Chapter 6

Frame semantics and verbs of emotion

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The intersection of lexical semantics and syntax has been an important area of linguistics for some time. Verbs as the core of the lexicon are key to exploring the interaction between syntax and semantics and to understanding the nature of the lexicon. The study focuses on verbs of emotion in the Bulgarian language and their frame semantics. An overview of theoretical and empirical observations forms the general aim of the study. Neutral, positive and negative verbs of emotion are discussed and the results are summarised. The analysis is based on the semantic and partly morphological information of the lexical units from the WordNet (Fellbaum 1998) as well as on the semantic and syntactic features with which the investigated emotion verbs are represented in the FrameNet (Fillmore et al. 1998, Ruppenhofer et al. 2016). Five semantic frames are documented, which were selected due to their high frequency and the wide variety of lexical units they are evoked by. The description includes grammatical features of the lexical units, semantic and syntactic restrictions that verbs impose on the frame elements, and the assignment of the frame elements to a WordNet noun synset or subtree that reflects the realisation of the frame elements in context. The status of the frame elements, which is essential for the realisation of a lexical unit, is retrieved from FrameNet.

1 Introduction

The aim of this study is to present the emotion verbs of the Bulgarian vocabulary. We apply the methodology of frame semantics to outline different constructions in which verbs of emotion are involved. We also use the BulNet semantic network to extract their characteristic meanings. Therefore, the verbs under investigation are presented in specific WordNet synsets containing lexical and morphological information. We then describe each predicate within the semantic frame it

evokes, together with its frame elements (FEs) and their selectional restrictions, which are expressed in terms of specific WordNet synsets or subtrees. We assume that the lower levels (hyponyms) of the selected subtree can also occupy the FE position.

In this study, we adopt a usage-based approach and provide evidence for the importance of context in semantic analysis and frame profiling. The analysis of the corpus data contributes to the development of a theoretically and empirically coherent approach to describing the semantic and syntactic features of verb classes.

The main aims of this study are: (i) to systematise the main theoretical findings on emotion verbs; (ii) to analyse semantic frames and their frame elements; (iii) to demonstrate how syntactic realisations can be predicted by lexical semantics within a given verb class; (iv) to highlight the importance of the interaction between semantics (lexical-semantic properties) and syntax (syntactic behaviour).

We rely on Levin's (1993) study, which categorises verbs of psychological state into four major subclasses based on both intuitive semantic grouping and participation in valency alternations. We consider the transitivity / intransitivity of the verbs *желая* 'wish' / *страхувам се* 'fear' and the possibility of taking the Experiencer as a grammatical subject – *обичам* 'love', or object – *харесва ми* 'appeal to' in a sentence to further subdivide them. This division is reflected in a verb's evoking Experiencer_focused_emotion – *завиждам* 'envy', or Stimulate_emotion and Cause_to_experience semantic frames – *изненадвам* 'surprise', *дразня* 'annoy'.

If we take *съжалявам* 'regret' as an example of a verb that evokes the Contrition frame, we can see that in most cases the position of the Experiencer is occupied in context by the synsets eng-30-00007846-n: {*човек*} 'person' or eng-30-07950920-n: {*социална група*} 'social group'. The Action FE "marks expressions that indicate a prior action that the Experiencer has come to feel bad about" and can be encoded both as a PP (with the prepositions *за* 'for' and *заради* 'because of') or as a clause (with the help of the conjunctions *че* 'that', *задето* 'for' and the interrogative pronouns *как* 'how', *къде* 'where', *какво* 'what', *кой* 'who', *колко* 'how much/many'). The prepositions *за* 'for' and *заради* 'because of' in turn take an object, which can vary between the following synsets: eng-30-00029378-n: {*събитие*} 'event', eng-30-00030358-n: {*действие*} 'act', eng-30-00037396-n: {*действие*} 'action', or eng-30-05770926-n: {*умствена дейност*} 'thought process'. We take into consideration the possible selectional restrictions a verb imposes on its frame elements and group verbs further into subclasses.

The study is based on corpus data; unless otherwise stated, the examples are taken from the Bulgarian National Corpus (Koeva et al. 2012).

The rest of the paper is organised as follows. Section 2 deals with the notion of conceptual frame and its preconditions. The resources used are explained in detail. Section 3 outlines previous studies and motivation. The focus is on the description of the class of verbs of emotion and the different criteria for categorisation. In the same section and throughout the paper, the differences in classification systems serve as a basis for distinguishing between subclasses of verbs of emotion. Section 4 gives an overview of the linguistic descriptions of the Bulgarian verbs of emotion and their special features. Section 5 deals with the semantic features of verbs of emotion in Bulgarian. It includes descriptions of different semantic frames and their frame elements. Section 6 summarises the results of this study and concludes the paper.

2 Resources

WordNet is a lexical-semantic network suitable for machine processing that was originally developed at Princeton University by a team led by George Miller (Miller 1995, Fellbaum 1998). The Bulgarian version of WordNet – BulNet – contains more than 100,000 synsets (Koeva 2021b).

Although BulNet was used to represent the semantic and paradigmatic features of the predicates, the most important resource for their "semantic and syntactic combination possibilities is FrameNet (Ruppenhofer et al. 2016: 7). FrameNet was launched in 1997 under the guidance of Charles Fillmore (Fillmore et al. 1998) and is essential for both theoretical linguistic research and practical natural language processing.

Semantic frames represent the conceptual structure of an event or object and its participants. Frame elements can be regarded as semantic roles. They can be core and non-core elements, the former being essential for the realisation of the respective semantic frame, while the latter are mostly descriptive (in terms of time, place, etc.). Lexical units are lemmas that describe a situation (frame). Each meaning of a word is encoded as a separate lexical unit and evokes a different semantic frame.

As Koeva and Doychev state, "a Conceptual frame defines a unique set of syntagmatic relations between verb synsets representing the frame and noun synsets expressing the frame elements" (Koeva & Doychev 2022: 203). Based on the information we extract from the WordNet about a verb meaning and the syntactic and semantic restrictions it imposes on its FrameNet frame elements, we create a grid of possible combinations. All analysed verbs are considered separately in each sense, and their frame elements can be an NP, PP, AdvP, AccCl

(obligatory accusative clitic), DatCl (obligatory dative clitic) or a clause element (S or small clause). We use the web-based system BulFrame to create and visualise conceptual frames (Koeva & Doychev 2022).

In order to provide an exhaustive description of the Bulgarian verbal lexical units, the following information was used:

(a) From FrameNet: core and non-core frame elements, their semantic types, the sets of verbal lexical units associated with a given semantic frame and the Inheritance relation between frames.

(b) From WordNet: hypernym-hyponym relations, which organise synsets for nouns and verbs in hypernym trees, and the semantic classes to which these synsets belong.

The web-based system BulFrame, developed at the Department of Computational Linguistics of the Bulgarian Academy of Sciences, is used to create, edit, view and review the conceptual frames (Koeva & Doychev 2022).

Most of the language material was taken from the Bulgarian National Corpus (Koeva et al. 2012), which was created at the Institute for Bulgarian Language "Prof. Lyubomir Andreychin". The Bulgarian National Corpus consists of a monolingual part containing 240,000 texts or 1.2 billion words and 47 parallel corpora.

3 Previous studies and motivation

3.1 Methodology

S. Koeva points out the need for a formal description of syntagmatic relations in WordNet (Fellbaum 1998, Koeva 2021b) by introducing the notion of conceptual frame to define a set of verbs that have unique syntagmatic relations to nouns (Koeva 2021c: 182). Leseva et al. have also explored the possibility of integrating data from WordNet, FrameNet and VerbNet and proposed a system of semantic relations that reflects thematic relations between predicates and their potential arguments in the context of WordNet' (Leseva et al. 2018). Our approach, which is based on frame semantics (Fillmore et al. 1998, Koeva 2010), combines both the abstract syntactic level and the projection of semantic relations onto the corresponding frame elements.

Since frame analysis is very sensitive and error-prone, decision-making is delegated to human experts. To facilitate the process, we have chosen the following procedure (described in detail in the chapter *Universality of semantic frames versus specificity of conceptual frames* in this volume).

Step 1: We select the relevant verb meaning (literal) that evokes a particular frame from a set of synsets.

Step 2: We check whether all core frame elements of the frame are relevant for Bulgarian and/or whether additional frame elements should be included. We can either choose from the existing FEs where appropriate or insert a completely new one and give it a name.

Step 3: We define the possible selectional restrictions by (a) choosing from a list of noun synsets for NPs; (b) specifying the prepositions for PPs; (c) specifying the conjunctions that can introduce the dependent clauses.

Frame-semantic analysis with its flexibility and versatility can contribute to a number of NLP tasks and applications and to improving language understanding.

(i) Frame semantics provides a framework for semantic role labelling, i.e. identifying and labelling the different roles that entities play in a sentence. This process is crucial for tasks such as question answering, information extraction and text understanding.

(ii) Sentiment analysis. Frame semantics helps to better understand and analyse the emotions and attitudes expressed in a text. By capturing the semantic frames associated with the sentiment, sentiment analysis models can understand the implicit information in a more nuanced way.

(iii) Text classification. By considering semantic frames and their associated meanings, models can identify the implicit information in context and capture the intended meaning of a text, leading to more accurate and nuanced text classification.

(iv) Machine translation. Frame semantics helps to transfer meaning from one language to another by capturing the semantic frames and their semantic roles. This approach goes beyond word-to-word translation and ensures that the intended meaning of the source sentence is preserved in the target language, resulting in more accurate translations. In addition, metrics based on frame semantics, e.g. (Czulo et al. 2019), have been proposed for machine translation evaluation, e.g. (Czulo et al. 2019).

(v) Information retrieval and question answering. Frame semantics helps to improve search engine results and question-answering systems. By understanding the frames and semantic roles in queries and documents, these systems can retrieve more relevant information and provide accurate answers by matching semantic frames and roles.

(vi) Building knowledge graphs. Frame semantics is useful in building knowledge graphs by identifying the relationships between entities based on semantic frames and their FEs. It helps in organising and representing the structured knowledge from an unstructured text and contributes to tasks such as knowledge extraction and knowledge representation.

Frame semantics also plays a crucial role in corpus research. It provides a framework for analysing and understanding the meaning and structure of texts within a given corpus. It can influence corpus research in various ways:

(vii) Semantic analysis. By identifying and labelling semantic frames and their FEs, corpus studies can uncover patterns and relationships between entities, actions and events, leading to a deeper understanding of the underlying semantics within the corpus.

(viii) Semantic annotation. Frame semantics provides a systematic approach for annotating corpora with semantic information. Corpus studies can use frame-based annotation schemes to label frames and their FEs in texts, which enables more detailed analysis and in turn facilitates the development of machine learning models for various NLP tasks.

(ix) Comparative studies. Frame semantics enables comparative studies of different corpora or subsets within a corpus. Researchers can analyse variations in the use of frames in different genres, time periods or languages and find out how meaning and semantic structure differ in distant contexts. This helps to analyse linguistic and cultural differences, diachronic changes and genre-specific semantic patterns.

(x) Semantic similarity and clustering. By applying frame semantics to corpus studies, researchers can measure semantic similarity and cluster texts based on their frame-based representations. This facilitates tasks such as document clustering, topic modelling and information retrieval, where a better understanding of the semantic relationships between texts is essential.

(xi) Corpus-based lexical semantics. Frame semantics helps with corpus-based studies of lexical semantics. By analysing lexical items in the context of semantic frames and their FEs, corpus studies can uncover the nuances and contextual meanings associated with words, leading to the identification of polysemy, homonymy and semantic shifts within the corpus.

(xii) Corpus-based frame compilation. Corpus studies contribute to the compilation of frame databases or resources. By analysing large corpora, researchers can identify recurring semantic frames, frame-triggering lexical units and their roles, which serve as valuable data for building or extending frame resources.

Overall, frame semantics provides a rich representation of the meaning and structure of language that enables NLP models to gain a deeper understanding of texts and perform a variety of tasks more effectively. It also provides a theoretical and practical basis for corpus studies, allowing researchers to delve deeper into the semantics of texts, compare different corpora, uncover patterns and improve our understanding of language structure and meaning within a given corpus.

3.2 Verbs of emotion

Emotions can be defined as experiences or states triggered off by a certain event, situation, action, other people, our thoughts, expectations and plans (Belaj & Faletar 2011: 155). In view of this phenomenon we attempt to relate the complexity of the syntax of emotions to the variety of their semantics as demonstrated in Section 1.

In one recently published psychological encyclopedic manual (Strickland 2000: 218) emotions are defined as "a reaction, both psychological and physical, subjectively experienced as strong feelings, many of which prepare the body for immediate action. In contrast to moods, which are generally longer lasting, emotions are transitory, with relatively well-defined beginnings and endings. They also have valence, meaning that they are either positive or negative. Subjectively, emotions are experienced as passive phenomena. Even though it is possible to exert a measure of control over one's emotions, they are not initiated – they happen to people."

As far as the linguistic field is concerned, there have been published a number of studies dealing with the description of emotion words, starting with Wierzbicka (1971), Wierzbicka (1972: 57), Wierzbicka (1980: 142), Wierzbicka (1986) and Iordanskaja (1970), Iordanskaja (1973), Iordanskaja (1986). Wierzbicka was the first to observe that unlike other language groups, Slavic languages tend to use verbs to speak of emotions, which holds true for the Bulgarian language as well. Her early works include attempts to formalise emotions, defining emotion words in natural language and referring to typical situations that evoke particular emotional states. Both Wierzbicka and Iordanskaja put forward the concept of evaluation of the situation by X for the description of emotion words in linguistic

semantics. Zaliznjak (1983), Zaliznjak (1985) deals with what she calls "predicates of internal state", establishing the distinction of the assertion and presupposition in their definitions. Lakoff (1987) and Kövecses (1988) pay attention to the uses of emotion expressions and metaphors in a given language, in order to describe a conceptual model of the corresponding emotion – as it is perceived and expressed in actual speech.

Another widely disputed issue throughout the studies of verbs of emotion and specifically among Slavic authors is the verbs' reflexivity or mediality. The most influential account of the Slavic verbs under discussion is offered by Wierzbicka (1988), Wierzbicka (1995). The author states that these verbs in Russian and Polish with -sja and *-się* respectively are reflexive forms on the basis that they indicate "emotions to which people 'give themselves' almost voluntarily and which they outwardly express" (Wierzbicka 1988: 253). As the author claims, expressing emotions by reflexive verbs implies that they are "treated not as arising by themselves but by the speaker's conscious thoughts about the event" (Wierzbicka 1995: 22). Moreover, she outlines the syntactic distinction between voluntary (with Experiencer in nominative and the *-sja* verb), involuntary (with dative Experiencer and an adverbial predicative) and neutral emotion (with nominative Experiencer and an adjectival predicative) (Wierzbicka 1988: 253–254). A. Bedkowska-Kopzcyk challenges Wierzbicka's views and considers this type of verbs in Slovene middle voice verbs (Będkowska-Kopczyk 2014).

As far as Bulgarian language is concerned, the particle *ce* can be involved in rather complex relations between words and constructions. It can represent both a word-forming and a morphological marker and can bear a passive (Example 1a), a medial (Example 1b) or a reflexive (Example 1c) meaning (Tisheva 2022: 100–103).

(1)   a.   *Пациент-ът не трябва да **СЕ БЕЗПОКОИ-Ø**   (от никого).*
          patient-DEF.M not should to REFL disturb-3.SG.PRS (by nobody)
          'The patient should not be disturbed (by anybody).'

      b.   *Пациент-ът не трябва да **СЕ БЕЗПОКОИ-Ø**.*
          patient-DEF   not should to REFL disturb-3.SG.PRS
          (да изпитва безпокойство)
          (to experience worry)
          'The patient should not worry. (experience worries)'

      c.   *Син-ът ми вече   **СЕ МИЕ-Ø**   сам-Ø.*
          son-DEF my already REFL wash-3.SG.PRS alone-M.SG
          'My son can already wash himself on his own.'

Tisheva & Dzhonova (2022: 76) also address this polemical issue in their research on syntactic characteristics of emotion predicates[1] in Bulgarian. According to the authors "*se* is a marker for middle voice construction and does not indicate reflexivity, it occupies the direct object position and those verbs could have only PP or a complement clause as their second argument."

Since the current study focuses on the semantic and syntactic features of the verbs under discussion together with their possible complements as imposed by the verb sense, we will not deal with this particular aspect of the verb description. As in most cases the verbs used with and without reflexive *ce* involve literals from different WordNet synsets, they will have different meanings and, respectively, heterogeneous frame elements' restrictions.

A large number of studies have been carried out on different language material in the last 20 years involving emotion verbs, their organisation in FrameNet and their semantic specifications.

Taking emotion concepts as a basis, Ruppenhofer describes the evolution and the development of FrameNet analyses over time due to application-oriented goals. Taking into account different linguistic theories and approaches (dimensional, categorical, meaning-oriented, etc.), the author illustrates how fine-grained distinctions of lexical units lead to formulating new semantic frames or dividing one frame into two (Ruppenhofer 2018). The explanation of the steps and motivation underlying the conceptualisation and the development of the frame organisation holds a specific value for emotion frame descriptions and their detailed understanding. Thus, the `Experiencer_Subj` and `Experiencer_Obj` verbs were initially grouped by valence criteria whereas in the latest version the semantics of the verbs is also considered.

Subirats & Petruck (2003) compare the Spanish lexical units with those of English in order to work out the similarities and differences in the lexicalisation patterns of the two languages. They use the annotation of Spanish verbs with the help of FrameNet frames to summarise the different syntactic realisations. Since the Bulgarian grammatical and syntactic realisation has many more similarities with Spanish than with English, it was particularly useful to learn about their experience.[2]

Subirats & Sato (2004) presented the Spanish FrameNet and the web application that processes bilingual information and facilitates the comparison of the semantic structures of two lexicons.

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[1]The authors explore both verbs and other constructions, based on adjectives, adverbs or nouns (predicatives).

[2]It shows closeness in agreement, the formation of questions, negation, the use of prepositions and, above all, word order.

Ghazi et al. (2015) make an attempt to automatically recognise the emotion Stimulus. They assemble a dataset with manually labelled emotion stimuli and then apply sequential learning methods to a complementary dataset that does not contain labelled stimuli.

All of these studies form the basis for our research and have influenced the observations we will make in the central part of this chapter, in which we will examine the nature of emotion categorisation and the way it is formally reflected in grammatical and semantic structure, particularly in emotion-verb complement constraints.

3.3 Classifications

The typological description of emotion verbs has also proved interesting for various authors in different studies. In this section we give a brief overview of their approaches.

Based on emotion words in general, Kövecses (2003) proposes a division into expressive and descriptive emotion words, whereby he categorises emotionally charged comments and expressions of agreement and disagreement in the first group, while in the second group he categorises terms that denote a specific emotional experience. Tisheva (2021: 115) also distinguishes between the lexical and grammatical means for the emotional attitude of the speaker/writer on the one hand and the naming of emotional states, relationships or evaluations on the other. In view of this subdivision, we will only deal with the descriptive emotion words in the following.

Tisheva (2021: 115) claims that duration is a fundamental concept to draw the line between emotions and feelings. According to the author, "emotions are spontaneous reactions to certain internal or external stimuli, while feelings are more permanent and enduring and always involve an evaluation of the object to which they are directed".

Most linguistic classifications are based on the above-mentioned psychological aspects of emotions and divide them into positive and negative emotions depending on their basic tone. Scherer (2005) recognises three characteristic features of emotions, namely: intensity, duration and the ability to evoke a reaction, and creates a typology of affective phenomena as presented below:

(a) emotion: a relatively brief response to an external or internal Stimulus event, e.g. *angry, sad, joyful, fearful, ashamed, desperate,*

(b) mood: a diffuse affect state characterised by low intensity but relatively long duration, often without apparent cause, e.g. *cheerful*, *gloomy*, *depressed*,

(c) interpersonal stance: affective stance taken toward another person in a specific interaction, e.g. *distant*, *warm*, *supportive*, *contemptuous*,

(d) attitude: relatively enduring, effectively colored beliefs, preferences, and predispositions towards objects or persons, e.g. *liking*, *hating*, *desiring*,

(e) personality traits: emotionally laden, stable personality dispositions and behavior tendencies, typical for a person, e.g. *nervous*, *hostile*, *jealous*, *envious*.

Lyashevskaya & Paducheva (2011), on the other hand, classify verbs of emotion on the basis of their semantic structure and the consistency of the verbal operational functors contained in each meaning. Thus, they categorise the verbs in question into five different groups: Event, Feeling, Attitude, State and Feature.

In the present study, we will not focus so much on the semantic differentiation, but rather on the syntactic realisation of the verbs and the semantic specificity of their FEs, which plays a crucial role in the frame-semantic analysis.

In terms of their grammatical features, Johnson-Laird & Oatley (1989) refer to two types of emotion verbs (they also speak of emotion nouns and emotion adjectives): **emotional relations**, e.g. *to love*, *to fear*, and **causatives**, e.g. *to annoy*, *to frighten*. This observation is consistent with the two types frequently described in the linguistic literature. Syntactic structures in which the Experiencer is the subject encode the emotional relation verb class, while the structures in which the Experiencer is encoded as the grammatical object denote the causative verb class. The former are known across languages as **Subject**-Experiencer verbs (SE), while the latter are known as **Object**-Experiencer verbs (OE) (Dowty 1991, Levin & Rappaport Hovav 2005). Fellbaum (1999) follows this line of linguistic description by saying that emotion predicates "fall into two grammatically distinct classes: those whose subject is the animate Experiencer and whose object (if any) is the Source (*fear, miss, adore, love, despise*); and those whose object is the animate Experiencer and whose subject is the Source (*amuse, charm, encourage, anger*)".

The main subdivision in the Slavic languages follows the definition of the two groups of emotion verbs based on the syntactic expression of the Experiencer as subject or direct or indirect object (Croft 1993: 55), (Ovsjannikova 2013: 21), (Tisheva & Dzhonova 2022: 75).

Based on these observations, three main subtypes are generally distinguished for Slavic languages: (i) SE verbs (Example 2a), (ii) OE verbs with the Experiencer in the accusative case (Example 2b), and (iii) OE verbs with the Experiencer in the dative case (Example 2c). This fact has been maintained by a number of Slavic linguists: for Russian – Sonnenhauser (2010), for Polish – Biały (2005) and Rozwadowska et al. (2007), for Bulgarian – Slabakova (1996), among others.

(2)   a.   *Аз наистина **ХАРЕСВАМ** вампир-и-те.*
           I   really   like-1.SG.PRS vimpire-PL.DEF
           'I really like vampires.'

      b.   *Тази   постоянна   светлина почва   да ме*
           this-F.SG constant-F.SG light   start-3.SG.PRS to I-ACC
           ДРАЗНИ-Ø.
           annoy-3.SG.PRS
           'This constant light is starting to annoy me.'

      c.   *Мисля,   че това му   **ХАРЕСВА-Ø**.*
           think-1.SG.PRS that it   he-DAT appeal-3.SG.PRS
           'I think he likes it.'

Some authors also observe the possibility of forming diathetic verb pairs in which the Stimulus-subject verb is transitive, while its counterpart Experiencer-subject is an intransitive reflexive verb marked with a reflexive pronoun or the suffix (Ovsjannikova & Say 2020: 121). Koeva (2022) introduces the system of diatheses and alternations for Bulgarian.

4 Bulgarian verbs of emotion

The Bulgarian verbs of emotion, traditionally considered part of the larger psychological class of verbs, form an intriguing set. In her 2008 study, Nitsolova (2008b: 265) proposes to consider verbs such as *обичам* 'love', *мразя* 'hate', *ненавиждам* 'detest' and others as "mental predicates for emotional attitude". Koeva (2019: 62–63) further subdivides them into predicates for emotional reaction or evaluation, (i) which are expressed by verbs *харесвам* 'like', *съжалявам* 'regret', *радвам се* 'be glad', *страхувам се* 'fear', *тревожа се* 'worry' or (ii) constructions like *благодарен съм* 'be grateful', *яд ме е* 'be mad', *срам ме е* 'be ashamed', *тъжно ми е* 'be sad'.

When looking at the argument structure of verbs and predicative expressions for emotions in the Bulgarian language, Dineva (2000) states that there are four

types, namely: (i) one-argument constructions, realising only an Experiencer, such as *вълнувам се* 'be excited', *тъжно ми е* 'be sad', *страх ме е* 'be afraid', *спокоен съм* 'be calm'; (ii) two-argument structures, expressing the Experiencer and the Stimulus with causative verbs, such as *радвам* 'rejoice', *натъжавам* 'sadden', *ядосвам* 'make angry', *изненадвам* 'surprise', or (iii) the Experiencer and the Object with verbs for attitude such as *обичам* 'love', *уважавам* 'respect', *харесвам* 'like', *ценя* 'appreciate', *обожавам* 'adore' and (iv) verbs with three arguments – an Experiencer and alternating arguments, expressing the Stimulus and the Object *Книгата ми харесва.* (I like the book.) – *Харесвам книгата.* (The book appeals to me.)

Tisheva (2022: 102) divides the verbs of emotion into two groups based on the semantic role of the subject in the sentence: subject-Stimulus verbs and subject-Experiencer verbs, which thus form conversive pairs (*безпокоя – безпокоя се* 'worry', *радвам – радвам се* 'rejoice', *обиждам – обиждам се* 'insult' and so on). The state verbs of emotion involved in these oppositions are reflexive in form and therefore intransitive. As a rule, the emotion state verbs with *се* take the Stimulus as PP, while the causatives encode the Stimulus as NP. Tisheva notes that not all emotion verbs fall into these pairs. A number of authors state that verbs such as *боя се* 'be afraid', *наслаждавам се* 'enjoy', *страхувам се* 'fear' are not used without the reflexive *се*, while *тъжа* 'grieve', *тъгувам* 'sorrow', *тържествувам* 'triumph' do not have a counterpart with *се* (Koeva 1996: 24), (Nitsolova 2008a: 232), (Tisheva 2022: 101–102). This is one of the reasons why the common semantic model comprising subject and object of emotion cannot be expressed with a universal structural equivalence drawn between the causatives and *се*-verbs.

Tisheva & Dzhonova (2022: 394) note that these conversive pairs can represent one and the same situation and have two identical valences, although they are occupied by different actants. Causative predicates transfer the semantic role of the Experiencer to the direct object, while stative predicates attribute it to the subject. According to the authors, state verbs of emotion in Bulgarian are considered primary predicates and causative predicates are considered semantically derived predicates, folowing the Van Valin and LaPolla's classification of predicates (Van Valin & LaPolla 1997).

Stamenov (2021: 70) categorises the Bulgarian verbs for internal psych experiences into 12 groups based on the semantic roles that each of them requires. In addition to verbs of emotion, Stamenov's structural classification also includes verbs of mentality and perception. Of the 12 types outlined by the author, we have singled out 7 that contain verbs of emotion (at least one) and are relevant for the purpose of our study:

(i) Intransitive verbs whose lexical meaning expresses the inseparable unity of the Actor and the Experiencer: *копнея* 'crave', *тъжа* 'grieve';

(ii) Transitive verbs with and Experiencer and Stimulus or Object: *обичам* 'love', *мразя* 'hate', *обожавам* 'adore', *харесвам* 'like';

(iii) Verbs, expressing the semantic structure of a Stimulus and a specific effect (on the Experiencer) with a predicate of the CAUSE + DEVERBAL NOUN type: *възторгвам* / *възторгвам се* 'enrapture' / 'go into raptures' – *предизвиквам* / *преживявам възторг* 'cause / experience rapture', *възхищавам* / *възхищавам се* 'cause admiration' / 'admire', *вълнувам* / *вълнувам се* 'excite' / 'experience excitement';

(iv) Verbs with the possibility of attaching clitics – *домъчнява (ми)* 'start to feel unhappy', *причернява (ми)* 'start to feel unwell' – *Четенето ми доскучава* (*Reading makes me bored*) / *Доскучавам на Петьо с въпросите си* (*I'm boring Petyo with my questions*);

(v) Verbs for ambient inner state with obligatory accusative Experiencer: *дострашава ме* 'start to feel scared', *доядява ме* 'start to feel angry'.

(vi) Verbs for inner psychological state with obligatory dative Experiencer, which allow for a second indirect object Stimulus / Theme: *дожаля́ва ми* 'start to feel pity', *докривя́ва ми* 'start to feel sad';

(vii) Reflexiva tantum verbs, in which the verb action is directed back to its subject Experiencer: *любувам се* 'revel', *срамувам се* 'feel ashamed', *страхувам се* 'fear';

The author also points out that the different meanings of the verbs in his classification can be categorised into different groups.

In Section 5 we analyse five of these subclasses of verbs, taking into account their frequency and distribution in Bulgarian. First, we analyse the top hypernyms of the general emotion verbs {*изпитвам, чувствам*} / {*feel, experience*}. Then we analyse the general transitive verbs that express an emotion and an attitude, such as *обичам* 'love', *мразя* 'hate', *харесвам* 'like'. We also deal with causatives *веселя* 'rejoice', *радвам* 'gladden', *плаша* 'scare', which are subdivided on the basis of the entity that evokes the emotion – either an Agent or a Stimulus. And finally, we introduce the stative and inchoative verbs, which are the causative verbs' middle-voice counterparts formally expressed with the

verb and the reflexive *ce* – *веселя се* 'rejoice (oneself)', *радвам се* 'gladden (oneself)', *плаша се* 'scare (oneself)'. We used the WordNet definitions where it was necessary to distinguish between different senses.

5 Frames and semantic features

The Experiencer and the Stimulus are the two obligatory participants in an emotion event. The Experiencer is at the centre of much research and is known to necessarily involve a sentient participant – usually a human or an animate being. Much less attention has been paid to the behaviour and syntactic expression of the Stimulus, as its multifaceted nature can hardly be specified. For the predicates under consideration in our work the Stimulus affects the Experiencer, changing the emotions he or she experiences. This general scenario determines the emotion verbs and specifies both the possible syntactic structures within a sentence and the morphological and semantic restrictions imposed on the situation participants.

In the present study, we will look at some of the most common verbs of emotion. The study is based on their semantic frame representation, which builds on the FrameNet and WordNet structures. For this reason, the different subclasses of emotion verbs will presented below with brief definitions taken from FrameNet when appropriate and slightly modified when not.

We will outline first the core frame elements within the Emotions frame as most of the semantic frames under study inherit them by virtue of the relations between frames. The definition of the Emotions non-lexical frame is that "An Experiencer has a particular emotional State, which may be described in terms of a specific Stimulus that provokes it, or a Topic which categorises the kind of Stimulus. Rather than expressing the Experiencer directly, it may (metonymically) have in its place a particular Event (with participants who are Experiencers of the emotion) or an Expressor (a body-part of gesture which would give an indication of the Experiencer's state to an external observer)". Both the core and the non-core Emotion frame elements are presented in Table 1.

We will consider five main semantic frames that demonstrate the syntactic specificity of five subclasses of emotion verbs. First, we will analyse the top hypernyms of the emotion verbs *изпитвам*:1, *чувствам*:1 (*feel*:8, *experience*:3), which are represented by the Feelings frame (Section 5.1). In Section 5.2 we will deal with the Experienced_focused_emotion frame, which is comprised of transitive verbs, expressing attitude. Thirdly, we will explore the Cause_to_experience and Stimulate_emotion frames, which represent causative verbs of

emotion, having an AGENT or a STIMULUS as a subject (Section 5.3). And finally, in Section 5.4, we will examine the `Emotion_directed` frame, which represents the stative and inchoative verbs, formed from the causatives from Section 5.3 and the reflexive *ce*.

Table 1: The `Emotion` frame elements.

(a) Core frame elements

EVENT	The occasion or happening in which EXPERIENCERS in a certain emotional state participate.
EXPERIENCER	The person or sentient entity who experiences or feels the emotion.
EXPRESSOR	It marks expressions that indicate body part, gesture or other expression of the EXPERIENCER that reflects his or her emotional state.
STATE	The abstract noun that describes a more lasting experience by the EXPERIENCER.
STIMULUS	The person, event, or state of affairs that evokes the emotional response in the EXPERIENCER.
TOPIC	The general area in which the emotion occurs. It indicates a range of possible STIMULUS.

(b) Non-core frame elements

DEGREE	The extent to which the EXPERIENCER's emotion deviates from the norm for the emotion.
EMPATHY-TARGET	The individual or individuals with which the EXPERIENCER identifies emotionally and thus shares their emotional response.
REASON/EXPLANATION	The EXPLANATION is the explanation for why the STIMULUS evokes a certain emotional response.
MANNER	Any description of the way in which the EXPERIENCER experiences the STIMULUS which is not covered by more specific FEs. Manner may also describe a state of the EXPERIENCER that affects the details of the emotional experience.
PARAMETER	A domain in which the EXPERIENCER experiences the STIMULUS.

5.1 **Feeling**

Definition: In this frame an Experiencer experiences an Emotion or is in an Emotional_state. There can also be an Evaluation of the internal experiential state.

The verbs *чувствам* 'feel' and *изпитвам* 'experience' typically evoke this semantic frame. The only synset that contains those verbs and is marked by the semantic prime *verb.emotion* is presented in Example 3 and is illustrated in Example 4:

(3) a. BG {*изпитвам*; *изпитам*; *чувствам*; *почувствам*; *преживея*; *преживявам*; *осезавам*} ('изживявам емоционално състояние или афект (по отношение на някого или нещо)')

     b. EN {*feel*; *experience*} ('undergo an emotional sensation or be in a particular state of mind')

(4) *Започна-ли   да ЧУВСТВА-Т   любов към*
     Start-3.PL.PST.INFR to FEEL-3.PL.PRS love   towards
     венерианк-и-те   и   същ-а-та   загриженост, както и
     Venusian-PL-DEF.PL and same-F-DEF.F concern   as   also
     към   себе си.
     towards oneself
     '*They started to feel love towards the Venusian women and the same concern they felt towards themselves.*'

The core frame elements are Emotion, Emotional_state, Evaluation, and Experiencer. The observations on Bulgarian material show that the transitive verbs (*чувствам* 'feel', *изпитвам* 'experience' only take an Experiencer and Emotion FEs, whereas intransitive ones (*чувствам се* 'feel (oneself)') encode an Experiencer and an Emotional_state or Evaluation (in rare cases).

Emotion – the Emotion is the feeling that the Experiencer experiences. There are a lot more examples with *изпитвам* 'experience' than with *чувствам* 'feel' with a direct object position filled with a hyponym of the {emotion} synset (Examples 5 and 6).

(5) *Често **ИЗПИТВА-М** [завист]*_{ЕМОТ} *към човешк-и-те   същесв-а.*
     often feel-1.SG.PRS envy   to human-PL-DEF.PL being-PL
     'I often feel envious of human beings.'

(6) *Елейн изобщо не* **ИЗПИТВА-ШЕ** [*гордост*]_{Emot}.
Eleyn at all   not feel-3.SG.IPFV   pride
'Elaine felt no pride at all.'

Experiencer – the Experiencer experiences the Emotion or is in the Emo-
tional_state. The position of the Experiencer is generally occupied by a lit-
eral belonging to the eng-30-00007846-n: {*person*} synset or its hyponyms. It is
expressed in a sentence by an NP, which functions as a subject. It can also be
used metaphorically with a part of the body, usually the *heart*, which has the
potential to serve as an expressor of one's feelings (Example 7).

(7) [...] *и   да каж-е   онова, кое-то*   **ЧУВСТВА-Ø**
[...] and to tell-3.SG.PRS that-N which-DEF.N feel-3.SG.PRS
[*сърце-то   ù*]_{Body_part}.
heart-DEF.N her
'[...] and to say what her heart feels.'

The *se* counterpart of *чувствам* 'feel' – *чувствам се* 'feel (oneself)' is reflexive
concerning its form and, respectively, intransitive. It does not take a direct object
and, therefore, does not encode an Emotion. In order to realise its meaning, it
needs the other core frame element – Emotional_state.

Emotional_state – the Emotional_state is the state the Experiencer is
in. The Emotional_state can be expressed by an adjective/participle as in Exam-
ples 8 and 9 describing the Experiencer or by an adverb (Example 10), indicating
the manner in which the Experiencer feels.

(8) **ЧУВСТВА-М СЕ** [*свободен-Ø*]_{Emos}.
feel-1.SG.PRS   free-SG.M
'I feel free.'

(9) *В момент-а   тя* **СЕ ЧУВСТВА-ШЕ** [*предад-ен-а*]_{Emos}.
in moment-DEF.M she feel-3.SG.IPFV   betray-PTCP-F
'Right now she felt betrayed.'

(10) *Дали   ще* **СЕ ЧУВСТВА-Ш** [*отвратително*]_{Emos}, *може*.
whether will feel-2.SG.PRS   disgustingly,   maybe
'Will you feel disgusted, maybe.'

5.2 `Experiencer_focused_emotion`

Definition: The words in this frame describe an Experiencer's emotions with respect to some Content. Although the Content may refer to an actual, current state of affairs, quite often it refers to a general situation which causes the emotion.

`Experiencer_focused_emotion` is a semantic frame that encodes the Experiencer as a subject and the Content as a direct object and is well-represented in Bulgarian. This semantic frame encompasses verbs like *харесвам* 'like', *обичам* 'love', *мразя* 'hate', *ненавиждам* 'detest', *обожавам* 'adore', *съжалявам* 'feel sorry', *презирам* 'despise', among others. As Tisheva (2021: 117) specifies "unlike the usage of some mental predicates (Nitsolova 2008b: 264), with the verb *обичам* 'love' the negation does not affect the choice of lexical elements that can occupy the syntactic positions, but only the interpretation of the meaning of the whole sentence". This observation can be spread over the verbs comprising this subclass with the exception of *ненавиждам* 'detest', which bears negation within its structure and does not allow for a second negative element.

The core frame elements within the `Experiencer_focused_emotion` in FrameNet are the Experiencer, the Content, the Event and the Topic. For the sake of the description of Bulgarian verbs we will use a modified frame, taking into consideration only the Experiencer and the Content as the other two core frame elements are generally combined with other parts of speech. The Event is generally expressed by noun phrases and the Topic, which gives additional information, was not found in the Bulgarian corpus examples with the verbs under discussion. That is why the latter two core FE will not be discussed here.

We will consider firstly the two main meanings of the verb *обичам* 'love' as reflected in the BulNet lexical-semantic resource (Examples 11 and 12). They both encode the Content as a direct object or as a *да*-clause. We believe that the other verbs from the group follow the same syntactic constructions.

(11)   a. BG {*обичам*} ('изпитвам силна привързаност и симпатии към някого или свързаност с и удоволствие от нещо')
Тя обича шефа си и работи усърдно за него; *Обичам френската кухня.*

   b. EN {*love*} ('have a great affection or liking for')
She loves her boss and works hard for him; *I love French cuisine.*

(12)   a. BG {*обичам*} ('харесвам много, изпитвам удоволствие от нещо')
Обичам да готвя.

b. EN {*love*} ('get pleasure from')
   I love cooking.

Experiencer – The Experiencer experiences the emotion or other internal state. The Experiencer FE position is generally filled with a subtree of {*person*} (Example 13), but can also be encoded as {*animal*} and its hyponyms (Example 14).

(13) [*Победител-ят*]₍ₑₓₚ₎ **ОБИЧА-ШЕ** *да вкарва гол-ове.*
     winner-DEF.M   love-3.SG.IPFV to score   goal-PL
     'The winner loved to score goals.'

(14) [*Куче-то*]₍ₑₓₚ₎ **ОБИЧА-Ø** *стариц-и-те.*
     dog-DEF.N   love-3.SG.PRS old woman-PL-DEF.PL
     'The dog loves old women.'

The subject Experiencer is usually expressed by a singular noun, as shown in Examples 13 and 14. If the subject Experiencer is in the plural, it denotes a specific group that acts as the collective subject of the emotion, as shown in the Example 15.

(15) [*Магьосниц-и-те*]₍ₑₓₚ₎ **ОБОЖАВА-Т** *неразкри-ти-те*
     magician-PL-DEF.PL   adore-3.PL.PRS undiscover-PTCP.PL-DEF.PL
     тайн-и.
     secret-PL
     'Magicians adore undiscovered secrets.'

In addition, the Experiencer's position is often occupied by {*душа*} 'soul' or {*сърце*} 'heart' synsets together with expressive modifiers or quantifiers to reveal the point where the feeling is concentrated (Example 16).

(16) [*Душа-та ми*]₍ₑₓₚ₎ *до болка те*   **ОБИЧА-Ø**.
     soul-DEF.F my   to pain   you-ACC love-3.SG.PRS
     'My soul loves you painfully.'

Examples with metonymic shifts of the type *Barcelona loves partying* (meaning the people of Barcelona) actually show that a great number of lexical units can possibly occupy a certain position if they can express the same semantic role. Our aim is to outline the syntactic regularities and that is why such occasional examples lie beyond the scope of this study.

Content – Content is what the Experiencer's feelings or experiences are directed towards or based upon. The Content differs from a Stimulus because the Content is not construed as being directly responsible for causing the emotion. The Content FE is commonly expressed by a noun of the {*person*} or {*animal*} subtrees, as is shown in Example 17, but the position of this FE can generally be occupied by any {*entity*} hyponym, alluding to a specific human being (e.g. one's voice, as shown in Examples 18 and 19).

(17) *Искрено да **ОБИЧА-Ø** [родител-я]*_{Cont} [...]
sincerely to love-3.SG.PRS parent-DEF.M   [...]
'To sincerely love the parent [...]'

(18) ***ОБИЧА-М** [звук-а   на глас-а   ти]*_{Cont}!
love-1.SG.PRS sound-DEF.M of voice-DEF.M your
'I love the sound of your voice!'

(19) *Библиотекар-ят **ОБИЧА-ШЕ** [театър-а]*_{Cont}.
librarian-DEF.M   love-3.SG.IPFV theatre-DEF.M
'The librarian loved theatre.'

There are examples in the corpus where the Content is also conveyed metaphorically as in Example 20, where the glass actually symbolises the Experiencer's attitude towards drinking.

(20) *Чичо Тошко **ОБИЧА-ШЕ** [чашка-та]*_{Cont} [...]
uncle Toshko love-3.SG.IPFV glass-DEF.F   [...]
'Uncle Toshko loved to drink [...]'

The Content of the emotion can also be expressed in Bulgarian by a subordinate clause, introduced by the conjunction *да* (Example 21), interrogative pronoun *как* (Example 22) and relative pronoun *когато* (Example 23). When the object position is filled with a clause, there is no structural dependency between the arguments of the predicates in the main and the subordinate clause.

(21) *Повече ѝ   **ХАРЕСВА-ШЕ** [да прочете-Ø]*_{Cont} [...]
More   she-DAT LIKE-3.SG.IPFV to read-3.SG.PRS   [...]
'She liked more to read [...]'

(22) *И **МРАЗЕ-ШЕ** [как я   гледа-ш]*_{Cont}   [...]
and hate-3.SG.IPFV how she-ACC look_at-2.SG.PRS [...]
'And she hated how you looked at her [...]'

(23) *Хора-та* **ОБИЧА-Т** [*когато някой се нужда-е от*
person-PL.DEF love-3.PL.PRS when somebody need-3.SG.PRS of
свобода]_{CONT} [...]
freedom [...]
'People like it when someone needs freedom [...]'

This usage should be distinguished from the one where *когато*-clause is used for conflicting circumstances as in Example 24. The CONTENT position in this sentence is filled with a direct object accusative pronoun *ме* 'me'.

(24) [...] *как може-ш* да [*ме*]_{CONT} **ОБИЧА-Ш,** *когато едва*
[...] how can-2.SG.PRS to I-ACC love-2.SG.PRS, when only
снощи се срещнахме [...]
last_night REFL met-1.PL.PST [...]
'[...] how can you love me when we met only last night [...]'

English verbs show similar usage to Example 23 when projecting the non-core frame element CIRCUMSTANCES with the help of a finite *wh*-complement, which is typically preceded by a pronominal object (Example 25).

(25) *I* **HATE** *it when you do that.*

An adjunct *когато*-clause is also used in Example 26, as *обичам* 'love' takes a complement *да*-clause, which occupies the position of the CONTENT. The proximity or remoteness of a phrase/clause and the verb does not affect the logical structure of the sentence.

(26) *Не* **ОБИЧА-М,** *когато ѝ говор-я колко много*
not love-1.SG.PRS when she-DAT speak-1.SG.PRS how much
я обича-м, [*тя да мълчи-Ø*]_{CONT}.
she-ACC love-1.SG.PRS, she to be silent-3.SG.PRS
'I don't like her keeping silent when I tell her how much I love her.'

Finally, we are going to examine a more specific sense of the verb *обичам* 'love' as in Example 27, as it demonstrates high frequency of usage.

(27) a. BG {*обичам*} ('влюбен съм, изпитвам любов към някого')
Тя искрено обичаше съпруга си.
b. EN {*love*} ('be enamored or in love with')
She loves her husband deeply.

In this particular meaning of the verb, the positions of theEXPERIENCER and CONTENT are semantically restricted to the synset {*person*:1} and its hyponyms. Furthermore, as Tisheva (2021: 124) states, they should reflect a single individual, so that both FEs should be expressed by singular nouns. If expressed with a plural form, the FEs consider a collective image of a specific group. The use of the definite form in singular or plural usually indicates a generic use. The Example 28 comes from the work of Tisheva.

(28) *Майка-та*   **ОБИЧА-Ø**   *дец-а-та*   *си.*
     mother-DEF.F love-3.SG.PRS child-PL-DEF.PL REFL-POSS
     'A mother loves her children.'

5.3 `Stimulate_emotion` and `Cause_to_experience`

We will consider these two semantic frames and the lexical units that evoke them in parallel, since they show great similarities in terms of sentence structure and situation participants and differ only with respect to one of the frame elements. Both frames denote two core frame elements that are expressed conventionally.

`Stimulate_emotion`'s definition is "Some phenomenon (the STIMULUS) provokes a particular emotion in an EXPERIENCER." Its core frame elements are an EXPERIENCER and a STIMULUS, defined as follows:

EXPERIENCER: the EXPERIENCER reacts emotionally or psychologically to the STIMULUS.

STIMULUS: the STIMULUS is the event or entity which brings about the emotional or psychological state of the EXPERIENCER.

Within the `Cause_to_experience` frame an EXPERIENCER and an AGENT can be pointed out as core frame elements and the definition of the frame is "An AGENT intentionally seeks to bring about an internal mental or emotional state in the EXPERIENCER".

AGENT: the AGENT is an external argument of the target word and purposefully arouses an emotional state.

EXPERIENCER: the EXPERIENCER is the person the AGENT causes to have a particular emotional state.

The semantic and syntactic restrictions of the frame element EXPERIENCER are identical for both semantic frames. It is an *animate being* (Example 29), but most of the time the position is represented by a {*person*} NP.

(29) *Изведнъж **СТРЯСКА-МЕ** [заек]*~Exp~ [...]
suddenly   startle-1.PL.PRS rabbit   [...]
'Suddenly, we startle a rabbit [...]'

An interesting case are the examples with the explicit presence of the Stimulus of the emotion and an unexpressed Experiencer (Example 30). In her study of the predicative construction *it is known*, Nitsolova (2001: 175) notes that "the place of Experiencer in the semantic structure is actually occupied by a variety of epistemic subjects. The set of epistemic subjects includes at least the speaker himself, who also wants to include the hearer". This observation can also be applied to the unexpressed Experiencer of the causative predicates of emotion: the object is present in the semantic structure of the predicate and represents a plurality of individuals.

(30) [*Москва*]~Age~ ***ПЛАШИ-Ø***,   *че   ще   разкрие-Ø   истина-та*
Moscow   threaten-3.SG.PRS that will reveal-3.SG.PRS truth-DEF.F
[...]
[...]
'Moscow threatens to reveal the truth [...]'

Both semantic frames can be evoked by verbs such as *ужасявам* 'terrify', *плаша* 'scare', *разстройвам* 'upset', *веселя* 'rejoice', *радвам* 'gladden', *успокоявам* 'comfort', *вълнувам* 'excite', *забавлявам* 'entertain', *стряскам* 'startle', which are causative and, correspondingly, transitive. The position of the direct object is taken by the Experiencer, while the subject can be either animate or inanimate. If the source of the emotion is animate, it receives an agent-like interpretation and refers to the frame Cause_to_experience; however, if it is inanimate, it is projected as the Stimulus of the emotion and belongs to the frame Stimulate_emotion.

Within the frame Cause_to experience the Agent can only be presented with the synset *person* or its hyponyms. The frame Stimulate_emotion can encode all {*entity*} hyponyms in its subject position, with the exception of *person*. In addition, the Stimulus can also be encoded as a clause. As Koeva (2021a: 18) notes, the complementiser in Bulgarian is represented by the conjunction or conjunction-like words such as *че, да, как* and *дето*. This applies to predicates of emotion whose complement clauses representing the Stimulus are generally introduced by one of these complementisers. Some of the verbs allow all types of clauses, while some verbs in the corpus show no use with some of them. Table 2 shows

the distribution of possible conjunctions with the predicates as represented in the Bulgarian National Corpus.[3]

Table 2: The distribution of causative verbs and possible complementisers.

verbs	*че* 'that'	*да* 'to'	*как* 'how'	*дето* 'as/for/that'[a]
ужасявам 'terrify'	+	+	–	–
плаша 'scare'	+	+	–	+
разстройвам 'upset'	–	–	–	–
веселя 'rejoice'	–	–	–	–
радвам 'gladden'	+	+	+	+
успокоявам 'comfort'	+	+	–	–
вълнувам 'excite'	+	–	+	–
забавлявам 'entertain'	+	+	–	–
стряскам 'startle'	–	–	–	–

[a]According to the Dictionary of Bulgarian Language *дето* is a conjunction formed by an adverb or a relative pronoun. It has a variety of functions in a sentence, that is why more than one possible translation is presented in the table.

The results from the corpus search show that *веселя* 'rejoice', *разстройвам* 'upset' and *стряскам* 'startle' can have only a NP in the subject position. Table 2 shows that *радвам* 'gladden' is the only verb that allows for all four conjunctions. *Ужасявам* 'terrify', *успокоявам* 'comfort' and *забавлявам* 'entertain' can have *че*- and *да*-clauses (Example 31), but do not show usage with the other two complementisers. *Плаша* 'scare' can be used with *че*-, *да*- and *дето*-constructions in the subject position, and *вълнувам* 'excite' – with *че* and *как* complementisers (Example 32).

(31)   *Винаги го*   **ЗАБАВЛЯВА-ШЕ**, [*че араб-и-те*   *им*
      always he-ACC entertain-3.SG.IPFV that Arab-PL-DEF.PL they-DAT
      вярва-ха]$_{\text{STIM}}$.
      believe-3.PL.IPFV
      'It always entertained him that the Arabs believed them.'

[3]We have documented the results of the corpus-based search, although the values do not always match our linguistic intuition.

(32) *Изобщо не ме* **ВЪЛНУВА-Ø** [*как изглежда-Ø*]_{STIM}!
at all not I-ACC CARE-3.SG.PRS how look like-3.PL.PRS
'I don't care at all what it looks like!'

The Stimulus clause can also be introduced with the intensifying modifier *колко* 'how much / many' as in Example 33.

(33) **УЖАСЯВА-Ø** *ме* [*колко е сериозен-Ø*]_{STIM}.
terrify-3.SG.PRS I-ACC how much be-3.SG.PRS serious-M.SG
'It terrifies me how serious he is.'

In addition to the subject clauses (Examples 31 and 33), the frame element Stimulus can also be introduced by a *c*-PP (Examples 34). In this case, the subordinate clause applies to the PP and not to the verb.

(34) *Неведнъж я беше* **СТРЯСКА-Л** [*с това, което*
not_once she-ACC startle-3.SG.PLUSQ with this which
знае-ше]_{STIM}.
know-3.SG.IPFV
'Not once had he startled her with what he knew.'

5.4 `Emotion_directed`

The frame `Emotion_directed` includes stative and inchoative subject-Experiencer psych verbs, which are characterised by the reflexive-by-form *ce* and a middle-voice use. It comprises of verbs such as *ужасявам се* 'feel/become terrified', *плаша се* 'fear', *разстройвам се* 'feel/become upset', *веселя се* 'rejoice', *радвам се* 'be glad', *успокоявам се* 'calm down', *вълнувам се* 'be excited', *забавлявам се* 'entertain', *стряскам се* 'be startled' and others. We consider the above verbs to be the *ce* counterparts of the verbs we analysed in Section 5.3.

Definition: this frame describes an Experiencer who is feeling or experiencing a particular emotional response to a Stimulus or about a Topic. There can also be Circumstances FE under which the response occurs or a Reason why the Stimulus evokes the particular response in the Experiencer.

The core frame elements are Event, Experiencer, Expressor, Reason, State, Stimulus, Topic. We will slightly modify this semantic frame for the Bulgarian verbs by excluding the FEs Event, Expressor and State, as we do not describe adjectives or nouns that evoke the semantic frame.

Experiencer – The Experiencer is the person or sentient entity that experiences or feels the emotions.

We found no examples in the corpus with complement clauses in subject position. When a subject is explicitly present in the sentence, the syntactic realisations of Experiencer consist mainly of noun phrases of the subtree *person*. There are rare cases with animate non-persons, which in this case belong to the subtree *animate being* (Example 35). As we have already mentioned, Bulgarian as a pro-drop language allows the subject position to be empty.

(35) *Животн-и-те*   ***СЕ ПЛАШЕ-ХА***, *но назад не може-хме   да*
      animal-PL-DEF.PL scare-3.PL.IPFV   but back   not can-1.PL.IPFV to
      се върне-м.
      go back-1.PL.PRS
      'The animals were scared, but we could not go back.'

Metonymic transfers make it possible for non-animate objects to take the position of the subject, although few cases illustrated that type in the corpus (Examples 36 and 37).

(36) *Как* ***СЕ ВЕСЕЛИ-Ø*** [*град-ът*]$_{\text{Exp}}$?
      how rejoice-3.SG.PRS city-DEF.M
      'How does the city have fun?'

(37) [...] *търсене-то беше прекрат-ен-о   и   [село-то]*$_{\text{Exp}}$
      [...] search-DEF   was   call off-PTCP-N and village-DEF.N
      СЕ УСПОКОИ-Ø.
      calm down-3.SG.PST
      '[...] the search was called off and the village calmed down.'

Stimulus – The Stimulus is the person, event, or state of affairs (excluding Reason) that evokes the emotional response in the Experiencer. As the last example (Example 37) shows, the Stimulus of the emotion can be syntactically unexpressed. When this element of the emotional scenario is expressed, it is traditionally projected into a subordinate clause.

As in Section 5.3 we checked all the possible combinations of verbs and complementisers and present them in Table 3.[4] The differences from causative verbs' usage are encircled.

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[4]We have documented the results from the corpus-based search, although the values are not always consistent with our own intuition .

Table 3: The distribution of *ce*-verbs and possible complementisers.

verbs	*че* 'that'	*да* 'to'	*как* 'how'	*дето* 'as/for/that'
ужасявам се 'feel terrified'	+	+	⊕	−
плаша се 'fear'	+	+	⊕	⊖
разстройвам се 'feel upset'	−	−	−	−
веселя се 'rejoice'	⊕	−	−	−
радвам се 'be glad'	+	+	+	+
успокоявам се 'calm down'	+	⊖	−	−
вълнувам се 'be excited'	+	⊕	+	−
забавлявам се 'entertain'	+	+	−	−
стряскам се 'be startled'	⊕	−	−	−

The verbs *ужасявам се* 'feel/become terrified', *плаша се* 'fear', *вълнувам се* 'be excited' show examples with the first three complement types as marked in Table 3 (Example 38). *Разстройвам се* 'feel/become upset' does not take subordinate clauses of any type. *Веселя се* 'rejoice', *успокоявам се* 'calm down' and *стряскам се* 'be startled' allow clause complements with *че* only (Example 39). The compatibility of *радвам се* 'be glad' with subordinate conjunctions is significantly wider – it can be used with all four of them, according to our empirical material (Example 40). And finally, *забавлявам се* 'entertain' can be used with the two most frequent conjunctions *че* and *да* (Example 41), but not with the other two.

(38) **УЖАСЯВА-Ø СЕ** [*да е*   *далеч от   теб*]$_{\text{STIM}}$.
be terrified-3.SG.PRS to   be-3.SG.PRS far   from you-ACC
'(He) is terrified of being away from you.'

(39) [...] *а   пи-хме   и   слага-хме   трапез-и да* **СЕ ВЕСЕЛИ-М**,
[...] but drink-1.PL.PST and set-1.PL.PST table-PL   to rejoice-1.PL.PRS
[*че те   си отидо-ха*]$_{\text{STIM}}$.
that they go away-3.PL.PST
'[...] but drank and set tables to rejoice that they had gone.'

(40) [...] *че я   обича-Ø   много и   СЕ РАДВА-Ø   [дето*
[...] that she-ACC love-3.SG.PRS much and be glad-3.SG.PRS that

всичко   свърши-Ø]_{STIM} [...]

everything end-3.SG.PST   [...]

'[...] that he loves her very much and is glad that everything ended [...]'

(41) *И   тя СЕ ЗАБАВЛЯВА-ШЕ* [*да ме   учи-Ø*]_{STIM}.

and she entertain-3.SG.IPFV   to I-ACC teach-3.SG.PRS

'And she had fun teaching me.'

In the corpus, there are occasional cases in which the complement clause is introduced with the intensifier *колко* 'how much / many' (Example 42).

(42) [...] *и   СЕ РАДВА-ХА* [*колко   хубав-Ø обещава-Ø*

[...] and rejoice-3.PL.IPFV how_much fine-M.SG promise-3.SG.PRS

да бъде   ден-ят]_{STIM}.

to be-3.SG.PRS day-DEF.M

'[...] and rejoiced at how fine the day promised to be.'

In addition to a subordinate clause, the Stimulus can also be introduced by a dative clitic argument (Example 43) or a *на-*, *за-*, *от-* or *с*-PP (Example 44).

(43) [...] *да* [*му*]_{STIM} *СЕ РАДВА-М   скришом.*

[...] to he-DAT rejoice-1.SG.PRS secretly.

'[...] and enjoyed him secretly.'

(44) *Обикновено СЕ УСПОКОЯВА-МЕ* [*с   известн-ия   факт*]_{STIM} [...].

usually   calm down-1.PL.PRS   with known-DEF.M fact   [...].

'We usually calm down at the well-known fact [...].'

Negative-emotion verbs – *ужасявам се* 'feel / become terrified', *плаша се* 'fear', *разстройвам се* 'feel / become upset', tend to take an *от*-PP, while positive ones prefer *на-* or *за*-PPs.

The *с*-PP appears a lot more frequently when denoting another individual or individuals, who the Experiencer shares emotional response with. Within the frame structure it is marked as an Empathy_target and is a non-core frame element (Example 45).

(45) *Върв-и   да СЕ ЗАБАВЛЯВА-Ш* [*с   Едуард*]_{EMPT}.

go-SG.IMP to entertain-2.SG.PRS   with Edward

'Go have fun with Edward.'

Another possible syntactic construction within this semantic frame is that both the Stimulus and the Reason appear together in one sentence. In these cases, the Stimulus is expressed by a PP and the Reason by a complement clause. Koeva points out that in these cases an internal left dislocation is observed – an argument from the subordinate clause can appear in object position with the main predicate. It can also be expressed explicitly in the subordinate clause and is coreferent with the object in the main clause. No such examples were found in the corpus, but there are some on the internet (Example 46).

(46) ***РАДВА-М СЕ*** [*на дец-а-та*]_{Stim} [*че ходя-т   на училище*
      be glad-1.SG.PRS to   child-PL-DEF.PL that go-3.PL.PRS to school
      с   удоволствие]_{Reas}.
      with pleasure
      'I am happy for the children that they attend school with pleasure.'

6 Conclusions

This study is devoted to the representation of the semantic and syntactic behaviour of verbs of emotion and their arguments.

A number of the most common emotion verbs were selected for the study and their semantic frames were discussed. The main focus was on five semantic frames, namely Feeling, Experiencer_focused_emotion, Cause_to_experience, Stimulate_emotion and Emotion_directed.

A smaller number of semantic frames (e.g. Worry, Fear, Emotion_heat and others), which comprise fewer lexical units, were not considered in our study and will be analysed in the future.

All semantic frames investigated were characterised in terms of the lexical units which evoke them; their core frame elements and the possible representations they may have in terms of their syntactic and semantic expression. The frame Feeling was presented with its core frame elements Experiencer, Emotion, Emotional_state and Evaluation. It was found that the transitive verbs encode an Emotion as a direct object, while the intransitive *чувствам се* 'feel (oneself)' includes the Emotional_state or Evaluation in the sentence. The Experiencer_focused_emotion was slightly modified with regard to the description of the Bulgarian verbs and the Content and Experiencer were adopted as core frame elements. Various options for the encoding of Content were presented. The semantic frames Stimulate_emotion and Cause_to_experience had similar characteristics: they both contain causative verbs and have two core

frame elements, one of which is the Experiencer. The second core frame element is semantically expressed as Stimulus in the first semantic frame and as Agent in the second. The potential conjunctions, interrogative and relative pronouns that can introduce a frame element were searched for in the corpus, and the results were presented as examples and listed in a table for clarification. The frame `Emotion_directed` comprises the middle-voice equivalents of the stative and inchoative verbs evoking `Stimulate_emotion` and `Cause_to_experience` frames.

Lexical units of the frame `Feeling` are neutral with respect to the emotion they denote, and their complements express the positive or negative connotation. The verbs themselves carry the semantics of a positive or negative emotion within the other four semantic frames discussed above.

To summarise, each semantic frame consists of a collection of frame elements that represent the semantic components or roles associated with it. The role of each frame element within a particular semantic frame is crucial for the accurate representation of the semantic structure and frame conceptualisation. FEs help to capture the relations, roles and interactions between the different participants and components within a semantic frame. They provide a detailed representation of the conceptual content of a frame and enable a more precise and nuanced linguistic analysis and understanding. The semantic analysis of the frame elements of the frame `Emotions` and its five analysed subframes enables a prediction of the arguments of a semantic frame with respect to the specified linguistic constraints. The corresponding facets of the scenario represented for each semantic frame are a set of possible values from an inverted tree or subtree of WordNet. Sorting possible semantic components of words into groups of common semantic type (hypernyms) is in contrast to analysing the semantic argument structure of sentences based on specific words.

This in-depth analysis and manual approach to assigning semantic and syntactic information to the core frame elements provides new insights and a deeper understanding of the syntactic behaviour of verbs and their environment. Although the manual review and selection is quite time-consuming, one of the strengths of the method is that it involves precise alignment of data from different resources which are quite asymmetric for automatic alignment.

Abbreviations

AccCl	Obligatory accusative clitic	AdvP	Adverbial phrase
Age	Agent	DatCl	Obligatory dative clitic
Cont	Content	Emos	Emotional_state

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Emot	Emotion		PP	Prepositional phrase
EmpT	Empathy_target		Reas	Reason
Exp	Experiencer		S	Subordinate clause
FE	Frame element		Stim	Stimulus
NP	Noun phrase			

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