (Communication)**. Въз основа на корпусни данни, извлечени от семантично анотирани корпуси Семкор (Miller et al. 1993b) за английски и Булсемкор (Коева et al. 2006) за български, в рамките на разработката на анализ се подлагат семантичните свойства и синтактичната реализация на групи глаголи, принадлежащи към няколко представителни семантични фрейма за комуникация. В хода на изследва-

нето се дискутират и онагледяват универсалните и езиково специфичните аспекти на семантичното и синтактичното описание и преносимостта им между езиците.

Извършените наблюдения относно валентните модели и синтактичната реализация на основните (ядрените) фреймови елементи ще послужат за проверка на достоверността на фреймовете, приписани на изследваните глаголи. Наред с това се извеждат и основни прилики и разлики както между глаголите в рамките на българския език, така и между тях и съответствията им в английски.

Ключови думи: глаголи за комуникация, Уърднет, Фреймнет, валентни модели, корпуси

Svetlozara Leseva
Institute for Bulgarian Language
Bulgarian Academy of Sciences
52, Shipchenski prohod Blvd., Bl. 17
Sofia 1113
Bulgaria
<https://orcid.org/0000-0001-8198-4555>

Ivelina Stoyanova
Institute for Bulgarian Language
Bulgarian Academy of Sciences
52, Shipchenski prohod Blvd., Bl. 17
Sofia 1113
Bulgaria
<https://orcid.org/0000-0003-3771-435X>