Conceptualization of Pain: A Database for Lexical Typology

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Abstract. The paper presents a study in lexical typology. We focus on the semantic domain of pain as one of the most universal and complex areas of human experience. The predicates of unpleasant bodily sensations are compared in a sample of 23 languages. The collected material demonstrates that the use of pain verbs is dependent on the range of factors of different nature. This data heterogeneity poses the problem of cross-linguistic comparability of pain predicates. As a way to overcome this problem, we propose the construction of a typological database. The multidimensional classifications implemented in the database allow for various cross-linguistic generalizations on pain and human body conceptualizations as well as on regularities of semantic shifts in different languages.

Keywords: Lexical typology, semantics, typological database, pain.

1 Introduction

Over the last several decades, typology has undoubtedly become one of the central fields of linguistic research. There have been considerable advances in the study of cross-linguistic variation in different areas of morphology, syntax, and phonology. However, the domain of vocabulary is still rarely studied from a typological point of view. This is quite understandable: the lexical typology differs from phonological and grammatical typologies as the latter use limited sets of features and their parameters while the former deals with an infinite diversity of lexical systems and implicit parameters of their distribution (cf. [1], [2]). That is why a lexical-typological study should start with an attempt to solve a "pre-typological" problem: how to reveal the domain of systematic lexical relations and to define the set of parameters that structure this domain. It is not accidental, therefore, that the first works on lexical typology were devoted to the best-structured taxonomies of color and kinship terms (see [3], [4], [5]).

As for more complicated lexical domains, the categorization of lexical units has to be carried out using different dimensions. Indeed, a lexical item is associated with certain types of situations. The comparison of these situational types reveals the relevant parameters of linguistic variation within the domain. As far as these parameters can be of different nature, this poses the problem of data comparability. In

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order to make generalizations about the entire conceptual domain and, in particular, to identify restrictions on its cross-linguistic variation, we need an efficient tool to visualize and analyze typological data.

The present article discusses the construction of a database as a technique for comparative lexical studies. Nowadays, electronic databases are increasingly popular tools in typological research (see for instance the database for word prosodic systems StressTyp, cf. [6], or the typological database of agreement, cf. [7]). In this paper we will demonstrate a lexical-typological database used for the formalization of the conceptual domain of pain.

The paper is organized as follows. Section 2 outlines the peculiarities of the semantic domain in question. Section 3 describes the data and methodology used for data collection. This is followed by a discussion of the database architecture and parameters relevant to the cross-linguistic analysis of pain in Section 4.

2 The Conceptual Domain of Pain

We have chosen the conceptual zone of pain as a target domain for our research. This fact imposes a challenge both for lexical typological studies and for linguistic analyses in general. This is due to several peculiarities of the pain domain and its linguistic conceptualization.

Firstly, pain has a specific ontological status, which accounts for the popularity of the subject in philosophy (cf. classical work by Wittgenstein [8]). pain is universal, in the sense that all human beings have experienced it, and, as such, it provides a fertile ground for cross-linguistic comparisons. At the same time, pain is highly individual and subjective, it cannot be directly observed or shared with others in an objective way. Our access to other people's pain is always mediated through language, i.e. the physiological experience of different people is subject to comparison only on the basis of their verbal descriptions. The verbalization of pain is of crucial importance, since it substantially contributes to healing. Indeed, pain reports are usually aimed at its relief. The more precisely pain is determined, the better it can be diagnosed, and, consequently, the more successfully it can be treated. This implies that a natural language needs to have means for describing and differentiating a great variety of painful sensations. This, again, renders the pain domain very promising for lexical investigation.

However, the non-observability of pain complicates the process of language data elicitation and their subsequent classification. Unlike some previous studies in lexical typology, our research cannot rely on visual stimuli in data collection (cf. cross-linguistic work on the cutting-breaking domain [9]). The domain under examination does not impose any method for data structuring. This raises the question of how to compare data across languages, which is the most essential issue for lexical typology in general. It is due to the problem of data comparability that lexical typology still occupies only a marginal position within the general field of cross-linguistic studies. Thus, an advance in comparative analysis of pain expressions could be a considerable step forward in establishing lexical typology as a research domain.

Secondly, the pain domain seems to be unique with regard to its lexical structure. Languages normally have few lexemes of pain *per se* (among predicative units we have encountered one to four pain-specific verbs in the languages studied so far, cf.

English *hurt*, *ache*; German *schmerzen*, *weh tun*; Russian *bolet'*). The major part of the domain is constituted by lexical units drawn from other semantic fields, which are metaphorically applied to pain (thus, rich systems reveal up to 50 metaphoric pain predicates). In this respect, pain is, in particular, opposed to other non-observable conceptual domains like e.g. 'mental states' or 'emotions' (cf. a wide range of inherently mental predicates in modern English *think*, *know*, *believe*, *consider*, *decide*, *suppose*, *understand*, etc.).

Due to the high rate of metaphoricity, the pain domain offers a new approach to cross-linguistic research on the derived meanings. Up to now comparative studies on metaphors have dealt mainly with the units associated with a unique source of metaphorical shifts and with the routes of their successive semantic derivations (consider the research on 'aqua-motion' [10]). By contrast, in the case of pain, the study is to focus on the goal of metaphors and on the exploration of the semantic shifts of basic meanings in relation to the meaning of pain[1]. This complicates the task of typological comparison: considering different languages, we come across heterogeneous sets of lexical units whose source meanings show great diversity. Indeed, how can we compare the Russian verb *gudet'* 'to hoot' (describes a painful sensation in one's head or legs) and the Serbian verb *burgijati* 'to drill' (describes a painful sensation in one's head or ears)?

As it will be shown below, the database technique used in the current research accounts for the problems of this kind. But before we turn to the description of the database, let us briefly outline the data used in the study and the methodology for its elicitation.

3 Data and Methodology

The data in focus comprises verbs and predicates that denote unpleasant physiological sensations. We favor lexical units with the meaning of inner sensations but not those of well observed external symptom (burning skin vs. reddening skin).

The research was based on the data of 23 languages, including those genetically related (Slavic – Russian, Ukrainian, Bulgarian, Serbian, Polish, Czech; Germanic – English, German; Romance – French, Spanish, Italian; Finno-Ugric – Hungarian, Estonian, Erzya (Mordvin)); a group of areally close languages (Caucasian – Georgian, Balkar (Turkic), Agul (Daghestanian)); and some others (Lithuanian, Hindi, Arabian, Japanese, Chinese, and Khmer). Interestingly, the comparison of closely related languages often shows amazing discrepancies and allows revealing some fine-grained parameters of semantic variation (see [13], [14] for similar remarks).

The specificity of the pain domain described above determines the complexities of data collecting.

Firstly, the non-observability of pain makes impossible the use of visual stimuli. Secondly, the metaphorical pain meaning is rarely enregistered in dictionaries and vocabularies. Therefore the main method of data collection is elicitation.

[1] Though there are several studies on source domains available for conceptualizing a certain target domain (see the analysis of anger in [11], the study of linguistic action in [12]), all of them have been done within one language. To our knowledge, no research of this kind deals with comparative data.

We have developed two data elicitation tools for the purposes of this research: a situational and a frame questionnaire. The situational questionnaire comprises a set of stimulus situations, that lead to painful sensations of their participant. A fragment of this questionnaire is shown below in Table 1.

Table 1. Situational questionnaire

1. The person was bound for two hours. What did he feel while being in such a state? What did he feel after he was unbound? What sensations did he get it his head, chest, back, arms, hands?
2. A small girl has a high temperature due to a cold. What are the sensations she has in her head, forehead, eyes, throat, nose, ears?

The frame questionnaire reflects the preliminary classification of five functional physical violation types that lead to pain sensations:

1) Skin sensations (e.g., *my face is stinging*);
2) Loss of functionality (refers to a body part, which is unable to move (back, neck, extremities) or unable to let fluids pass through (nose, ears, extremities), e.g., *my arm is numb*);
3) Volume extension (i.e., all kinds of swellings and tumors, e.g., *my left knee is swelled up*);
4) Anomalism of function (i.e., unpleasant sensations described in terms of the abnormal functioning of a body part, e.g. *my stomach is churning*);
5) Pain sensations *per se* (i.e., inner sensations that are due to systemic bodily disturbances (diseases), e.g., *my head is throbbing*).

Table 2. Frame questionnaire

Part 2. Loss of functionality
1. Mobile body parts – loss of mobility
External affect
• cold water (affected body part: hands, legs, fingers, teeth)
• frost (affected body part: hands, legs, fingers)
• poison (affected body part: hands, legs, tongue)
• narcosis (affected body part: hands, legs, tongue, lip)
Internal affect
• long stay in the same posture (sit, stand, lie; affected body part: hands, legs)
• paralysis (affected body part: hands, legs)
• fatigue (affected body part: hands, legs)
• senility (affected body part: legs)
• strain (affected body part: hands, legs)
2. Immobile body parts, body cavities – loss of functionality because of filling with extrinsic substances
• flu (affected body part: nose, breast)
• plain, mountains (affected body parts: ears)

The subtypes of each type are distinguished by a difference of stimuli, which can be connected with an external affect (i.e., bright light, smoke, unpleasant scent) or with inner reasons.

At the same time there seems to be a conceptual opposition of affected body parts. For example, the type (2) – loss of functionality – consists of two subtypes, associated with different types of body parts – 1) mobile body parts: loss of mobility 2) immobile body parts: filling with extrinsic substances. Consider a fragment of the frame questionnaire in Table 2:

For some languages the data were gathered by experts on these languages. The data collected by questioning were then checked and supplemented by corpus data (if available).

The semantic analysis of the dataset helped to reveal the relevant parameters of cross-linguistic variations in the lexical domain of pain, which were then used in the database elaboration.

4 Pain Predicates: Parameters for a Typology

4.1 Metaphorical Source

As was mentioned above, the conceptual space of pain is mainly expressed by metaphors. The semantic domains of metaphoric sources show significant similarity among the language sample. There is a limited set of taxonomic verbal classes that can serve as sources for the development of metaphorical pain meaning. That is

- FIRE: verbs meaning 'burn', 'bake', etc., cf. *My throat is* ***burning***, Serbian *zub* ***tinja*** lit. 'tooth is smoldering';
- SOUND: verbs meaning 'hoot', 'buzz', 'ring', etc., cf. *My head* ***throbs***, Russian *nogi* ***gudjat*** lit. 'legs are hooting';
- MECHANICAL DESTRUCTION/DEFORMATION, which can be further subdivided into several groups:
  - AGENTIVE, including the following subtypes
    - INSTRUMENTAL: verbs meaning 'cut', 'prick', etc., cf. Balkar *bašym čančady* lit. 'my head pricked', Hindi *mUh* ***kaT*** *rahaa hai* lit. 'mouth is being cut';
    - QUASI-INSTRUMENTAL (using teeth, claws, and alike): verbs meaning 'bite', 'scratch', etc., cf. Lithuanian ***graužia*** *akis* lit. 'it gnaws my eyes';
    - NON-INSTRUMENTAL
      - DESTRUCTION: verbs meaning 'break', 'tear', etc., cf. French *j'ai le dos* ***rompu*** lit. 'I have the back broken';
      - DEFORMATION: verbs meaning 'pull', 'press', etc., cf. Serbian ***pritiska*** *me u grudima* 'it presses me in the breast';
  - NON-AGENTIVE: verbs meaning 'burst', 'explode', etc., cf. Agul lit. *fun čurq.aa* 'the stomach is bursting';
- MOTION: verbs meaning 'twist', 'spin', etc., cf. English *my stomach is* ***churning***, Russian *golova* ***kružitsja*** lit. 'my head is spinning';
- ANTROPOMORPHIC: NEGATIVE EMOTION: verbs meaning 'hate', 'be upset', cf. English *My stomach* ***hates*** *me*.

The classes above differ in the consistency of their occurrence within the pain domain. For example the verbs of burning can convey the pain meaning in all languages of our sample, while the anthropomorphic class is rarely instantiated. Interestingly, this parameter can be different in genetically close languages. The sound class of pain sensation counts about 14 verbs in German but only 4 in English.

We consider the loss of functionality concept as a specific development of the pain domain, though it may not be associated with painful sensations, cf. *my arm's* ***gone to sleep***. In this case other metaphorical sources are employed. Interestingly, they are in some way reverse to the basic pain metaphorical list, as

- "sound" {PAIN} vs. "loss of sound-producing and perception possibility" {FUNCTIONALITY LOSS} (cf. Russian *nemet'* 'become mute', German *taub werden* 'become deaf');
- "movement" {PAIN} vs. "movement impediment" {FUNCTIONALITY LOSS} (cf. English *trap*, *lock*, Spanish *dormirse* 'go to sleep'),
- "destruction" {PAIN} vs. "stiffening" {FUNCTIONALITY LOSS} (cf. English *stiffen*, Spanish. *envararse* lit. 'become stick-like').

The cross-linguistic consistence of semantic sources for pain metaphors provides evidence for their cognitive relevance in the pain domain. Another perspective of the study is to consider the semantic evolution of separate lexical meanings within the same metaphorical class. For example, what kinds of sounds can develop pain meaning and what kind of painful sensations do they correlate with? The important point here is to define the sound verb properly, i.e., to understand precisely what kind of sounds it can denote. This sort of information can rarely be found in the dictionaries but the list of prototypical sound sources could be a good help in this case. It means that not only verbs but their prototypical subjects and objects should be taken into account. If language X does not distinguish the destruction of soft and solid objects, but language Y does, would the corresponding verbs behave differently if used in the pain domain?

So, the first parameter of typological lexical comparison of the pain domain could be sources of metaphorically used verbs, classified as taxonomic classes or analyzed as concrete lexical meanings.

4.2 The Stimulus Situation of Pain

The second parameter is based on the classification of the goal domain, i.e. classification of pain sensations that can be lexicalized in a language.

Anyone who has ever experienced painful sensations would agree that there can be very different kinds of pain. That means that pain can be categorized. The task of pain differentiation is carried out just by the use of particular metaphors. It is not accidental that the famous McGill Pain Questionnaire and its variants, widely applied in medical diagnostics, are based mainly on metaphorical notions (cf. [15]).

We suppose that a good way for pain categorization is to correlate painful sensations with stimulus situation types that can cause pain. Such situations include external events affecting the experiencer (e.g., getting soap in one's eyes, or cold water on one's aching tooth) as well as wide-spread diseases with distinct symptoms. We assume that the same stimulus causes similar physiological reactions of different

people, and it gets a conventionalized expression in a language (e.g, in Hungarian the sensation caused by spicy food is expressed with the phrase ***ůgeti*** *a nyelvemet* lit. 'my tongue (Acc) burns', in Russian the feeling of tiredness in the legs is described with the help of the verb to hoot: *nogi* ***gudjat*** lit. 'feet are hooting').

The comparative analysis of pain predicates focused on the stimulus situations is aimed at investigating the typological problem of meaning distribution between language units: what sensations would be commonly expressed by one lexical expression and what sensations are consistently denoted in a different way (cf. the grammatical typology of morpheme semantics). Thus, feelings due to fever and to sun exposure are described with the same predicate in some languages of our sample, cf. German *glühen* 'glow': *mein Kopf* ***glüht*** lit. 'my head is glowing', while it is lexically distinguished in the others: cf. Russian. *golova/lob* ***gorit*** lit. 'head is burning' (of fever) vs. *golovu* ***pečet*** lit. 'it bakes my head (acc)'. The sensations caused by an extremely bright light or an unpleasant scent are usually expressed by different lexemes in most of the languages of our sample, cf. Russian. *glaza* ***režet*** lit. 'it cuts my eyes' and *v nosu* ***sverbit*** lit. 'it itches in my nose'. Still we can find some examples of these two stimulus situation combined in one pain metaphor, cf. Ukrainian. o*či* ***rиže*** lit. 'it cuts my eyes'***,*** *v nosi* ***rиže*** lit. 'it cuts my nose'.

4.3 Pain Localization

The next parameter which characterizes the pain domain is the localization of a painful sensation in a distinct body part. Pain is perceived differently in different body parts. This is reflected in the differentiation of language conceptualizations. A sensation caused by one stimulus situation can be expressed differently depending on the body part to which it is applied. For example the painful sensation caused by smoke exposure on the eyes is described in Russian by the verb *ščipat'* 'pinch' (cf. *glaza ščipit* 'it pinches my eyes'), while the same effect on the nose is usually denoted by the verb *sverbet'* 'itch' (cf. *v nosu sverbit* lit. 'it itches in my nose'). Thus, the choice of a pain verb is determined, among other factors, by the body part, where the painful sensation is located.

The data shows that most of the lexical units denoting pain can function only within a limited set of body parts. Therefore the crucial parameter for comparison of pain-denoting predicates is their compatibility with different body parts. The compatibility constraints can be analyzed as a result of interaction between basic (non-metaphoric) verbal meaning and conceptual characteristics of the body part.

The most relevant conceptual properties of a body part can be described as follows:

a) Solid structure vs. soft tissue. The basic semantics of verbs which belong to the taxonomic class of mechanical destruction/deformation usually involves an idea of the specificity of the patient's physical properties. Consider the Georgian verb *ṭexa* 'break' where the patient should be solid vs. the German verb *kneifen* 'pinch' that denotes an idea of temporary change in the object's configuration without destroying its inner structure. If a metaphorical shift into the pain domain takes place, the body part – location of the pain sensation – is conceptualized as a patient of the transitive destruction verb. In this case the conceptual properties of the body part should agree with the object properties of the basic verbal meaning. For example the Georgian verb *ṭexa* 'break' is used to denote pain in joints (cf.

saxsrebši ***mtexavs*** lit. 'it breaks me in my joints'), but cannot be combined with "soft-tissue" body parts such as the stomach. By contrast, the German verb *kneifen* can be combined with 'stomach' (cf. *es* ***kneift*** *im Bauch* lit. 'it pinches in the belly') but cannot describe pain in "solid structure" body parts.

b) Topological features. Combinational properties of pain predicates can rely on the notion of the geometrical characteristics of the body parts conceptualized in a language. Thus the view of a body–part as a container seems to be extremely relevant for the pain-domain. The unpleasant physical sensations related to this kind of body parts can be described with a specific subgroup within the verbs of functionality loss, namely, with verbs that denote filling with external substance that impedes normal functioning of the body part, cf. Japanese *hana ga* ***cumaru*** lit. 'the nose is filled'. Another topological type is surface (skin and outer body parts – forehead, cheeks, feet).

c) Functional characteristics. Another type of compatibility limitations is connected with the idea of the functional properties of the body part. If we consider the verbs of sound, we can see that there are two types of constructions they are involved in: 1) they describe painful reactions accompanied with sound, i.e., the body part should exhibit functional possibilities to emit the sound (and this sound could be heard by an external observer), cf. Agul *ze fun* ***raXaa*** lit. 'my belly is talking', English *My joints crack*; 2) they refer to a sound that exists only in the consciousness of the experiencer, in this case they combine with the body parts that are functionally related with sound perception – mostly ears and head, cf. Bulgarian *ušite* ***pišč̆jat*** lit. 'the ears are cheeping', French *J'ai la tête qui* ***hurle*** lit. 'I have the head that howls'.

It is important to point out that the body part classification is not universal. First of all, the anatomical conceptualization can be different in different languages. Secondly, even within one language a body part can show different properties, thus referring to different categories. For example in Russian the noun "arms" demonstrates an ambivalent behaviour. On the one hand, it can be combined with the verb *lomit'* (cognate with the verb *lomat'* 'break') which is used with solid structure objects:

(1) *Segodnja noč'ju podnjalas' temperatura 37,3, ruki, nogi* ***lomit***. [Online-magazine mama.ru]
'Last night I got a fever of 37,3, I feel an aching pain in my arms and legs (lit. "it breaks my arms and legs")'.

On the other hand, the painful sensation in the arms can be described by the verb *tjanut'* 'pull/draw', which implies a soft-tissue object:

(2) *Posle trenirovok u menja 2-3 dnja nabljudajutsja krome bolej naprjaženie v myščax, ešče i sil'no* ***tjanet*** *ruki, osobenno po nočam.* [Bodybuilding and Powerlifting Forum]
'For 2 or 3 days after a training session, aside from the pain, I feel muscle tension, and my arms hurt (lit. "it pulls my arms")'.

The fact is that the conceptual idea of an arm involves both solid structure (bones) and soft tissue (muscles). In (1) the focus is on the bone-like structure, that can be affected with painful sensations due to fever, while in (2) the context indicates pain in the muscles. If the solid structure is expressed explicitly, the use of the verb 'pull' is unacceptable: *ʔsil'no* ***tjanet*** *kosti ruk* lit. 'it pulls the bones of the arms'.

The compatibility limitations can attenuate as a result of consistent bleaching of the basic verbal meaning. The extreme case is unlimited combinability of the metaphorical verb with all the body parts as in the case of the Russian verb *nyt'* 'whimper', which can describe a background non-intensive pain sensation of almost every body part. Native speakers usually do not associate the pain usage of this verb with any sound.

The specific conceptualization of body parts in a language is manifested also in the syntactic marking of the body part participant in pain expression.

4.4 Syntactic Constructions

A standard pain situation involves two main participants – a Body-part and a pain Experiencer. Also a Reason of pain can be relevant for some kinds of situations (cf. the Frame Perception_body in the FrameNet model). As our investigation of the language sample shows, verbs whose basic meaning is 'ache' can imply a different syntactic coding for the two semantic roles.

- The Body-part can be interpreted as (a) the Location (of the pain) and then coded with a locative construction cf. Czech *Boli mi v krku*, lit. '(it) hurts me in the neck'; (b) the Theme, i.e., the only argument of a one-place predicate, thus getting a subject or direct object marking (= affected with pain) cf. Russian *U menia bolit noga* lit. 'at me hurts leg (nom)' (c) the Stimulus (= initiator of the pain situation) – has the syntactic marking of a subject of a transitive verb, cf. Bulgarian: *Sărceto me zaboljava* lit. 'heart me (acc) hurts'.
- The Experiencer can get (a) Experiential dative marking, cf. German. *mir schmerzt der Kopf* lit. 'me (dat) hurts the head (nom)'; (b) the Possessor (of the body part) – in this case a possessive pronoun or an oblique object is used, cf. *my leg hurts*; (c) the Patient – coded as a direct object, cf. the Bulgarian example above.
- Finally, the Reason can be interpreted as (a) the Causer (of the pain situation) being marked as a subject, cf. French *la lumiure me fait mal aux yeux* lit. 'the light me hurts in the eyes', or as (b) its Source, marked as an oblique object, cf. Russian. *glaza boljat ot sveta* lit. 'eyes ache from light'.

The subject of the investigation is the syntactic structure of metaphorically used verbs. The matters to be taken into account are the basic semantic and syntactic (transitive/intransitive) properties of the verb.

Intransitive verbs (for instance, sound verbs) act in a most predictable way. The Body-part (BP) is marked as subject, or there can be no overtly marked subject with BP marked as a locative phrase. The Experiencer gets a dative or possessive marking. The reason, if expressed, is marked as oblique object, see Table 3.

Let's provide some examples of the constructions above:

(3) Russian

Ot	*ustalosti*	*u menja*	*kružitsja*	*golova*	
From		tiredness	at me (poss.)	spin	head (Nom)

(4) Serbian

Mi	*pišti*	*u*	*ušima*,
me-dat	whistle	in	ears

Table 3. Source verb: Intransitive

$V_{intr\text{-}physical}$ ex..<make noise>			**X_S**		
$V_{intr\text{-}pain}$	1	REASON$_{\varnothing/OBL}$	**BP_S**	$EXP_{DAT/POSS}$	
	2	REASON$_{\varnothing/OBL}$		$EXP_{DAT/POSS}$	BP_{LOC}

Transitive verbs used metaphorically demonstrate two types of syntactic constructions: transitive and intransitive.

In a transitive pain construction, formed by a transitive source verb (with core arguments X_S and Y_O), the Body part or Reason may get subject marking, the direct object position can be filled by the Body Part or the Experiencer. As in the case of intransitive source-verbs, subjectless constructions are also possible, see Table 4.

Table 4. Source verb: Transitive, derived verb: Transitive

$V_{tr\text{-}physical}$ ex.<cut>			**X_A**	**Y_O**	
$V_{tr\text{-}pain}$	1	REASON$_{\varnothing/OBL}$	**BP_A**	**EXP_O**	
	2		**$REASON_A$**	**BP_O**	$EXP_{DAT/POSS}$
	3	REASON$_{\varnothing/OBL}$		**BP_O**	$EXP_{DAT/POSS}$
	4	REASON$_{\varnothing/OBL}$		**EXP_O**	BP_{LOC}

The constructions are exemplified below:

(5) Bulgarian:
Gărbăt *me* *bode.*
def.back (nom) me(acc) prick

(6) Russian
Svet *mne* *režet* *glaza*
Light(nom) me(dat) cut eyes(acc)

(7) Balkar
Belimi *tartady*.
Back-my (acc) pull

(8) Bulgarian
Bode *me* *v* *grădite*
Prick me(acc) in def.chest

The most remarkable change of syntactic structure concerns the cases when a basically transitive verb forms an intransitive syntactic construction. This derived construction can be subjectless or can have an overt subject. In this case it is the Body part that gets subject marking, see Table 5.

Table 5. Source verb: Transitive; derived verb: Intransitive

$\mathbf{V}_{\text{tr-physical}}$ ex..<cut>			$\mathbf{X}_{\text{A}}$	$\mathbf{Y}_{\text{O}}$		
$\mathbf{V}_{\text{intr-pain}}$	1	$\text{REASON}_{\varnothing/\text{OBL}}$			$\text{EXP}_{\text{DAT/POSS}}$	BP_{LOC}
	2	$\text{REASON}_{\varnothing/\text{OBL}}$	$\mathbf{BP}_{\text{S}}$		$\text{EXP}_{\text{DAT/POSS}}$	

Here are examples of the defined constructions:

(9) German

Es	*beißt*	*mir*	*in*	*den*	*Augen*	
It		bite	me (dat)	in	def.dat	eyes

(10) Russian

Včera	*večerom*	*u menja*	*ochen'*	*bok*	*kolol.*
Yesterday	evening	at me (poss)	very	side(nom)	prick

We suppose that the formation of the second construction could be regarded as a result of the basic pain construction influence. In fact the argument structure here copies precisely the syntactic properties of the verb 'ache' (*bolet'*).

4.5 Emotion Viewed as Pain

A number of pain verbs combined with some specific body parts act as secondary metaphorical sources, being used to express emotional states. This fact triggers a range of typological questions. Some of them will be briefly outlined below.

- What body parts can be viewed as the location/source of an emotional state in a language? For example, as one might expect, in all the languages of the sample a pain construction with the heart as a Body part can get an emotional interpretation, cf. English *my heart tightens up*, Agul *jurk' ugaa* lit. 'heart burns' = 'anxiety'. Furthermore, a frequent source of emotional constructions are phrases with 'head' and 'stomach', cf. French *j'ai la tête qui explose* lit. 'I have the head that explodes' = 'stress', Hungarian *felfordul a gyomrom* lit. 'stomach turns round' = 'disgust'. A less frequent example is the emotional interpretation of expressions with 'liver', cf. Hindi *kaleje mE jalan hai* lit. 'in my liver there is burning'. A special task is to analyze what body parts localize particular emotions.
- If a certain body part in a language can be associated with a certain emotional state, does it concern all pain verbs which can be used with the corresponding noun? Are there any pain verbs that never express an emotional state?

– If a certain construction can be used both to denote physical pain and an emotional state, are there any language means to distinguish them? For example in the German sentence *Wenn ich an dich denke, sticht mein Herz* 'When I think of you, my heart <lit.> pricks' the pain is viewed as a complex psycho-physiological event which may or may not include a real physical sensation: the difference here is not reflected in a language expression. At the same time the nominalization construction with the same verb denotes only physical pain: *ich verspüre ein Stechen im Herz* lit. 'I feel a pricking in my heart'.

We have presented a range of parameters that can be relevant for the typological study of the pain domain. In the last section we are going to show how these parameters can be incorporated in a database constructed for the study of a conceptual domain in a typological perspective.

5 Database for the Typology of Pain Predicates

One entry in the database corresponds to one possible combination "predicate + body part", including its syntactic structure in a language. The entry contains all syntactic information about the phrase. If a combination demonstrates variations of the syntactic coding, then each possible syntactic structure will be entered as a separate entry. The database presents the following types of linguistic information:

LANGUAGE. The field is used to show the language of the entry. Currently there is data on 23 languages in the database. The number of languages is to be increased in future.

METTYPE. The field is used to relate the entry to one of the metaphorical classes, described in 4.1 (FIRE, SOUND, INSTRUMENTAL DESTRUCTION, etc.). If the predicate is not a metaphor then the value of the field will be "specific pain verb".

PREDICATE. Contains the basic form of the predicate.

MEANING. The field presents a translation of the predicate into English.

BASIC ARGUMENTS TR. The field is used to determine the basic (= non-pain) meaning of the lexeme, and it is filled only if the verb in its first sense is transitive. Here the prototypical agents and objects are assigned. For example, Russian verb *žeč'* 'burn (tr)' has 'human' as a prototypical agent and 'paper' as an object; English *sting* has 'bee' as an agent, and 'human skin' as an object.

BASIC ARGUMENTS INTR. The field functions similarly to the previous one, but it is filled if the basic verb in its first (= non-pain) sense is intransitive. Here the prototypical subject is assigned (for example, sound sources for sound verbs, cf. 'bell' for the verb *ring*, objects of inchoative destruction, cf. 'baloon'/'soap bubble' for German *platzen*, etc.). Generally only one of the two fields (Basic arguments tr / Basic arguments intr) is chosen depending on the syntactic properties of the verb in its basic meaning. In the case of labile verbs, it is difficult to define which syntactic structure has been the source for the metaphoric usage, so both fields are filled.

EXAMPLE BASIC TR. The field is used to illustrate the function of the predicate in its basic non-metaphorical meaning, cf. Russian verb *žeč'*: *On sžeg starye pis'ma* 'He burned old letters'.

EXAMPLE BASIC INTR. The field functions similarly to the previous one: the usage of the basic intransitive verb is exemplified here, cf. for English verb *ring*: *The bell is ringing*.

BODY PART. Contains information about the body part engaged in the construction of the entry (see Section 4.3).

STIMULUS. Contains information on possible stimulus situations that may cause the pain sensation denoted by the construction of the entry (see Section 4.2).

PAIN SYNTACTIC PATTERN. The field presents schematic information on the syntactic coding of the arguments within the pain construction of the entry. So, for example, the English sentence *My eyes sting* corresponds to the schematic description EXP:POSS BP:S, (the Experiencer is expressed as a possessive pronoun, and the Body Part as a subject). Note that this field does not duplicate the information on transitivity found under BASIC ARGUMENTS TR/ BASIC ARGUMENTS INTR. Whereas the transitivity feature refers to the source (non-pain) meaning of a verb, the argument structure described here is characteristic of its pain uses.

EXAMPLE PAIN. Contains an example of a sentence with a pain construction.

EMOTIVE. This is a Boolean parameter. It is true when the construction of the entry can have an emotional interpretation, and it is false when no emotional state can be denoted.

In this paper, the parameters of the cross-linguistic variations of pain denoting predicates have been described. This list of parameters has been a result of an analysis of data on 23 languages. These parameters have been used to construct a lexical-typological database, which makes it possible to recover information on the various aspects of pain conceptualization and can serve as a good basis for future investigations.

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