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# Polysemy patterns in Russian adjectives and adverbs

## A corpus-oriented database

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The paper presents a research tool for studying semantic change and polysemy patterns in Russian adjectives and adverbs. It is based on a corpus analysis of high-frequency polysemous units. For each of them we describe the meanings it can have, assign to each meaning a corresponding taxonomic class, identify types of semantic shifts between individual meanings (metaphor, metonymy; besides, a full-scale approach reveals non-canonical cases of semantic shifts), describe context conditions of these shifts (semantic and grammatical restrictions on co-occurring words). The results gained from this analysis are implemented in a database, which allows for various generalizations on the regularities of change in adjective and adverb meaning. Several examples are given to illustrate what kinds of queries can be performed on the database.

**Keywords:** polysemy; semantic shift; metaphor; metonymy; semantics of adjectives; Russian language; lexical database

### 1. Introduction

In several last decades, much attention has been focused on the phenomenon of regular polysemy, and in particular, on the detection of productive metaphoric and metonymic patterns (cf., e.g. Apresjan 1973; Lakoff 1987; Radden & Kövecses 1999; Peirsman & Geeraerts 2006). The most thorough studies in this field contain large lists of the attested polysemy patterns and examples of their realizations. Such catalogues, however valuable they may be, cannot provide information on a challenging aspect of linguistic theory, namely what phenomena are not possible in a certain language system. Indeed, in order to give an adequate account of the observed facts one should not confine oneself just to cataloguing every piece of collected data,

but one has also to determine constraints on these data. The latter task can only be performed, first, if all the units within a given system are involved into analysis, and second, if the attested facts are ordered in a systematic classification.

In the present study, this full-scale approach is applied to Russian polysemous adjectives. In the wealth of literature on metaphor and metonymy, relatively little attention has been paid to adjectives. Those studies that do deal with them either focus on the semantics of several lexemes (cf. Dirven 1985 on the English adjective *sweet*, Kustova 2004 on the Russian *tjaželyj* and adjectives of emotions, Tolstaja 2008 on Slavic caritives) or treat adjectives alongside with other parts of speech, in which case they remain out of the main scope of the research (cf. Apresjan 1973; Radden & Kövecses 1999; Peirsman & Geeraerts 2006, Zaliznjak 2009). A systematic description of metaphoric and metonymic patterns involved in adjectives is still a desideratum, both language-internally and cross-linguistically. The current work is intended as a step to bridge this gap with respect to Russian data.

Since our research is aimed not only at enumerating the attested polysemy patterns but also at classifying them by various parameters, we have developed a database that allows users to query the information in multiple ways and thus to detect semantic regularities in the lexicon. The paper will first present the data and the methodology used for their analysis (Section 2). Then we will describe the types of information we enter into the database (Section 3) and give several examples of queries that may be addressed to it (Section 4). We conclude with suggestions for further research (Section 5).

## 2. Data and methodology of analysis

The study is concerned with high-frequency Russian adjectives of quality (“qualitative” adjectives, cf. *spokojnyj rebenok* ‘a quiet child’), as well as with adverbs derived from these adjectives (cf. *spokojno govorit* ‘to speak quietly’) and corresponding predicatives (cf. *na duše spokojno* ‘I feel easy in my mind’, lit. ‘it is quiet in my soul’). The list of adjectives to be examined has been extracted from the Frequency Dictionary of Russian (Ljaševskaja & Šarov 2009), which was compiled based on the Russian National Corpus (RNC, <http://ruscorpora.ru>). We considered as highly frequent those adjectives whose frequency exceeds 15 per million words. In accordance to this, we have selected 250 polysemous adjectival vocables that are intended, along with corresponding adverbs and predicatives, to be included in the Database.

The qualitative words are analyzed on the basis of their occurrences in the RNC. For each adjective or adverb, all collocates are extracted and grouped according to the meaning they attach to a given node word. The contexts that give

the same meaning to a particular node are generalized, i.e. we try to uncover those properties of the context that contribute to the meaning of the node. As a simple example, consider the adjective *sladkij* 'sweet'. It conveys the meaning 'inducing a sweet taste' when collocating with nouns like *pirog* 'cake', *jabloko* 'apple', *kofo* 'coffee', etc., all of which share the common semantic feature 'food and drinks'. If however *sladkij* combines with nouns like *pečal'* 'sorrow', *toska* 'grief', *čuvstvo* 'feeling', then its meaning is 'pleasing to one's mind', and, in this case, the collocating nouns can easily be grouped under the class 'emotions' (cf. in this regard the practical work on word sense disambiguation in the RNC, see Rakhilina et al. 2009).

The next stage of the analysis is to identify semantic relations between particular meanings of each qualitative word. Theoretical studies on semantic change generally accept two types of meaning shifts – metaphor and metonymy (cf. Lakoff & Johnson 1980; Croft 1993; Feyaerts 2000; Dirven 2002; Peirsman & Geeraerts 2006 among many others). Examples of both shifts abound in our data. But along with them, our full-scale analysis has revealed a non-canonical shift type that does not fit the classical definition of either metaphor or metonymy. Consider the following examples:

- (1) a. *dikij zver'* 'a wild animal' → *dikaja radost'* lit. 'wild joy', i.e. 'high degree of joy';
- b. *zdorovyj čelovek* 'a healthy person' → *zdrovaja palka* lit. 'healthy stick', i.e. 'a stick of a big size';
- c. *priličnyj čelovek* 'a decent person' → *priličnye den'gi* lit. 'decent money', i.e. 'a big quantity of money';
- d. *četkoe ob'jasnenie* 'a clear explanation' → *četskij pacan* lit. 'clear guy', i.e. 'a cool guy'.

Examples of this kind cannot be viewed as metonymies, because by definition a metonymic shift takes place within one and the same frame (or, in other terms, taxonomic class/domain, cf. among others Lakoff & Turner 1989; Croft 1993; Blank 1999; Padučeva 2004), i.e. both the source and target of metonymy belong to the same taxonomic class. Yet, the examples above exhibit a clear change from one taxonomic class to another, cf.:

- (2) a. 'property of an animal' → 'high degree';
- b. 'property of a person' → 'big size';
- c. 'property of a person' → 'big quantity';
- d. 'property of mental substance' → 'positive polarity'

But the shifts in (1) cannot be classified as metaphors either, because a metaphor implies a similarity between the source and the target domains (cf. Lakoff &

Johnson 1980; Fauconnier 1985; Lakoff 1987; Fauconnier & Turner 1996; Kövecses 2002), whereas the semantic domains in (2) can hardly be directly compared to their respective counterparts (thus, property of an animal is not similar to the concept of high degree, etc.).

We claim that such cases should be treated as a distinct type of semantic change. In our previous work we have suggested the term ‘re-branding’ to refer to it. A re-branding involves a metaphoric extension based on a conventionalized implicature (for a detailed description of this process, see Raxilina et al. 2010; Reznikova et al. 2012).

Once the semantic relations between individual meanings of a word have been identified, we can represent its polysemy as a chain whose nodes are meanings and whose edges are types of shifts. If an adjective is derivationally related to an adverb and/or predicative we do not build separate schemes for each of them, but link them into a single chain. This approach reveals the semantic relationship between derivatives, thus, it is just natural that in a scheme the node *tjaželoje pereživanie* ‘a heavy worry’ is more closely connected to *tjaželo pereživat’* ‘to worry heavily’ than to *tjaželaja sumka* ‘a heavy bag’ (cf. in this regard Radden & Kövecses 1999; Kustova 2004). We term the semantic shifts between parts of speech “a transcategorial metonymy” (TCmeton). An example of a semantic chain is given in Figure 1.

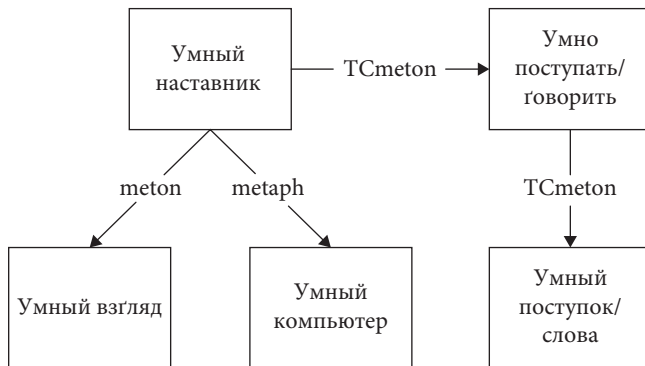


Figure 1. Semantic chain for the word *умный* ‘clever’

The semantic chains constructed in this way are then implemented into the Database. Its structure is discussed in the next section.

### 3. The database structure

The database is developed by using the SQLite. The data can be entered by means of any database editor for SQLite with Unicode support, e.g. SQLite2009 Pro. The

Database can be searched with standard SQL commands, but besides that, we have developed a client-side program that allows those users who are not acquainted with the SQL language to set up typical queries with the help of graphic interface. The program is also capable of displaying search results in a graphic format.

A record in the database corresponds to an individual meaning of a qualitative word. Each meaning is classified according to the following features:

1. **ID:** Number of this meaning in the Database.
2. **lemma:** Polysemous lexeme that has the given meaning as one of its meanings.
3. **parent\_ID:** Number of the parent, i.e. the source for the given meaning. Each derived meaning in the database is linked to the sense that is considered to be its source. In this way we are able to compare meaning shifts and their various features to each other.
4. **POS:** Part of speech (adjective, adverb or predicative).
5. **short\_description:** a prototypical context for the given meaning, a sort of “label” that identifies the meaning under description. E.g. for the adjective *mjagkij* ‘soft’ we use the label *divan* ‘sofa’ when describing the meaning of a physical property, and the label *človek* ‘person’ when characterizing the meaning of a human property.
6. **tax\_class:** Taxonomic class, to which the given meaning belongs. E.g. various senses of the adjective *dlinnyj* represent different taxonomic classes, cf. *dlinnyj1* as in *dlinnye volosy* ‘long hair’ falls into the taxonomic class of ‘size’ and *dlinnyj2* as in *dlinnyj den’* ‘long day’ refers to that of ‘time’. Using of taxonomic classes enables to go beyond the comparison of individual shifts and to draw generalizations in terms of semantic categories. Thus, e.g. it can be checked whether adjectives of sound demonstrate similar semantic shifts.
7. **ev:** Connotation (positive, neutral or negative), which is associated with the given meaning. Meaning shifts are often accompanied by changes in evaluational polarity, cf. *gluxoj starik* ‘deaf old man’ (referring to a physical disablement, neutral in polarity) → *glux k pros’bam* ‘deaf to pleas’ (negative polarity). The database allows the user to reveal regularities in polarity shifts.
8. **gram\_restrict:** Grammatical restrictions on the use of the given qualitative word in the given meaning. For example, in some cases an adjective cannot be used in the so-called “short” form when expressing a given sense, cf. *polnyj* as in *polnaja ženščina* ‘stout woman’ which occurs only in the “long” form.
9. **context\_sem:** Semantic co-occurrence restrictions. It is generally accepted that meaning shift in adjectives is often dependent on the noun or noun class they modify (cf., e.g. Pustejovsky 1995; Partee 1995). In the database, each meaning of an adjective is associated with noun classes that can co-occur with this adjective in the given sense. Through this, we can identify the semantic classes of nouns relevant to meaning change in adjectives. E.g. the noun

class containing names of professions (as opposed to other nouns of persons) proves to be pertinent to discriminating adjective senses. Thus, the adjective *staršij* refers to social position when used with names of professions, cf. *staršij ekonomist* ‘senior economist’, but it denotes age when combined with other names of persons, cf. *staršij drug* ‘elder friend’. In the same way we describe co-occurrence restrictions on adverb-verb and adverb-adjective combinations.

10. **context\_gram**: Grammatical co-occurrence restrictions. For each meaning of a qualitative word in the database we determine whether it imposes any restrictions on the grammatical form of adjacent words. Thus, several adjectives have senses that can only be attested with a noun in singular form.
11. **trans\_type**: Type of semantic shift. Each derived meaning of a qualitative word is classified according to the type of semantic shift through which it was developed. As discussed in Section 2, we distinguish four types of semantic shifts: metaphor, metonymy, transcategorical metonymy, and re-branding.
12. **example**: Each meaning of a qualitative word is illustrated with an example from the RNC.

These are the parameters that are used to describe each meaning of polysemous qualitative words in the Database. In the next section we will present several examples of queries that can be performed on the basis of this information.

#### 4. The use of the database: Examples of search queries

**A. Type of shift.** One of the most obvious features that can be queried on is the type of semantic shift. Thus, if a user specifies it as “metaphor” he will see all the instances of metaphor that are registered in our data. They can then be classified into patterns according to taxonomic categories of source and target meanings. Below are several examples of patterns that can be extracted from the Database:

- physical property of an animal → non-physical property of a person, cf. *čutkij* ‘sensitive’: *zver’* ‘animal’ → *čelovek* ‘person’;
- physical property of a person → non-physical property of a mechanism, cf. *sil’nyj* ‘strong’: *čelovek* ‘person’ → *motor* ‘engine’;
- size of an object → duration of a situation, cf. *bol’šoj* ‘big’: *dom* ‘house’ → *prival* ‘halt’;
- distance → time, cf. *dal’nij* ‘remote’: *les* ‘forest’ → *vremena* ‘times’;
- size of an object → age of a person, cf. *malen’kij* ‘small’: *kamen’* ‘stone’ → *mal’čik* ‘boy’;
- taste → emotion, cf. *sladkij* ‘sweet’: *pirog* ‘cake’ → *muka* ‘suffering’, etc.

**B. Type of shift + taxonomic class of the source meaning.** Along with the type of shift the user may specify any parameters for source and/or target meanings. The search interface offers the possibility to set values for up to four different parameters for each meaning at once (i.e. any combination of settings for taxonomic class, polarity, semantic restrictions, part of speech, grammatical restrictions, etc.). These values may further be combined with a particular type of shift. Thus, as a simple example, consider the query, which asks for those meanings that are derived through metaphorical extension (type of shift = metaphor) from adjectives denoting a physical property of an object (taxonomic class of the source meaning = physical property of an object). This query returns meanings that represent the following taxonomic classes:

- physical property of a person, cf. *tonkij* ‘thin’: *stena* ‘wall’ → *devuška* ‘girl’;
- non-physical property of a person, cf. *žestkij* ‘hard’: *stul* ‘chair’ → *čelovek* ‘person’;
- property of a sound, cf. *tonkij* ‘thin’: *stena* ‘wall’ → *golos* ‘voice’;
- property of a color, cf. *grjaznyj* ‘dirty’: *doroga* ‘road’ → *cvet* ‘color’;
- physical state, cf. *mutnyj* ‘dim’: *steklo* ‘glass’ → *soznanie* ‘consciousness’;
- property of an abstract concept, cf. *pročnyj* ‘firm’: *stul* ‘chair’ → *družba* ‘friendship’.

**C. Type of shift + taxonomic class of the target meaning.** The next example is analogous to the case above except that here we set a condition on target meanings. Suppose the user is interested in those meanings that can serve as metaphoric sources for adjectives denoting human properties (i.e. type of shift = metaphor, taxonomic class of the target meaning = human property). The results of this query belong to the following classes:

- physical property of an object, cf. *skol’zkiy* ‘slippery’: *pol* ‘floor’ → *čelovek* ‘person’;
- physical property of a person, cf. *slabyj* ‘weak’: *čelovek* ‘person’ → *slabyj* [*duxom*] ‘weak [in spirit]’;
- physiological property of a person, cf. *gluxoj* ‘deaf’: *čelovek* ‘person’ → *glux k pros’bam* ‘deaf to pleas’.

**D. Semantic property of the context for the source meaning + semantic property of the context for the target meaning.** A query can also be based on co-occurrence restrictions, e.g. in case of an adjective, on taxonomic classes of nouns that it can combine with when used in its source or derivative meaning. In particular, having specified context conditions for both source and target the user can check whether the two conceptual domains share any common properties in Russian.



For instance, if the semantic context for the source meaning is defined as “person” and that for the target meaning as “organizations”, the Database returns among others the following shifts: *sil’nyj* ‘strong’/*slabyj* ‘weak’: *čelovek* ‘person’ → *gosudarstvo* ‘state’; *junnyj* ‘young’: *devuška* ‘girl’ → *gorod* ‘city’.

**E. Type of shift + polarity.** As is well known, adjectives are prone to acquire polarity connotations. This subject certainly deserves a systematic study on its own right. Among the questions that might be addressed are: what are the sources for positive and negative connotations? What are the most common types of polarity change? What is specific about the meanings that are ambiguous as to their polarity? What semantic mechanisms underlie a shift in polarity? All these issues can be approached with the Database. As an example, consider the query which asks for the meanings that acquire a positive connotation through a re-branding process (polarity of the source meaning = neutral, polarity of the target meaning = positive, type of shift = rebranding). The results of this query include the following shifts: *blestjaščij* ‘brilliant’: *pugovicy* ‘buttons’ → *ispolnenie* ‘performance’; *krutoj* ‘steep, sharp’: *nrav* ‘temper’ → *paren’* ‘guy’; *redkij* ‘rare’: *vystrely* ‘shots’ → *almaz* ‘diamond’; *fantastičeskij* ‘fantastic’: *personaž* ‘character (of a fiction book)’ → *vid* ‘view’; *znatnyj* ‘noble’: *graždanin* ‘citizen’ → *šči* ‘cabbage soup’, etc.

## 5. Conclusions and further research

We have presented in this paper a tool that aims at providing information on polysemy and meaning change in Russian adjectival vocabulary. With several examples we have demonstrated the search possibilities it offers to the user. It remains to add that the database is accessible online at [http://rakhilina.ru/adjectives\\_query.html](http://rakhilina.ru/adjectives_query.html).

Although the resource is based on a large amount of data we are fully aware of the fact that it is still far from covering all the polysemy patterns existing in Russian. But even with this limited data we can already draw a number of theoretically important conclusions. Our research, first, gives a clear evidence for the systemic organization of the vocabulary. Thus, the user of the Database will easily find lots of recurrent correlations between different parameters of qualitative words. Second, the study unequivocally shows that the commonly accepted theory of semantic change needs further elaboration, as a full-scale analysis of even a moderate-size sample reveals many cases where a semantic shift does not fit the standard definition of either metaphor or metonymy.

Further research can be pursued in two directions. On the one hand, the Database can be enlarged by adding data on less frequently used adjectives and adverbs. Although we assume that the current version of the Database encompasses the most widespread polysemy patterns, there must still be some marginal ones that are not covered by the data included so far. On the other hand, the generalizations

over the semantic shifts observed in the Russian data could serve in the future as a base for cross-linguistic comparison that might show, which polysemy patterns are universal or at least frequent among different languages and which ones have a genetically and/or areally restricted distribution.

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