Metonymy in word-formation*

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Abstract

A foundational goal of cognitive linguistics is to explain linguistic phenomena in terms of general cognitive strategies rather than postulating an autonomous language module (Langacker 1987: 12–13). Metonymy is identified among the imaginative capacities of cognition (Langacker 1993: 30, 2009: 46–47). Whereas the majority of scholarship on metonymy has focused on lexical metonymy, this study explores the systematic presence of metonymy in word-formation. I argue that in many cases, the semantic relationships between stems, affixes, and the words they form can be analyzed in terms of metonymy, and that this analysis yields a better, more insightful classification than traditional descriptions of word-formation. I present a metonymic classification of suffixal word-formation in three languages: Russian, Czech, and Norwegian. The system of classification is designed to maximize comparison between lexical and word-formational metonymy. This comparison supports another central claim of cognitive linguistics, namely that grammar (in this case word-formation) and lexicon form a continuum (Langacker 1987: 18–19), since I show that metonymic relationships in the two domains can be described in nearly identical terms. While many metonymic relationships are shared across the lexical and grammatical domains, some are specific to only one domain, and the two domains show different preferences for source and target concepts. Furthermore, I find that the range of metonymic relationships expressed in word-formation is more diverse than what has been found in lexical metonymy. There is remarkable similarity in word-formational metonymy across the three languages, despite their typological differences, though they all show some

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degree of language-specific behavior as well. Although this study is limited to three Indo-European languages, the goal is to create a classification system that could be implemented (perhaps with modifications) across a wider spectrum of languages.

Keywords: *Metonymy; word-formation; morphology; suffixation; Russian; Czech; Norwegian.*

1. Introduction

Metonymy is an inferential relationship between two concepts: a source concept is overtly named and provides mental access to a target concept in a given context (Kövecses and Radden 1998: 39–40, Radden 2009: 202).[1] In lexical metonymy, the source is the concept usually associated with the word that is uttered, the target is the meaning actually accessed, and the context is the remainder of the utterance. In word-formation, the source corresponds to the source word that the derivation is based on, the context for the metonymic relationship is the affix, and the target is the concept associated with the derived word. A set of examples in English, Russian and Czech illustrate two SOURCE FOR TARGET metonymy patterns and how they function in both lexicon and word-formation.

(1) PART FOR WHOLE
   a. *We need a good head for this project.*
   b. Russian *brjuxan* (lit. 'belly'-*an*) 'person with a large belly'
   c. Czech *břicháč* (lit. 'belly'-*áč*) 'person with a large belly'

(2) CONTAINED FOR CONTAINER
   a. *The milk tipped over.* (cf. Peirsman and Geeraerts 2006: 281)
   b. Russian *saxarnica* (lit. 'sugar'-*nica*) 'sugar-bowl'[2]
   c. Czech *květináč* (lit. 'flower'-*áč*) 'flower-pot'

The English examples illustrate lexical metonymy, while parallel examples of metonymy in word-formation are presented in Russian and Czech. In both (1) and (2) sources are used to access targets. Examples in (1) involve a source that

1. Earlier scholarly works, such as Kövecses and Radden (1998) use the term "vehicle" instead of "source". However, current practice in cognitive linguistics prefers the use of "source" (cf. Panther and Thornburg 2009; Radden 2009; Barnden 2010).
2. Whereas in some examples it would make sense to distinguish between suffix and desinence (as in Russian *-nica*, which could be segmented as *-nic-a*), complex morphophonemics make this segmentation difficult and/or artificial in some cases, so for the purposes of this article, such segmentation has not been attempted.

names a PART but is used to access the WHOLE as a target. When we need a clever person for a project, their head (and particularly the brain therein) is salient, and we can use the body part to refer to the whole person. The Russian and Czech examples show a similar PART FOR WHOLE metonymy in which a whole person is identified by means of a salient body part. The underlined segments are the roots that signify the source in the two languages. The nouns in the examples are derived from the words for 'belly': Russian *brjuxo* and Czech *břicho*. The source in (2) is the contents of the container that is thus accessed as a target. It is not the milk itself that tips over, but the glass or carton the milk is in. Word-formation performs parallel CONTAINED FOR CONTAINER metonymies in the Russian and Czech examples, which are derived from *saxar* 'sugar' and *květina* 'flower, flowering plant' respectively. Comparison of the Czech examples in (1c) and (2c) illustrates an important point about word-formation. Note that the same suffix, *-áč*, signals two different metonymies in these examples. In fact, this suffix can also signal a third metonymy, namely CHARACTERISTIC FOR ENTITY, as we see in the word *naháč* 'naked person', derived from the adjective *nahý* 'naked'. The Russian suffix in (2b), *-nica*, likewise signals three different metonymies, and the closely related suffix *-ica* is associated with eleven metonymies. Multiple metonymy patterns are common among suffixes: Norwegian has up to eleven metonymies for a given suffix, and the figures for Russian and Czech are fifteen and sixteen respectively (for more detail, see Section 3.4). The point is that a word-formational affix can be highly non-specific in terms of identifying the relevant metonymy. Affixes are sub-lexical and abstract, and in terms of metonymy they often underspecify the relationship involved.

In order to probe the systematic use of metonymy in word-formation, I present a study of suffixal derivation in three languages: Russian (an East Slavic language), Czech (a West Slavic language), and Norwegian (a Germanic language).[3] The choice of these languages is motivated by both theoretical and practical considerations. Theoretically, these languages give us the opportunity to compare both languages that are closely related (Czech vs. Russian), and languages that are more distantly related (Slavic vs. Germanic). Thus we can see that even languages with essentially the same inventory of suffixes and overall strategies do not behave identically. Conversely, we also see that languages with rather different strategies show some striking overall similarities. Russian and Czech are highly inflected languages that require a word to have a stem reflecting its word class so that the inflections have a place to attach. The Slavic languages also present lexicons comprised almost entirely of word-

3. English has been specifically avoided since the history of massive borrowings has compromised its native word-formational system.

formational families (Dokulil 1962: 14). Norwegian by contrast makes less use of inflection and is more heavily invested in compounding.[4] Still, the same metonymy patterns dominate word-formation in all three languages. On the practical side, the choice of languages was limited by my own linguistic skills: the detailed information needed to undertake this research requires native or near-native ability in each language, since the relevant data is not available in secondary sources.

In addition to revealing cross-linguistic trends and language specific patterns for metonymy in word-formation, this study finds that there are actually more types of metonymy patterns in word-formation than in the lexical use of metonymy that most scholarship has focused on. While many metonymy patterns are shared by both lexical and word-formational domains, some are specific to only one domain.

I begin this article with a brief survey of relevant previous scholarship in Section 2, sampling both works on metonymy (2.1) and works on word-formation (2.2). Section 3 presents a comparative empirical study of the metonymies signaled by suffixes in Russian, Czech, and Norwegian. After addressing some overall issues and challenges in designing the databases and classifying the data (3.1), I offer quantitative comparisons across the three languages in terms of metonymy patterns (3.2), word class patterns (3.3), and the relation of suffixes to both kinds of patterns (3.4). Analysis of the data in Section 4 begins with a comparison of the metonymies found in word-formation vs. the lexicon (4.1). There I show that metonymy is more diverse in word-formation than in the lexicon and that the distribution of metonymy in word-formation supports the prototypicality claims made by Peirsman and Geeraerts (2006). In Section 4.2 I address the directionality of metonymy relationships in word-formation and its implications. Relative preferences for metonymy patterns are partially language-specific, as shown in 4.3. Conclusions are offered in section 5.

2. Relevant previous scholarship

It is not possible to do full justice to the wealth of scholarly works on metonymy and word-formation in the scope of this article. My purpose in this section is to build upon relevant previous achievements while at the same time pointing out the specific gap that this study aims to fill. In gross terms, it is possible to divide the relevant previous studies into two groups: one is focused on metonymy and has made few connections to word-formation, whereas the other is focused

4. Cf. Nesset (2010) for a comparison of Russian word-formation vs. Norwegian compounding.

on word-formation with a few rare mentions of metonymy. This survey will focus mainly on the exceptional works that draw connections between metonymy and word-formation.

2.1. *Works on metonymy*

The focus of most works on metonymy has been on lexical metonymy, how to describe it, and how to distinguish it from metaphor (cf. Lakoff and Johnson 1980; Lakoff 1987; Croft 1993; Kövecses and Radden 1998; Radden and Kövecses 1999; Seto 1999; Panther and Thornburg 1999, 2007; Barcelona 2002; Kövecses 2002; Barnden 2010). At the risk of overgeneralizing, one can identify three main strategies for classifying metonymy:

– Contiguity (Jakobson [1956] 1980; Peirsman and Geeraerts 2006);
– Frames/ICMs (Kövecses and Radden 1998; Radden and Kövecses 1999; Panther and Thornburg 1999; Barcelona 2002);
– Domains/Dominions (Croft 1993; Langacker 1993, 2009; Ruiz de Mendoza 2000).

These strategies are by no means mutually exclusive or even entirely discrete. Peirsman and Geeeraerts (2006), while focusing primarily on contiguity, present groupings of terms (such as an ACTION and PARTICIPANTS) that are compatible with a frame approach. Croft's (1993: 348) definition of metonymy as mapping within one "domain matrix" implicitly suggests contiguity. There are many such examples of relations among the current approaches to metonymy. For the purposes of the present study, the differences between these approaches are not crucial. This study in no way contradicts any of these approaches, but rather elaborates upon them. Within the framework of cognitive linguistics these strategies have collectively contributed to the SOURCE FOR TARGET model of metonymy used in the present study.

Taken together, scholarly works on metonymy make a strong case for metonymy as a pervasive, important cognitive process that motivates linguistic phenomena. Langacker (1993: 30) established an early landmark in this line of reasoning: "Metonymy is prevalent because our reference-point ability is fundamental and ubiquitous, and it occurs in the first place because it serves a useful cognitive and communicative function". In 2009, he takes this argument even further, stating that "the canonical situation in language is indeterminacy", and that grammar is inherently metonymic in structure (Langacker 2009: 45–46). However, despite these and similar claims (cf. Radden 2005), relatively little analysis of metonymy in grammar, and specifically in word-formation, has been produced. No existing work takes a systematic approach

to metonymy in word-formation. Works that do exist are limited to a single affix or a small group of affixes or focus on arguably marginal subsystems of word-formation, such as conversion or compounding.

Perhaps the earliest reference to metonymy in word-formation is an oblique one made by Jakobson ([1956] 1980: 87): "Also, as a rule, words derived from the same root, such as *grant—grantor—grantee* are semantically related by contiguity". Given that a few pages earlier ([1956] 1980: 84) Jakobson identifies metonymy as a contiguity relationship and that the example he cites is of word-formation, if we read between the lines, it seems that Jakobson has made the connection between word-formation and metonymy. However, this is just a single tantalizing remark.

In the context of a detailed discussion of lexical metonymy in Russian, Padučeva (2004: 147, 163) in two places mentions that a metonymy expressed lexically in one language might be expressed via word-formation in another; for example the difference between *matin* and *matinée* that is marked via word-formation in French is handled via lexical metonymy in Russian, where the word *utro* 'morning' covers both uses. Conversely, Padučeva (2004) points out that the semantic shift present lexically in English *grow* (intransitive) vs. *grow (melons)* (transitive) is handled via word-formation in Russian, where the former is equivalent to *rasti* 'grow', and the latter to the derived verb *vyraščivat'* 'cultivate'.

Koch (1999) presents a theoretical argument that metonymy is even more ubquitous than metaphor and specifically important for word-formation, but offers only a pair of examples from the history of French. Basilio (2006) makes similar claims about the connection between metonymy (and metaphor) and word-formation, and illustrates them with an analysis of three suffixes in Brazilian Portuguese: *-dor* (*vendedor* 'seller'), *-nte* (*tranquilizante* 'tranquilizer'), and *-ista* (*pianista* 'pianist'). These suffixes are partially equivalent to English *-er*, which is the topic of Panther and Thornburg's (2002) analysis of the interaction of metaphor and metonymy in word-formation. Radden (2005) contributes an analysis of metonymy in English *-able* derivations. Both Warren (1999) and Dirven (1999) focus on conversion (also known as "zero derivation"; e.g. the verbs *clean* and *calve* derived from the corresponding adjective and noun) in the formation of English verbs as an example of metonymy in word-formation. Dirven (1999: 280) identifies "event-schema metonymy" as the driving force behind the conversion process, with three types of schemata: action (involving participants in an event), location, and essive ("beingness"). All three of Dirven's schemata are indeed relevant for the model I present in section 3 (cf. Table 3), as are the "recurring patterns" of SOURCE FOR TARGET combinations that Warren (1999: 124) finds. The present article builds upon these achievements and takes the study of metonymy in word-formation in a new direction by applying a system-wide approach.

2.2. *Works on word-formation*

Again at the risk of over-generalizing, one can classify works on word-formation as either traditional or theoretical. While they provide a wealth of concrete details, most traditional works on word-formation are basically lists of affixes. They tend to be ad hoc and idiosyncratically organized and thus do not facilitate cross-linguistic, much less cross-domain, comparisons. Descriptions of the semantic roles of affixes tend to be haphazard, inconsistent, or simply absent. Most importantly, these works do not connect word-formation to a cognitive mechanism that would motivate a consistent structure and mention of metonymy is rare.[5]

The traditional sources of information about word-formation in Russian, Czech, and Norwegian are their three reference grammars: Švedova (1980), Dokulil (1986), Faarlund et al. (1997). These works are organized primarily according to word classes, with some indications of semantic roles for source and derived words. The same can be said of most other works more narrowly focused on the word-formational systems of Russian and Czech (Šanskij 1968; Townsend 1975; Janda and Townsend 2000, Townsend and Komar 2000; McFadden 1975; Maksimov 1975; Andrews 1996).

A few works deserve some additional mention since they support the present study. Rasch (1977) provides a classification of Russian deverbal nouns using terms remarkably similar to those used in both Peirsman and Geeraerts (2006) and the present study (including ACTION, STATE, EVENT, AGENT, INSTRUMENT, LOCATION). She attempts a transformational grammar account of this subsystem of Russian word-formation, but shows that it cannot succeed because it is impossible to establish rules to predict which suffix will result in which meaning for a deverbal noun. Lönngren (1978) points out that Russian suffixes signal relations that can be symmetrical and cannot be analyzed as additive components. He finds two groups of such relations that reflect the overall structure of metonymies found in this study: associative (which roughly correspond to metonymies involving ENTITIES), and situative (which roughly correspond to metonymies based on a verb and its participants).

Relevant theoretical models of word-formation are those proposed by Lipka (1990; cited from Kastovsky [2005]), Dokulil (1962), and Mel'čuk (1996). Lipka, a Romance philologist, takes an eclectic approach, combining structuralist, generative, and lexical field theory to model the semantic structures of words. His work focuses on conversion and includes metaphor and metonymy

5. An exception here is Araeva (2009) who presents a classification system for the Kemer dialect of Russian, identifying hundreds of "types", but only once (2009: 25) mentions metonymy as a possible motive for the relationship between a source word and a derived word, and only in relation to three examples of WHOLE FOR PART/PART FOR WHOLE relationships.

as systematic motives for this sub-type of word-formation. His model does not, however, extend to affixal word-formation, and allied approaches (such as that of Marchand) are largely restricted to compounding (cf. Kastovsky 2005: 112–115).

The Czech linguist Dokulil is the primary proponent of the onomasiological model of word-formation, detailed in his 1962 volume *Tvoření slov v češtině* (Word-formation in Czech). In some ways, this model is parallel to the one I advance in section 3. Dokulil presents a set of terms used to define the relationships between the "mark" (= source) and the "base" (= target), and he analyzes derived words in terms of "onomasiological types", which contain a semantic relationship, a word-class relationship, and an affix. However, Dokulil's set of terms is very small and very abstract, consisting of only four items: "substance" (substantives), "quality" (adjectives), "action" (verbs), and "circumstance" (adverbs). Dokulil thus conflates the semantic and the word-class aspects of word-formation, rather than trying to tease them apart. He claims that all relationships are bi-directional, but the resulting sixteen possible combinations are illustrated by only a handful of examples (Dokulil 1962: 32–33), and in the academy grammar Dokulil (1986) does not organize his description of Czech word-formation according to his onomasiological model, so our insights into how this model might be applied in a systematic fashion are limited.

Mel'čuk's (1996) "Lexical Functions" treat semantic relations as parallel to mathematical functions. Mel'čuk's model lists several dozen Lexical Functions designed to describe "all types of genuine lexical relations that obtain between LUs [Lexical Units] of any language". Word-formation is thus just one of several phenomena that fit under this umbrella. Though metonymy is not directly named, the sub-phenomenon of "meronymy" (part-whole relationships) is recognized as the motive for five Lexical Functions (cf. Wanner 1996: 6). Mel'čuk himself (1996: 51–55) recognizes a number of his Lexical Functions as relevant for word-formation (LFs 8–23) , and there are several additional candidates (LFs 24–26, 39, 42), which could be described using the terms suggested in Section 3.

3. Empirical study of word-formation

Data on Russian, Czech, and Norwegian word-formation was culled primarily from the three most comprehensive and authoritative grammars of these languages: Švedova 1980, Dokulil 1986, and Faarlund et al. 1997.[6]

6. I am grateful to Anna Baydimirova for assisting with the data on Russian adjectives and verification of the remaining Russian data. I also thank Tore Nesset for verifying the Norwegian data. Of course I retain all responsibility for errors.

The classification system presented here is consciously modeled after that found in Peirsman and Geeraerts 2006. Peirsman and Geeraerts have amassed an inventory of the lexical metonymy relationships attested in scholarly works.[7] My study of word-formation in Russian, Czech, and Norwegian is directly inspired by their classification, though it was necessary to modify it to some extent, as described in 3.2. The use of an equivalent classification maximizes the opportunity for making comparisons between lexical and word-formational metonymy.

3.1. *Size and structure of the databases*

As with any study, a number of choices had to be made in order to define a clear focus for analysis and structure the classification. And of course several challenges arose as well. This section describes the logic behind the structure of the databases.

This study is restricted to suffixal word-formation. This does not mean that other affixes are not relevant. Indeed, all three languages derive words via prefixes as well, and there is evidence of metonymy in that subsystem of word-formation also (cf. Janda 2008; Nesset 2009). However, the behavior of prefixes in Slavic languages is focused primarily on aspectual derivation and thus very different from what we observe in Germanic languages. Since suffixes are responsible for the majority of word-formation in all three languages, limiting the study in this way facilitates collection of a maximally large yet comparable group of databases.[8]

The present study includes "conversion": word-formation achieved without the addition of an overt suffix. The decision to include conversion was based on two factors. Firstly, all three languages have conversion and the grammars cited previously list this type in the descriptions of suffixal word-formation. Some illustrative examples are Russian *vxodit'* 'enter[verb]'—*vxod* 'entrance' (an ACTION FOR LOCATION metonymy), Czech *péci* 'bake[verb]'—*pec* 'oven, stove' (an ACTION FOR INSTRUMENT metonymy), and Norwegian *søt* 'sweet'—*søte* 'sweeten[verb]' (a CHARACTERISTIC FOR ACTION metonymy; note that *-e* is the infinitival desinence, not a suffix). Secondly, scholars often describe conversion in terms of "zero-suffixation" (cf. Townsend 1975); in other words, under some interpretations what we observe in these cases is a suffix that just happens to

7. Although Peirsman and Geeraerts (2006: 277) state that their inventory "is by no means meant to be an exhaustive classification of types of metonymy", it is the most comprehensive systematic inventory available, representing most (if not all) types of lexical metonymy known to scholarship.

8. To be consistent in treatment of aspectual morphemes, Slavic semelfactive and imperfectivizing suffixes were also excluded from this study.

have no phonological substance. In this article I do not take a stance on whether zero morphemes exist or not, but I take the presence of conversion in all three reference grammars as an indication that a study of word-formation that left out conversion would be incomplete.

A number of kinds of data were excluded from this study on the grounds that they do not represent systematic phenomena, do not encode metonymic relationships, or are beyond the scope of the study. Isolated examples pertaining to only a single lexical item, dialectisms, occasionalisms, and examples from highly marked registers have been avoided in order to maintain focus on the systematic role of metonymy in the standard registers of the three languages. Excluded on the grounds that they do not regularly signal metonymy are the formation of hypocoristics, comparative adjectives and adverbs.[9] Word-formation that changes only the word class and/or gender of the word is likewise excluded. Examples include deverbal nouns with no specialized meaning, such as Czech *zazvonění* 'ringing' (derived from the verb *zazvonit* 'ring') and the use of suffixes to effect gender changes as in *přítelkyně* 'female friend' (derived from *přítel* 'friend').

All data in this study involve examples containing only one stem to which a suffix is added, thus excluding compounding. This means that univerbations such as Russian *pjatiletka* 'five-year plan (lit. 'five-years'-*ka*)' are not represented, despite the fact that some of them, like this example, use the same suffixal morphology that is included in the database (cf. examples of Russian and Czech *-ka* in footnote 9). The rationale for restricting the study in this way was to limit the data to examples that identify a single source and thus best correspond to the lexical use of metonymy, facilitating comparison across domains. Also beyond the scope of this study are examples that show stacking of multiple suffixes or chaining of metonymic relationships.

The databases represent only types. Each entry in each database is a type and thus a unique combination of a metonymy pattern, a word class pattern, and a suffix. In addition, each entry is supplied with a single illustrative example. Table 1 presents the sample entries corresponding to examples (1b)–(1c) and

9. In both Russian and Czech some of the same suffixes are used both to create hypocoristics and to signal metonymy, cf. the diminutive *knižka*/*knížka* 'little book' formed via the suffix *-ka* from Russian *kniga* and Czech *kniha* 'book'. The same suffix encodes metonymic relationships in Russian and Czech such as MATERIAL FOR ENTITY in Russian *žestjanoj* 'tin'—*žestjanka* 'tin can', and ACTION FOR PRODUCT in Czech *sbírat* 'collect'—*sbírka* 'collection (e.g. a stamp or coin collection)'. However the function of hypocoristic forms is to signal a pragmatic relationship between speech-act participants and an object (Wierzbicka 1980: 53–60; Taylor 1995: 144–149), and some scholars argue that hypocoristics should not be considered a type of word-formation at all (cf. Townsend 1975: 196; Dokulil 1962: 46–48). The formation of comparative adjectives and adverbs is marginal to word-formation and arguably can be included in inflection.

Table 1. *Sample entries in the databases for examples cited previously.*

Metonymy pattern		Word class pattern		Suffix	Illustrative example		Language
Source	Target	Source	Target		Source word	Derived word	
PART	WHOLE	noun	noun	*(i)a[jan*	*brjuxo* 'belly'	*brjuxan* 'person with large belly'	Russian
PART	WHOLE	noun	noun	*áč*	*břicho* 'belly'	*břicháč* 'person with large belly'	Czech
CONTAINED	CONTAINER	noun	noun	*nica*	*saxar* 'sugar'	*saxarnica* 'sugar-bowl'	Russian
CONTAINED	CONTAINER	noun	noun	*áč*	*květina* 'flower'	*květináč* 'flower-pot'	Czech
CHARACTERISTIC	ENTITY	qualitative adjective	noun	*áč*	*nahý* 'naked'	*naháč* 'naked person'	Czech
ACTION	LOCATION	verb	noun	*Ø*	*vxodit'* 'enter'	*vxod* 'entrance'	Russian
ACTION	INSTRUMENT	verb	noun	*Ø (fem)*	*péci* 'bake'	*pec* 'oven, stove'	Czech
CHARACTERISTIC	ACTION	qualitative adjective	verb	*Øe*	*søt* 'sweet'	*søte* 'sweeten'	Norwegian
MATERIAL	ENTITY	relational adjective	noun	*ka*	*žestjanoj* 'tin'	*žestjanka* 'tin can'	Russian
ACTION	PRODUCT	verb	noun	*ka*	*sbírat* 'collect'	*sbírka* 'collection'	Czech

Table 2. *Total size of databases in terms of types, metonymy patterns, word class patterns, and suffixes.*

Language	# Types	# Metonymy patterns	# Word class patterns	# Suffixes
Russian	747	110	32	274
Czech	562	106	23	207
Norwegian	177	60	12	57

(2b)–(2c) and others presented in the previous text. There are no duplicates of combinations of metonymy pattern, word class pattern, and suffix. No attempt has been made to represent the number of examples available for each type, nor has there been any attempt to discover the token frequencies of such examples. Both kinds of information are certainly valuable since a given type might have only a handful or perhaps dozens or even hundreds of exemplars, and some exemplars will be of very low frequency whereas others will be of high frequency. Obviously a type that has only a few low-frequency exemplars has a different status in a language than one with many high-frequency exemplars, but the task of collecting and analyzing that information goes beyond the scope of this article.

Table 2 presents some overall measures of the databases. The most striking difference in the number of types is between the two Slavic languages and the Germanic one.[10] Norwegian expresses many of the concepts found in the Russian and Czech databases by other means, namely compounding and phrases. A parallel pattern is seen in the number of suffixes identified for each language, as shown in Table 2. Whereas both Russian and Czech have over 200 suffixes that signal metonymy in word-formation, Norwegian has only 57.

Several classificatory problems arose in collecting the data, primarily in identifying suffixes and metonymy patterns. Allomorphy and its attendant issues (primarily morphophonemic alternations and simple vs. extended versions of suffixes) often made it difficult to know whether one or more suffixes should be recognized. As much as possible, I followed the conventions of the three reference grammars, which combine both lumping and splitting strategies. The grammars lump together suffixes when variation is due to morphophonemic, prosodic or orthographic alternations. For example, there is a Russian relational adjective suffix, which can be realized as *-nyj* or *-noj* depending

10. It is possible that the three grammars are not equally extensive in their coverage of word-formation, and that this has affected the distribution of the data. There is, however, clear evidence (Dokulil 1962, 1986) that the Czech and Soviet grammarians were in close contact, and furthermore the relative dimensions of the databases correspond to my experience as a non-native speaker of all three languages. Still, the comparison is best understood as impressionistic as opposed to exact.

upon stress; thus the following two examples have the same suffix: *mesjačnyj* 'monthly' (derived from *mesjac* 'month' via TIME FOR CHARACTERISTIC) and *oblastnoj* 'regional' (derived from *oblast'* 'region' via LOCATION FOR CHARACTERISTIC). However, the trend is toward splitting as concerns suffixes and their extended versions containing additional segments. Thus Russian *-nica* in *saxarnica* 'sugar-bowl' and *-ica* in *teplica* 'hot-house' (derived from *teplyj* 'hot' via CHARACTERISTIC FOR LOCATION) are treated as separate suffixes, despite their etymological affinity. This differentiation is justified by the fact that the initial *n* cannot be motivated synchronically (e.g. as due to an alternation) and that the range of metonymies these two related suffixes signal is not the same.

Some derived words encode multiple metonymies that are disambiguated in context. For example, Czech *beranina* (derived from *beran* 'ram') can signal either 'mutton' (thus ENTITY FOR MATERIAL) or 'the smell of a ram' (thus ENTITY FOR ABSTRACTION). Since the database was not designed to capture this level of detail and variation, it was decided to recognize only one metonymy pattern for each entry, but to include enough entries to cover the full range of possibilities. The first (and sometimes only) meaning of *beranina* listed in dictionaries, namely 'mutton', is the only one recognized in connection with this entry in the database. Another example (*rybina* 'fishy smell', derived from *rybí* 'fish') illustrates the type ENTITY FOR ABSTRACTION in this connection in the database.

Some derived words are unambiguous but hard to classify. For example, Czech *pec* 'oven' from *péci* 'bake' is classified as ACTION FOR INSTRUMENT in Table 1. But an oven is not a prototypical instrument and depending on its size it might be appropriate to classify it as a CONTAINER or even a LOCATION. Problems of this sort are particularly frequent among the group of metonymies that are related to PART FOR WHOLE: CONTAINED FOR CONTAINER, LOCATED FOR LOCATION, and POSSESSED FOR POSSESSOR.[11] Since the goal of the study was to explore the range of metonymy in word-formation rather than to arrive at a definitive interpretation of every example, the same general strategy was followed as for ambiguous words. When multiple classifications were possible, one was assigned and other entries were included in order to cover the range of possibilities.

By far the biggest challenge was to devise a system of classification that would do justice to the full range of metonymy patterns found in word-formation while facilitating comparison both across languages and across the domains of grammar and lexicon. This system is described in more detail in the next subsection.

11. The potential overlaps in metonymy relations are addressed in Janda (2010), based on a small pilot study restricted to Czech.

Table 3. *Classificatory terms for sources and targets.*

Relating to **Actions**:	ACTION, STATE, CHANGE STATE, EVENT, MANNER, TIME
Relating to **Participants**:	AGENT, PRODUCT, PATIENT, INSTRUMENT
Relating to **Entities**:	ENTITY, ABSTRACTION, CHARACTERISTIC, GROUP, LEADER, MATERIAL, QUANTITY
Relating to **PART FOR WHOLE**:	PART, WHOLE, CONTAINED, CONTAINER, LOCATED, LOCATION, POSSESSED, POSSESSOR

3.2. *Metonymy patterns*

Overall the goal was to create a classification system that would be as parsimonious as possible while doing some justice to the variety of data observed. A compromise between these two goals would ideally also maximize the opportunity to compare data across languages. As mentioned previously, this classification is based on Peirsman and Geeraerts (2006).[12] As shown in Section 4, the range of metonymy relationships encoded in word-formation is more extensive than that found in the lexicon, so it was necessary to elaborate Peirsman and Geeraerts' system in order to accommodate the word-formation data. This was done by adapting and differentiating subtypes among the set of sources and targets. Table 3 presents the items that serve as sources and targets in this system, organized according to a rough thematic grouping (though others are possible).

Here I briefly describe the correspondences between Peirsman and Geeraerts' system and the system used in this study. With the single exception of QUANTITY, the terms in this system are equivalent to terms used by Peirsman and Geeraerts.

The following terms have been adopted directly from Peirsman and Geeraerts (2006): PART, WHOLE, CONTAINER, CONTAINED, LOCATION, LOCATED, ENTITY, MATERIAL, TIME, STATE, MANNER, POSSESSOR, POSSESSED, and CHARACTERISTIC. In the present system, ENTITY is also used to classify the terms ADJACENT ENTITY, SINGLE ENTITY, and OBJECT in Peirsman and Geeraerts (2006).[13] The term ACTION/EVENT/PROCESS found in Peirsman and Geeraerts (2006) is broken down into several

12. Note that while adopting Peirsman and Geeraert's classification facilitates cross-domain comparison, any weaknesses in that system are also inherited. One potential problem is a lack of constraints on the identification and combination of terms for sources and targets.

13. A lexical example of ENTITY FOR ADJACENT ENTITY would be English *leg* to refer to the leg of a pair of pants. This corresponds to the pattern ENTITY FOR ENTITY in the present system. SINGLE ENTITY appears in Peirsman and Geeraerts (2006) only in collocation with COLLECTION. This relationship is classed as ENTITY FOR GROUP or GROUP FOR ENTITY in the present system. Russian *žestjanka* 'tin can', cited in Table 1 is an example of MATERIAL FOR OBJECT in Peirsman and Geeraerts' (2006) inventory, but is listed as MATERIAL FOR ENTITY in this system since there is no operational way to distinguish between entities and objects.

terms: (1) EVENT (some result from a verb, like Norwegian *trening* 'practice session' derived from *trene* 'train', though this term also covers other kinds of events like *høytid* 'festival, holiday' which serves as the source for *høytidelig* 'ceremonious'), (2) CHANGE STATE for verbs that describe changes of state (as opposed to static states or actions; cf. Mehlig's [1994: 590] "relative transformatives"); an example is Russian *kamenet'* 'turn to stone' a MATERIAL FOR CHANGE STATE metonymy based on *kamen'* 'stone', and (3) ACTION (for verbal actions not classed as STATE or CHANGE STATE; cf. examples of ACTION in Table 1). The single term PARTICIPANT in Peirsman and Geeraerts (2006) is realized in this classification as (1) AGENT, (2) PRODUCT, (3) PATIENT,[14] and (4) INSTRUMENT. Finally, COLLECTION in Peirsman and Geeraerts (2006) is rendered as GROUP in this system.[15] Although ABSTRACTION does not appear as a term in Peirsman and Geeraerts (2006), it can be subsumed under their system as an abstraction of ENTITY, since their system allows for various levels of abstraction. ABSTRACTION appears as the source in the derivation of Norwegian *farlig* 'dangerous' from *fare* 'danger', an example of ABSTRACTION FOR CHARACTERISTIC. A similar argument can be made for the term LEADER, which is a more specific type of ENTITY. To illustrate, Czech *hitlerovec* 'follower of Hitler' derived from *Hitler* is an example of LEADER FOR ENTITY.

The only term that constitutes a non-commensurate addition to the system is QUANTITY, which we see in Russian *dvoit'* 'double, divide in two' derived from the numeral *dvoe* 'two(some)' via QUANTITY FOR ACTION.

The combinations of terms should not be interpreted as a componential analysis of metonymy. Instead each metonymy relationship is a unique gestalt, akin in some ways to a construction. The parts are there, but they do not add up to make the whole, and in the context of different constructions, the same part can play different roles. For example, ACTION is the source term for both *pekař* 'baker' (derived via ACTION FOR AGENT from *péci* 'bake') and *jídlo* 'food' (derived via ACTION FOR PATIENT from *jíst* 'eat'; both examples are from Czech). But in *pekař* 'baker' the ACTION identifies something that someone does, whereas in *jídlo* 'food' the ACTION identifies what happens to a PATIENT. The assumption here is that both bottom-up (compositional) and top-down (constructional)

14. PATIENTS are pre-existing items, whereas PRODUCTS are created in the context of the metonymy relationship described. Thus Czech *sbírka* 'collection' has a PRODUCT as target since the collection did not exist prior to the collecting. But Czech *zubař* 'dentist' has a PATIENT as its source since *zub* 'tooth' exists prior to the dentist's work on it.
15. The rationale for this was that GROUP (or COLLECTION) was found to have metonymical relationships with more terms than (SINGLE) ENTITY, and for many of these the word GROUP was more felicitous. For example Czech *plukovník* 'colonel', derived from *pluk* 'regiment' illustrates GROUP FOR LEADER metonymy. Here the relationship is not merely of a single entity to a collection because a colonel is not a random member of a regiment and a regiment is not a collection of colonels.

Table 4. *Top ten metonymy patterns shared by all three languages.*

Metonymy pattern	Illustrative example		Language of example
	Source	Target	
ABSTRACTION FOR CHARACTERISTIC	*mysl'* 'thought'	*myslennyj* 'mental'	Russian
ACTION FOR ABSTRACTION	*myslit* 'think'	*myšlenka* 'idea'	Czech
ACTION FOR AGENT	*bake* 'bake'	*baker* 'baker'	Norwegian
ACTION FOR CHARACTERISTIC	*bereč'* 'guard'	*berežnyj* 'careful'	Russian
ACTION FOR INSTRUMENT	*sušit* 'dry'	*sušička* 'dryer'	Czech
ACTION FOR PRODUCT	*stifte* 'establish'	*stiftelse* 'establishment'	Norwegian
CHARACTERISTIC FOR ABSTRACTION	*tixij* 'quiet'	*tišina* 'silence'	Russian
ENTITY FOR CHARACTERISTIC	*Kafka*	*kafkovský* 'Kafkaesque'	Czech
CHARACTERISTIC FOR ENTITY	*tøff* 'tough'	*tøffing* 'tough guy'	Norwegian
ACTION FOR EVENT	*zabastovat'* 'go on strike'	*zabastovka* 'strike'	Russian

semantic processes are at work in word-formational metonymy, as described in Geeraerts' (2002) "prismatic structure".

In Table 2 we see that Czech and Russian are nearly equivalent in the number of metonymy patterns they encode via suffixation, whereas Norwegian makes much less of an investment in this system. A closer comparison of which metonymy patterns are more characteristic of one language than the others is presented in 4.3. Table 4 shows the ten most popular metonymy patterns across the three languages. This was arrived at by aligning the metonymy patterns that were represented by the most suffixes in each language. All ten patterns listed in Table 4 are within the top fourteen patterns for all three languages (the presence of ties[16] made a comparison of less than fourteen impossible).

3.3. *Word class patterns*

The classification of word class patterns is parallel to that of metonymy patterns in that each pattern consists of a source term and a target term. The following terms serve as both sources and targets in all three languages: adverb, noun, numeral, qualitative adjective, relational adjective, and verb. The division of adjectives into qualitative vs. relational was justified on the grounds that they behave differently (for example, relational adjectives are less likely to form comparatives and abstract nouns) and these differences correlate with a distinction in meaning since qualitative adjectives refer to inherent qualities

16. Ties were registered when two or more metonymy patterns were signaled by the same number of suffixes.

whereas relational adjectives relate the noun they modify to another referent (often this item describes the physical source of the noun's referent). Furthermore, when relational adjectives serve as sources for metonymic word-formation, they encode a source MATERIAL rather than a CHARACTERISTIC. Note, for example, the way that Russian *žestjanoj* 'made of tin' (cf. Table 1) references the tin itself in forming *žestjanka* 'tin can' rather than a CHARACTERISTIC such as a tin-like quality. Contrast this with the behavior of a qualitative adjective as a source in Czech *nahý* 'naked', which describes a CHARACTERISTIC of the target *naháč* 'naked person' (also in Table 1). Other word classes are less frequently encountered and attested only in the role of source in the two Slavic languages: pronoun, interjection, and preposition. Table 5 gives examples of the latter, less frequent word classes.

The Slavic languages have a more extensive system in that more word classes participate in word-formation and they also use more of the theoretically possible combinations of word class source and target. However, if we compare the top ten word class patterns (those associated with the most entries in the databases), we find that eight of them are shared by Russian, Czech, and Norwegian. The top portion of Table 6 lists these eight most frequent word class patterns. Five of these patterns have been illustrated with examples already in the text, and cross-references to those examples are cited. The remaining three word class patterns are illustrated in the lower portion of the table.

Word class patterns are much more restricted than metonymy patterns and there is strong agreement across languages as to which word class patterns are preferred. This is partly because there are fewer terms involved in word class patterns and four word classes, namely nouns, verbs, qualitative adjectives and relational adjectives, are more frequent in the lexicon. As we see in 3.4, suffixes are also quite specific in terms of the word class patterns they signal.

3.4. *Suffixes in relation to metonymy and word class patterns*

The distribution of metonymy and word class patterns among the suffixes of the three languages reveals some important characteristics of how suffixes signal metonymy in word-formation. Suffixes are less specific in identifying the relevant metonymy target than in identifying the relevant word class target.

Figure 1 depicts the distribution of metonymy patterns (along the x-axis) relative to suffixes (along the y-axis). To the left we see that each language has a number of suffixes with a unique metonymy pattern: there are 121 such suffixes in Russian, ninety-four in Czech, and twenty in Norwegian. However, most suffixes are much less specific and some can signal a wide variety of

Table 5. *Examples of pronoun, interjection, and preposition as word class sources.*

Metonymy pattern		Word class pattern		Suffix	Illustrative example		Language
Source	Target	Source	Target		Source word	Derived word	
PRODUCT	ACTION	pronoun	verb	*kat*	*vy* 'you'	*vykat* 'say you to'	Czech
PRODUCT	ACTION	interjection	verb	*kat'*	*gav* 'woof'	*gavkat'* 'bark'	Russian
LOCATION	CHARACTERISTIC	preposition	relational adjective	*(a|e|ij)šnij*	*vne* 'outside of'	*vnešnij* 'exterior'	Russian

Table 6. *Top eight shared word class patterns.*

Word class pattern		Illustrative example
Source	Target	
noun	noun	cf. Russian *brjuxan* 'person with a large belly' in Table 1
verb	noun	cf. Russian *vxod* 'entrance' in Table 1
noun	relational adjective	cf. Norwegian *bergensk* 'from/in Bergen' below
qualitative adjective	noun	cf. Czech *naháč* 'naked person' in Table 1
noun	qualitative adjective	cf. Norwegian *farlig* 'dangerous' in 3.2
noun	verb	cf. Russian *zavtrakat'* 'eat breakfast' below
verb	qualitative adjective	cf. Czech *váhavý* 'hesitant' below
relational adjective	noun	cf. Russian *žestjanka* 'tin can' in Table 1

Metonymy pattern	Word class pattern		Illustrative example		Language of example
	Source	Target	Source word	Derived word	
LOCATION FOR CHARACTERISTIC	noun	relational adjective	*Bergen*	*bergensk* 'from/in Bergen'	Norwegian
PATIENT FOR ACTION	noun	verb	*zavtrak* 'breakfast'	*zavtrakat'* 'eat breakfast'	Russian
ACTION FOR CHARACTERISTIC	verb	qualitative adjective	*váhat* 'hesitate'	*váhavý 'hesitant'*	Czech

metonymy patterns. On the opposite extreme we have two Czech suffixes (*-ina* and *-ník*) that signal sixteen metonymy patterns each, two Russian suffixes (*-ina* and *-nyj*) that signal fifteen metonymies each, and one Norwegian suffix (*-ing*) that signals eleven metonymies. Table 7 presents entries to illustrate such versatile suffixes.

The three languages studied here differ in terms of the numbers of metonymy relationships attested in their word-formation systems (cf. Table 2), but are similar in terms of the specificity of suffixes. The mean number of metonymy patterns per suffix is 2.6 for both Russian and Czech and 3 for Norwegian.

Sources and targets play very different roles in the specificity of suffixes. Since words derived by suffixation explicitly name the source, it is the variability of the target that is the greatest source of underspecification in the system. In other words, when confronted with a derived word, we can always access the source via the source word, so variation among sources connected to a single suffix does not produce potential ambiguity. Accessing the target, however, is more challenging and thus variation among targets creates more potential ambiguity in the system. Table 8 compares the Russian suffix *-o/evyj* with the Czech suffix *-dlo*.

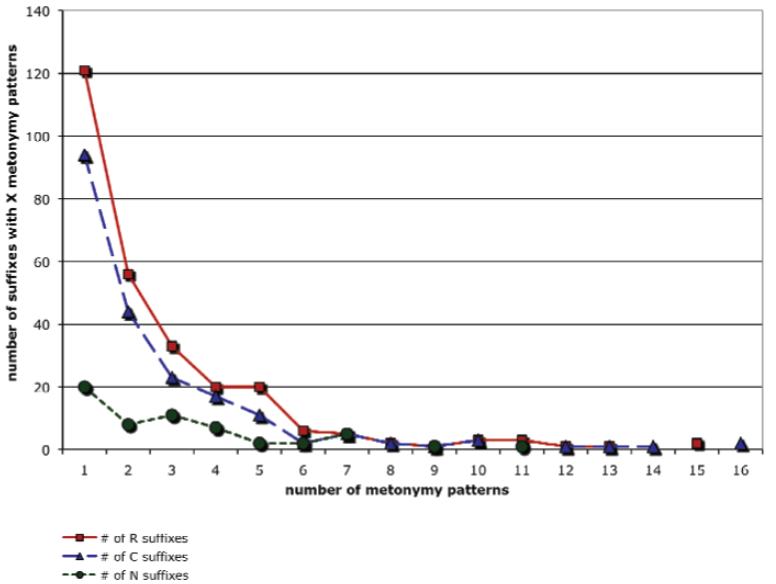

Figure 1. *Metonymy patterns per suffix.*

Whereas Russian *-o/evyj* signals ten different metonymy patterns, they all have the same target, CHARACTERISTIC, and thus the suffix is quite specific despite the proliferation of sources. The Czech suffix *-dlo*, on the other hand, signals eight metonymy patterns, with only two sources but seven targets. Czech *-dlo* is thus much less specific. If you encounter a word formed by Russian *-o/evyj* you always know that it will encode a CHARACTERISTIC relating to whatever source is named by the source word. But Czech *-dlo* doesn't tell you much more than to take the ACTION or STATE named by the source word and perform a metonymy. Figure 2 depicts the degree to which suffixes specify metonymy targets.

The first two clusters of bars (these add up to 100% for each language) divide the suffixes according to whether they are associated with only one or more than one metonymy target. Whereas most suffixes (between 60% and 68%) are specific to a single target, many (between 32% and 40%) are not. Furthermore, between 11% and 17.5% of suffixes are associated with more targets than sources (like Norwegian *-ing* and Czech *-dlo*), representing the high end of underspecification in the system.

The means for word class patterns per suffix are nearly identical across the three languages, with 1.55 for Russian and Czech and 1.63 for Norwegian. Suffixes are thus highly specific as to the word class of the target though less specific as to its metonymic relation to the source.

Table 7. *Highly versatile suffixes in Russian, Czech, Norwegian.*

Metonymy pattern		Illustrative example	
Source	Target	Source	Target
Russian *-ina*: 15 metonymy patterns (9 sources, 7 targets)			
CHARACTERISTIC	ABSTRACTION	*tixij* 'quiet'	*tišina* 'silence'
CHARACTERISTIC	ENTITY	*ženskij* 'female'	*ženščina* 'woman'
ENTITY	ABSTRACTION	*Dostoevskij*	*dostoevščina* 'Dostoevskian style'
ACTION	PRODUCT	*carapat'* 'scratch'	*carapina* 'scratch'
GROUP	ENTITY	*vinograd* 'grapes'	*vinogradina* 'grape'
GROUP	ABSTRACTION	*policejskij* 'police'	*policejščina* 'police repression'
ACTION	EVENT	*krestit'* 'christen'	*krestiny* 'christening'
CHARACTERISTIC	MATERIAL	*pušnoj* 'fur-bearing'	*pušnina* 'furs (collect.)'
CHARACTERISTIC	LOCATION	*ravnyj* 'equal'	*ravnina* 'plain'
CHARACTERISTIC	ENTITY	*rogatyj* 'horned'	*rogatina* 'bear-spear'
CHARACTERISTIC	GROUP	*obščij* 'common'	*obščina* 'community'
MATERIAL	ENTITY	*led* 'ice'	*l'dina* 'ice-floe'
ENTITY	MATERIAL	*kon'* 'horse'	*konina* 'horse-meat'
PART	LOCATION	*verx* 'top'	*veršina* 'summit'
PRODUCT	ENTITY	*maslo* 'oil'	*maslina* 'olive-tree'
Czech *-ník*: 16 metonymy patterns (12 sources, 6 targets)			
ABSTRACTION	ENTITY	*služba* 'service'	*služebník* 'servant'
ACTION	AGENT	*pracovat* 'work'	*pracovník* 'worker'
ACTION	INSTRUMENT	*narazit* 'collide with'	*nárazník* 'bumper'
ACTION	LOCATION	*chodit* 'walk'	*chodník* 'sidewalk'
CONTAINED	CONTAINER	*čaj* 'tea'	*čajník* 'teapot'
ENTITY	ENTITY	*střevíček* 'lady's shoe'	*střevíčník* 'lady-slipper (a flower)'
GROUP	ENTITY	*družstvo* 'collective'	*družstevník* 'collective farmer'
INSTRUMENT	AGENT	*soustruh* 'lathe'	*soustružník* 'lathe-worker'
LOCATED	LOCATION	*ryba* 'fish'	*rybník* 'fishpond'
LOCATION	AGENT	*knihovna* 'library'	*knihovník* 'librarian'
LOCATION	LOCATED	*skála* 'cliff'	*skalník* 'cotoneaster (grows on cliffs)'
MATERIAL	AGENT	*zlatý* 'gold'	*zlatník* 'goldsmith'
MATERIAL	ENTITY	*pára* 'steam'	*parník* 'steamboat'
PATIENT	AGENT	*papír* 'paper'	*papírník* 'seller of paper goods'
PRODUCT	AGENT	*kouzlo* 'magic'	*kouzelník* 'magician'
QUANTITY	ENTITY	*pět* 'five'	*pětník* '5 crown piece'
Norwegian *-ing*: 11 metonymy patterns (5 sources, 9 targets)			
ACTION	ABSTRACTION	*bake* 'bake'	*baking* 'baking'
ACTION	EVENT	*trene* 'train'	*trening* 'practice'
ACTION	GROUP	*regjere* 'govern'	*regjerning* 'government'
ACTION	LOCATION	*fylle* 'fill'	*fylling* 'landfill'
ACTION	MATERIAL	*male* 'paint'	*maling* 'paint'
ACTION	PRODUCT	*tegne* 'draw'	*tegning* 'drawing'
CHARACTERISTIC	ENTITY	*tøff* 'tough'	*tøffing* 'tough guy'

Table 7 (*Continued*)

Metonymy pattern		Illustrative example	
Source	Target	Source	Target
STATE	ABSTRACTION	*sone* 'do time in jail'	*soning* 'incarceration'
STATE	LOCATION	*skråne* 'slant'	*skråning* 'slope'
WHOLE	PART	*kveld* 'evening'	*kvelding* 'dusk'

Table 8. *Multiple sources vs. multiple targets.*

Metonymy pattern		Illustrative example	
Source	Target	Source	Target
Russian *-o/evyj*: 10 sources, 1 target			
ABSTRACTION	CHARACTERISTIC	*vkus* 'taste'	*vkusovoj* 'taste, gustatory[adj]'
MATERIAL	CHARACTERISTIC	*benzin* 'gasoline'	*benzinovyj* 'gasoline[adj]'
ENTITY	CHARACTERISTIC	*slon* 'elephant'	*slonovyj* 'elephant[adj]'
TIME	CHARACTERISTIC	*čas* 'hour'	*časovoj* 'hour-long[adj]'
PART	CHARACTERISTIC	*gorlo* 'throat'	*gorlovoj* 'throat[adj]'
LOCATION	CHARACTERISTIC	*kraj* 'region'	*kraevoj* 'regional[adj]'
GROUP	CHARACTERISTIC	*orkestr* 'orchestra'	*orkestrovyj* 'orchestral[adj]'
INSTRUMENT	CHARACTERISTIC	*ščipcy* 'tongs'	*ščipcovyj* 'relating to tongs[adj]'
ACTION	CHARACTERISTIC	*torgovat'* 'trade'	*torgovyj* 'trading[adj]'
CHARACTERISTIC	CHARACTERISTIC	*černyj* 'black'	*černovoj (variant)* 'first draft[adj]'
Czech *-dlo*: 2 sources, 7 targets			
ACTION	AGENT	*zlobit* 'be naughty'	*zlobidlo* 'naughty person'
ACTION	GROUP	*plavat* 'swim'	*plavidlo* 'all types of boats'
ACTION	INSTRUMENT	*létat* 'fly'	*letadlo* 'airplane'
ACTION	LOCATION	*dívat se* 'watch'	*divadlo* 'theater'
ACTION	MATERIAL	*mýt* 'wash'	*mýdlo* 'soap'
ACTION	PART	*chodit* 'walk'	*chodidlo* 'sole of foot'
ACTION	PATIENT	*jíst* 'eat'	*jídlo* 'food'
STATE	LOCATION	*sedat, sedět* 'sit'	*sedadlo* 'seat'

4. Observations

The classification system and databases were designed to facilitate comparison across the domains of lexicon and word-formation and across languages. This makes it possible to discover a variety of interesting asymmetries. It turns out that metonymy is not only widespread in word-formation, but also more diverse in that domain than it is in the lexicon. Also, certain metonymies are better adapted to one domain than the other. There are differences in the direc-

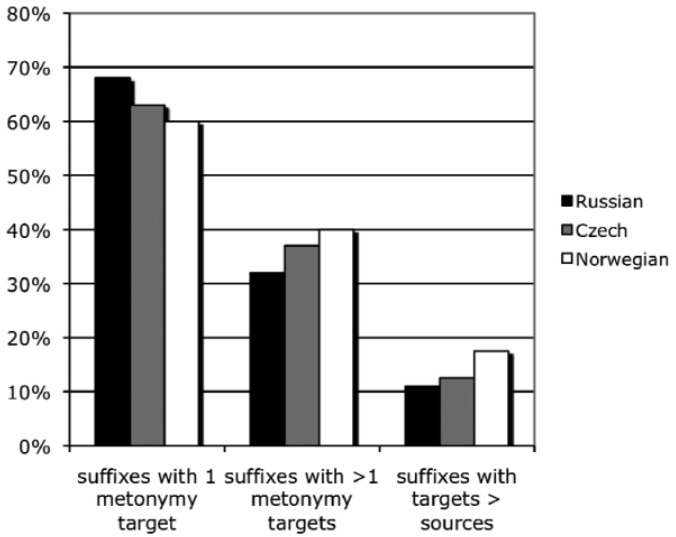

Figure 2. *Target specificity of suffixes.*

tionality of metonymies: some of them are bi-directional, some of them are uni-directional, and sometimes the directionality is affected by the domain. Finally, we see that metonymy patterns are to some extent language-specific: some languages have a strong preference for certain metonymies that are either rare or unattested in other languages.

4.1. *Metonymies across the domains of lexicon and word-formation*

One of the most surprising results of this study is that more metonymy patterns are attested in the domain of word-formation than we find in Peirsman and Geeraerts' (2006) inventory of lexical metonymy. Figure 3 compares the metonymy patterns listed by Peirsman and Geeraerts with those found in the databases of Russian, Czech, and Norwegian word-formation. All of the metonymies inventoried in Peirsman and Geeraerts (2006) have been "translated" into their equivalent patterns in my system, so that all of them are represented and the counts are commensurate. This means, for example, that "PARTICIPANT FOR PARTICIPANT" is counted as a series of more specific items according to my classification.

The majority of the metonymy relationships cited by Peirsman and Geeraerts were also found in the word-formation databases; only nine of their patterns could not be found among our suffixes. However word-formation yields another fifty-four metonymy patterns that are not observed among lexical

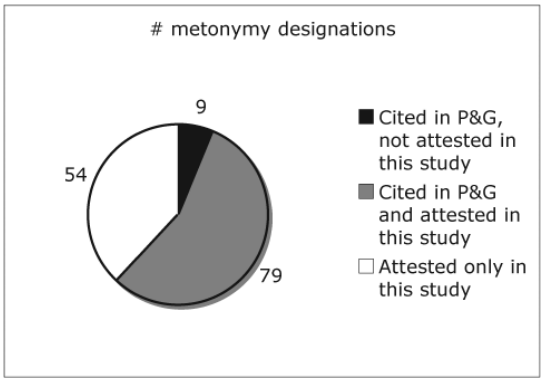

Figure 3. *Comparison of metonymy patterns across lexicon and word-formation.*

metonymies. Since the terms are comparable (except for QUANTITY, which is infrequent), the major source of diversity is increased flexibility in the kinds of combinations that are found. Table 9 compares the metonymies found in lexicon only, those found in both lexicon and word-formation, and those found in all three word-formation systems but not attested in the lexicon. The table cites examples of lexical metonymy from various European languages found in Peirsman and Geeraerts' (2006) inventory, while the examples of word-formational metonymy are from Czech.

A comparison of the three lists in Table 9 is revealing. For most of the metonymies that appear to be specific to the lexicon, it is hard to imagine how they might be implemented in word-formation. Take for example the bidirectional patterns HYPONYM FOR HYPERNYM and HYPERNYM FOR HYPONYM. In the former case we have lexical examples of brand names standing in as generic terms, as in the use of *Xerox* to refer to any copy machine. In the latter case English *the pill* stands specifically for a contraceptive pill (cf. Peirsman and Geeraerts 2006: 306–308). Word-formation rarely, if ever, makes use of hierarchical semantic relations in this way. A curious example is AGENT FOR PRODUCT, as in *Where's my Roget?*, where the author's name stands in for his famous thesaurus. This metonymy is bidirectional in the lexicon, where we also find examples of PRODUCT FOR AGENT (cf. French *coucou* 'cuckoo', cited by Peirsman and Geeraerts 2006: 298), but only the latter is found in word-formation, as in Czech *hrnčíř* 'potter' derived from *hrnec* 'pot'.

The main purpose of Peirsman and Geeraerts' (2006) article is to propose a radial category structure for metonymy based on clines ranging from most to least prototypical. Three such clines serve as axes for a three-dimensional category: strength of contact (part-whole, containment, contact, and adjacency), boundedness (bounded and unbounded), and domain (space, time, action/

Table 9. *Comparison of metonymy patterns across lexicon and word-formation.*

Metonymy patterns found only in the lexicon (full list of 9 items):
- ACTION FOR TIME: *la saison* (< 'act of sowing')
- AGENT FOR PRODUCT: *(I'm reading) Shakespeare*
- TIME FOR ENTITY: *the sixties*
- CONSEQUENT FOR ANTECEDENT: *phobos* ('fear' < 'flight')
- SUBEVENT FOR COMPLEX EVENT: *mother is cooking potatoes* (involves also washing, peeling, etc.)
- CAUSE FOR EFFECT: *unlock the prisons* (meaning 'set the prisoners free')
- POTENTIAL FOR ACTUAL: *Can you see him?* (meaning 'Do you see him?')
- HYPONYM FOR HYPERNYM: *Kodak* (meaning 'camera')
- HYPERNYM FOR HYPONYM: *the pill* (meaning 'contraceptive pill')

Metonymy patterns shared by lexicon and word-formation (sample from 79 items):
- ACTION FOR AGENT: *a snitch*; *hrabal* 'greedy person' (< *hrabat* 'rake')
- ACTION FOR INSTRUMENT: *Andenken* ('keepsake' < 'act of remembering'); *odměrka* 'measuring-cup' (< *odměřit* 'measure')
- ACTION FOR LOCATION: *Gang* ('corridor' < 'act of walking'); *parkoviště* 'parking-lot' (< *parkovat* 'park')
- INSTRUMENT FOR ACTION: *to ski*; *bičovat* 'beat with a whip' (< *bič* 'whip')
- ACTION FOR PATIENT: *achat* ('purchase' < 'act of buying'); *lízátko* 'lollipop' (< *lízat* 'lick')
- AGENT FOR ACTION: *to butcher*; *pytlačit* 'do poaching' (< *pytlák* 'poacher')
- CHARACTERISTIC FOR ENTITY: *a beauty*; *naháč* 'naked person' (< *nahý* 'naked')
- CONTAINER FOR CONTAINED: *(to drink) a glass*; *kapesné* 'pocket-money' (< *kapsa* 'pocket')

Metonymy patterns found only in word-formation (sample from 54 items):
- ABSTRACTION FOR ACTION: *toužit* 'long for[verb]' (< *touha* 'desire')
- ABSTRACTION FOR MANNER: *honem* 'quickly' (< *hon* 'chase')
- ACTION FOR CHARACTERISTIC: *váhavý* 'hesitant' (< *váhat* 'hesitate[verb]')
- ACTION FOR EVENT: *zabijačka* 'pig-slaughtering' (< *zabíjet* 'kill[verb]')
- ACTION FOR GROUP: *plavidlo* 'all types of boats' (< *plavat* 'sail[verb]')
- CHARACTERISTIC FOR ACTION: *chladit* 'cool[verb]' (< *chladný* 'cool[adj]')
- CHARACTERISTIC FOR CHANGE STATE: *mládnout* 'grow younger [verb]' (< *mladý* 'young')
- EVENT FOR CHARACTERISTIC: *válečný* 'war[adj]' (< *válka* 'war')
- PATIENT FOR ACTION: *věznit* 'imprison[verb]' (< *vězeň* 'prisoner')
- STATE FOR ABSTRACTION: *nenávist* 'hatred' (< *nenávidět* 'hate[verb]')
- TIME FOR CHARACTERISTIC: *včerejší* 'yesterday's[adj]' (< *včera* 'yesterday')

event/process, and assemblies & collections). The first cline serves as the major axis of the category and is most relevant for this study. A comparison of metonymies attested in word-formation supports the prototypicality claim made by Peirsman and Geeraerts (2006): the vast majority (eighty-nine) of word-formation metonymies are of the "part-whole" kind (this includes not only PART & WHOLE relations, but also ENTITY & MATERIAL, CHARACTERISTIC & ENTITY, and various relations of ACTION & PARTICIPANT, among others). The representation of "part-whole" along the strength of contact cline for word-formation thus parallels that found for lexical metonymy where this, the most prototypical end of the continuum, is also the center of gravity in lexical

metonymy. Next along this cline is "containment", which includes relations involving CONTAINER & CONTAINED, ENTITY & GROUP, and ENTITY & TIME. Nine metonymy patterns of this type are found in the word-formation databases. Further toward the periphery is "contact", which is dominated by LOCATION & LOCATED relations; sixteen such relations can be identified in the word-formation databases. Finally, at the periphery of the cline is "adjacency", with relations such as ENTITY & ENTITY, PARTICIPANT & PARTICIPANT, and LOCATION FOR PRODUCT. At the "adjacency" end of the scale we find somewhat more metonymy patterns, nineteen, but this is due mainly to the differentiation among PARTICIPANTS as AGENTS, PATIENTS, PRODUCTS, INSTRUMENTS, etc. The position of "part-whole" as prototypical and the differentiation of three more peripheral kinds of metonymy are justified from the perspective of word-formation.

4.2. *Directionality of metonymy*

The directionality of metonymic relationships is significant because it reveals asymmetries in the salience of referents. If a metonymy relationship were perfectly bi-directional, this would mean that there is a balanced distribution for the two terms that serve as both source and target. However, many metonymy relationships are uni-directional and even the bi-directional relationships are usually highly unbalanced, with one direction strongly preferred over the other (cf. Kövecses and Radden 1998: 62–63). If relationships are uni-directional or strongly skewed in one direction, this probably means that the source is more salient than the target (Langacker 1993). A close examination of the directionality of metonymy patterns can thus open a window on our mental address system, showing trends in the relative salience of concepts.

The three languages behave nearly identically in terms of overall distributions, with about 60% of metonymy relationships being bi-directional and 40% uni-directional. Though some of the uni-directional metonymies are rather rare, found among patterns with only one suffix in any given language, others are quite strongly attested. Three examples illustrate particularly robust uni-directional metonymies that are found in all three languages, documented in Table 10.

The first item in Table 10, PRODUCT FOR AGENT, is interesting because the converse, namely AGENT FOR PRODUCT, is found only in the lexicon. Taken together, PRODUCT FOR AGENT and INSTRUMENT FOR AGENT suggest that concrete objects associated with event situations are often used as sources to access an AGENT as the target. The uni-directionality of the third pattern, STATE FOR LOCATION, seems reasonable since it is probably easier to name a location after a state experienced there than the other way around.

Table 11 presents examples of bi-directional metonymies that are either clearly balanced or strongly unbalanced across the three languages. The latter types are listed according to the directionality that is favored.

Table 10. *Some robust uni-directional metonymies.*

PRODUCT FOR AGENT			
Languages attested in	# of suffixes	Illustrative example	
		Source	Target
Russian	12	*stol* 'desk'	*stoljar* 'cabinet-maker'
Czech	6	*socha* 'sculpture'	*sochař* 'sculptor'
Norwegian	5	*musikk* 'music'	*musikant* 'musician'
INSTRUMENT FOR AGENT			
Languages attested in	# of suffixes	Illustrative example	
		Source	Target
Russian	8	*lyži* 'skis'	*lyžnik* 'skier'
Czech	4	*soustruh* 'lathe'	*soustružník* 'lathe operator'
Norwegian	1	*cello* 'cello'	*cellist* 'cellist'
STATE FOR LOCATION			
Languages attested in	# of suffixes	Illustrative example	
		Source	Target
Russian	5	*žit'* 'live'	*žilišče* 'living quarters'
Czech	4	*vězet* 'be stuck'	*vězení* 'prison'
Norwegian	1	*skråne* 'slant'	*skråning* 'slope'

Table 11. *Balanced and unbalanced bi-directional metonymies.*

Balanced bi-directional metonymies		
ENTITY & CHARACTERISTIC	ABSTRACTION & CHARACTERISTIC	ACTION & PRODUCT
Unbalanced bi-directional metonymies		
ACTION FOR CHARACTERISTIC	PATIENT FOR AGENT	ACTION FOR AGENT
ACTION FOR EVENT	ACTION FOR INSTRUMENT	ACTION FOR ABSTRACTION
POSSESSOR FOR POSSESSED	PART FOR WHOLE	CONTAINED FOR CONTAINER

It is nearly equally easy to access a CHARACTERISTIC via an ENTITY or ABSTRACTION as to do the reverse process and the same is true for ACTION and PRODUCT. The unbalanced metonymies tell us about asymmetries in the system. Five of the unbalanced types have ACTION as the source, which may indicate that ACTIONS are particularly salient. PART FOR WHOLE and CONTAINED FOR CONTAINER both indicate the use of a component item as a source to access a

Table 12. *Distribution of metonymy patterns across the three languages.*

Number of languages	Which languages	Number of metonymy patterns
Shared by all 3 languages	Russian, Czech, Norwegian	51
Shared by 2 languages	Russian and Czech	37
	Russian and Norwegian	2
	Czech and Norwegian	2
Found in only 1 language	Russian	20
	Czech	16
	Norwegian	5

larger item. POSSESSOR FOR POSSESSED may suggest an anthropocentric bias in salience.

4.3. *Special investments*

The implementation of metonymy across Russian, Czech, and Norwegian reveals not only quantitative differences, but qualitative ones as well, since the languages differ in which metonymy relations they prefer in word-formation. Table 12 details the distribution of the 133 metonymy patterns attested in this study across the three languages.

Over one third of metonymy patterns are shared by all three languages. Approximately another third is comprised of metonymy patterns shared by two languages, and most of these are shared by Russian and Czech. The remainder are metonymy patterns found in only one language.

A further metric for determining preference for certain metonymy patterns in given language(s) is the number of associated suffixes. Often a given metonymy pattern is attested in all three languages, but is proportionally more prominent in one language than the others. Table 13 presents metonymy patterns that are particularly prominent in either the two Slavic languages or in only one of the three languages.

The first group of examples in Table 13 is of metonymy patterns that are relatively common in both Russian and Czech, but rare or unattested in Norwegian. For example, LOCATION FOR CHARACTERISTIC is signaled by twenty-two suffixes in Russian and by fourteen suffixes in Czech, but only two suffixes are associated with that metonymy pattern in Norwegian. POSSESSOR FOR POSSESSED, signaled by eighteen Russian suffixes and eleven Czech suffixes, is signaled by only one suffix in Norwegian. The remaining metonymy patterns in that group are absent in Norwegian.

In the Russian section of Table 13, the first pattern, CHARACTERISTIC FOR MATERIAL is associated with nine Russian suffixes, but with only three Czech suffixes and no Norwegian suffixes. The other two patterns in this section of Table

Table 13. *Language-specific preferences for metonymy patterns.*

Russian and Czech			
Metonymy patterns	# of suffixes	Illustrative example	
		Source	Target
LOCATION FOR CHARACTERISTIC	22 (R), 14 (Cz)	*centr* 'center'	*central'nyj* 'central'
POSSESSOR FOR POSSESSED	18 (R), 11 (Cz)	*kráva* 'cow'	*kraví* 'cow's'
STATE FOR CHARACTERISTIC	12 (R), 10 (Cz)	*želat'* 'want'	*želatel'nyj* 'desirable'
CHARACTERISTIC FOR LOCATION	11 (R), 6 (Cz)	*suxoj* 'dry'	*suša* 'dry land'
PART FOR WHOLE	9 (R), 9 (Cz)	*uši* 'ears'	*ušák* 'bunny'
Russian			
Metonymy patterns	# of suffixes	Illustrative example	
		Source	Target
CHARACTERISTIC FOR MATERIAL	9	*gustoj* 'thick'	*gušča* 'dregs'
INSTRUMENT FOR CHARACTERISTIC	4	*ščipcy* 'tongs'	*ščipcovyj* 'relating to tongs'
CHARACTERISTIC FOR CHARACTERISTIC	4	*velikij* 'great'	*veličavyj* 'stately, majestic'
Czech			
Metonymy patterns	# of suffixes	Illustrative example	
		Source	Target
CONTAINED FOR CONTAINER	11	*písek* 'sand'	*pískoviště* 'sandbox'
PRODUCT FOR LOCATION	6	*mléko* 'milk'	*mlékárna* 'dairy'
QUANTITY FOR ENTITY	6	*sedm* 'seven'	*sedmička* 'number 7 bus, highway, etc.'
Norwegian			
Metonymy patterns	# of suffixes	Illustrative example	
		Source	Target
LOCATION FOR LOCATED	8	Strømmen	*strømling* 'person from Strømmen'
PRODUCT FOR AGENT	5	*musikk* 'music'	*musikant* 'musician'

7 are exclusive to Russian. These patterns suggest that Russian is particularly strong in metonymies that involve CHARACTERISTICS.

Czech excels in deriving nouns via three metonymy relationships that are either unattested or rare in the other two languages. PRODUCT FOR LOCATION is not

found in Russian or Norwegian, and CONTAINED FOR CONTAINER is not found in Norwegian; otherwise these three relationships are represented by three or fewer suffixes in the other languages.

The two metonymy patterns that are flagged for Norwegian are attested robustly in both Russian and Czech, but are ranked relatively higher (eighth and eleventh most common) in Norwegian. LOCATION FOR LOCATED, though it can identify objects in addition to people in both Russian and Czech, is specialized only to human targets in Norwegian.

It is tempting to speculate on possible cultural parallels to language-specific patterns. In addition to the bias toward CHARACTERISTICS noted previously for Russian, it appears that Czech is very focused on quantification and commercial transactions. The Norwegian preference for LOCATION FOR LOCATED seems to comport well with a strong sense of the connection between location and personal identity in Norway. However, this line of inquiry must be left for future studies. All I can establish at this point is that it is possible to compare languages and identify language-specific patterns.

5. Conclusions

This article demonstrates that many types of word-formation can be classified according to the metonymic relationships involved. Such a classification is more insightful than traditional taxonomies of suffixes and word classes since it explains a linguistic phenomenon in terms of a general cognitive mechanism. A metonymic interpretation of word-formation focuses on the semantic relationships between the source word, the derived word as the target, and the affix as the context for the metonymy. Together, the base word and the affix behave like a grammatical construction in that the relationship is non-compositional, since the meaning of the whole cannot necessarily be computed from its parts. Furthermore, the affix often underspecifies the nature of the metonymy.

The development of a unified classification system for metonymy that can apply both across domains (lexical and grammatical) and across languages facilitates comparisons that were previously difficult if not impossible to make. At the same time, such comparisons foreground a series of issues that merit further investigation. These include the relationship of affixal word-formation to lexical metonymy, the division of labor between grammar and lexicon, and typological phenomena.

Lexical metonymy and word-formational metonymy can be viewed as parts of a continuum of target specification. At one extreme lexical metonymy offers only a source and rather diffuse contextual cues as to the presence of a metonymic reference. Word-formational metonymy is somewhat more explicit, offering both the source and an (usually) overt cue to the presence of metonymy, such as an affix. In cases of conversion (a.k.a. "zero suffixation"), how-

ever, there may be little or no functional difference between lexical metonymy and word-formational metonymy. Usually conversion is recognized when there is a change in word class and this accompanies a change in the paradigm of the word as well. Highly inflected languages like Russian and Czech, however, usually require that a word have a stem reflecting its word class so that the inflections have an appropriate place to attach. Conversion is not always capable of providing appropriate stems in such languages. This fact perhaps accounts for proportionally higher use of non-null suffixes in word-formation instead of conversion or lexical metonymy in highly inflected languages. The rest of the continuum ranges from underspecified suffixes with a high metonymy ratio to those that signal only one metonymy.

While many metonymies are shared by both lexicon and word-formation, some are exclusive to only one domain. Further research on this distribution could reveal more about how grammar and lexicon divide the task of bearing meaning in language, contributing to an on-going discussion of what can be expressed grammatically and what cannot (cf. Talmy 2005).

In a number of respects, the three languages in this study behave remarkably similarly. The distribution of metonymy patterns per suffix and word class patterns per suffix are similar, as are the distributions of metonymy sources and targets and directionality of metonymy. Furthermore, there is strong agreement on which metonymy and which word class patterns are most prominent, and these patterns confirm the prototypicality of certain metonymy relationships as suggested by Peirsman and Geeraerts (2006). However, more research is needed on the directionality of the observed asymmetries.

It would be important to extend this study to other languages, particularly ones outside of the Indo-European family, in order to explore typological patterns in these distributions. Although word-formation is not a universal phenomenon (cf. Evans and Levinson 2009: 431), it is found in the majority of languages, and in some languages (Finno-Ugric for example, cf. Karlsson 1999) it is considerably more pervasive than in Slavic. If certain metonymies are strongly represented across many languages, they might tell us something about what kinds of concepts are most likely to serve as sources and are thus most salient in human conceptual systems. At the same time, however, language-specific facts emerge, indicating certain differences in expression of metonymy. Some of these differences may be culturally relevant as well.

Finally, this study looked exclusively at types. A given type in the databases might represent only two or several hundred derived words. And each of those words might be of very different token frequency. Frequency data would add a dimension to the measurement of prominence among metonymies.

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