Chapter 2

Language-independent and language-specific properties of semantic description: A case study on verbs of communication

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The study focuses on the properties of verb conceptual description in view of their linguistic universality and transferability of conceptual information across languages. Further, we present the semantic class of verbs of communication, the hierarchical organisation of frames and the corresponding frame elements. We consider the most prominent FrameNet frames evoking verbs of communication of higher frequency and make observations on the syntactic realisation of the frame elements in different valence patterns both in English and Bulgarian.

1 Introduction

In this paper we focus on combining the semantic description available for verbs in different lexical semantic resources (WordNet and FrameNet) which contain complementary semantic information (Baker & Fellbaum 2009). We discuss the

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aspects of universality of conceptual knowledge that enable the transfer of semantic and to a lesser extent syntactic information across resources and languages. Further, we analyse the language-specific properties of the semantic and syntactic description. We illustrate our findings in a case study on verbs of communication in English and Bulgarian.

For the purposes of the study we employ: (a) the Princeton WordNet, PWN (Fellbaum 1998), and the Bulgarian WordNet (Koeva 2021b), and (b) FrameNet (Fillmore et al. 1998, Ruppenhofer et al. 2016). In particular, we centre on the information included in them and how they complement each other in terms of coverage of lexical units and with respect to the semantic and syntactic features of the description. While we use resources for English and Bulgarian, the principles adopted in this work are applicable to other languages for which a wordnet aligned with PWN is developed.

There are several other resources relevant to our study, which provide background on the approaches for the extensive language-specific description of verb classes in comparison to developing cross-lingual and multilingual lexical and semantic resources. Further, their brief review sheds light on the possibilities for combining resources aiming at comprehensive description of lexical units. The functionalities and the additional information contained in these resources are summed up below.

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 (defined as configurations of thematic roles) with one-to-one linking to the syntactic category (type of phrase) and grammatical function (subject, object, etc.) of each argument expressed in terms of a relatively small number of syntactic frames. Selectional restrictions are defined for the thematic roles assigned to a verb's arguments; these restrictions capture the semantic/ontological class of the nouns that express the arguments. However, although the verb classes describe the syntactic behaviour of verbs, many of the traditional thematic roles employed may be too general for an exhaustive semantic description and appropriate handling of the syntax-semantics interface, while the syntactic description is often biased towards English. Moreover, the overlap (and hence, the coverage of the existing mappings) between the WordNet synsets and the VerbNet classes is not large enough to provide sufficient data for analysis.

VerbAtlas (Di 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) integrating 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 restrictions governing their compatibility (116 types). A semantic annotation API with the frames described in it is also provided with the resource.

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.[1] (Palmer 2009) Predicate Matrix is compiled using advanced graph-based algorithms to extend the mapping coverage between resources. Additionally, by exploiting SemLink, new role mappings are inferred among the different predicate schemas.

The alignments of WordNet and FrameNet have been proposed for different languages, such as Danish (Pedersen et al. 2018), Dutch (Horák et al. 2008), Korean (Gilardi & Baker 2018), 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. For instance, the alignment between lexical units evoking particular frames in FrameNet and corresponding verbs in synonym sets in WordNet, achieves coverage of 30.5% (Leseva & Stoyanova 2019). New 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).

Combining the semantic description of verbs from different resources has been proposed by Urešová et al. (2020a,b). 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 arguments.[2] The project is also aimed 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 (Lopatková et al. 2016), which represents the predicate-argument structure of each verb, its semantic class and the syntactic transformations (diatheses) in which it participates.

Our work on aligning conceptual resources relies on the notion of universality. We side with the idea that the conceptual description provided in the FrameNet frames is to a considerable degree language-independent, which makes it possible for it to be transferred and/or adapted from one language to another. We map the conceptual knowledge contained in FrameNet onto the Princeton WordNet

[1] https://verbs.colorado.edu/semlink/

[2] https://ufal.mff.cuni.cz/synsemclass

and through it, onto the Bulgarian WordNet. We then go on to examine the feasibility of transferring the valence information described for English to Bulgarian and the language-specific features that need to be addressed. The combination of semantic and syntactic information is seen as a possible way of transferring knowledge across languages (especially underresourced ones) by relying on the universality of the semantic description.

The study is organised as follows. Section 2 briefly presents the lexical-semantic resources involved in the work as well as the corpora used for extracting examples illustrating the various syntactic realisations in English and Bulgarian. Section 3 discusses the mapping of FrameNet frames onto WordNet synsets with a view to the universality of conceptual description as the main principle for cross-lingual transfer. Section 4 offers a detailed analysis of the semantic class of verbs of communication in terms of their conceptual structure and frame elements involved in the relevant frames. This analysis serves as a case study illustrating the main principles of universality as well as the language-specific features of syntactic realisation of frames. Section 5 draws conclusions based on the analysis and gives some directions for future work.

2 Resources

Below we describe in brief the lexical semantic resources used in the study, focusing on their strengths and the ways of overcoming their possible limitations through integrating the information contained in them. We also describe the corpora serving as a source of examples, the methodology for extracting suitable examples and the annotation of frame elements and their syntactic realisation.

2.1 Lexical-semantic resources

2.1.1 WordNet

WordNet[3] (Miller 1995, Fellbaum 1998) is a large lexical database that represents comprehensively conceptual and lexical knowledge in the form of a network whose nodes denote cognitive synonyms (synsets) linked by means of a number of conceptual-semantic and lexical relations such as hypernymy, meronymy, antonymy, etc. WordNet provides extensive lexical coverage; the verbs presented in it are organised in 14,103 synsets (including verb synsets specific for Bulgarian). In this work, we use both the Princeton WordNet and the Bulgarian WordNet

[3]https://wordnet.princeton.edu/

(Koeva 2021b), which are aligned at the synset level by means of unique synset identifiers.

WordNet provides the most coarsely-grained semantic division in terms of a set of language-independent semantic primitives assigned to all the nouns and verbs in the resource. The verbs fall into 15 groups, 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.[4]

Verb synsets are interrelated and form a hierarchical structure based on a troponymy relation which represents a manner relation and is to a great degree analogous to hypernymy; for example, in *talk*.v – *whisper*.v 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).

2.1.2 FrameNet

FrameNet[5] (Fillmore et al. 1998, Baker 2008) is a lexical semantic resource which couches lexical and conceptual knowledge in the apparatus of frame semantics. Frames are conceptual structures describing types of objects, situations, or events along with their components – frame elements (Fillmore et al. 1998, Ruppenhofer et al. 2016). Depending on their status, frame elements may be core, peripheral or extra-thematic (Ruppenhofer et al. 2016). We deal primarily with core frame elements, which instantiate conceptually essential 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: 81–84). Here we list the hierarchical relations, which bear most relevance to the internal structure of 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") – 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

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

[5]https://framenet.icsi.berkeley.edu/

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.

2.2 Corpora

2.2.1 Semantically annotated corpora: SemCor and BulSemCor

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. 1993, 1994, Landes et al. 1998) is compiled by the Princeton WordNet team and covers texts excerpted from the Brown Corpus. SemCor is supplied with POS 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. In addition to open-class words, BulSemCor includes annotation of prepositions, conjunctions, particles, pronouns and interjections; for that purpose the Bulgarian WordNet has been expanded with closed-class words (Koeva et al. 2011). The size of the corpus is close to 100,000 annotated units.

The size of the two corpora is not sufficient to provide enough evidence for many of the studied verbs so examples from other corpora have also been employed.

2.2.2 Bulgarian-English parallel corpus

The Bulgarian-English Sentence- and Clause-Aligned Corpus (BulEnAC)[6] (Koeva, Rizov, et al. 2012) 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).

[6]https://dcl.bas.bg/en/resources_list/bulenac/

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 that illustrate the use of particular verbs evoking the frames under study. Further, it facilitates the identification of corresponding translation equivalents within aligned clauses.

2.2.3 The Bulgarian National Corpus

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, Stoyanova, et al. 2012). The search engine developed for the exploration of the corpus allows the extraction of information according to complex grammatical criteria. We use the corpus to study the syntactic expression and the validity of the valence patterns described in Section 4 in addition to the examples extracted from the semantically disambiguated part of the corpus (BulSemCor).

2.3 Motivation for combining WordNet and FrameNet

It has long been acknowledged that combining WordNet with conceptual resources such as FrameNet results in more comprehensive semantic and syntactic representation of the lexical entries (Baker & Fellbaum 2009, Schneider et al. 2012, Das et al. 2014), thus expanding the possible applications of the resources for the purposes of syntactic and semantic parsing. Elaborating a bit on the discussion of the strengths and shortcomings of the different kinds of lexical semantic resources offered by Shi & Mihalcea (2005), we may point out the following motivation for putting effort into their alignment.

FrameNet provides a rich semantic description of the predicates using schematic representations (frames) of the configurations of "participants and props" (elements corresponding to the surrounding circumstances or other supporting facets of meaning, in the sense of Ruppenhofer et al. 2016: 7) that define the situation described. The corpus of sentences annotated with explicit and implicit frame elements supplies empirical evidence about the syntactic realisations of semantic frames that is particularly valuable not only for linguistic generalisations about the target language (English) but also as a point of departure for

making observations cross-linguistically. Besides the explicit syntactic expression, the annotators have marked non-overt but conceptually present frame elements retrievable from the immediate or the more general context (so-called null instantiations). However, while formulating ontological semantic types that classify lexical units, frames and frame elements and in the latter case denote the selectional restrictions imposed on the fillers of frame elements (Ruppenhofer et al. 2016: 86), FrameNet does not explicitly define the content of these semantic types (see Section 3.2, which provides the authors' suggestions regarding that). In addition, FrameNet's 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 lexical units that cannot be described properly by the existing frames. Finally, as some of the frame elements are too finely-grained, certain generalisations across frames and frame elements might be missed.

WordNet ensures vast lexical coverage of the English lexicon structured and enriched with lexical and semantic information in the form of synset glosses, usage examples, notes on the usage or grammatical specificities, and a rich network of semantic relations. However, WordNet encodes no explicit semantic information about the participants in the situations described by the predicates and only limited information about their syntactic behaviour.

The combination of the resources requires: (i) mapping of the units that correspond to each other in the resources, i.e. discovering the counterparts of the synsets' members among the lexical units in FrameNet and linking them to the frames they evoke; (ii) expanding the mapping by discovering new candidates in WordNet to be matched to the relevant frames. Such mapping procedures are discussed in Section 3. The limitations stemming from the lack of appropriate frames to describe certain parts of the lexicon need to be addressed by defining new frames.

The greater granularity of the frame elements in FrameNet (as compared with VerbNet, VerbAtlas and other resources) 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). Consider for instance the taxonomy of frame elements Air > Fluid > Theme derived from the frame hierarchy `Breathing` > `Fluidic motion` > `Motion` built on the frame-to-frame relation of *Inheritance* between the three frames. In certain contexts and for certain tasks it may be more appropriate to make reference not to the most specific Air but to Fluid or even to Theme, or vice versa. The maintaining of the different levels of granularity provides a more robust semantic description that is relatively resource- and theory-independent.

While genuinely beneficial, the mutual enrichment of WordNet and FrameNet is by no means trivial, as senses of the synsets and the lexical units that may be thought as equivalent may in fact not correspond well. The use of corpus occurrence and especially the study of annotated examples help in elucidating both theoretical and pragmatic aspects of the alignment between the resources and informs the judgments made in the course of the manual validation of the automatic assignment of frames to synsets. The case study presented in Section 4 may be viewed as the result of such analysis.

3 Mapping between WordNet and FrameNet based on universal principles

Both resources have shown to be sufficiently language-independent as to provide an approximation at a description across typologically distinct languages. Both models have been transferred and adapted cross-linguistically. These include coordinated attempts to build multilingual resources or link existing independent resources through projects such as EuroWordNet (Vossen 2004) or Global WordNet (McCrae et al. 2021), as well as Multilingual FrameNet (Gilardi & Baker 2018), among others.

Our work expands on the notion of universality and cross-lingual applicability of lexical-semantic resources by linking the resources to each other and then transferring the language-independent (semantic and conceptual) description of English verbs in WordNet onto the Bulgarian lexical units in the Bulgarian WordNet.

3.1 Universality of semantic inheritance relations between synsets and between frames

The two resources have been aligned automatically by employing existing mappings (Tonelli & Pighin 2009, Palmer et al. 2014, among others) with additional implemented procedures for expansion and validation (Leseva et al. 2018) and later refined (Leseva & Stoyanova 2019, 2020); these procedures involve the mapping of FrameNet frames to WordNet synsets on the basis of the inheritance of conceptual features in hypernym trees, i.e., by assigning frames from hypernyms to hyponyms where possible and implementing a number of validation procedures based on the structural properties of the two resources, primarily the relations encoded in them. This has resulted in 13,104 automatic alignments, of

which over 6,000 have been validated and corrected manually in the framework of this project and previous initiatives.

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 (`Cooking_creation` being an elaboration of the mother frame `Intentionally_create`).

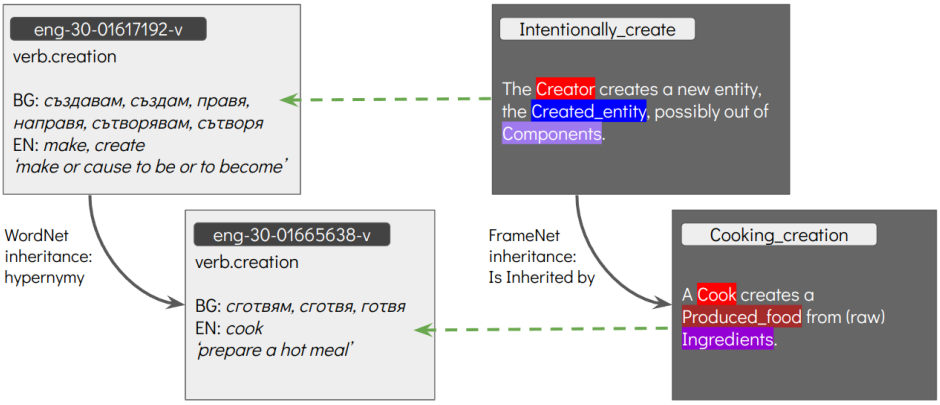

Figure 1: Frame inheritance (`Intentionally_create` → `Cooking_creation`) as reflected in the hypernym relation (*make, create* → *cook*).

3.2 Universality of selectional restrictions

Part of the FrameNet frame elements are supplied with 'semantic types' defining noun classes that narrow down the set of possible nouns that may be realised in the respective positions in the semantic frame. These semantic types are to a great degree relevant cross-linguistically, as they define ontological distinctions that underlie human cognition. To the best of our knowledge, the list of the FrameNet types and the pertaining definitions have not been made available, but their semantic content can be intuitively construed by speakers from the relevant designations, such as Sentient, Physical object, etc.). As noted in Ruppenhofer et al. (2016: 86) most ontological semantic types "correspond directly to synset nodes of WordNet, and can be mapped onto ontologies, e.g. Cyc or the Knowledge Graph". The FrameNet semantic types form a semantic type hierarchy, which, however, does not necessarily correspond to that of WordNet or any other resource. Most of the frame-to-frame relations enable the propagation of the ontological semantic types of the parent frame and its frame elements down to the child frame and its frame elements (Ruppenhofer et al. 2016: 99) as well

as to the lexical units in the respective frame (Ruppenhofer et al. 2016: 86). Using a linguistic taxonomy (moreover one implemented for numerous languages such as WordNet) to describe the selectional restrictions imposed by verbs on the nouns that fill the positions of their arguments has been proposed in different frameworks (Agirre & Martínez 2002, Koeva 2010). While the particulars differ, the general idea is the same as the one adopted in FrameNet, i.e. to represent semantic constraints in the form of taxonomically definable classes.

3.3 Universal and language-specific aspects of valence frames and syntactic realisation

Through the alignment between frames and synsets, each verb in WordNet is associated with a number of valence patterns defined for the lexical units evoking a given frame in FrameNet. While the semantic component of the description is language-independent, the syntactic component is more language-specific as the realisation of the frame elements depends on the syntactic properties of each language. Even so, we assume that the valence patterns that underlie the syntactic expression are valid cross-linguistically to a considerable degree as they are grounded in human cognition and the conceptualisation of situations. More precisely, valence patterns describe "the semantic and syntactic combinatory possibilities", or valences of lexical units (Ruppenhofer et al. 2016: 7). They thus refer to the co-occurrence combinations of frame elements (both core and non-core) attested for each annotated lexical unit in the FrameNet annotated corpus.

The second, more language-specific level of syntactic description consists of the *syntactic categories and grammatical functions* by which a particular frame element for a given lexical unit is expressed. Even at this level, for many (related) languages one can observe similar syntactic expression especially with respect to the participants that are selected as the subject and the object. A great degree of differentiation may be found at the level of certain grammatical peculiarities and constructions – for instance, unlike English, Bulgarian lacks *-ing* and infinitive clauses, so propositional complements will be realised as finite clauses; Bulgarian has impersonal verbs and subjectless sentences and does not make use of pleonastic subjects. Of course, there may be mismatches in the syntactic categories across languages, e.g. a certain frame element may be a direct object in one language and a prepositional object in another. 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 inventory of means that introduce certain frame elements such as prepositions, conjunctions, wh-words, etc. may also vary across languages.

The linking from the semantic level of the frame elements to the syntactic level of patterns of co-occurrence and syntactic categories in FrameNet is implemented in a straightforward manner by associating each frame element with a syntactic category and possibly a grammatical function – e.g. subject (NP.Ext) and object (NP.Obj).

Example 1 shows a partial representation of the valence patterns and the syntactic realisation of the verb *teach* in the FrameNet frame `Education_teaching`.

(1) a. Teacher Institution
NP.Ext PP[*at*]

b. Teacher Student Subject
NP.Ext NP.Obj PP[*about*]

c. Teacher Student Skill
NP.Ext NP.Obj Sinterrog/VPto

To sum up, even though there may be typological cross-linguistic differences in the conceptualisation and expression of situations for many language pairs, English and Bulgarian including, there are also parallels that facilitate the transfer of information across languages at the semantic and possibly at the syntactic level. Even where direct transfer of the syntactic description is not justified, the valence patterns and the syntactic realisation lattices taken from FrameNet may serve as a point of departure in the analysis of the Bulgarian syntactic data: they help establishing what is valid or invalid in Bulgarian by comparing the syntactic properties of the Bulgarian verbs to those of their English counterparts and the example sentences in the resources.

4 A case study: Verbs of communication

Below we offer an analysis of a selection of verbs of communication as an illustration of the universal principles and the language-specific features of the adopted linguistic description.

The domain of speech act verbs and their classification have been discussed by many authors (Wierzbicka 1987, Levin 1993: 202–211, Levin et al. 1997, Urban & Ruppenhofer 2001, Boas 2010, among others), including for Bulgarian (Nitsolova 2008, Penchev 1998, Tisheva 2000, 2004, Koeva 2021a, among others). While previous work in this area has served to inform the current state of the linguistic

knowledge about the semantic and syntactic properties of communication verbs, the analysis below is based primarily on our observations on the descriptions proposed in FrameNet for English and exploring and extending them to Bulgarian.

First, we identify the "basic" frame which describes the general scenario or situation characterising the domain of communication in terms of the participants and circumstances involved and the relations among them (Johnson et al. 2001: 16). This general scenario is then elaborated in various ways in more specific frames. The semantic generalisations among such frames exhibiting different levels of abstraction and specialisation are typically cast in the form of frame-to-frame relations based on the inheritance among the semantic descriptions or parts of them.

The hierarchical organisation of the domain of communication verbs is presented in Figure 2.

Starting from this basic, or prototypical frame, we delve into several of the frames inheriting from it in order to show what kinds of processes are involved in the semantic specialisation and how this is reflected in the semantic description. The frames are selected based on the frequency of the verbs evoking them in the annotated data or with the objective to illustrate particular aspects of the analysis. For each such frame (including the prototypical one), we consider: (i) its semantics in terms of the frame definition, constellation of core frame elements that represent the main participants in the situation, and the relations among them, (ii) the syntactic expression of the frame elements, and (iii) the specifics of their realisation in Bulgarian as compared to English. The semantic and syntactic aspects referred to in (i) and (ii) are mostly taken for granted as represented in the FrameNet annotated corpus. In presenting each frame inheriting from the prototypical one, we do discuss how the conceptualisation of the basic frame is specialised or narrowed down and how this is reflected in the number of frame elements and the relationships among them. The main burden of our work is focused on (iii), i.e. the analysis of the syntactic expression of the frame elements as attested in the corpus compiled for Bulgarian. The valence patterns emerge from the annotated examples and are thus specified independently from the English data. The same holds for the syntactic information (syntactic function and syntactic category of the expressed frame elements). The tagset of categories is adapted from the FrameNet corpus so that the notations in the two annotated datasets are unified.

Although there may be differences in the conceptualisation of situations across languages, we expect the semantic properties of the description to be largely shared between English and Bulgarian, as it has been shown by efforts

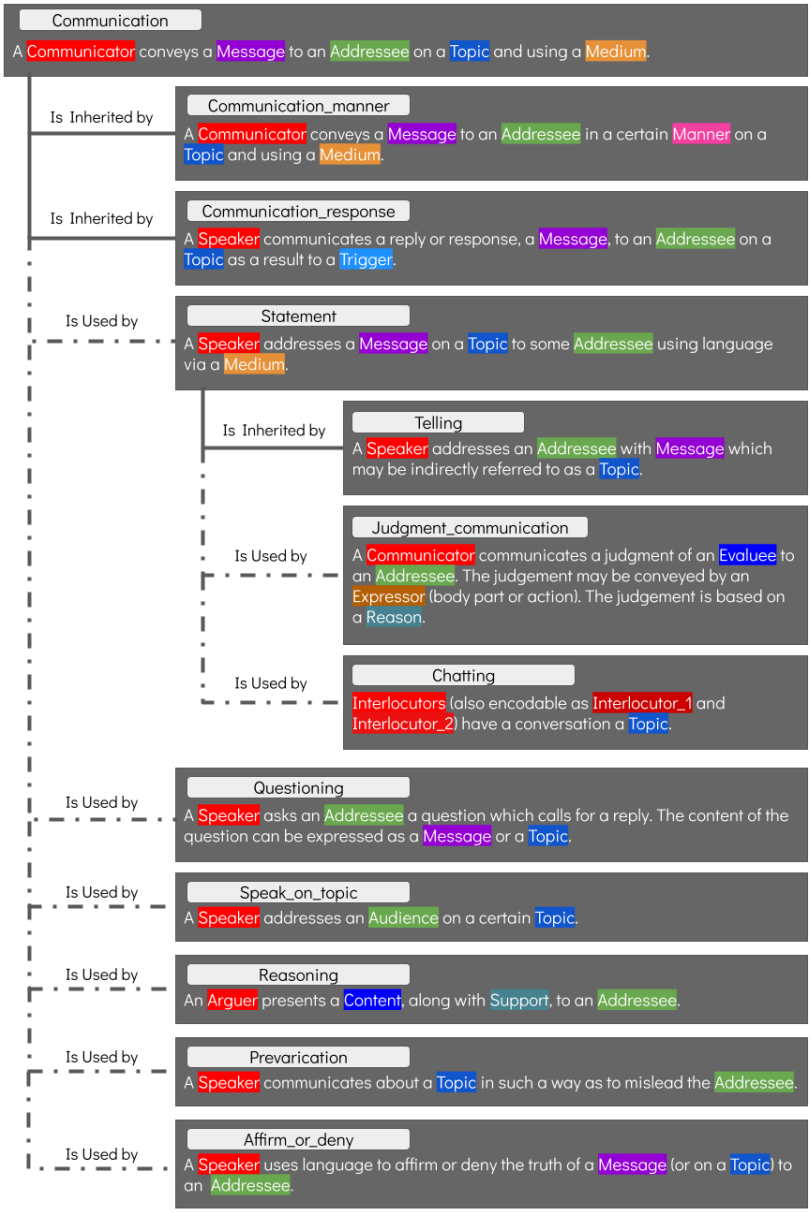

Figure 2: The hierarchical organisation of FrameNet frames describing the verbs of communication.

undertaken for other languages (Section 1). Based on our preliminary observations, we also expect that at least part of the valence patterns will be relevant for both languages, i.e. the frame elements that tend to be expressed and the particular configurations in which they co-occur will be similar, even allowing for cross-lingual differences (such as the fact that Bulgarian, unlike English, is a pro-drop language). We then look at the syntactic expression of the patterns in terms of the grammatical function and the syntactic categories of the core frame elements and, where relevant, the possibility for their contextual construal (null instantiations).

We take as a point of departure the lattices of the frame elements and their syntactic realisations for certain verbs and the valence patterns of frame elements as described in the annotated FrameNet examples[7] (Burchardt & Pennacchiotti 2008). In addition, below we also use examples from SemCor in order to illustrate the applicability of the FrameNet description independently of the annotation undertaken in the FrameNet corpus.

After analysing this information for English, we go on to observe to what extent it is applicable to Bulgarian. For this purpose, we have constructed a corpus of manually annotated examples extracted from BulSemCor and, where the number of examples is not sufficient, from the Bulgarian National Corpus.

Each example sentence in the English and the Bulgarian dataset is annotated as shown in Example 2. The English dataset consists of 93 verbs (lexical units in FrameNet) to which an appropriate communication-related frame is assigned. The verbs are aligned to 72 WordNet synsets. Each verb is supplied with a number of examples from the FrameNet corpus illustrating its valence patterns; the dataset contains a total of 4,525 illustration examples representing 863 different valence patterns. The annotation of each sentence in the Berkeley FrameNet corpus includes explicit annotation of the target word (in this case a verb) and the syntactic realisation of the frame elements.

The Bulgarian dataset covers 112 communication verbs (including aspectual pairs) across 63 WordNet synsets. As the corpus of annotated examples for Bulgarian is still work in progress, it is considerably smaller than the one for English: it contains 890 annotated sentences representing 136 different patterns. The annotation consists in labelling the sentence components with the frame elements they realise in a way consistent with the annotation in the Berkeley FrameNet.

(2) a. FrameNet description: *ask*.v 'say something in order to obtain an answer or some information from someone', frame: `Questioning`

[7] http://framenet.icsi.berkeley.edu/

WordNet alignment: {*ask*:4} 'address a question to and expect an answer from', synset ID: eng-30-00897746-v
BulNet alignment: {*питам*:2, *попитвам*:1, *попитам*:1, *запитвам*:3, *запитам*:3}, synset ID: eng-30-00897746-v

b. An adapted example from the FrameNet corpus with the relevant pattern:
[*They*]$_{\text{COM}}$ ***ASKED*** [*Rubbie*]$_{\text{ADDR}}$ [*what she ate*]$_{\text{MSG}}$.
[NP.Ext]$_{\text{COM}}$ VERB [NP.Obj]$_{\text{ADDR}}$ [Sinterrog]$_{\text{MSG}}$

c. An annotated example from BulSemCor with the relevant pattern:
[*Престъпникът*]$_{\text{COM}}$ ***ПОПИТАЛ*** [*полицая*]$_{\text{ADDR}}$
Criminal-DEF asked policeman-DEF
[*дали може да си купи цигари*]$_{\text{MSG}}$.
whether he could buy cigarettes.
'The criminal asked the policeman whether he could buy cigarettes.'
[NP.Ext]$_{\text{COM}}$ [NP.Obj]$_{\text{ADDR}}$ [Sinterrog]$_{\text{MSG}}$

4.1 The prototypical frame: `Communication`

As noted by Johnson et al. (2001: 108), the frames in the domain of communication describe "verbal communication between people and inherit structure and frame elements from the higher-level frame `Communication`". `Communication` is thus the prototypical frame that represents the basic conceptual structure of the activity of communication as a configuration of five main interacting frame elements. This basic structure will be further elaborated (narrowed down, profiled or otherwise specialised) in the frames that inherit it.[8]

Definition of the frame `Communication`: A COMMUNICATOR conveys a MESSAGE to an ADDRESSEE; the TOPIC and MEDIUM of the communication may also be expressed.

As described in the definition, the `Communication` frame does not itself involve specification of the method of communication (speech, writing, gesture, etc.) but only the fact of it. The frames that inherit `Communication` can add elaboration to the general idea in several ways:

[8]By "inherit" we mean the relationships between the more general and the more specific frames between which the following hierarchical frame-to-frame relations hold: *Inheritance*, *Using*, *Perspectivises*, *Subframe*.

(i) by specifying the MEDIUM in a variety of ways, such as the particular language (*in French, in Russian*), or the physical entity or channel, e.g. a medium, technology, form, etc. (*on the radio, in a letter, through the Messenger, in writing*).

(ii) by specifying the manner of verbal communication according to various criteria such as loudness (e.g. *shout*.v, *whisper*.v); volubility and/or mood (e.g., *babble*.v, *rant*.v), distinctness (e.g., *slur*.v, *stutter*.v, *mutter*.v), among many others;

(iii) specialisation may also mean that the more concrete frames inherit only part of the `Communication` frame elements or do not inherit them in a straightforward manner. For example, `Judgment_communication` (which inherits from `Statement`, in turn inheriting from `Communication` according to the *Using* relation, see Figure 2 above) reinterprets the frame element MESSAGE as a judgement on an EVALUEE according to a REASON.

The prototypical and the inheriting frames might exhibit a different construal of the relationship between certain frame elements. For instance (as pointed out in the description of `Communication`), in the frame `Chatting`, the COMMUNICATOR and ADDRESSEE alternate their roles, and are often expressed by a single, plural NP, i.e. the relationship between them is not asymmetrical but reciprocal as they participate in the situation in the same way.

Another aspect of specialisation is the inability for overt expression of all the frame elements (Johnson et al. 2001: 16). For example, the lexical units *talk*.v and *speak*.v in the `Statement` frame (which inherits `Communication` according to the *Using* relation) usually block the overt expression of MESSAGE, although its existence is implied at the conceptual level (in their meaning). This is shown by the fact that in the annotated examples available for the two verbs the frame element TOPIC is much more frequently expressed than MESSAGE, although it is dependent on it (the topic characterises the message).

Another kind of elaboration is represented by the incorporation of frame elements (Jackendoff 1990: 164–165) 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). In the domain of `Communication` the frame `Communication_means` describes situations that specify the concrete means with the aid of which communication takes place; the various MEANS are thus incorporated in the meaning of the respective verbs, e.g. *fax*.v, *telephone*.v, *email*.v.

The frame `Communication` is evoked by a small number of verbs – *communicate*.v, *convey*.v, *indicate*.v, *share*.v. Although pertaining to the prototypical frame,

these verbs are not the most frequent ones associated with the activity of communicating, which are in fact described in more elaborate frames.

4.1.1 Prototypical frame elements in the domain of communication

Below we present the prototypical frame elements of the `Communication` frame as defined in FrameNet.

Communicator (Semantic type: Sentient) 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 (Semantic type: Message) A proposition or set of propositions that the Communicator wants the Addressee to believe or take for granted; in other words it is the content which is communicated.

Topic The subject matter to which the Message pertains. It is thus a property of Message (Johnson et al. 2001: 17) and as a result its syntactic expression is also predetermined by the expression of the Message.

Addressee (Semantic type: Sentient) The Addressee is typically a person or organisation, etc. that receives a Message from the Communicator.[9]

In the remainder of the chapter the data in the annotated corpora that are subject to analysis are organised as follows. We first show and discuss how each of the considered frame elements is realised at the level of the individual verbs evoking a given frame (the odd-numbered tables). This kind of presentation allows us to observe the expression of each frame element for each verb and the differences among verbs in the same frame. The data shown in the pairs of odd-numbered tables enable the comparison between English and Bulgarian and help in drawing conclusions about the correspondences and differences in the syntactic realisation between the two languages. These tables, however, do not represent the configurations of frame elements that actually occur in the annotated corpora. To illustrate those, we give a summarised list of the most characteristic valence patterns for each frame (i.e. the best-represented patterns in terms of numbers of

[9] In the FrameNet frame `Communication` the Addressee is specified as a non-core element. However, we consider it is nonetheless implied in all examples from the FrameNet annotated corpus and thus analyse it in the set of prototypical frame elements.

examples) and the verbs that are observed in these configurations in the two languages (the even-numbered tables). The information in the subsequent odd- and even-numbered tables is thus complementary. Due to the currently insufficient number of examples even for many English verbs, we represent the valence patterns as an aggregate of the valence patterns for all verb,[10] thus obtaining what we call generalised valence patterns. These give us an overall idea of the distribution of valence patterns across verbs and a point of departure for a more in-depth evidence based analysis.[11]

4.1.2 Syntactic realisation of the `Communication` frame elements

The syntactic expression of the basic configuration of frame elements in the `Communication` frame is exemplified in Table 1.

Table 1: Syntactic expression of the `Communication` frame elements of selected FrameNet lexical units.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
communicate									
Communicator	39				5				44
Addressee			27		16			1	44
Message	3	23			14	1			41
Topic		1	3		1			1	6
Medium	2		3					1	6
indicate									
Communicator	7								7
Addressee					8				8
Message		3				6			9
Medium	4								4
say									
Communicator	5				6				11
Medium	5				1				6
Message	6					9	2		17
Topic			1		1				2

[10] In theory, the differences among the individual verbs are lost in this way, but since we do not have at our disposal large samples of annotated data for each verb, in practice, this is not relevant as the sparseness of data prevents us from making such detailed observations.

[11] The numbers in the tables for English are based on a version of the Berkeley FrameNet obtained in XML format in 2019.

Communicator is expressed as the external argument, i.e. as a subject of the respective sentence or clause; as it is a sentient entity, it is realised as an NP. In a number of cases the frame element is realised as a definite null instantiation (DNI), i.e. it is retrievable from the previous context, or as a constructional null instantiation (CNI), where it is the grammatical construction that allows it to remain non-overt, e.g. in passive or infinitive clauses, etc.

Here and below, unless the distinction is specifically relevant, we consider INIs (indefinite null instantiations), CNIs (constructional null instantiations) and DNIs (definite null instantiations) as one category – NI (null instantiations), together with the category INC (incorporated frame element), see Petruck (2019). The null instantiations are a very interesting category that merits a separate in-depth study. In particular, they may be considered as exponents of distinct properties, may stand for different syntactic categories and constituents with different grammatical functions, and respectively – may participate in different valence patterns. However, the distinction among them is not trivial and especially the one between DNIs and INIs may require a broader context to be interpreted accurately. In addition, as this has not been the focus of study, sufficient number of examples and broad enough context has not been provided in the Bulgarian data.[12]

With the verbs in this frame, Message is typically realised as an object NP, as a complement clause (Example 3a) or as a quote. Quotes represent the content of the Message as directly stated by the Communicator in his or her own words, while clauses denote it as being retold by someone (such as in reported speech). A Message realised as an NP constitute a nominalisation which rephrases its content in a more concise way or as a generalised idea. In about a third of the examples available for *communicate*.v 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), as in Example 3b. The INIs correspond to the activity use of certain types of verbs where the object remains implicit (Van Valin & LaPolla 1997).

The FrameNet examples show that Topic is rarely expressed, with only several instances in the FrameNet corpus even for *communicate*.v. Extrapolating from examples from other sources and the definition of the frame element, we may conclude that the Topic is usually expressed as a prepositional phrase headed by the preposition *about*. An alternative way of realising the Topic is as a modifier

[12]The category 'Other' encompasses examples where a frame element is otherwise expressed. Due to the limited number of such instances, we omit them here.

of a noun expressing the Message (Example 3c); 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 (Example 3d); this is one of the typical patterns of its realisation as attested in the more specific communication frames.

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

Addressee is either realised as a prepositional phrase or is left unexpressed, although its presence is always required conceptually as every act of communication is addressed to someone. Predominantly, the non-overt Addressee frame elements are indefinite null instantiations (INI).

(3) a. [*Iranian officials*]$_{\text{Com}}$ ***INDICATE*** [*that Iran would honor its safeguards agreement with the IAEA*]$_{\text{Msg}}$ [_]$_{\text{Addr-INI}}$.
b. [*They*]$_{\text{Com}}$ *can easily* ***COMMUNICATE*** [_]$_{\text{Msg-INI}}$ [*with one another*]$_{\text{Addr}}$.
c. [*The letter*]$_{\text{Med}}$ ***COMMUNICATED*** [*nothing*]$_{\text{Msg}}$ [*of her pleasure and love*]$_{\text{Top}}$.
d. [*I*]$_{\text{Com}}$ ***COMMUNICATED*** [*with the Minister*]$_{\text{Addr}}$ [*on that issue*]$_{\text{Top}}$.

4.1.3 `Communication` valence patterns

`Communication` valence patterns are presented in Table 2.

The most common valence pattern found in the data is represented as an expressed subject NP Communicator, an object NP Message and an Addressee PP. The Message is usually expressed and when it is not – the Topic may be realised (Example 3). Due to the small number of examples, this last observation is not included in the table, but it is supported by the expression of the relevant frame element in the more specific frames.

4.1.4 Syntactic realisation of the `Communication` frame in Bulgarian

The core frame elements are expressed in a similar way as in English: the Communicator is realised as a subject, the Message is an NP object or more rarely (although varying from verb to verb) a complement clause or a quote; if overt, the Addressee is expressed as a prepositional phrase. The Topic is syntactically explicit in about 20% of the cases and, similarly to English, is realised as either

Table 2: FrameNet valence patterns of `Communication` verbs, their frequency in the FrameNet corpus and the verbs they appear with.

Pattern	#	verbs
[NP.Ext]$_{\text{Com}}$ [PP]$_{\text{Addr}}$ [NP]$_{\text{Msg}}$	11	*communicate, signal*
[NP.Ext]$_{\text{Com}}$ [PP]$_{\text{Addr}}$ [_]$_{\text{Msg-INI}}$	7	*communicate*
[NP.Ext]$_{\text{Msg}}$ [_]$_{\text{Com-CNI}}$ [Clause]$_{\text{Msg}}$	5	*say*
[NP.Ext]$_{\text{Com}}$ [_]$_{\text{Addr-INI}}$ [NP]$_{\text{Msg}}$	5	*communicate*
[NP.Ext]$_{\text{Com}}$ [_]$_{\text{Addr-INI}}$ [_]$_{\text{Msg-INI}}$	4	*communicate*
[NP.Ext]$_{\text{Com}}$ [Clause]$_{\text{Msg}}$	4	*indicate, say, signal*
[NP.Ext]$_{\text{Msg}}$ [PP]$_{\text{Addr}}$ [_]$_{\text{Com-CNI}}$	3	*communicate*
[NP.Ext]$_{\text{Com}}$ [_]$_{\text{Addr-DNI}}$ [NP]$_{\text{Msg}}$	3	*communicate, indicate*
[NP.Ext]$_{\text{Com}}$ [PP]$_{\text{Addr}}$ [NP]$_{\text{Msg}}$ [PP]$_{\text{Top}}$	2	*communicate*
[NP.Ext]$_{\text{Med}}$ [_]$_{\text{Addr-INI}}$ [Clause]$_{\text{Msg}}$	2	*indicate*

a prepositional phrase that modifies a Message head noun (Example 4a) or independently in the absence of an overt Message (Example 4b); the number of examples is too small to make definitive conclusions, but both languages support this observation.

(4) a. [*Те*]$_{\text{Com}}$ ***СЪОБЩАВАТ*** [*съответната информация*]$_{\text{Msg}}$ [*за*
They communicate relevant information about
дейността си]$_{\text{Top}}$.
activity-def REFL.
'They communicate relevant information about their activity.'

b. [*Те*]$_{\text{Com}}$ ***СЪОБЩАВАТ*** [_]$_{\text{Msg-INI}}$ [*за пристигането си на*
They communicate about arrival-def REFL at
гарата]$_{\text{Top}}$.
station-def.
'They communicate about their arrival at the station.'

c. [*Те*]$_{\text{Com}}$ ***СЪОБЩАВАТ*** [*на Комисията*]$_{\text{Addr}}$ [*текста на*
They communicate to Commission-def text-def of
разпоредбите]$_{\text{Msg}}$.
measures-def.
'They communicate to the Commission the text of the measures.'

d. [*Органите*]$_{\text{COM}}$ ***СЪОБЩАВАТ*** [*цялата съществена*
Authorities-DEF communicate all essential
информация]$_{\text{MSG}}$ [_]$_{\text{ADDR}}$.
information.
'The authorities communicate all essential information.'

e. [*Страните*]$_{\text{COM}}$ ***ПОСОЧВАТ***, [*че информацията не може да*
Parties-DEF indicate that information-DEF cannot to
бъде резюмирана]$_{\text{MSG}}$ [_]$_{\text{ADDR}}$.
be summarised.
'The parties indicate that the information cannot be summarised.'

The syntactic realisation of the `Communication` frame elements in Bulgarian is shown in Table 3.[13]

Table 3: Syntactic expression of the `Communication` frame elements in Bulgarian.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
споделям/споделя 'share'									
COMMUNICATOR	14								14
MESSAGE		11			2	1			14
ADDRESSEE			12		2				14
TOPIC			1						1
съобщавам/съобщя 'communicate'									
COMMUNICATOR	29								29
MESSAGE		22			6	2			30
ADDRESSEE			22		8				30
MEDIUM			1						1
TOPIC		1	6						7
предавам/предам 'convey'									
COMMUNICATOR	48								48
MESSAGE	3	42			1	1	1		48
ADDRESSEE			28		19				47

[13] In the Bulgarian annotated data the verbs are assigned a WordNet sense, so the corresponding Princeton WordNet synset serves as an English translation equivalent. As this information is not available to the readers, henceforth we have provided translation equivalents for the Bulgarian verbs.

The valence patterns in Bulgarian (Table 4) show similar preferences for the co-occurrence of frame elements; with both MESSAGE and ADDRESSEE expressed (Example 4c) or with a realised MESSAGE and a non-overt ADDRESSEE (Example 4d).

Table 4: FrameNet valence patterns of `Communication` verbs, their frequency in the Bulgarian dataset and the verbs they appear with. English translation equivalents: *предавам/предам* 'convey', *споделям/споделя* 'share', *съобщавам/съобщя* 'communicate'.

Pattern	#	verbs
$[\text{NP.Ext}]_{\text{COM}}$ $[\text{NP.Obj}]_{\text{MSG}}$ $[\text{PP}]_{\text{ADDR}}$	50	*предавам/предам, споделям/споделя, съобщавам/съобщя*
$[\text{NP.Ext}]_{\text{COM}}$ $[\text{NP.Obj}]_{\text{MSG}}$ $[\_]_{\text{ADDR-INI}}$	13	*предавам/предам, съобщавам/съобщя*
$[\text{NP.Ext}]_{\text{COM}}$ $[\text{NP.Obj}]_{\text{MSG}}$ $[\_]_{\text{ADDR-DNI}}$	9	*споделям/споделя, предавам/предам*
$[\text{NP.Ext}]_{\text{COM}}$ $[\text{PP}]_{\text{ADDR}}$ $[\text{PP}]_{\text{TOP}}$ $[\_]_{\text{MSG-INI}}$	4	*споделям/споделя, съобщавам/съобщя*
$[\text{NP.Ext}]_{\text{COM}}$ $[\text{PP}]_{\text{ADDR}}$ $[\_]_{\text{MSG-DNI}}$	3	*споделям/споделя, съобщавам/съобщя*
$[\text{NP.Ext}]_{\text{COM}}$ $[\text{Clause}]_{\text{MSG}}$ $[\_]_{\text{ADDR-INI}}$	2	*съобщавам/съобщя*
$[\text{NP.Ext}]_{\text{COM}}$ $[\text{NP.Obj}]_{\text{MSG}}$ $[\text{PP}]_{\text{ADDR}}$ $[\text{PP}]_{\text{TOP}}$	1	*съобщавам/съобщя*

In the Bulgarian data we have found only rare instances where there is an expressed ADDRESSEE with non-overt MESSAGE or TOPIC, but this observation needs further corroboration from the data for this frame as well as for other related frames.

The MESSAGE can also be expressed as a quote or a clausal complement; however, as Bulgarian lacks infinitives and *-ing* clauses, clausal complements are realised as finite clauses (Example 4e).

4.2 Frame `Communication_manner`

Definition of the frame `Communication_manner`: The words in this frame describe MANNERS of verbal communication. Core frame elements: SPEAKER, MESSAGE, TOPIC, ADDRESSEE.

The Speaker is a specific type of Communicator who uses his or her voice to produce the Message. Thus, apart from being a sentient being, it needs to be able to produce speech, e.g. is typically a person (Example 5a). The type of communication involves characteristics of individual organisms, so organisations are not typically realised as Speakers, but groups of people can be (Example 5b).

In particular, the verbs in the `Communication_manner` frame describe various manners of speaking or vocalising whereby a Speaker conveys a Message to the Addressee. The focus is on the specifics of the articulation or vocalisation such as clarity, speed, loudness, etc. Thus, the Manner of the communication is incorporated in the lexical meaning of the verb, e.g. *whisper*.v 'speak very softly using one's breath', *babble*.v 'talk rapidly and continuously', etc.; the Manner can appear overtly when expressing additional manner meaning than the one incorporated by the verb (Example 5e).

The Medium of communication is peripheral to the conceptualisation of the frame and thus has a non-core status.

The remaining core frame elements, i.e. Message and Topic, have the same specifics as in the `Communication` frame.

4.2.1 Syntactic realisation of the `Communication_manner` frame elements

The syntactic expression of the basic configuration of frame elements in the `Communication_manner` frame is similar to the one in the `Communication` frame, but there are differences that we point out below. Like Communicator, the Speaker is the external argument and is realised as the subject, which, under some contextually or constructionally grounded circumstances can be left implicit.

Similarly to the same frame element in the `Communication` frame, the Message can be expressed as a subordinate clause (Example 5c), a quoted expression (Example 5d), or an NP object that generalises over the type of information (Example 5a). In some cases the Message can be unexpressed (Example 5e).

The Topic is typically expressed as a prepositional phrase complement headed by 'about' (Example 5f). An alternative type of pattern is for it to be left implicit (a null instantiation), especially in the presence of a Message. As shown above, the two frame elements co-occur overtly primarily as an NP and a PP, where the Topic PP should be treated as a modifier of the Message NP (Example 5g).

The Addressee is typically left non-overt but is always implied; otherwise it is expressed as a prepositional phrase (Examples 5a, 5d, 5e).

Among the verbs in this frame, certain differences may also be found. For instance, *rave*.v and *rant*.v tend to express overtly the Topic more often than the Message as compared with the purely manner verbs, which give preference to the Message itself.

(5) a. [*Ann*]$_{\text{COM}}$ ***WHISPERED*** [*the question*]$_{\text{MSG}}$ [*to Harry*]$_{\text{ADDR}}$.
b. [*The crowd*]$_{\text{COM}}$ ***CHANTED*** [*my name*]$_{\text{MSG}}$ [_]$_{\text{ADDR-INI}}$.
c. [*He*]$_{\text{COM}}$ ***MUMBLED*** [*that he was in a state of shock*]$_{\text{MSG}}$ [_]$_{\text{ADDR-INI}}$.
d. [*'Change of plan,'*]$_{\text{MSG}}$ [*Peter*]$_{\text{COM}}$ ***SHOUTED OUT*** [*to Kelly*]$_{\text{ADDR}}$.
e. [*I*]$_{\text{COM}}$ *was* ***SINGING*** [_]$_{\text{MSG-INI}}$ [*happily*]$_{\text{MANR}}$ [*to myself*]$_{\text{ADDR}}$.
f. [*He*]$_{\text{COM}}$ *was* ***RAVING*** [_]$_{\text{MSG-INI}}$ [*about Armageddon*]$_{\text{TOP}}$ [_]$_{\text{ADDR-INI}}$.
g. [*He*]$_{\text{COM}}$ ***MUMBLED*** [*something*]$_{\text{MSG}}$ [*about something or other*]$_{\text{TOP}}$.

The specifics of the syntactic expression of the basic configuration of frame elements in the `Communication_manner` frame is exemplified in Table 5.

Table 5: Syntactic expression of the `Communication_manner` frame elements in selected FrameNet lexical units.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
mutter									
SPEAKER	89								89
ADDRESSEE			21		68				89
TOPIC			20		14				34
MESSAGE		32				7	26		65
rave									
SPEAKER	27								27
ADDRESSEE			3		24				27
TOPIC		3	13		8				24
MESSAGE		1	1				3		5
shout									
ADDRESSEE	3		38		83				124
SPEAKER	116				5				121
TOPIC			3		34				37
MESSAGE	2	38	5			15	26		86
sing									
SPEAKER	59		6		2				67
ADDRESSEE			8		58				66
MESSAGE	8	33			24		2		67
TOPIC			14					1	15
whisper									
SPEAKER	47				5			1	53
ADDRESSEE			16		37				53
MESSAGE	6	14				8	9		37
TOPIC			7		12				19

4.2.2 `Communication_manner` valence patterns

Table 6 shows the prevalent valence patterns found with the verbs evoking the `Communication_manner` frame in the FrameNet annotated corpus.

The most frequent patterns include a canonical expression of the Speaker as a subject NP and a Message realised as either a direct quote, an object NP or a clausal complement. The valence patterns also show most frequently a non-overt or less often an expressed Addressee.

4.2.3 Syntactic realisation of the `Communication_manner` frame in Bulgarian

In a similar manner, in Bulgarian the Speaker is realised as the external subject NP, while the Message is expressed as a direct quote (Example 6a), a finite complement clause (Example 6b) or an NP Object (Example 6c). The Topic and the Addressee are expressed as prepositional complements (Example 6d).

(6) a. [_]$_{\text{Spkr-DNI}}$ *Едва* ***ПРОШЕПВАМ***: [– *За* *какво*
Hardly whisper.1sg: – About what
става дума?]$_{\text{Msg}}$ [_]$_{\text{Addr-INI}}$
take place word?
'I hardly whisper: – What is it about?'

b. [_]$_{\text{Spkr-DNI}}$ ***ПРОМЪРМОРВАМ***, [*че* *отчаяно* *искам* *да си*
Mutter.1sg that desperately want.1sg to REFL
го върна]$_{\text{Msg}}$ [_]$_{\text{Addr-INI}}$.
it get back.
'I mutter that I desperately want to get it back.'

c. [*Аз*]$_{\text{Spkr}}$ ***ИЗМЪНКАХ*** [*някакъв отговор*]$_{\text{Msg}}$ [_]$_{\text{Addr}}$.
I stammered some reply.

d. [*Тя*]$_{\text{Spkr}}$ ***ДРЪНКА*** [*на всички*]$_{\text{Addr}}$ [*за* *мен*]$_{\text{Top}}$.
She babbles to everyone about me.

e. [*Капитанът*]$_{\text{Spkr}}$ *продължи да* ***КРЕЩИ*** [*заповедите си*]$_{\text{Msg}}$ [*за*
Captain-def continued to shout orders REFL about
разни платна и *въжета*]$_{\text{Top}}$.
some sails and ropes.
'The captain continued shouting his orders about sails and ropes.'

f. [– *Здравейте*]$_{\text{Msg}}$ – ***ИЗМЪНКВАМ*** [*аз*]$_{\text{Spkr}}$ [_]$_{\text{Addr}}$ *нерешително.*
– Hello – mumble I hesitantly.

Table 6: FrameNet valence patterns of `Communication_manner` verbs, their frequency in the FrameNet corpus and the verbs they appear with.

Pattern	#	verbs
[NP.Ext]$_{\text{Spkr}}$ [_]$_{\text{Addr-INI}}$ [Quote]$_{\text{Msg}}$	166	*rant, chant, slur, stutter, stammer, babble, chatter, rave, mumble, mutter, whisper, sing, shout*
[NP.Ext]$_{\text{Spkr}}$ [_]$_{\text{Addr-INI}}$ [_]$_{\text{Top-INI}}$	156	*rant, chant, slur, stutter, stammer, babble, chatter, rave, mumble, mutter, whisper, shout*
[NP.Ext]$_{\text{Spkr}}$ [_]$_{\text{Addr-INI}}$ [NP.Obj]$_{\text{Msg}}$	146	*rant, chant, slur, stutter, stammer, babble, chatter, mumble, mutter, whisper, sing, shout*
[NP.Ext]$_{\text{Spkr}}$ [_]$_{\text{Addr-INI}}$ [PP]$_{\text{Top}}$	70	*rant, babble, chatter, rave, mumble, mutter, whisper, shout*
[NP.Ext]$_{\text{Spkr}}$ [PP]$_{\text{Addr}}$ [_]$_{\text{Top-INI}}$	48	*rant, chant, babble, chatter, rave, mumble, mutter, whisper, shout*
[NP.Ext]$_{\text{Spkr}}$ [_]$_{\text{Addr-INI}}$ [Clause]$_{\text{Msg}}$	41	*rant, chant, mumble, mutter, stutter, stammer, whisper, shout*
[NP.Ext]$_{\text{Spkr}}$ [PP]$_{\text{Addr}}$ [NP.Obj]$_{\text{Msg}}$	34	*mumble, mutter, stutter, whisper, sing, shout*
[NP.Ext]$_{\text{Spkr}}$ [PP]$_{\text{Addr}}$ [Quote]$_{\text{Msg}}$	31	*rant, chant, mumble, mutter, whisper, shout*
[NP.Ext]$_{\text{Spkr}}$ [_]$_{\text{Addr-INI}}$ [NP.Obj]$_{\text{Msg}}$ [PP]$_{\text{Top}}$	21	*mumble, mutter, stammer, babble, sing, shout*

Table 7: Syntactic expression of the `Communication_manner` frame elements in Bulgarian.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
шепна 'whisper'									
Message		3			1		3		7
Addressee			6		2				8
Speaker	8								8
промърморвам/промърморя 'mumble, mutter'									
Message		2					8	3	13
Addressee			3		10				13
Medium			1						1
Speaker	13								13
викам 'shout'									
Message		3			1		23	4	31
Addressee			2		33				35
Medium			1						1
Speaker	35								35
прошепвам/прошепна 'whisper'									
Message		8					7	1	16
Addressee			6		10				16
Speaker	17								17

Table 7 shows a selection of verbs in Bulgarian evoking the frame `Communication_manner`, while Table 8 presents the most frequent valence patterns. The syntactic realisation is similar to English: strong preference for the overt expression of the Message either together with the Addressee or in its absence; realising the Topic most often either in the absence of (Example 6d) or as a modifier to the Message (Example 6e).

We can also note that at least for some manner verbs such as *мърморя* 'mumble, mutter', *мънкам* 'stutter', there is a marked trend of expressing the Message as a quote rather than as a complement clause.

4.3 Frame `Statement`

Definition of the frame `Statement`: A Speaker addresses a Message to some Addressee using language. Instead of (or in addition to) a Speaker, a Medium may also be mentioned. Likewise, a Topic may be stated instead of a Message. Core frame elements: Speaker, Message, Medium, Topic; Non-core: Addressee.

Table 8: FrameNet valence patterns of `Communication_manner` verbs, their frequency in the Bulgarian dataset and the verbs they appear with. English translation equivalents: *бъбря* 'babble, prattle', *викам* 'shout', *дрънкам* 'rattle, jabber', *заеквам/заекна* 'stammer, stutter', *крещя* 'shout, yell', *мърморя, промърморвам/промърморя* 'mumble, mutter', *пошушвам/пошушна, прошепвам/прошепна, шепна, шушна, шушукам* 'whisper', *смотолевям/смотолевя* 'mumble, falter'.

Pattern	#	verbs
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{Quote}]_{\text{Msg}}$ $[\_]_{\text{Addr-INI}}$	48	*бъбря, викам, заеквам/заекна, крещя, пошушвам/пошушна, промърморвам/промърморя, прошепвам/прошепна, смотолевям/смотолевя, шепна*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{NP.Obj}]_{\text{Msg}}$ $[\_]_{\text{Addr-INI}}$	13	*бърборя, викам, дрънкам, крещя, мърморя, прошепвам/прошепна, шепна, промърморвам/промърморя*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\_]_{\text{Addr-INI}}$	12	*бъбря, викам, дрънкам, заеквам/заекна, крещя, мърморя, шушукам*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{NP.Obj}]_{\text{Msg}}$ $[\text{PP}]_{\text{Addr}}$	11	*викам, дрънкам, крещя, мърморя, прошепвам/прошепна, шепна, шушукам*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{PP}]_{\text{Addr}}$ $[\text{Quote}]_{\text{Msg}}$	10	*бъбря, викам, прошепвам/прошепна, шепна, шушна, промърморвам/промърморя*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{Clause-that}]_{\text{Msg}}$ $[\_]_{\text{Addr-INI}}$	6	*викам, дрънкам, шушна, промърморвам/промърморя*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{PP}]_{\text{Top}}$ $[\_]_{\text{Addr-INI}}$	2	*дрънкам*

This frame represents the greatest number of verbs of speech, including many general lexis verbs such as *say*.v, *state*.v, *declare*.v, *speak*.v, *report*.v, *note*.v, etc.

4.3.1 Syntactic realisation of the `Statement` frame elements

The frame `Statement` is an elaboration of the prototypical frame `Communication` which specifies verbs for communication involving language. This is reflected by the fact that the COMMUNICATOR is conceptualised as the more specific SPEAKER, which denotes the person who produces the message. Likewise, this The frame element SPEAKER is realised as the external NP.

The MESSAGE is typically expressed either as a subordinate clause, an NP object, or a direct quote that represents the content being conveyed (Example 7a, 7b, 7c, respectively). There is a range of preferred realisations of the MESSAGE with the different verbs in this frame: some of them have a stronger tendency to take a complement subordinate clause (e.g., *claim*.v, *suggest*.v, *note*.v), while others show preference for an NP object (e.g., *profess*.v, *reiterate*.v, *relate*.v) or a quote (e.g., *exclaim*.v); in some cases the three realisations are equally likely (e.g., *caution*.v).

The TOPIC is typically expressed as a prepositional phrase headed by different prepositions depending on the verb, e.g. (*speak about him, speak of him, preach of heaven, comment on the protests, comment upon the economic conditions*), a trend inherited from the `Communication` frame. Similarly to the frames discussed above, usually either the MESSAGE or the TOPIC is expressed; as expected, they may also occur together in a phrase (Example 7b), where the TOPIC is syntactically dependent on the MESSAGE. In addition, some verbs co-occur more readily with a TOPIC rather than with a MESSAGE, e.g. *explain*.v (Example 7d).

As a peripheral frame element the ADDRESSEE is often left non-overt although implied. When present, it is expressed as a prepositional phrase most frequently with the preposition 'to' (Example 7d). In some cases it may be realised as an indirect object (Example 7e).

(7) a. [*North Korea*]$_{\text{SPKR}}$ ***CLAIMED*** [*it had no intention of producing nuclear weapons*]$_{\text{MSG}}$.
b. [*He*]$_{\text{SPKR}}$ ***SAID*** [*little*]$_{\text{MSG}}$ [*about the case*]$_{\text{TOP}}$.
c. [*He*]$_{\text{SPKR}}$ ***ADDED***: ['*Eldorado is a brave venture*']$_{\text{MSG}}$.
d. [*Doc*]$_{\text{SPKR}}$ ***EXPLAINED*** [*the injuries*]$_{\text{MSG}}$ [*to the police*]$_{\text{ADDR}}$.
e. [*The agency*]$_{\text{SPKR}}$ ***WROTE*** [*me*]$_{\text{ADDR}}$ [*that you had moved*]$_{\text{MSG}}$.
f. [*The letter*]$_{\text{MED}}$ ***ALLEGED*** [*serious breaches of the law*]$_{\text{MSG}}$.

The various specific configuration of frame elements as expressed by verbs in the `Statement` frame are shown in Table 9.

Table 9: Syntactic expression of the `Statement` frame elements in selected FrameNet lexical units.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
announce									
Speaker	44		3		5			1	53
Addressee			6					1	7
Message	8	20				24	6		58
Medium	3		2						5
declare									
Speaker	58				7				65
Addressee			7						7
Message	7	32	6			17	15	7	84
report									
Speaker	54		1		19				74
Addressee			8						8
Message	19	20	2	1	1	44	2		89
Medium	9		5		1			1	16
Topic	2		5		1				8
say									
Message	14	22	1	4	2	49	33		125
Addressee			8						8
Speaker	90	1			14				105
Medium	9		10		1				20
Topic			10		1			1	12
state									
Speaker	38								38
Addressee			3						3
Message	3	8	2			19	13		45
Medium	3		1		3				7
suggest									
Speaker	27		2		4				33
Addressee			5						5
Message	3	5		3		21	5		37
Medium	4		4						8
talk									
Speaker	32		1		3				36
Topic	3		29	2		2			36
Message	1	3							4
write									
Speaker	42				1				43
Addressee		2	4			1			7
Message	1	5			2	10	13		31
Topic	1		22						23
Medium	1		8						9

4.3.2 `Statement` valence patterns

The prevalent valence patterns for verbs in the FrameNet frame `Statement` are shown in Table 10. The most typical ones include the canonical expression of the Speaker as the external NP and the Message as a subordinate clause, an object NP, or a quote.

Alternatively, the Medium may occupy the position of the external argument with an implied generalised reading of the Speaker which is left unexpressed (Example 7f). Similarly to many of the frames describing verbs of communication, instead of the Message the Topic may be realised, most often as a prepositional phrase.

The patterns involving the expression of an Addressee are quite infrequent.

4.3.3 Syntactic realisation of the `Statement` frame in Bulgarian

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 (Example 8a, 8b). In some cases the Medium can take the position of the external argument (Example 8c).

The Message is either a finite clause (Example 8a), an object NP (Example 8b) or a direct quote (Example 8f). The Topic rarely occurs together with the Message, and it is usually a modifier of the Message (Example 8d). The non-core Addressee is mostly optional and is realised as a prepositional complement (Example 8b).

(8) a. [*Панайотов*]$_{\text{Spkr}}$ ***ДОБАВИ***, [*че лидер на бъдещата партия ще е Симеон*]$_{\text{Msg}}$.
Panayotov added that leader of future-def party will be Simeon.
'Panayotov added that Simeon will be the leader of the future party.'

b. [*Кредитните институции*]$_{\text{Spkr}}$ ***ДЕКЛАРИРАХА*** [*пред властите*]$_{\text{Addr}}$ [*нарасналите печалби*]$_{\text{Msg}}$.
Credit institutions declared to authorities-def increased-def profits.
'Credit institutions declared increased profits to the authorities.'

c. [*Неофициалните статистики за 1999 г.*]$_{\text{Med}}$ ***СОЧАТ*** [*5000 посетители*]$_{\text{Msg}}$.
Unofficial-def statistics for 1999 report 5000 visitors.
'The unofficial statistics for 1999 state 5,000 visitors.'

Table 10: FrameNet valence patterns of `Statement` verbs, their frequency in the FrameNet corpus and the verbs they appear with.

Pattern	#	verbs
[NP.Ext]$_{\text{Spkr}}$ [Clause]$_{\text{Msg}}$	281	*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*
[NP.Ext]$_{\text{Spkr}}$ [NP.Obj]$_{\text{Msg}}$	191	*explain, note, declare, tell, conjecture, reiterate, assert, preach, claim, speak, talk, state, caution, write, add, allege, exclaim, say, suggest, propose, announce, confirm, acknowledge, refute, proclaim, reaffirm, report*
[NP.Ext]$_{\text{Spkr}}$ [Quote]$_{\text{Msg}}$	143	*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*
[NP.Ext]$_{\text{Spkr}}$ [PP]$_{\text{Top}}$	83	*explain, gloat, preach, report, comment, remark, speak, talk, write*
[NP.Ext]$_{\text{Medium}}$ [Clause]$_{\text{Msg}}$	39	*note, declare, allege, say, suggest, propose, announce, confirm, acknowledge, proclaim, report, claim, state*
[NP.Ext]$_{\text{Spkr}}$ [PP]$_{\text{Addr}}$ [NP.Obj]$_{\text{Msg}}$	28	*reiterate, declare, report, say, speak, state, suggest, propose, announce, mention*
[NP.Ext]$_{\text{Spkr}}$ [PP]$_{\text{Msg}}$	28	*profess, declare, preach, say, speak, describe, insist, caution*
[NP.Ext]$_{\text{Spkr}}$ [PP]$_{\text{Addr}}$ [Clause]$_{\text{Msg}}$	25	*add, explain, declare, allege, suggest, insist, propose, announce, mention, confirm, preach*
[NP.Ext]$_{\text{Spkr}}$ [PP]$_{\text{Medium}}$ [Clause]$_{\text{Msg}}$	20	*explain, note, acknowledge, allege, claim, say, state, suggest, write, mention*
[NP.Ext]$_{\text{Medium}}$ [NP.Obj]$_{\text{Msg}}$	20	*explain, note, proclaim, tell, allege, reaffirm, say, state, propose, announce, mention*

d. [*Тези лица*]$_{\text{Spkr}}$ ***ИЗКАЗВАТ*** [*пред нас*]$_{\text{Addr}}$ [*неприятни истини*]$_{\text{Msg}}$ [*за смъртните ни врагове*]$_{\text{Top}}$.
These persons state to us unpleasant truths about mortal-DEF our enemies.
'These people state to us unpleasant truths about our mortal enemies.'

e. [В *интервюто*]$_{\text{MED}}$ [*Симеон*]$_{\text{SPKR}}$ ***ОБЯВИ*** [*промяна на*
In interview-DEF Simeon announced change of
политическата посока]$_{\text{MSG}}$.
political-DEF direction.
'In the interview Simeon announced a change in the political direction.'

f. [– *Тя го каза просто така*]$_{\text{MSG}}$ – ***ДОБАВИ*** [*Джени*]$_{\text{SPKR}}$.
– She it said just so – added Jenny.
'– She said it just like that – added Jenny.'

Table 11 shows some of the most frequent verbs in Bulgarian evoking the frame `Statement`. The Bulgarian examples show similar patterns to the realisation of frame elements of the examples in the English dataset.

Table 12 presents the most frequent valence patterns typical of the verbs evoking the `Statement` frame in Bulgarian. Like in English, the most preferred realisations involve a subject SPEAKER and a MESSAGE expressed as an object NP, a clause or a quote.

4.4 Frame `Telling`

The definition of the `Telling` frame is: A SPEAKER addresses an ADDRESSEE with a MESSAGE, which may be indirectly referred to as a TOPIC. Instead of (or in addition to) a SPEAKER, a MEDIUM may also be mentioned. Core frame elements: SPEAKER, ADDRESSEE, MESSAGE, MEDIUM, TOPIC.

The frame `Telling` is evoked by a small number of frequently occurring verbs such as *tell*.v, *advise*.v, *inform*.v, *notify*.v, etc. The frame inherits from `Statement` and its specialisation consists in the fact that it describes speech acts directed to a specific ADDRESSEE. As a result this frame element is promoted to core status and with most verbs (*inform*.v, *advise*.v, *confide*.v, *notify*.v) is favoured for the direct object position.

4.4.1 Syntactic realisation of the `Telling` frame elements

The frame elements generally have the same characteristics as the ones in the `Statement` frame from which they are inherited. The SPEAKER usually takes the position of the external NP (Example 9a). Most often the ADDRESSEE is expressed as an NP object (Example 9b) or in the case of *tell*.v as an indirect object NP or a PP.

The MESSAGE is most often realised as a prepositional phrase, a subordinate clause or a quote (Example 9b, 9c, 9a, respectively). It may also take the position

Table 11: Syntactic expression of the `Statement` frame elements in Bulgarian lexical units.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
обявявам/обявя ‘announce’									
Speaker	17				1				18
Message		4				12	1	1	18
твърдя ‘claim’									
Speaker	11				1				12
Message						10	2		12
коментирам ‘comment’									
Speaker	8								8
Message		4				2	1	1	8
добавям/добавя ‘add’									
Speaker	10								10
Message						5	5		10
съобщавам/съобщя ‘announce’									
Speaker	10				1				11
Message		4				2	5		11
Addressee			1						1
казвам/кажа ‘say’									
Speaker	47				1				48
Message	1	10				18	19		48
Addressee			4						4
обяснявам/обясня ‘explain’									
Speaker	14				2				16
Message	1	2			1	5	6	1	16
Addressee			6						6
заявявам/заявя ‘state’									
Speaker	17								17
Message						10	7		17
Addressee			4						4

Table 12: FrameNet valence patterns of `Statement` verbs, their frequency in the Bulgarian dataset and the verbs they appear with. English translation equivalents: *добавям/добавя* 'add', *заявявам/заявя* 'state', *казвам/кажа* 'say', *коментирам* 'comment', *обявявам/обявя, оповестявам/оповестя, съобщавам/съобщя* 'announce', *обяснявам, обясня* 'explain', *отбелязвам/отбележа* 'note', *пиша* 'write', *повтарям/повторя* 'reiterate', *посочвам/посоча* 'state', *предлагам/предложа* 'suggest'.

Pattern	#	verbs
[NP.Ext]$_{\text{Spkr}}$ [Clause]$_{\text{Msg}}$	67	*добавям/добавя, заявявам/заявя, казвам/кажа, коментирам, обявявам/обявя, обяснявам/обясня, отбелязвам/отбележа, пиша, посочвам/посоча, предлагам/предложа, твърдя*
[NP.Ext]$_{\text{Spkr}}$ [Quote]$_{\text{Msg}}$	48	*добавям/добавя, заявявам/заявя, казвам/кажа, коментирам, обявявам/обявя, обяснявам/обясня, отбелязвам/отбележа, пиша, повтарям/повторя, съобщавам/съобщя, твърдя*
[NP.Ext]$_{\text{Spkr}}$ [NP.Obj]$_{\text{Msg}}$	29	*казвам/кажа, коментирам, обявявам/обявя, оповестявам/оповестя, повтарям/повторя, посочвам/посоча, предлагам/предложа, съобщавам/съобщя*
[NP.Ext]$_{\text{Spkr}}$ [Clause]$_{\text{Msg}}$ [PP]$_{\text{Addr}}$	9	*заявявам/заявя, обяснявам/обясня, предлагам/предложа, съобщавам/съобщя*
[NP.Ext]$_{\text{Spkr}}$ [PP]$_{\text{Addr}}$ [Quote]$_{\text{Msg}}$	5	*заявявам/заявя, казвам/кажа*
[NP.Ext]$_{\text{Spkr}}$ [NP.Obj]$_{\text{Msg}}$ [PP]$_{\text{Addr}}$	2	*обяснявам/обясня*

of an NP object, while the Addressee is represented by a PP (Example 9d), a pattern which is actually favoured by the verb *confide*.v. Instead of the Message, its Topic may be realised as a prepositional phrase (Example 9e).

(9) a. [*'Take your bag and go,'*]$_{\text{Msg}}$ [*Jake*]$_{\text{Spkr}}$ ***TOLD*** [*her*]$_{\text{Addr}}$.

b. [*The police*]$_{\text{Spkr}}$ *didn't* ***INFORM*** [*the British Consulate*]$_{\text{Addr}}$ [*about his disappearance*]$_{\text{Msg}}$.

c. [*We*] *have* ***NOTIFIED*** [*Benoit*]$_{\text{Addr}}$ [*that Tweed is wanted*]$_{\text{Msg}}$.

d. [*She*]$_{\text{Spkr}}$ ***CONFIDED*** [*her sadness*]$_{\text{Msg}}$ [*in Beth*]$_{\text{Addr}}$.

e. [*He*]$_{\text{Spkr}}$ *will* ***ADVISE*** [*you*]$_{\text{Addr}}$ [*on the inheritance tax*]$_{\text{Top}}$.

The various specific configurations of frame elements as expressed by verbs in the `Telling` frame are shown in Table 13.

Table 13: Syntactic expression of the Telling frame elements in selected FrameNet lexical units.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
tell									
Speaker	90	1	9		14				114
Addressee	18	59	3	1	36	1		2	120
Topic		3	31			4		1	39
Message	5	11	9	3	13	35	6	8	90
Medium	10		2						12
inform									
Speaker	39				8				47
Addressee	8	37			2				47
Message			10		7	20	6		43
Medium			3						3
Topic			4						4
advise									
Speaker	59		1		6				66
Addressee	8	31	1		27				67
Message		3	7			29	8		47
Topic			19		1				20
confide									
Speaker	45				1				46
Addressee			23		23				46
Message	1	23			4	14	4		46
Medium			1						1

4.4.2 `Telling` valence patterns

The prevalent valence patterns for the verbs in the FrameNet frame `Telling` are illustrated in Table 14. These include the prototypical expression of the Speaker as the external NP, usually with a direct object Addressee, which may be left implicit and/or a Message realised as a subordinate clause, a prepositional phrase or a quote; the Message may also be implicit. A PP Topic may co-occur with the Addressee but usually not with the Message.

4.4.3 Syntactic realisation and patterns in Bulgarian

In a similar manner, in Bulgarian the Speaker is realised as the external subject NP, while the Message takes the position of an object NP, a subordinate clause or a quote (Example 10a, 10b, 10c).

With some of the verbs in this frame, such as *казвам, съобщавам* 'tell, let know' the Addressee assumes the position of the indirect object as the receiver

Table 14: FrameNet valence patterns of `Telling` verbs, their frequency in the FrameNet corpus and the verbs they appear with.

Pattern	#	verbs
[NP.Ext]$_{\text{Spkr}}$ [NP.Obj]$_{\text{Addr}}$ [Clause]$_{\text{Msg}}$	53	*inform, advise, tell, assure, notify*
[NP.Ext]$_{\text{Spkr}}$ [NP.Obj]$_{\text{Addr}}$ [PP]$_{\text{Top}}$	30	*apprise, inform, advise, tell, notify*
[NP.Ext]$_{\text{Spkr}}$ [_]$_{\text{Addr-DNI}}$ [Clause]$_{\text{Msg}}$	26	*advise, confide, tell, assure*
[NP.Ext]$_{\text{Spkr}}$ [NP.Obj]$_{\text{Addr}}$ [_]$_{\text{Msg-DNI}}$	20	*inform, tell, assure, notify*
[NP.Ext]$_{\text{Spkr}}$ [NP.Obj]$_{\text{Addr}}$ [PP]$_{\text{Msg}}$	20	*inform, advise, tell, notify*
[NP.Ext]$_{\text{Spkr}}$ [_]$_{\text{Addr-DNI}}$ [PP]$_{\text{Top}}$	17	*advise, tell*
[NP.Ext]$_{\text{Spkr}}$ [_]$_{\text{Addr-DNI}}$ [NP.Obj]$_{\text{Msg}}$	16	*advise, confide, tell*
[NP.Ext]$_{\text{Spkr}}$ [PP]$_{\text{Addr}}$ [NP.Obj]$_{\text{Msg}}$	16	*advise, confide, tell, notify*
[NP.Ext]$_{\text{Spkr}}$ [_]$_{\text{Addr-DNI}}$ [Quote]$_{\text{Msg}}$	14	*advise, confide, assure*
[NP.Ext]$_{\text{Spkr}}$ [NP.Obj]$_{\text{Addr}}$ [Quote]$_{\text{Msg}}$	11	*inform, tell, assure*

to whom the message is directed (Example 10b), while with verbs such as *уведомявам* 'notify, inform', *информирам, осведомявам* 'inform' it is realised as an NP object (Example 10d); the Addressee may also be null instantiated (Example 10e).

(10) a. [_]$_{\text{Spkr-DNI}}$ *Искам да* [*ви*]$_{\text{Addr}}$ ***СЪОБЩЯ*** [*една тъжна*
Want.1sg to you.2pl-DAT tell one sad
вест]$_{\text{Msg}}$.
news.
'I want to tell you some sad news.'

b. [*Всеки българин*]$_{\text{Spkr}}$ *ще* [*ти*]$_{\text{Addr}}$ ***КАЖЕ*** [*каквото е чул*
Every Bulgarian will you.2sg-DAT tell whatever has heard
от майка си]$_{\text{Msg}}$.
from mother REFL.
'Every Bulgarian will tell you whatever he has heard from his mother.'

c. [*Не са намерили Санса*]$_{\text{Msg}}$ – *учтиво* [*го*]$_{\text{Addr}}$ ***УВЕДОМИ***
Not have found Sansa – politely him informed
[*чичо му*]$_{\text{Spkr}}$.
uncle his.
'They have not found Sansa – his uncle informed him politely.'

d. [_]$_{\text{Spkr-DNI}}$ *Трябва да* ***ОСВЕДОМЯ*** [*читателя*]$_{\text{Addr}}$ [*за*
Need.1sg to inform reader-DEF about
тайната интрига]$_{\text{Top}}$.
secret-DEF plot.
'I need to inform the reader about the secret plot.'

e. [*Пенсионерите да избягват навалиците*]$_{\text{MSG}}$, ***СЪВЕТВА*** [*г-жа Ненова*]$_{\text{SPKR}}$ [_]$_{\text{ADDR-INI}}$.
Elderly-DEF to avoid crowds, advises Mrs Nenova.
'The elderly should avoid crowds, Mrs Nenova advises.'

Table 15: Syntactic expression of the `Telling` frame elements in Bulgarian.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
уверявам/уверя 'assure'									
MESSAGE			1			24	6		31
ADDRESSEE		31							31
SPEAKER	31								31
съобщавам/съобщя 'tell, let know'									
MESSAGE		3				2			5
ADDRESSEE			5						5
SPEAKER	5								5
уведомявам/уведомя 'inform, notify'									
MESSAGE					5	5	3		13
ADDRESSEE	1	15							16
TOPIC			4						4
SPEAKER	15				1				16
казвам/кажа 'tell'									
MESSAGE		11				15	6		32
ADDRESSEE			32						32
SPEAKER	32								32

Table 15 presents the most frequent verbs in Bulgarian evoking the frame `Telling`, while Table 16 shows the typical valence patterns. The MESSAGE and the ADDRESSEE tend to co-occur syntactically, while the TOPIC is expressed more rarely.

4.5 Frame `Judgment_communication`

Definition of the frame `Judgment_communication`: A COMMUNICATOR communicates a judgement of an EVALUEE to an ADDRESSEE. The judgement may

Table 16: FrameNet valence patterns of the frame `Telling`, their frequency in the Bulgarian dataset and the verbs they appear with. English translation equivalents: *информирам, осведомявам/осведомя* 'inform', *казвам, съобщавам/съобщя* 'tell, let know', *посъветвам* 'advise', *уведомявам/уведомя* 'notify', *уверявам/уверя* 'assure'.

Pattern	#	verbs
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{Clause}]_{\text{Msg}}$ $[\text{NP.Obj}]_{\text{Addr}}$	32	*осведомявам/осведомя, уверявам/уверя, уведомявам/уведомя*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{Clause}]_{\text{Msg}}$ $[\text{PP}]_{\text{Addr}}$	15	*казвам/кажа, съобщавам/съобщя*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{NP.Obj}]_{\text{Msg}}$ $[\text{PP}]_{\text{Addr}}$	14	*казвам/кажа, съобщавам/съобщя*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{NP.Obj}]_{\text{Addr}}$ $[\text{Quote}]_{\text{Msg}}$	9	*уверявам/уверя, уведомявам/уведомя*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{PP}]_{\text{Addr}}$ $[\text{Quote}]_{\text{Msg}}$	6	*казвам/кажа*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{NP.Obj}]_{\text{Addr}}$ $[\text{PP}]_{\text{Top}}$ $[\_]_{\text{Msg-INI}}$	5	*осведомявам/осведомя, уведомявам/уведомя*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{Quote}]_{\text{Msg}}$ $[\_]_{\text{Addr-INI}}$	4	*информирам, посъветвам*

be positive (e.g. *praise*.v) or negative (e.g. *criticise*.v). Core frame elements: Communicator, Expressor, Reason, Medium, Topic, Evaluee; Non-core: Addressee.

The frame `Judgment_communication` inherits from both the `Statement` and the `Judgment` frame (weak inheritance through the *Uses* frame-to-frame relation). Verbs included in this frame concern acts of speech which also convey judgement on a certain topic, the Evaluee. The frame elaborates on the frame `Statement` most notably in the interpretation of the Message as a judgement on a complex state-of-affairs concerning an additional participant, represented by the frame element Evaluee. The Evaluee can be a person, an object, an action or any topic (Example 11a, 11b, 11f). The judgement may be positive, e.g. *praise*.v, *commend*.v, *acclaim*.v, or negative, e.g. *criticise*.v, *condemn*.v, *denounce*.v; its value is encoded by the verb. In addition, the frame element Reason denotes the argumentation for the judgement. The Addressee is a non-core frame element, reflecting the fact that the judgement regarding the Evaluee may but need not be intended for another participant.

4.5.1 Syntactic realisation of the `Judgment_communication` frame elements

The frame `Judgment_communication` specifies the more general frame element Communicator rather than inheriting the Speaker from the `Statement` frame. The reason for this is that the frame also includes verbs which represent com-

munication acts that are more general or complex than speech acts, e.g. *belittle*.v, *ridicule*.v.

The Communicator is usually realised as the external argument and can be represented by a person, a group or an organisation (Example 11a, 11b).

The Evaluee is most often expressed in the position of the NP direct object (Example 11a, 11b, 11c), while the Reason can be a prepositional phrase headed by prepositions such as *for, of, as* (Example 11c, 11d, 11f). Instead of the Reason, a Topic can be present (Example 11e).

The Addressee, whenever overt, is expressed as a prepositional phrase (Example 11b).

The Expressor is rare with verbs evoking this frame and usually represents a body part or an action performed by the Communicator in order to convey the judgment (Example 11g).

(11) a. [*Frank*]$_{\text{Com}}$ ***RIDICULED*** [*everything*]$_{\text{Eval}}$.
b. [*Jon*]$_{\text{Com}}$ ***BELITTLED*** [*Madie*]$_{\text{Eval}}$ [*to her colleagues*]$_{\text{Addr}}$.
c. [*Georgia*]$_{\text{Com}}$ *has* ***ACCUSED*** [*Russian troops*]$_{\text{Eval}}$ [*of backing separatists*]$_{\text{Reas}}$.
d. [*I*]$_{\text{Com}}$ *have* ***PRAISED*** [*her*]$_{\text{Eval}}$ [*for her work*]$_{\text{Reas}}$.
e. [*He*]$_{\text{Com}}$ ***CRITICISED*** [*the president*]$_{\text{Eval}}$ [*over his decision to go to war*]$_{\text{Top}}$.
f. [*The conservatives*]$_{\text{Com}}$ ***DENOUNCED*** [*the proposed reforms*]$_{\text{Eval}}$ [*as an attempt to distract voters*]$_{\text{Reas}}$.
g. [*His glance*]$_{\text{Exr}}$ ***DENIGRATED*** [*her attempt at humour*]$_{\text{Eval}}$.

Table 17 shows some of the frequent verbs of the frame and the realisation of their frame elements.

4.5.2 `Judgment_communication` valence patterns

The valence patterns characteristic for verbs in the FrameNet frame `Judgment_communication` are presented in Table 18. The most common ones involve a Communicator as the external argument, a direct object NP Evaluee, and an either overtly expressed or implicit Reason or much more rarely a Topic.

4.5.3 Syntactic realisation of the frame `Judgement_communication` in Bulgarian

The Communicator is expressed as the external NP (Example 12a). The Evaluee can be any concrete or abstract entity, quality, property, etc., whose properties are

Table 17: Syntactic expression of the `Judgment_communication` frame elements in selected FrameNet lexical units.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
condemn									
Communicator	105		21		11				137
Evaluee	32	103	1		2				138
Medium	1		5						6
Reason		4	44		90				138
criticize									
Communicator	88		15		47				150
Addressee			1						1
Evaluee	74	71			9			1	155
Reason		4	87		59				150
Topic		1	3						4
Medium	5		3						8
praise									
Communicator	50		12		18				80
Evaluee	27	49						4	80
Reason	3	2	38		34				77
Medium			5						5
ridicule									
Communicator	14		16		16				46
Evaluee	38	9							47
Medium	1		2						3
Reason		1	13		33				47

Table 18: FrameNet valence patterns of `Judgment_communication` verbs, their frequency in the FrameNet corpus and the verbs they appear with.

Pattern	#	verbs
$[\text{NP.Ext}]_{\text{Com}}$ $[\text{NP.Obj}]_{\text{Eval}}$ $[\text{PP}]_{\text{Reas}}$	263	*accuse, deprecate, denigrate, censure, castigate, condemn, ridicule, commend, belittle, denounce, praise, damn, criticize, execrate, mock*
$[\text{NP.Ext}]_{\text{Com}}$ $[\text{NP.Obj}]_{\text{Eval}}$ $[\_]_{\text{Reas-DNI}}$	138	*accuse, deprecate, denigrate, censure, ridicule, commend, castigate, acclaim, belittle, condemn, denounce, praise, damn, criticize*
$[\text{NP.Ext}]_{\text{Com}}$ $[\text{NP.Obj}]_{\text{Eval}}$ $[\_]_{\text{Reas-INI}}$	25	*criticize, denigrate, mock, castigate, condemn, denounce*
$[\text{NP.Ext}]_{\text{Com}}$ $[\text{NP.Obj}]_{\text{Eval}}$ $[\text{PP}]_{\text{Top}}$	7	*slam, charge, criticize*

being evaluated, and is usually realised as the direct NP object (Example 12a, 12b) or as a prepositional phrase for a limited number of verbs such as *подигравам се* 'mock, ridicule' in (Example 12e).

The Reason is expressed as a prepositional phrase with a range of prepositions such as *за, в, на* (Example 12c, 12d, 12f), or more rarely as a clause (Example 12b) or a direct quote (Example 12g). In some cases the Evaluee and the Reason can be expressed jointly (Example 12f).

The Addressee is rarely expressed and is realised as a prepositional phrase (Example 12g).

(12) a. [*Нашето посолство*]$_{\text{Com}}$ ***ОСЪДИ*** [*разрушаването на*
Our embassy condemned destruction-DEF of
храма в Скопие]$_{\text{Eval}}$ [_]$_{\text{Reas-INI}}$.
church-DEF in Skopje.
'Our embassy condemned the destruction of the church in Skopje.'

b. [_]$_{\text{Com-DNI}}$ *Не могат да* [*ме*]$_{\text{Eval}}$ ***ОБВИНЯВАТ***, [*че съм ги*
Not can.3pl to me accuse that have them
оскърбил]$_{\text{Reas}}$.
offended.
'They cannot accuse me of offending them.'

c. [*България*]$_{\text{Com}}$ [*ни*]$_{\text{Eval}}$ ***ПРОКЛИНА*** [*за нещастията си*]$_{\text{Reas}}$.
Bulgaria us condemns for misfortunes-DEF REFL.
'Bulgaria condemns us for its misfortunes.'

d. [_]$_{\text{Com-DNI}}$ ***ОБВИНЯВАШЕ*** [*ме*]$_{\text{Eval}}$ [*в коравосърдечие*]$_{\text{Reas}}$.
Accused me in cold-heartedness.
'He/she accused me of cold-heartedness.'

e. [*Ти*]$_{\text{Com}}$ ***ПОДИГРАВАШ*** *ли* ***СЕ*** [*с мен*]$_{\text{Eval}}$?
You mock QST REFL with me?
'Are you mocking me?'

f. [*Мускетарите*]$_{\text{Com}}$ *се* ***ПОДИГРАВАХА*** [*на кривите му*
Musketeers-DEF REFL ridiculed for bow-DEF his
крака]$_{\text{Eval+Reas}}$.
legs.
'The musketeers ridiculed him for his bow legs.'

g. [–*Много е наблюдателна*]$_{\text{Reas}}$ – ***ПОХВАЛИ*** [*я*]$_{\text{Eval}}$ [*той*]$_{\text{Com}}$
–Very is.3sg observant – praised her he

[*на другите*]$_{\text{ADDR}}$.
to others-DEF.
'– She is very observant – he praised her to the others.'

Table 19: Syntactic expression of the `Judgment_communication` frame elements in Bulgarian.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
похвалвам/похваля 'praise'									
COMMUNICATOR	16								16
EVALUEE		15			1				16
REASON			2						2
обвинявам/обвиня 'blame'									
COMMUNICATOR	12								12
EVALUEE		11			1				12
REASON			5	1		2			8
подигравам се/подиграя се 'mock, ridicule'									
COMMUNICATOR	15								15
MEDIUM			1						1
EVALUEE			13		2				15
REASON			2		1				3

4.5.4 `Judgment_communication` valence patterns in Bulgarian

The valence patterns for the Bulgarian verbs in this frame are presented in Table 20. Similarly to English, the most typical ones involve the expression of the COMMUNICATOR and the EVAULEE and possibly the REASON; in the dataset there have not been cases of TOPIC.

Table 20: FrameNet valence patterns of `Judgment_communication` verbs, their frequency in the Bulgarian dataset and the verbs they appear with. English translation equivalents: *величая, възхвалявам/възхваля* 'extol', *виня, обвинявам/обвиня* 'blame', *гавря се* 'deride', *заклеймявам/заклеймя* 'condemn', *заяждам се/заям се* 'criticise', *иронизирам* 'ironise', *клеветя* 'denigrate', *критикувам* 'criticise', *кълна* 'damn', *омаловажавам/омаловажа* 'belittle', *осъждам/осъдя* 'judge', *отричам/отрека* 'denounce', *подценявам/подценя* 'disparage', *подигравам се/подиграя се, присмивам се/присмея се* 'mock, ridicule', *порицавам/порицая* 'castigate', *похвалвам/похваля, хваля* 'commend, praise' *прославям/прославя, славя* 'laud'.

Pattern	#	verbs
$[\text{NP.Ext}]_{\text{Com}}$ $[\text{NP.Obj}]_{\text{Eval}}[\_]_{\text{Reas-DNI/INI}}$	57	*величая, виня, възхвалявам/възхваля, иронизирам, клеветя, критикувам, кълна, обвинявам/обвиня, омаловажавам/омаловажа, осъждам/осъдя, отричам/отрека, подценявам/подценя, порицавам/порицая, похвалвам/похваля, прославям/прославя, славя, хваля*
$[\text{NP.Ext}]_{\text{Com}}$ $[\text{PP}]_{\text{Eval}}$ $[\_]_{\text{Reas-DNI/INI}}$	28	*гавря се, заяждам се/заям се, подигравам се/подиграя се, присмивам се/присмея се*
$[\text{NP.Ext}]_{\text{Com}}$ $[\text{NP.Obj}]_{\text{Eval}}$ $[\text{PP}]_{\text{Reas}}$	12	*заклеймявам/заклеймя, иронизирам, обвинявам/обвиня, подигравам/подиграя, порицавам/порицая, похвалвам/похваля, проклинам/прокълна*

4.6 Frame `Questioning`

Definition of the frame `Questioning`: A Speaker asking an Addressee a question, which represents the Message, calling for a reply. Core frame elements: Speaker, Message, Addressee, Topic.

4.6.1 Syntactic realisation of the `Questioning` frame elements

The semantic specification of the core frame elements is similar to those in the other related frames. As questioning is a purposeful action, the Speaker is nec-

essarily a person or an organisation. The SPEAKER is the external argument projected as a subject NP.

The central role of the ADDRESSEE is reflected in the fact that it is a frame element that is typically expressed as the direct object NP (except for *inquire*.v and some uses of *ask*.v where it can be expressed as a prepositional complement headed by *of*).

Except for a small number of occurrences with the same verbs, i.e. *inquire*.v and *ask*.v, where it takes the direct object position, MESSAGE is typically expressed as a direct quote or an embedded question.

The TOPIC is either expressed as a prepositional complement or remains implied but non-overt syntactically.

The verbs evoking the frame `Questioning` are divided along two lines:
(i) whether they tend to express the MESSAGE over the TOPIC or vice versa;
(ii) whether they tend to leave the ADDRESSEE unexpressed if it is understood from the context or not.

With respect to the first criterion, the valence patterns for the verbs in the frame clearly show that the MESSAGE and the TOPIC rarely co-occur. Out of the verbs listed in this frame, *grill*.v, *interrogate*.v, *question*.v and *quiz*.v strongly favour the TOPIC (Example 13a, 13b), with much rarer occurrences of the MESSAGE, usually in the form of a direct quotation (Example 13c); at least in the annotated corpus the two frame elements do not co-occur with these verbs.

The remaining verbs: *ask*.v, *inquire*.v, *query*.v tend to express the content of the question, i.e. the MESSAGE rather than its subject matter, the TOPIC, but TOPICS do occur. Besides, the two frame elements can co-occur provided that the MESSAGE is not realised by a clause, compare (Example 13d and Example 13e) or a quote. With the verb *inquire*.v, the MESSAGE may be realised not only as a clause or a quote but also (though rarely) as a prepositional complement (Example 13f). In addition, both *inquire*.v and *ask*.v allow the MESSAGE to be expressed as an object NP (Example 13d, 13h). This pattern is typical of *ask*.v and rare for *inquire*.v. In such cases the ADDRESSEE is expressed as an indirect (Example 13h) or a prepositional object (see Example 13i, which is a rephrase of Example 13h).

As regards the second distinction, the same verbs that favour TOPICS over MESSAGES – *grill*.v, *interrogate*.v, *question*.v and *quiz*.v – show preference to expressing the ADDRESSEE as an object NP, rather than leaving it implicit (Example 13j). As shown in Table 22, they tend to realise the ADDRESSEE together with the TOPIC (expressed as a PP headed by *about*). When the MESSAGE is expressed, the ADDRESSEE is often left out.

(13) a. [*Journalists*]$_{\text{SPKR}}$ ***GRILLED*** [*Mr. Major*]$_{\text{ADDR}}$ [*about Maastricht*]$_{\text{TOP}}$.

b. [*She*]$_{\text{Spkr}}$ ***QUESTIONED*** [*him*]$_{\text{Addr}}$ [*about his aspirations*]$_{\text{Top}}$.
c. [*I*]$_{\text{Spkr}}$ ***QUIZZED*** [*him*]$_{\text{Addr}}$: [*"Who are you?"*]$_{\text{Msg}}$.
d. [*You*]$_{\text{Spkr}}$ ***ASK*** [*many questions*]$_{\text{Msg}}$ [*about her*]$_{\text{Top}}$ [_]$_{\text{Addr-DNI}}$.
e. [*The clerk*]$_{\text{Spkr}}$ ***INQUIRED*** [_]$_{\text{Addr-DNI}}$ [*if it would be cash*]$_{\text{Msg}}$.
f. [*He*]$_{\text{Spkr}}$ ***INQUIRED*** [_]$_{\text{Addr-DNI}}$ [*as to their whereabouts*]$_{\text{Msg}}$.
g. [*I*]$_{\text{Spkr}}$ *did not* ***INQUIRE*** [*the reason*]$_{\text{Msg}}$ [_]$_{\text{Addr-DNI}}$.
h. [*They*]$_{\text{Spkr}}$ ***ASKED*** [*the newcomer*]$_{\text{Addr}}$ [*his name*]$_{\text{Msg}}$.
i. [*They*]$_{\text{Spkr}}$ ***ASKED*** [*the name*]$_{\text{Msg}}$ [*of the newcomer*]$_{\text{Addr}}$.
j. [*They*]$_{\text{Spkr}}$ ***QUESTIONED*** [*the convict*]$_{\text{Addr}}$ [*about the money*]$_{\text{Top}}$.
k. [*"Why not?"*]$_{\text{Msg}}$ ***QUERIED*** [*she*]$_{\text{Spkr}}$ [_]$_{\text{Addr-DNI}}$.

Table 21 shows some of the frequent verbs of the frame and the realisation of their frame elements.

Table 21: Syntactic expression of the `Questioning` frame elements in selected FrameNet lexical units.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
inquire									
Speaker	37								37
Addressee			5		32				37
Message		3	1			5	18		27
Topic			10						10
question									
Speaker	34		4		9				47
Addressee	13	29			5				47
Message							5		5
Topic			25		17				42
ask									
Speaker	68				8				76
Addressee	7	27			35				69
Message	2	7	3		5	26	18		61
Topic		4	8			1		1	14

4.6.2 `Questioning` valence patterns

The valence patterns (Table 22) show the tendency outlined above: the preference for expressing the Addressee together with the Topic or to leave it non-overt when the focus is on the Message (i.e. it is syntactically expressed).

Table 22: FrameNet valence patterns of `Questioning` verbs, their frequency in the FrameNet corpus and the verbs they appear with.

Pattern	#	verbs
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\_]_{\text{Addr-DNI}}$ $[\text{Quote}]_{\text{Msg}}$	55	*quiz, inquire, question, query, ask*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{NP.Obj}]_{\text{Addr}}$ $[\text{PP}]_{\text{Top}}$	48	*quiz, interrogate, question, ask, grill*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{NP.Obj}]_{\text{Addr}}$ $[\_]_{\text{Top-DNI/INI}}$	38	*quiz, grill, interrogate, question*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{NP.Obj}]_{\text{Addr}}$ $[\text{Clause}]_{\text{Msg}}$	13	*ask*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\_]_{\text{Addr-DNI}}$ $[\text{PP}]_{\text{Top}}$	12	*inquire, ask*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\_]_{\text{Addr-DNI}}$ $[\text{Clause}]_{\text{Msg}}$	10	*inquire, query, ask*

4.6.3 Syntactic realisation of `Questioning` in Bulgarian

Most of the Bulgarian counterparts are derived from the basic `Questioning` verb *питам* 'ask' – *попитвам*, *запитвам* 'ask', *разпитвам* 'ask, question, grill', *препитвам* 'quiz, query'. Typically, either the Message or the Topic is expressed (Example 14a, 14b). The two may co-occur only if the Message is nominalised, usually by means of any of a small inventory of pronouns such as *нещо* 'something, anything', *нищо* 'nothing', *това* 'this, that' or some other expressions (Example 14c). If the Message is expressed otherwise, most often as a quote or an embedded clause, the two frame elements typically do not co-occur. The Topic is expressed as a PP headed by the prepositions *за* or *относно* 'about, regarding', while the Addressee occupies the direct object position – NP.Obj (Examples 14a, 14b, 14c).

The predominant valence patterns in Bulgarian are similar (Table 24), although the data show that the Addressee co-occurs more frequently with Message (Example 14d) than in English.

(14) a. $[$– *Какво мислиш*?$]_{\text{Msg}}$ – ***ПОПИТА*** $[$*я*$]_{\text{Addr}}$ $[$*той*$]_{\text{Spkr}}$.
– What think.2sg? – asked her he.
'– What do you think? – he asked her.'

b. [*Тя*]$_{\text{Spkr}}$ [*го*]$_{\text{Addr}}$ ***РАЗПИТВА*** [_]$_{\text{Msg}}$ [*за личния му живот*]$_{\text{Top}}$.
She him inquires about personal-DEF his life.
'She inquires him about his personal life.'

c. [_]$_{\text{Spkr}}$ *Ще* [*те*]$_{\text{Addr}}$ ***ПОПИТАМ*** [*нещо*]$_{\text{Msg}}$ [*за Арон*]$_{\text{Top}}$.
Will you ask.1sg something about Aaron.
'I will ask you something about Aaron.'

d. [*Престъпникът*]$_{\text{Spkr}}$ ***ПОПИТАЛ*** [*полицая*]$_{\text{Addr}}$ [*дали може да си купи цигари*]$_{\text{Msg}}$.
Criminal-DEF asked policeman-DEF whether can to himself buy cigarettes.
'The criminal asked the policeman whether he could buy cigarettes.'

The most frequent verbs and the syntactic realisation of the frame elements of `Questioning` is shown in Table 23.

Table 23: Syntactic expression of the `Questioning` frame elements in Bulgarian.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
попитвам/попитам 'ask'									
Message		1			1	20		7	29
Addressee		34							34
Topic			2						2
Speaker	57								57
запитвам/запитам 'ask, question'									
Message						6		14	20
Addressee		16							16
Topic			3						3
Speaker	23								23
питам 'ask'									
Message	1	1			2	6		15	25
Addressee		16			3				19
Topic			5						5
Speaker	29				1				30

Table 24: FrameNet valence patterns of the frame `Questioning`, their frequency in the Bulgarian dataset and the verbs they appear with. English translation equivalents: *питам, запитвам/запитам, попитвам/попитам* 'ask, question', *интересувам се/поинтересувам се* 'inquire', *разпитвам/разпитам* 'question, grill, interrogate'.

Pattern	#	verbs
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{NP.Obj}]_{\text{Addr}}$ $[\text{Sinterrog}]_{\text{Msg}}$	25	*питам, запитвам/запитам, попитвам/попитам*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{NP.Obj}]_{\text{Addr}}$ $[\_]_{\text{Msg-INI}}$	25	*разпитвам/разпитам*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{Quote}]_{\text{Msg}}$ $[\_]_{\text{Addr-INI}}$	20	*питам, запитвам/запитам, попитвам/попитам, поинтересувам се*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{NP.Obj}]_{\text{Addr}}$ $[\text{Quote}]_{\text{Msg}}$	14	*питам, запитвам/запитам, попитвам/попитам*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{Sinterrog}]_{\text{Msg}}$ $[\_]_{\text{Addr}}$	13	*интересувам се, питам, запитвам/запитам, попитвам/попитам, полюбопитствам*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\text{NP.Obj}]_{\text{Addr}}$ $[\text{PP}]_{\text{Top}}$	9	*питам, запитвам/запитам, попитвам/попитам, разпитвам/разпитам*

4.7 Frame `Communication_response`

Definition of the frame `Communication_response`: A Speaker communicates a reply or response, a Message, to some prior communication or action, the Trigger. Core frame elements: Speaker, Message, Trigger, Addressee, Topic.

The `Communication_response` frame inherits from the frame `Communication`. It elaborates on the prototypical frame by introducing a new frame element, the Trigger, which requires a response, expressed as the Message.

4.7.1 Syntactic realisation of `Communication_response` frame elements

The Speaker inherits the frame element Communicator which exhibits the same characteristics and behaviour as in the other frames in the domain, and is realised most often as an external NP.

The Trigger is the prior communication or action to which a response is given. It can be implicit, or overtly expressed either as an NP object or as a prepositional complement (Examples 15a, 15b).

The Message is not necessarily expressed when the Trigger is present (Examples 15a, 15b). When the Message is realised, it predominantly takes the form of an embedded clause (Example 15c) or a direct quote (Example 15d).

Although rarely, the Trigger and the Message may co-occur (Example 15g).

The Addressee is the person to whom the response is directed. When expressed, it occurs as a prepositional phrase introduced by the preposition 'to' (Example 15e) or as an indirect object (Example 15f).

The Topic is possible but rare with verbs from this frame.

(15) a. [*Sue*]$_{\text{Com}}$ ***ANSWERED*** [*the question*]$_{\text{Trig}}$.
b. [*The US*]$_{\text{Com}}$ *has not* ***RESPONDED*** [*to the offer*]$_{\text{Trig}}$.
c. [*Blanche*]$_{\text{Com}}$ ***RESPONDED*** [*that the police were talking to everyone*]$_{\text{Msg}}$.
d. ['*Does it matter*?']$_{\text{Msg}}$ [*she*]$_{\text{Com}}$ ***COUNTERED*** *defeatedly.*
e. [*Sue*]$_{\text{Com}}$ ***RESPONDED*** [*to Bob*]$_{\text{Addr}}$ *immediately.*
f. [*The senator*]$_{\text{Com}}$ *took the floor to* ***ANSWER*** [*critics of the deal*]$_{\text{Addr}}$.
g. ['*Does it matter*?']$_{\text{Msg}}$ ***REPLIED*** [*she*]$_{\text{Com}}$ [*to his question*]$_{\text{Trig}}$.

Table 25 shows the syntactic realisations of verbs evoking the frame `Communication_response`.

4.7.2 `Communication_response` valence patterns

Table 26 illustrates the valence patterns that characterise the verbs in the frame `Communication_response`. The most frequent pattern has the Message realised as a direct quote, followed by the pattern with an embedded clause or a PP. The Trigger is expressed in fewer instances and in such cases the Addressee and the Message remain non-overt.

4.7.3 Syntactic realisation of `Communication_response` frame in Bulgarian

In Bulgarian the syntactic realisation of the frame is similar to English. The Message most often appears as an embedded clause (Example 16a) or as a direct quote (Example 16b), and in some cases as a direct object (Example 16d) or a prepositional phrase (Example 16c). The Trigger is realised as a prepositional phrase (Example 16e).

(16) a. [*Той*]$_{\text{Spkr}}$ [*ми*]$_{\text{Addr}}$ ***ОТГОВОРИ***, [*че няма да отиде*]$_{\text{Msg}}$.
He me answered that not to go.
'He answered me that he won't go.'

Table 25: Syntactic expression of the `Communication_response` frame elements for selected FrameNet lexical units.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
answer									
Speaker	31		1		2				34
Addressee		1			30			3	34
Message		2	4		21	2	5		34
Trigger	3	11			18	1			33
reply									
Speaker	69								69
Addressee			4		65				69
Message			4		21	11	27	6	69
Trigger			13		56				69
respond									
Speaker	25								25
Addressee			1		23				24
Message			3	1	4	4	13		25
Trigger			1		24				25
retort									
Speaker	46								46
Addressee			1		45				46
Message		2	1		2	21	23		49
Trigger			1		45				46

Table 26: FrameNet valence patterns of `Communication_response` verbs, their frequency in the FrameNet corpus and the verbs they appear with.

Pattern	#	verbs
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\_]_{\text{Addr-DNI}}$ $[\text{Quote}]_{\text{Msg}}$ $[\_]_{\text{Trig-DNI}}$	83	*answer, rejoin, counter, reply, respond, retort*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\_]_{\text{Addr-DNI}}$ $[\text{Clause}]_{\text{Msg}}$ $[\_]_{\text{Trig-DNI}}$	34	*answer, rejoin, counter, reply, respond, retort*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\_]_{\text{Addr-DNI}}$ $[\text{PP}]_{\text{Msg}}$ $[\_]_{\text{Trig-DNI}}$	14	*answer, counter, reply, respond*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\_]_{\text{Addr-DNI}}$ $[\_]_{\text{Msg-INI}}$ $[\text{PP}]_{\text{Trig}}$	10	*reply*
$[\text{NP.Ext}]_{\text{Spkr}}$ $[\_]_{\text{Addr-DNI}}$ $[\_]_{\text{Msg-INI}}$ $[\text{NP.Obj}]_{\text{Trig}}$	7	*answer*

b. [*Студентът*]$_{\text{SPKR}}$ ***ОТГОВОРИЛ***: [– *Професоре, забравих*!]$_{\text{MSG}}$
Student-DEF responded: – Professor, forgot.1sg!
'The student responded: – Professor, I forgot!'

c. [*Мнозинството*]$_{\text{SPKR}}$ ***ОТВРЪЩА*** [*с надменни приказки*]$_{\text{MSG}}$
Majority-DEF answers with arrogant words
[*за своята безалтернативност*]$_{\text{TOP}}$.
about their-REFL lack of prospects].
'The majority answers with arrogant words about their lack of prospects.'

d. [*Той*]$_{\text{SPKR}}$ *не* ***ОТГОВОРИ*** [*нищо*]$_{\text{MSG}}$.
He not responded nothing.
'He did not respond anything.'

e. [*На този въпрос*]$_{\text{TRIG}}$ *ще* ***ОТГОВОРИ***
To this question will answer
[*министър-председателят*]$_{\text{SPKR}}$.
prime minister-DEF.
'The prime minister will answer this question.'

The most frequent verbs evoking the frame `Communication_response` and the realisation of their frame elements are shown in Table 27. The associated valence patterns are presented in Table 28.

5 Conclusions

In this paper we have discussed the universal features of the conceptual description of verbs which is transferable across languages. We illustrate our analysis with examples from the class of verbs of communication with a view to their use in English and Bulgarian.

The universality of the semantic relations of inheritance (from a more generalised to a more specialised entity) underlies the hierarchical organisation of both the FrameNet frames and the WordNet synsets. The configuration of frame elements describing the behaviour of verbs evoking a particular frame are also language-independent, as well as the semantic restrictions determining their selection. Moreover, we have shown that the principles of syntactic realisation of the frame elements as represented by the generalised valence patterns are also valid to a large degree across different languages. For Bulgarian and English we have established substantial correspondence in both the valence patterns and

Table 27: Syntactic expression of the `Communication_response` frame elements in Bulgarian.

	NP.Ext	NP.Obj	PP	AVP	NI	Clause	Quote	Other	Total
отвръщам/отвърна 'reply'									
Trigger			2		4				6
Message		2			5		23	5	35
Addressee			14		21				35
Manner			2					3	5
Speaker	35								35
отговарям/отговоря 'answer, reply'									
Trigger			15		15				30
Message		3			26		21	16	66
Addressee			23		43				66
Medium			7						7
Manner			2					12	14
Speaker	66								66

Table 28: FrameNet valence patterns of the frame `Communication_response`, their frequency in the Bulgarian dataset and the verbs they appear with. English translation equivalents: *контрирам* 'counter', *отвръщам/отвърна, отговарям/отговоря* 'answer, reply, counter, retort'.

Pattern	#	verbs
[NP.Ext]$_{\text{Spkr}}$ [Quote]$_{\text{Msg}}$ [_]$_{\text{Addr-DNI}}$ [_]$_{\text{Trig-DNI}}$	22	*контрирам, отвръщам/отвърна, отговарям/отговоря*
[NP.Ext]$_{\text{Spkr}}$ [PP]$_{\text{Addr}}$ [Quote]$_{\text{Msg}}$ [_]$_{\text{Trig-DNI}}$	12	*отвръщам/отвърна, отговарям/отговоря*
[NP.Ext]$_{\text{Spkr}}$ [Clause]$_{\text{Msg}}$ [_]$_{\text{Addr-DNI}}$ [_]$_{\text{Trig-DNI}}$	10	*отвръщам/отвърна, отговарям/отговоря*
[NP.Ext]$_{\text{Spkr}}$ [Clause]$_{\text{Msg}}$ [PP]$_{\text{Addr}}$ [_]$_{\text{Trig-DNI}}$	9	*отвръщам/отвърна, отговарям/отговоря*
[NP.Ext]$_{\text{Spkr}}$ [PP]$_{\text{Trig}}$ [_]$_{\text{Addr-DNI}}$ [_]$_{\text{Msg-INI}}$	8	*отвръщам/отвърна, отговарям/отговоря*

the syntactic categories and grammatical functions by which frame elements are expressed.

Further, we have outlined some basic language-specific properties of the syntactic realisation of semantic frames and their corresponding frame elements. In some cases the two languages give different preference to the overt expression of particular frame elements. For example, the Topic is more frequent in English and rarely expressed with Bulgarian communication verbs (e.g., evoking the frames `Statement` and `Communication_manner`). We also observe differences in the syntactic realisation of particular frame elements due to the distinct syntactic properties of the two languages. For example, Bulgarian lacks infinitives and *-ing* clauses, so clausal complements expressing the frame element Message are finite clauses. Differences at the syntactic level between Bulgarian and English are also found between verbs considered as translation equivalents (belonging to corresponding synsets in Bulgarian and English). For example, with the verb *ridicule* (evoking the frame `Judgment_communication`) the Evaluee is expressed predominantly as a direct object, while the Bulgarian verb *подигравам се* realises it as an indirect object due to the fact that reflexive verbs do not take a direct object.

The analysis confirms the assumption that a large part of a verb's semantic valency and syntactic behaviour is predictable from its lexical meaning and the semantic class it belongs to. The various semantic classifications of verbs focus on different semantic and/or syntactic properties, relying mostly on theoretical analysis or expert intuition rather than on authentic corpus data. 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.

In our work on describing the conceptual and syntactic properties of Bulgarian verbs, we have found the applicability of the conceptual description encoded in the FrameNet frames to be to a great extent language-independent and transferrable cross-linguistically, even if in some cases adjustments may be necessary. Given the fact that the alignment between equivalent senses in the wordnets developed for different languages is ensured by means of shared identification numbers with the original Princeton WordNet, the conceptual information from FrameNet is mappable across languages via WordNet.[14]

[14]For a list of existing wordnets in the world, see http://globalwordnet.org/resources/wordnets-in-the-world/.

Abbreviations

Addr	Addressee	INI	Indefinite null instantiation
Auth	Author		
BulEnAC	Bulgarian-English Sentence- and Clause-Aligned Corpus	Manr	Manner
		Med	Medium
		Msg	Message
BulSemCor	Semantically annotated corpus for Bulgarian	N or n	Noun
		NP	Noun phrase
		PP	Prepositional phrase
CNI	Constructional null instantiation	PWN	Princeton WordNet
		Reas	Reason
Com	Communicator	SemCor	Semantically annotated corpus for English
Cont	Content		
DNI	Definite null instantiation	Spkr	Speaker
		Top	Topic
Eval	Evaluee	Trig	Trigger
Exr	Expressor	V or v	Verb

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