

Modeling word formation in Frame Semantics: metonymy and lexical rules

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Abstract

In this study, I enquire into word formation in Frame Semantics and argue that the semantic relationships between bases, affixes, and derived words cannot be analyzed in terms of metonymy. I show that although metonymy is a well-established strategy in word formation, as in bahuvrihi compounds, the general assumption that derived words are metonymic extensions from their respective bases is problematic in several respects. I argue that the introduction of lexical rules into the inventory of Frame Semantics is theoretically judicious and can offer a better understanding of word-formation phenomena. Such rules can account for the derivation of words and the associative relationships between bases and derivatives. Arguments and proposals are exemplified with data drawn from prefixal lexical negation.

Keywords: metonymy, lexical rules, prefixal lexical negation, affixation

1 Introduction¹

In recent years there has been an upsurge of interest in the study of the relation between metonymy and word formation, and several approaches have been developed (see among others, Radden & Kövecses 1999; Barcelona 2002, 2009; Schönefeld 2005; Peirsman & Geeraerts 2006; Basílio 2009; Janda 2011, 2014; Brdar & Brdar-Szabó 2014, 2013). A review of the relevant literature shows that there are two main approaches to metonymy below the level of word: (a) metonymy operates on single items (e.g. morphological bases) and (b) metonymy is a mechanism that accounts for the relation between affixes and bases.

The first proposal, i.e. metonymy can operate on single items, is evident, for example, in the work of Plag (1999) who argues that it is possible for bases to be understood metonymically. Consider, for instance, that the bases *Marx* in *marxize* and *Chomsky* in *Chomskian* are interpreted metonymically as referring to a framework of ideas and not as referring to the person of that name (Plag 1999: 139). The second approach, which I will call “the metonymy approach to word formation”, is evident in the studies of scholars working within the realms of Frame Semantics (Löbner 2013; Schulzek 2014; Kawaletz & Plag 2015) and cognitive linguistics (among others, Kövecses & Radden 1998; Barcelona 2009;

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Janda 2011, 2014). Under this approach to word formation, metonymy is considered to be a general mechanism that accounts for the semantic relationships between morphological bases, affixes, and derived words. For example, the derived word *driver* is analyzed as an instance of the ACTION FOR AGENT metonymy (Radden & Kövecses 1999).

In this paper, I use Frame Semantics (Petersen 2007; Löbner 2014) and argue that the semantic relationships between bases, affixes, and derived words cannot be generally analyzed in terms of metonymy.

In the following, I give a brief overview of the literature on metonymy and present the metonymy approach to word formation (Section 2). In Section 2.1, I present the way Frame Semantics models metonymy above and below the level of word. In Section 2.2, I focus on the work of scholars working within the realms of cognitive linguistics who have made similar claims. Section 3 delves more deeply into whether the semantic relationships between bases, affixes, and derived words can be analyzed in terms of metonymy. In Section 3.1, I comment on whether derived words are metonymic expressions and argue that we cannot conflate source² and target in word formation. In Section 3.2, I show that the broad notion of metonymy that is employed by proponents of the metonymy approach to word formation cannot promote our understanding of word-formation phenomena. In Section 4, I analyze the prefix *non-* as a stereotype negator and argue that word formation in Frame Semantics should be accounted for in terms of lexical rules. Section 5 concludes the paper.

2 The metonymy approach to word formation

The traditional rhetorical view is that metonymy is a figure of speech that operates on words. That is, metonymy is a *stand for* relationship between names and involves the substitution of the name of one thing for the name of another thing it is associated with. The latter point means that contrary to metaphor, which presupposes resemblance, metonymy is a relationship of contiguity or proximity. Consider the definition in (1):

- (1) METONYMY (Gr. “change of name,” Lat. *denominatio*). A figure in which one word is substituted for another on the basis of some material, causal, or conceptual relation. Quintilian lists the kinds usually distinguished: container for thing contained (“I’ll have a glass”); agent for act, product, or object possessed (“reading Wordsworth”); cause for effect; time or place for their characteristics or products (“a bloody decade,” “I’ll have Burgundy”); associated object for its possessor or user (“the crown” for the king). (Greene et al. 2012: 876)

Cognitivist literature rejects the idea that there is a strict separation between literal and figurative language (Gibbs 1994) and holds that metonymic relations are established between concepts and not words. That is, metonymy is conceptual in nature and cannot be merely considered as a figure of speech or a matter of words. In addition, metonymy is not treated as a stand for relationship, but as a cognitive process through which speakers gain access to one entity via another conceptual entity. Thus, metonymy is a reference-point phenomenon by which one conceptual entity, i.e. the source, affords access to another conceptual entity,

²In the relevant literature, *source* is also called *reference point* (Langacker 1993) or *vehicle* (Kövecses & Radden 1998). In this paper, I will use the term *source* to refer to the conceptual entity which provides access to the target entity.

i.e. the target (Langacker 1993: 30). Consider the definition of Radden & Kövecses (1999: 21) (2):

- (2) Metonymy is a cognitive process in which one conceptual entity, the vehicle, provides mental access to another conceptual entity, the target, within the same domain, or ICM.

According to Lakoff (1987), an *Idealized Cognitive Model* (ICM) is understood as “a complex, structured whole, a “gestalt”, which organizes our knowledge, and uses metonymic mapping as one of its structuring principles” (Lakoff 1987: 68). Some metonymies are given below (adapted from Lakoff & Johnson 1980: 38-39):

- (3) THE PART FOR THE WHOLE Get your butt over here!
PRODUCER FOR PRODUCT He bought a Ford.
OBJECT USED FOR USER The sax has the flu today.
INSTITUTION FOR PEOPLE RESPONSIBLE Exxon has raised its prices again.
THE PLACE FOR THE INSTITUTION The White House isn't saying anything.
THE PLACE FOR THE EVENT Remember the Alamo.

According to Lakoff & Johnson (1980: 37), metonymy is not merely a matter of language since it manifests itself in our everyday life and is grounded in experience. Consider the example in (4) where a person's *pretty face* is used to denote the *person*.

- (4) She's just a pretty face.

The metonymy THE FACE FOR THE PERSON is evident in our cultural experience, as for instance in painting and photography in which portraits function in terms of metonymy; a person's face for the person.

2.1 Frame Semantics and metonymy

Metonymy is based on contiguity, and cognitivist linguistics has tried to capture this in terms of ICMs, domains, and frames. In this section, I present the way Frame Semantics accounts for metonymy. In particular, I present the analysis put forward by Löbner (2013) who argues that metonymy shifts “the reference of an expression to something that BELONGS to the original kind of referent” (p. 313).

Let us first offer a brief overview of the way frames³ are used as formats for describing concepts. Consider the following two hypotheses from Löbner (2014: 23-24):

H1 The human cognitive system operates with a single general format of representations.

H2 If the human cognitive system operates with one general format of representations, this format is essentially Barsalou frames.

³Frames have been used by several scholars to model linguistic phenomena (for an overview see Lehrer & Kittay 1992). Frames, for example, figure in works on Lexical Functional Grammar (Bresnan 2001) and Head-Driven Phrase Structure Grammar (Pollard & Sag 1994). More recently, Sag (2012) uses a version of Frame Semantics and Minimal Recursion Semantics (Copestake et al. 2005). Fillmore's frames (Fillmore 1982) are used in the FrameNet project (Fillmore & Baker 2010). In this paper, I will use Frames as defined in the work of Petersen (2007), Petersen & Gamerschlag (2014), and Löbner (2013, 2014, 2015).

These two hypotheses build on the work of Barsalou (1992a,b, 1999) and constitute the *Frame Hypothesis*. A frame is a recursive attribute-value structure that provides information about a referent and fulfills the following three uniqueness conditions (Löbner 2014: 27):

UR Unique frame referent

All attributes and subattributes recursively relate to one and the same referent. (For the graph representation, there is exactly one node, the central node, such that every other node can be reached from it via a chain of one or more attribute arcs.)

UV Unique values

Attributes are partial functions: Every attribute assigns to every possible possessor exactly one value.

UA Unique attributes

Every attribute is applied to a given possessor in a frame structure only once. (All attributes assigned to a given possessor are mutually different.)

Frames can be represented as either attribute-value matrices (AVMs), as also used, for example, in Head-driven Phrase Structure Grammar (HPSG, Pollard & Sag 1994), or as directed graphs. In the latter formalization a frame is “a directed, connected graph with nodes labeled by types and arcs labeled by attributes” (Petersen & Osswald 2014: 248). Attributes are always functional, in that there cannot be two arcs labeled with the same attribute going out from one node. The central node is the reference node⁴ and is marked by a double border; rectangular borders are used for arguments. Consider for example the frame of the concept >basketball<⁵ as a directed graph and as an attribute-value matrix (adapted from Petersen & Osswald 2014: 247):

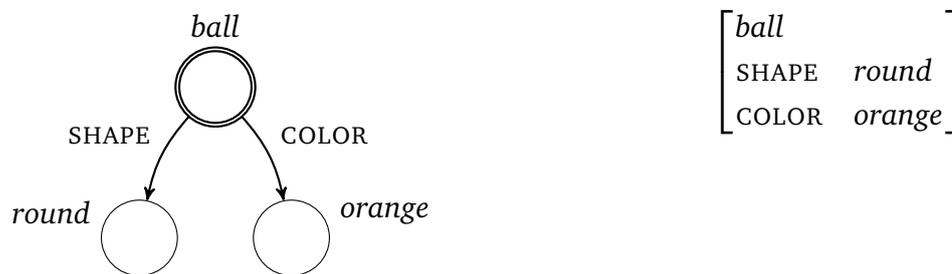


Figure 1: Frame for >basketball< as a directed graph and as an AVM

Figure 1 informs us that >basketball< is a type of ball that is round and orange. The double border marks the central node that refers to the extension of the concept.

Given that frames are attribute-value structures, metonymical shifts can be defined as cases in which “reference is shifted to the value of one of the original referent’s attributes” (Löbner 2013: 314). Consider for example the sentence in (5) from Löbner (2013: 51) in which *the university* refers to the campus:

⁴The reference node stands for the referential argument. In the case of nouns, for example, it stands for the so-called “R” argument that suggests “referential” and is involved in referential uses of NPs (Williams 1981; Wunderlich 2012).

⁵Concepts will be included in brackets > <.

(5) The university lies in the eastern part of the town.

This metonymical shift from the concept >university< to >campus< is depicted in Figure 2 (from Löbner 2013: 314).

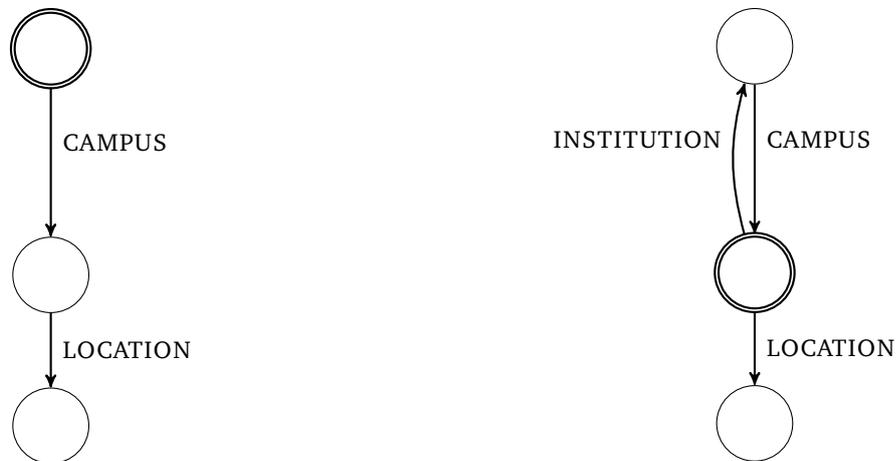


Figure 2: Metonymical shift >university< to >campus<

In that figure, *CAMPUS* is an attribute of the referent node of >university< (given as the top node in the left-hand representation) and its value is further specified by the attribute *LOCATION* that allows us to form sentences such as the one in (5). Via metonymy, the referent node is shifted, in that the value of the attribute *CAMPUS* is the new referent node as shown in the graph on the right in Figure 2. Observe, however, that this referent is linked back to the original referent by an attribute *INSTITUTION* that takes university as its value. This means that metonymy in Frame Semantics is understood as a shift of reference from the original referent node to one of the values of its attributes and this shift is only made possible when an appropriate attribute links the new referent back to the original referent node; this relation is called *bidirectional functionality*.

A frame semantic approach to word formation also makes reference to metonymy (see for example Löbner 2013 and Schulzek 2014 on *-er* and possessive compounds in German, and Kawaletz & Plag 2015 on English *-ment* nominalizations). The derived *walker* serves as an illustrative example of metonymy below the level of word (from Löbner 2013: 312).

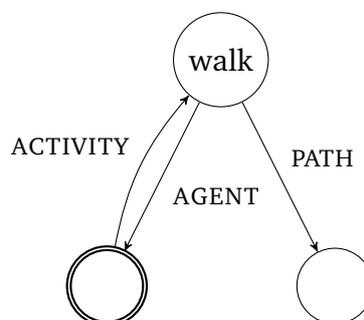


Figure 3: Frame for >walker<

The concept >walk< has two attributes, namely AGENT and PATH as for example in *We walked to the station*. Thus, >walker< is formed by shifting the reference to the value of the attribute AGENT of >walk<. Observe that in accordance with bidirectional functionality, there is an attribute ACTIVITY that links the new referent back to the original referent node; a >walker< is engaged in a walking activity.

In a similar vein, Kawaletz & Plag (2015) analyze *-ment* nominalizations in terms of metonymy. Consider, for example, the frame for the derived *bumfuzzlement* in Figure 4 (from Kawaletz & Plag 2015: 312).

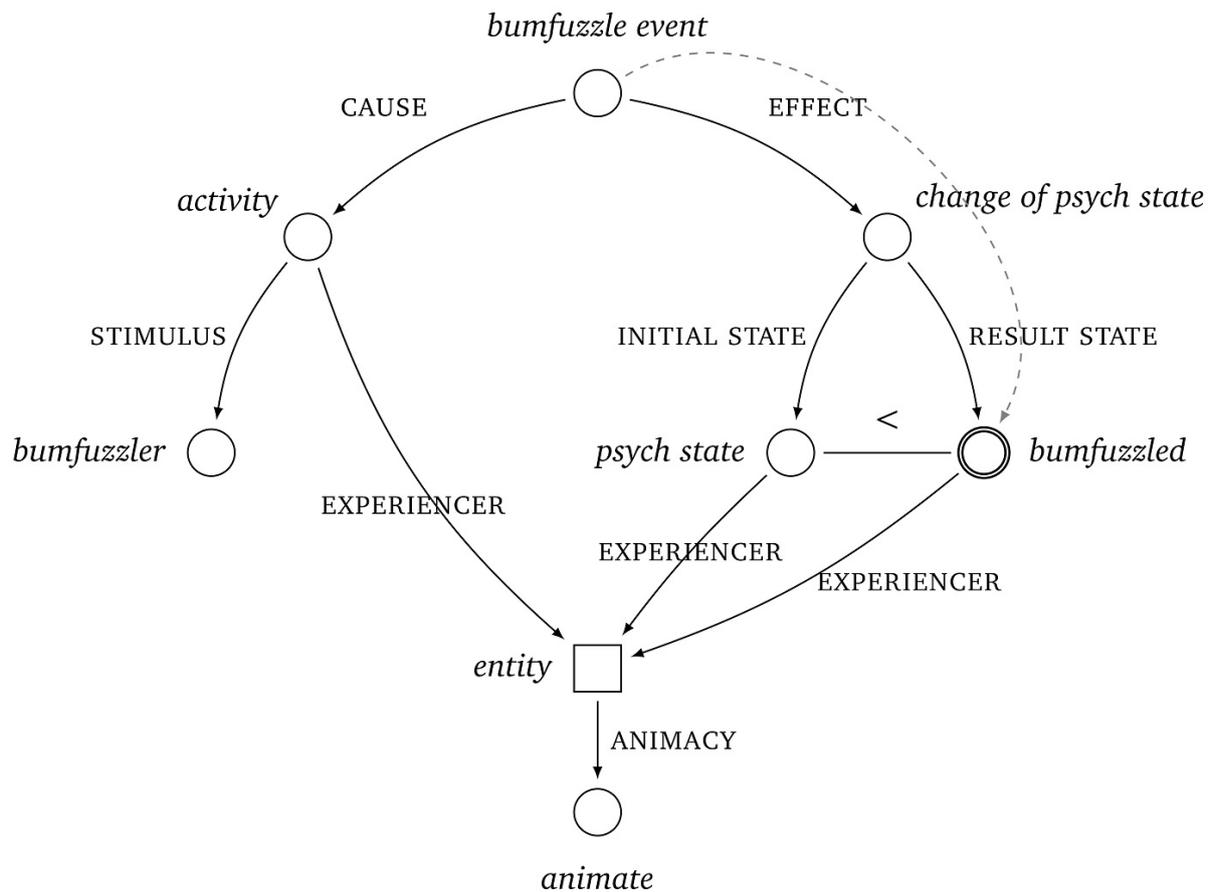


Figure 4: Partial frame for the nominalization *bumfuzzlement* in a RESULT STATE reading

In their analysis, the verb *bumfuzzle* is a complex event of psychological causation and consists of two sub-events: a CAUSE and an EFFECT. The CAUSE is an activity and the EFFECT is a change of psych state with an INITIAL STATE and a RESULT STATE. Thus, the RESULT STATE reading of *bumfuzzlement* is understood as a shift from the original referential node, i.e. *bumfuzzle event*, to the node *bumfuzzled*, which specifies the arc of RESULT STATE.

There are two technical, theory internal problems with the frame in Figure 4. The first problem is that the arc which connects the node *bumfuzzle event* to the node *bumfuzzled* is not labeled. The second problem is that there is no attribute linking the node *bumfuzzled* to the original referent. Thus, the frame in Figure 4 violates *bidirectional functionality*. In more detail, *bidirectional functionality* is a relation which accounts for the assumed metonymical

relation between the base and the derived word. Violation of *bidirectional functionality* casts doubts on the overall concept of word-formation as metonymy since it is not always possible to devise proper attributes to establish bidirectionality. That is, to link the original referent to the new referent, and to link the new referent to the original referent.

Let us now turn to bahuvrihi compounds of the *redhead* type that have been analyzed by scholars as a category of endocentric compounds that is based on metonymy (Booij 2002, 2007; Bauer 2008, 2010; Lieber 2004, 2005, 2009; Andreou & Ralli 2015). In other words, bahuvrihis are instances of the stylistic trick *pars pro toto* according to which a salient feature/part of an entity is used to denote the whole entity (part-for-whole relationship). By way of example, *redhead* is used metonymically to denote ‘a person with red hair’.⁶

Frame Semantics offers a detailed account of the way metonymy can be modeled in bahuvrihi compounds. Consider the analysis of the German *Lockenkopf* ‘lit. curls-head, curly hair’ that can be used in both a metonymical and a non-metonymical way (examples adapted from Schulzek 2014: 234):

- (6) a. *Peter hat einen Lockenkopf.*
 Peter have.3SG a.ACC curls-head
 ‘Peter has curly hair.’
- b. *Der Lockenkopf ist laut und nervig.*
 The curls-head be.3SG loud and obnoxious
 ‘The curly-haired person is loud and obnoxious.’

Both uses of this compound can be captured in frames as illustrated in Figures 5 and 6 (from Schulzek 2014: 236).

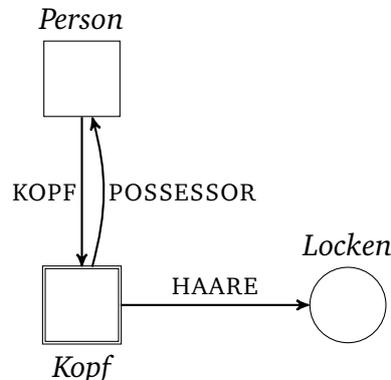


Figure 5: Frame for the compound *Lockenkopf*

⁶It should be noted that in *redhead*, there is a WHOLE FOR PART metonymy as well since *head* is used to denote *hair*.

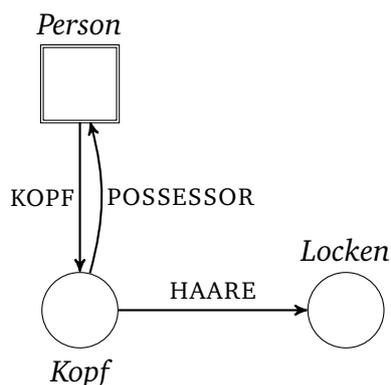


Figure 6: Metonymical shift

In Figure 5, >Kopf< ‘head’ contains an attribute HAARE ‘hair’ the value of which is *Locken* ‘curls’, and a possessor node of type *Person* ‘person’. Given that >Kopf< ‘head’ is a functional concept (Löbner 1985; Löbner 2014), it comes with a possessor argument in its frame; head is part of a person’s body. The double border marks the referential node of the frame, that is, *Kopf*.

Figure 6 captures the metonymical use of the compound *Lockenkopf*. This is modeled as a metonymical shift, that is, a shift in which the referent is no longer *Kopf* but the possessor node (which is marked by a double border). The central node of the frame *Kopf* is not an argument of the new concept, i.e. >person<, and, thus, it is transformed into a round node.

2.2 Cognitive linguistics and metonymy

In the previous section I showed the way the products of word formation can be interpreted in terms of metonymy in Frame Semantics. In this section, I present the work of scholars working within the realms of cognitive linguistics who have made similar claims (see among others, Kövecses & Radden 1998; Radden & Kövecses 1999; Barcelona 2002, 2009; Basílio 2009; Janda 2011, 2014).

Janda (2011, 2014) argues that the semantic relationships between bases, affixes, and derived words can be analyzed in terms of metonymy. Thus, she considers metonymy to be a general cognitive strategy that explains linguistic phenomena (Janda 2011: 359). Janda sees affixation as a metonymic process and derived words as metonymic extensions from their respective bases. In her analysis, the base is the source, the target is the derived word, and the affix is the context for the metonymic relationship. Consider, for example, the PART FOR WHOLE and CONTAINED FOR CONTAINER metonymies in (7) and (8), respectively (examples adapted from Janda 2011: 360):

- (7) PART FOR WHOLE
- a. We need a good **head** for this project.
 - b. **brjuxan** (‘belly’ -an) ‘person with a large belly’ *Russian*
 - c. **břicháč** (‘belly’ -áč) ‘person with a large belly’ *Czech*
- (8) CONTAINED FOR CONTAINER

- a. The **milk** tipped over.
- b. **saxarnica** ('sugar' -nica) 'sugar-bowl' *Russian*
- c. **květináč** ('flower' -áč) 'flower-pot' *Czech*

The items in bold are the sources used to access targets. In (7a), a part of the target concept >person<, namely *head*, is used as a source to provide access to the whole. Under Janda's analysis, the PART FOR WHOLE metonymy is also evident in the Russian *brjuxan* ('belly' -an) 'person with a large belly' (7b) and Czech *břicháč* 'person with a large belly' (7c). In a similar vein, *the milk* in (8a), exhibits a CONTAINED FOR CONTAINER metonymy since the content of a container is used as a source to access the target, that is, the thing containing milk. Janda assumes that the CONTAINED FOR CONTAINER metonymy is also at work below the level of word as exemplified by (8b-c). The actual content of this claim, however, is far from clear. If the base is the source and the derived word is the target, then *saxar* 'sugar' in (8b) stands for *saxarnica* 'sugar bowl' and *květina* 'flower' in (8c) stands for *květináč* 'flower-pot'. In Janda's words, "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" (Janda 2011: 361). Thus, under the metonymy approach to word formation, the base stands for the derivative. This idea, however, is rather problematic since it is the affix that provides access to the interpretation of the derived word, and not the base.

What does it mean that word-formation "performs metonymies" which are derived from bases such as *saxar* 'sugar', and how is this achieved? What is the role of word-formation rules, processes, and categories such as stem and affix in this derivation of metonymies? What does it mean to treat the affix as the context for metonymy? Although Janda (2011) claims that her study applies "a system-wide approach" (p. 364), these questions are not dealt with satisfactorily in her work.

A similar proposal is made by Kövecses & Radden (1998) and Radden & Kövecses (1999). These scholars argue that there are two types of metonymy-producing relationships, namely (a) between a whole Idealized Cognitive Model and its part(s) and (b) between Parts of an Idealized Cognitive Model. The first configuration is evident in cases in which speakers access the whole ICM via one of its parts as in *America* for 'United States' (i.e. WHOLE THING FOR A PART OF THE THING) or *England* for 'Great Britain' (i.e. PART OF A THING FOR THE WHOLE THING). The second configuration allows for metonymies between parts of the ICM, that is, cases in which speakers access a part via another part of the ICM. Consider the following (adapted from Radden & Kövecses 1999: 37):

- (9) a. AGENT FOR ACTION: to author a new book; to butcher the cow
b. ACTION FOR AGENT: writer; driver
- (10) a. INSTRUMENT FOR ACTION: to ski; to hammer
b. ACTION FOR INSTRUMENT: pencil sharpener; screwdriver
- (11) a. OBJECT FOR ACTION: to blanket the bed; to dust the room
b. ACTION FOR OBJECT: the best bites; the flight is waiting to depart
- (12) a. RESULT FOR ACTION: to landscape the garden
b. ACTION FOR RESULT: the production; the product
- (13) MANNER FOR ACTION: to tiptoe into the room

- (14) MEANS FOR ACTION: He sneezed the tissue off the table.
 (15) TIME FOR ACTION: to summer in Paris
 (16) DESTINATION FOR MOTION: to porch the newspaper

The examples in (9)-(16) include Noun-to-Verb conversion (e.g. to blanket the bed) and Verb-to-Noun nominalization via overt affixation (e.g. writer). Radden & Kövecses (1999) treat Noun-to-Verb conversion and nominalizations as reversible metonymies. In other words, a participant is converted into a verb in Noun-to-Verb conversion (e.g. to author a new book) and a predicate is nominalized in overt affixation (e.g. production). Thus, they claim that “Noun-verb conversion and nominalization can therefore be seen as two complementary morphological processes leading to the two types of reversible metonymies. What makes these morphological derivations special types of metonymy, however, is their conflation of vehicle and target: the original word class describes the metonymic vehicle and the morphologically recategorized form expresses the target” (Radden & Kövecses 1999: 38). Although one could claim that this “conflation” holds for cases of conversion, it is at least doubtful to assume that the base and the derived word in overt affixation can be “conflated”. In overt affixation there is change in form, e.g. from *produce* to *production*.⁷

An additional problem is that, from a morpho-semantic perspective, the metonymical approaches to word formation presented in this section, do not take into consideration a number of aspects of derived words. Consider, for example, the lexemes *to ski* and *to hammer*. Radden & Kövecses (1999) treat these as instances of the INSTRUMENT FOR ACTION metonymy. This analysis does not take into consideration two crucial aspects of these lexemes. The first aspect is the difference between the two verbs. The activities denoted by the two verbs are certainly not the same but this is not shown by the proposed analysis. The second aspect is that in Noun-to-Verb conversion there is a change in the argument structure of the base. That is, a Noun such as *hammer* has a referential argument, i.e. “R”. The verb *to hammer*, however, is an EVENT, and, as such, it comes with a different argument structure. An analysis, nevertheless, which simply treats *to hammer* as an INSTRUMENT FOR ACTION metonymy, leaves much to be desired.

3 Word formation is not metonymical in nature

This section delves more deeply into whether the semantic relationships between bases, affixes, and derived words can be analyzed in terms of metonymy. In Section 3.1, I argue that derived words are not metonymic expressions and that we cannot conflate source and target in word formation. In Section 3.2, I comment on whether the broad and very general notion of metonymy that is employed by proponents of the metonymy approach to word formation can promote our understanding of word-formation phenomena.

⁷It could be the case that conversion (at best) could be treated as metonymy. In other words, given that there is no change of form in converted pairs, one could assume that source and target in conversion are “conflated”.

3.1 Derived words are not metonymic expressions by nature

In (17), *the glass* is a metonymical expression which stands for the liquid in the glass. This is a CONTAINER FOR CONTAINED metonymy.

(17) She drank **the glass**.

The glass as a metonymic expression is in a way polysemous since it is used to cover multiple senses. It refers to the concepts >glass< and >liquid<, that is, to the source and target respectively. Observe that the two concepts “conflate” since they are identified phonologically.

Could one propose that a parallel mechanism is at work in word formation as well? The main problem with the idea that derived words are metonymic expressions is that it is highly problematic to assume that target and source “conflate” in affixation (contra Radden & Kövecses 1999: 38). In particular, in bare metonymies (e.g. *the glass*) there is no marker flagging the new concept that is accessed via metonymy and, thus, “conflation” of source and target is possible. In overt affixation, however, this conflation is not possible since we observe a change in the form of the base lexeme.

Change in form also affects the way bare metonymies and derived words work in context. In particular, although a rich context is needed in order to trigger metonymic extensions, derived words are meaningful by and of themselves (Schönefeld 2005). That is, in bare metonymies it is the context that triggers the new sense of the metonymic expression *the glass* in (17). In affixation, however, it is the addition of a derivational suffix to a base that guides speakers to the new sense. This is not to say that the actual reading of derived words might not be context sensitive. There is plenty of evidence that context can shape the reading of words (Hanks 2013). My claim is that the addition of a suffix, as for example *-er*, to a base triggers and flags the creation of a new concept which may acquire specific readings in context. This is in accordance with a concept of morphology in which it is the affix that provides access to the derived word and not the base lexeme.

3.2 Against overgeneralizing metonymy

The idea that word formation is metonymical in nature is based on a rather broad definition of metonymy. The choice of a broad over a narrow definition of metonymy is based on the idea that a broad definition allegedly allows one to capture larger generalizations (Janda 2014: 342-343). This can be useful insofar as these generalizations promote our understanding of the way linguistic phenomena work.

What is the larger generalization that metonymical approaches capture? The assumed generalization in the relevant literature is that metonymy, that is, the cognitive strategy of using a conceptual source to access a target, is manifested below and above the level of word. This generalization allows proponents of this proposal to draw some parallels between bare metonymies (i.e. >university< being used to refer to >campus<) and derived words (>driver< ACTION FOR AGENT metonymy). Although the exact nature of these parallels is far from clear, it seems that they are based on some notion of contiguity.

The idea that contiguity-based relationships are necessarily metonymical in nature has been called into question by a number of scholars (among others Koch 1999a,b, 2001; Brdar & Brdar-Szabó 2013, 2014; Panther & Thornburg 2002). Koch (2001: 232-233) considers

cases such as the Italian *pera* ‘pear’/*pero* ‘pear tree’, the French *ferme* ‘farm’/*fermier* ‘farmer’, and the German *Brief* ‘letter’/*Briefmarke* ‘stamp’, and argues that although these formations are based on contiguity, they are not metonymies. In his view, contiguity-based relationships are the cognitive basis not only of metonymy but of lexical processes that involve a morpho-lexical change of form as well. Consider for instance the contiguity between FRUIT and TREE (Koch 1999a: 158):

- (18) a. limone ‘lemon’, hence: ‘lemon tree’ *Italian*
 b. limón ‘lemon’, limonero ‘lemon tree’ *Spanish*
 c. lemon, lemon tree *English*

Although all three examples exhibit the same contiguous relation (i.e. FRUIT and TREE), Koch mentions that a metonymic change of meaning and metonymic polysemy are evident only in the Italian example *limone*. The contiguous relation in the Spanish and English formations is accounted for by word formation.

In reference to whether a broad definition of metonymy promotes our understanding of linguistic phenomena, Brdar & Brdar-Szabó (2014) mention that “if every contiguous or associative relationship in grammar is a priori metonymic, it is trivial to qualify anything as metonymic as it does not add anything to our knowledge, i.e. our understanding of language.” (Brdar & Brdar-Szabó 2014: 323).

In a similar vein, Panther & Thornburg (2002) also argue against an overgeneral notion of metonymy. Thus, they militate against the proposal that the base word in derivation serves as source that affords access to another conceptual entity (i.e. the target). They reject the idea that in the derived *teacher*, *teach* acts as a metonymic source, for this “[...] leads to an undesirable overgeneral notion of metonymy. We will therefore say that the verbal base evokes the whole scenario (with its concomitant participants) directly (i.e. non-metonymically) [...]” (Panther & Thornburg 2002: 287).

Another problem with the overgeneral notion of metonymy is that it is not clear why every associative relationship should be treated as metonymical. With respect to word formation, one could argue that this relation can be explained in terms of the compositional and associative nature of morphological processes. As widely acknowledged by scholars (see among others Aronoff 1976; Plag 1998, 1999, 2003; Lieber 2004), the combination of an affix and a base affects both the form and the semantics of the base. An illustrative example of a lexeme-formation rule is given below (Lieber 2010: 181):

- (19) *-ize*
 structural information: [[]_{A,N} ___]_V
 semantic information: ‘make A; make/put into N’
 phonological information: [. . .σσ_w aɪz]

The structural information that this rule encodes is that *-ize* is a suffix that attaches to adjectives or nouns, and derives verbs. The semantic information can be described as the addition of the meaning ‘make A or make/put into N’ to the derived lexeme. Finally, *-ize* combines with bases that have at least two syllables, the last of which is unstressed. Thus, the contiguous and associative relationship between the base and the derived word is not conceptualized as metonymical in nature. Rather, this relationship is accounted for by derivation involving an operation on the lexeme that serves as the base for the derivation.

Thus, the meaning of the base contributes to the semantics of the derived word.

Consider also that the application of an overgeneral notion of metonymy to word formation offers a rather simplistic account of word phenomena. This is mainly due to the fact that a large portion of literature on word formation is not taken into consideration and the proposed analyses are rather vague. Any articulated theory that aspires to do justice to word-formation phenomena must tackle a number of issues that are not taken into consideration by metonymic approaches to word formation.

One very prominent issue is that the combination of affixes and bases is regulated by restrictions that constrain overgeneration and lead to well-formedness as we saw above with respect to *-ize*. Selection figures prominently as one of these restrictions. Affixes come with certain selectional restrictions in their entries that consist of information on the types of bases they attach to and the type of arguments they have scope over. These well-formedness conditions may be of semantic nature (on *s*-selection see Lieber 2004, 2007; Plag 2004) and have an impact on the reference of the derived word. Consider, for example, the difference between the affixes *-er* and *-ee* on verbs. The affix *-er* most productively selects for verbs the external argument of which is volitional and *-ee* has scope over the internal argument of the verb it combines with (Barker 1998; Lieber 2004). The fact that restrictions affect the referential properties of the derived lexeme is evident in that *driver* is agentive and *employee* has an object-oriented meaning. Metonymical approaches, however, do not inform the discussion on the referential properties of derived words. In the previous section, we noted that in a metonymy approach to word formation, *driver* would be an instance of the ACTION FOR AGENT metonymy. Such an analysis, however, does not offer an account of the way the contiguous and associative relationship between *drive* and *driver* is established in the first place.

4 Frame semantics, metonymy, and lexical rules

In this section, I focus on lexical negation⁸ and show that it is highly problematic to assume that metonymy could explain all word formation (see also Brdar & Brdar-Szabó 2013). In addition, I argue that the introduction of lexical rules into the apparatus of Frame Semantics can offer a better understanding of word-formation phenomena.

Why lexical negation? Any theory that aspires to offer a comprehensive approach to word formation must take into consideration processes in which information not already present in the frame of a concept seems to be added to it. As we saw in Section 2.1, the concept *>walker<* is formed by shifting the reference from the original referential node to the value of the attribute AGENT of *>walk<*. In this case, the referent of *>walker<* is a participant in the *>walk<* event, and, thus, an argument already present in the frame of the base concept. Negation, however, introduces semantic information that is not already part of the frame of the base concept.

Bauer et al. (2013) show that lexical negation in English covers a range of eight readings as illustrated in Figure 7.

⁸Given that “standard (or clausal) negation” can be expressed by means of affixation in many languages, I use the term “lexical negation” instead of “affixal negation” to refer to the contribution of affixes. As a result, the distinction between lexical and clausal negation should not be based on whether the negator is an affix or a word (Dahl 2010; Andreou 2015).

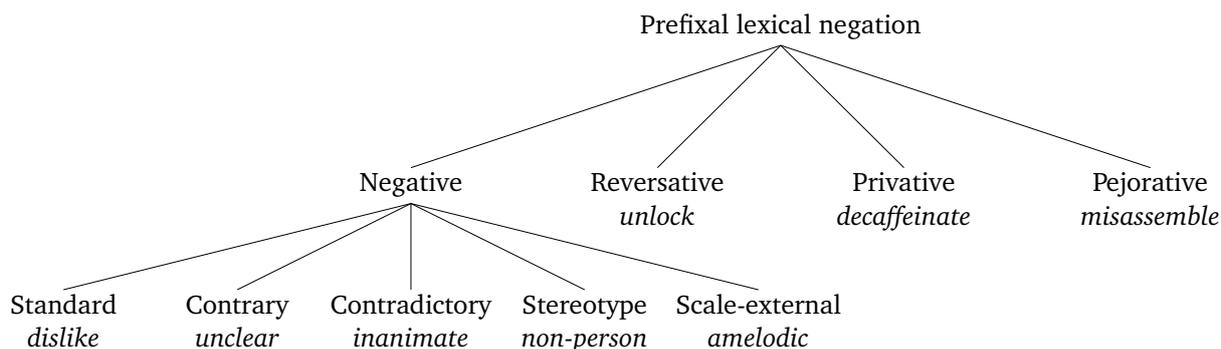


Figure 7: Distribution of readings in prefixal lexical negation (based on Bauer et al. 2013: Ch. 17)

Standard lexical negation exemplified by *dislike* ‘not like’ is very similar in interpretation to standard clausal negation, i.e. ‘not X’.

The distinction between contrary and contradictory negation is based on the characteristics of the adjective that serves as the base for the derivation. In particular, in contrary negation, “P” and “not-P” can be false at the same time since there can be a middle state between the two as exemplified by the pair *clear-unclear*. Although *clear-unclear* cannot be true at the same time, they can be simultaneously false since between the two, which are considered as terminal points on a gradable scale, there can be intermediate states. That is, something can be neither *clear* nor *unclear*.

Contradictory meanings, however, exclude any intermediate states. To adduce an example, one can be either *animate* or *inanimate*; there is no middle state between the two (for more on this issue see Horn 1989/2001).

In stereotype negation, what is negated is a part of the qualities of the base noun. A *non-person*, for instance, is a person whose existence is not recognized. Thus, the derived word is not a stereotypical exemplar of its category.

Scale-external negation is evident in cases in which what is denoted is the “complete irrelevance of the scale or polar opposition in question” (Bauer et al. 2013: 365). *amelodic*, for example, does not denote something melodic or unmelodic, but something for which the total absence of melody is relevant.

Reversative covers prefixed verbs such as *unlock* in which the verb describes a reversal of the action. Privation, which also covers removal, manifests itself in verbs such as *decaffeinate* in which the meaning ‘depriving of or removing the thing described by the nominal base’ is salient. Finally, in *misassemble* ‘to assemble incorrectly’, the prefix *mis-* contributes a negative evaluation.

These readings are expressed by a number of affixes which can be polysemous. The prefix *non-*, for example, produces privative, contrary, contradictory, and stereotype negation, and *un-* expresses contrary, contradictory, reversative, privative, and stereotype negation. In this section, I focus on the use of *non-* as a stereotype negator.

Could metonymy account for lexical negation? One could argue that *driver*, (pencil) *sharpener*, and *saxarnica* ‘sugar-bowl’ could be analyzed as instances of ACTION FOR AGENT, ACTION FOR INSTRUMENT, and CONTAINED FOR CONTAINER metonymy, respectively. This raises the following question: if *saxar* ‘sugar’ (i.e. CONTAINED) stands FOR *saxarnica* ‘sugar-

bowl' (i.e. CONTAINER) and *drive* (i.e. ACTION) FOR *driver* (i.e. AGENT), what kind of metonymy could account for that *lock* stands FOR its reversative *unlock*, *like* FOR *dislike*, and *animate* FOR *inanimate*?

In the following, I will focus on stereotype negation and show that the contiguous relation between the bases and derived words follows from the associative nature of word formation processes. Thus, it is not a result of metonymy. Consider for example the use of *non-* as a stereotype negator in the following example from Bauer et al. (2013: 371):

- (20) The man in the tweed suit wore his hair clipped short, in a crew cut. It was a flat metallic color, a **non-color**, like his eyes.

An analysis of *non-color* should capture that the derived word denotes a kind of *color*, but lacks a characteristic quality of the base; *non-color* lacks vibrancy.

Other examples of *non-* as a stereotype negator from the OED, include the lexemes *nonperson*, i.e. 'a person who is regarded as non-existent or unimportant, or who is not considered as a person for purposes of entitlement to rights, etc.; an ignored, humiliated, or forgotten person', *nonanswer*, i.e. 'an answer that does not deserve to be called an answer; an inadequate or evasive answer', and *nonword*, i.e. 'an unrecorded or hitherto unused word; a word which has (or is regarded as having) no accepted meaning' (for more examples see Algeo 1971).

Given that a metonymical analysis does not seem to be possible for these cases, it is the contention of this study that semantic rules that model the interaction of affix and base semantics need to be introduced. Such a rule for *non-* should model the fact that this prefix on nouns can act as a stereotype negator, in that it can negate the value of an attribute of the base lexeme. Which attribute(s) is/are affected is contextually determined. The rule should not change the referential or categorial properties of the base word. That is, both the base and the derived word should share reference and belong to the same category.

Before we proceed with the rule for *non-*, let us first introduce the notion of *type signature*. I assume that attributes and their values are given in a type signature which can be considered as an ontology which covers world knowledge (Petersen & Gamerschlag 2014).⁹ According to Petersen & Gamerschlag (2014: 203-204) a type signature restricts the set of admissible frames, includes a hierarchy of the set of types, and states appropriateness conditions (ACs). These conditions declare the set of all admissible attributes for a lexeme of a certain type and the values these attributes take. ACs are inherited by subtypes. Consider, for example, the type signature in Figure 8.

⁹For more on typed feature structures see Carpenter (1992).

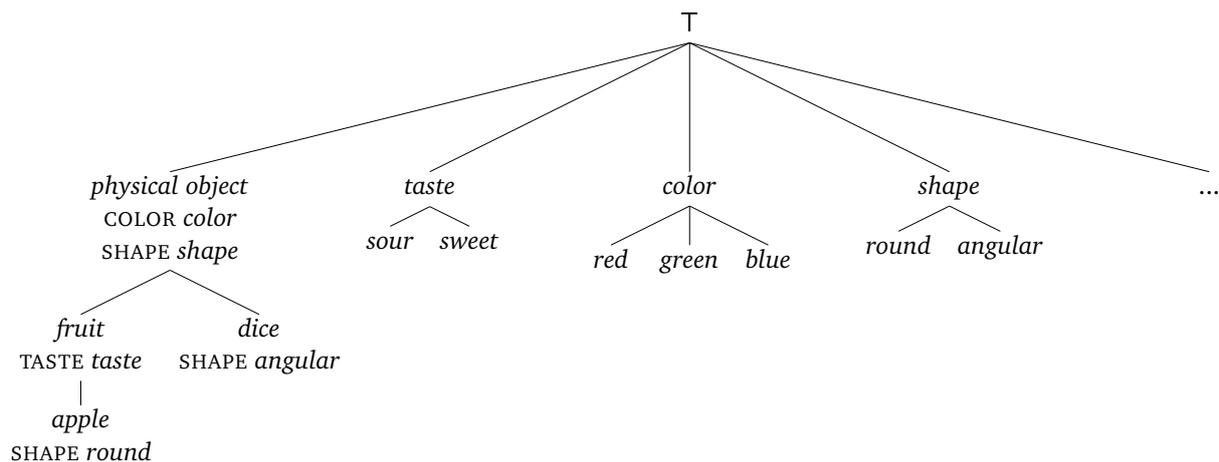


Figure 8: Example type signature (adapted from Petersen & Gamerschlag 2014: 204)

In this type signature, subtypes are given below supertypes. For example, *apple* is a *fruit*, which is itself a *physical object*. The node *physical object* meets two ACs, that is, it is characterized by the attributes *COLOR* and *SHAPE* that have the values *color*, *red*, *green*, *blue* and *shape*, *round*, *angular*, respectively. According to the ACs on *physical object*, *TASTE* does not attach to nodes of this type. Thus, not all *physical objects* have a taste. Given that ACs are inherited and tightened by subtypes, *apple* inherits the ACs on *fruit* and *physical object*. Thus, *apple* is characterized by the attributes *TASTE*, *COLOR*, and *SHAPE*. The value of *SHAPE* is *round* since subtypes not only inherit attributes from their supertypes, but also specify and tighten the value of inherited attributes. In a similar vein, *dice* inherits the attribute *SHAPE* from the node *physical object* and specifies the value of *SHAPE* as *angular*.

Let us now comment on the use of *color* as both an attribute label (i.e. *COLOR*) and a type label (i.e. *color*). In frames, this redundancy is attributed to the ontological status of attribute concepts. These functional concepts can be interpreted both *denotationally* and *relationally* (Guarino 1992). Thus, the denotational interpretation of *color* covers the set of all colors (i.e. type label *color*) and the relational interpretation covers the use of *color* as a functional attribute that assigns a particular color (e.g. *red*) to the referent of the frame (for more on the use of functional attributes see Löbner 2015).

Figure 9 gives a sample rule for *non-* as a stereotype negator in the form of an attribute-value matrix (AVM). AVMs have been used by HPSG (Pollard & Sag 1994; Riehemann 1998; Koenig 1999) and other constraint-based models (see Bonami & Crysmann 2016 and literature therein) to capture morphological phenomena. In Frame Semantics, AVMs have also been used for syntactic and computational purposes (see for instance Kallmeyer & Osswald 2013; Osswald & Van Valin 2014). As I will show, the use of attribute-value structures proves to be very useful with respect to the analysis of lexical negation. In particular, it allows one to offer a detailed analysis of negation and to express scope.

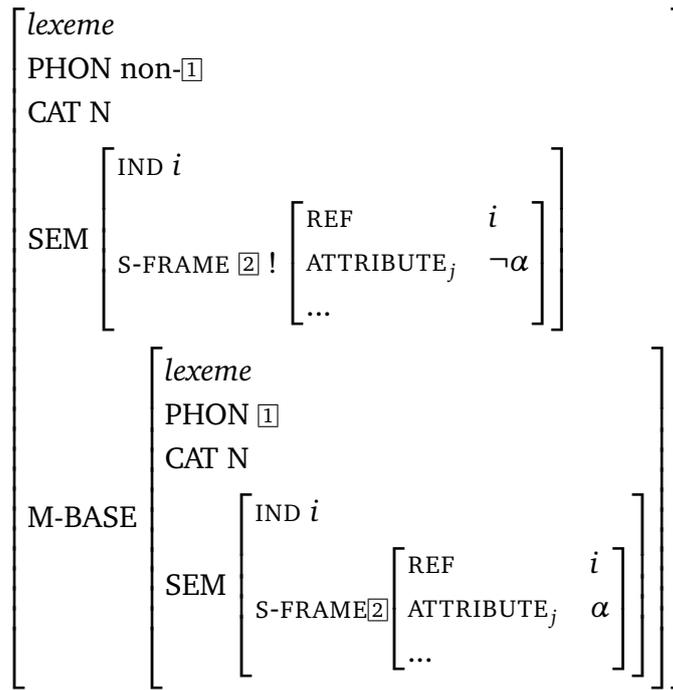


Figure 9: Sample rule for *non-* as a stereotype negator

The rule in Figure 9 gives a parallel representation of phonological information (PHON), morphosyntactic information (in particular, category, CAT), and semantic information (SEM) of both the derived lexeme and the morphological base (M-BASE)¹⁰.

The M-BASE has the phonology $\boxed{1}$, its category is N(oun), and its semantic information is specified by index (IND) and semantic frame (S-FRAME). IND identifies the referent of a lexeme. S-FRAME conveys two kinds of semantic information. First, it includes information on the referential properties (REF) of the M-BASE. Second, it includes functional attributes that assign values to the referent of the frame, in this case the referent of the M-BASE. In Figure 9, the M-BASE has an ATTRIBUTE_j with the value α . The three dots in the S-FRAME indicate that there might be other attributes as well.

The derived lexeme is phonologically realized as non- $\boxed{1}$, where $\boxed{1}$ is the phonology of the base lexeme. A caveat is in order here. Structure sharing in AVMs is indicated by boxed numerals. That is, the derived lexeme and the base lexeme share the phonological value $\boxed{1}$. The value of CAT is the same for both the derived and the base lexeme. That is, both are specified as N(ouns). The semantics (SEM) of the derived lexeme includes information on index (IND) and semantic frame (S-FRAME). The value i of IND and REF shows that the derived and base lexemes share reference. This is in accordance with the fact that *non-* does not change the reference of the base lexeme.

The “S-FRAME $\boxed{2}$! [ATTRIBUTE_j $\neg\alpha$]” notation needs some explanation. First, the boxed numeral $\boxed{2}$ shows that the value of S-FRAME of the derived lexeme must be identical to the S-FRAME part of the M-BASE. Second, the “!” notation informs us that the values of S-FRAME

¹⁰The M-BASE feature accounts for the internal structure of morphologically complex words and is equivalent to the morphological daughters notation (M-DTRS) used in Bonami & Crysmann (2016).

for the derived and base lexemes are identical except for the value of the $ATTRIBUTE_j$.¹¹ In particular, the value of the $ATTRIBUTE_j$ is $\neg\alpha$ for the derived lexeme and α for the base lexeme.

In a nutshell, the sample rule in Figure 9 accounts for the fact that *non-* as a stereotype negator, attaches to Nouns and alters neither the category nor the reference of the base lexeme. In addition, this rule allows one to express scope. That is, the negation operator ‘ \neg ’ of the rule has scope over certain attributes of the base lexeme (i.e. $ATTRIBUTE_j$). It does not have scope over the whole base lexeme.

The rule in Figure 9 is based on the type signature in Figure 10 which introduces a constraint on the values of attributes. In particular, the values α and $\neg\alpha$ of $ATTRIBUTE_j$ are not compatible with one another. From this follows that negation of the value of an attribute alters the value of the attribute in question.

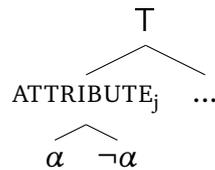


Figure 10: Type signature for $ATTRIBUTE_j$

Figure 11 gives the lexical entry of the derived lexeme *non-color*.

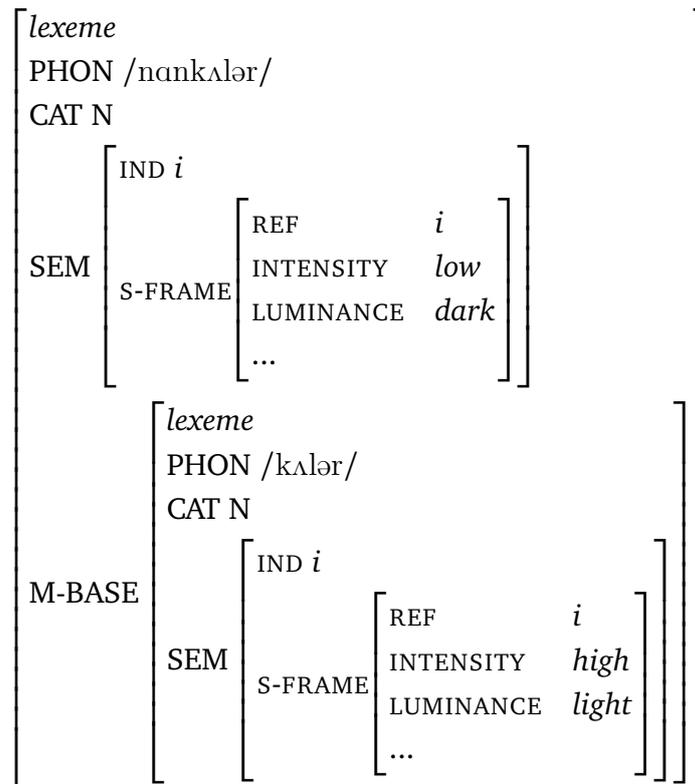


Figure 11: Lexical entry for *non-color*

¹¹For the use of the “!” notation see Sag (2012: 125).

This entry reads as follows: the lexeme *non-color* is morphologically complex and its M-BASE is the lexeme *color*. The derived lexeme has the phonology /nʌnkʌləɹ/. *non-color* and *color* have the same values with respect to IND, REF, and CAT since *non-* changes neither the reference nor the category of the derived word.

With respect to the S-FRAME part, we would like to model the fact that *non-color* is a color which lacks vibrancy. In order to model this, we would have to include a number of conceptually plausible attributes that are characteristic of the property “vibrancy”. I assume that this property is complex and that it is accounted for by the attributes INTENSITY and LUMINANCE. Consider the type signature in Figure 12.

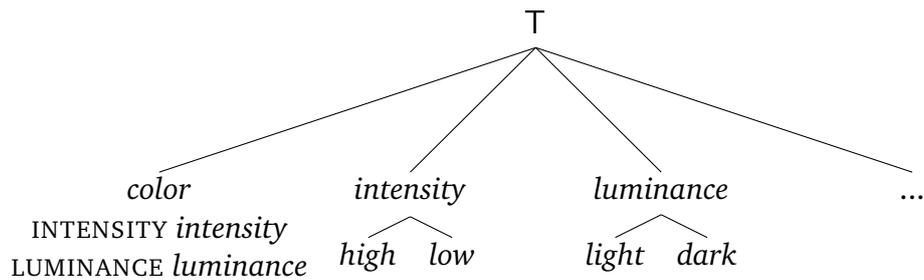


Figure 12: Type signature for *color*, *intensity*, and *luminance*

This type signature conveys information on appropriateness conditions that declare the set of all admissible attributes for *color* and the values these attributes take. In particular, *color* includes (at least) the attributes INTENSITY and LUMINANCE. The attribute INTENSITY may take the values *intensity*, *high*, *low*, and LUMINANCE may take the values *luminance*, *light*, *dark*. With respect to the redundant information “INTENSITY *intensity*” and “LUMINANCE *luminance*”, the attributes INTENSITY and LUMINANCE denote functions that assign the relevant properties to the referent of the frame. The types *intensity* and *luminance* denote the value range of these functions. In accordance with the type signature in Figure 10, the values for each of the two attributes are not compatible with one another.

With respect to the M-BASE, the value of INTENSITY is *high* and the value of LUMINANCE is *light*. Thus, *color* is characterized by the property “vibrancy”. In accordance with the rule in Figure 9, the contribution of *non-* in *non-color* can be characterized as the negation of the values *high* and *light* of the attributes INTENSITY and LUMINANCE, respectively. Given that the values of attributes are not compatible with one another (see the constraint in Figure 10), *non-* alters the values *high* and *light* of the attributes INTENSITY and LUMINANCE to *low* and *dark*, respectively. From this follows that *non-color* is a kind of color that lacks a characteristic aspect of color. It does not have the vibrancy associated with color, and, thus, it is not a stereotypical exemplar of its category.

A closer inspection of the rule in Figure 9 and the lexical entry for *non-color* in Figure 11 allows one to comment on the associative relation between the base and the derived word in word formation. Recall that it is this associative relation that much work on metonymy below the level of word has been based on. As evident by the pair *color-noncolor*, this relation need not be accounted for in terms of metonymy. In the present study, the relation between base and derivative is captured by including the frame for *color* into the rule for *non-color*. Thus, the semantics of the base lexeme becomes part of the semantics of the derived word and contributes to the overall meaning in a compositional way.

The proposed analysis highlights the importance of two aspects of frame theory. First, it shows that information on world knowledge has important ramifications for the analysis of lexical semantics. This is in accordance with previous work on decompositional models (see for example the work on the *qualia structure* by Pustejovsky 1995 and on the *encyclopedic body* by Lieber 2004). In particular, we saw that stereotype negation operates on the encyclopedic part of the base lexeme. Thus, a decompositional model allows one to be much more explicit with respect to the properties of the base lexeme negation has scope over.

The second aspect is the distinction between functional attributes and the values they assign to referents in frame theory. The foregoing discussion suggests that stereotype negation does not have scope over the whole attribute. Rather, it has scope over the value of a given attribute. This has implications for the way stereotype negation works below the level of word, since the lack of a characteristic of the base lexeme is treated as a change in the value of an attribute of the base lexeme and not as negation of the attribute itself. Consider, for example, an analysis in which *non-* negates the attributes INTENSITY and LUMINANCE in *non-color*. Such an analysis would not predict the desired meaning, for *non-color* would be something that lacks both of these properties of *color*. The meaning of *non-color*, however, guides us to an analysis in which the attributes for vibrancy are still present in the derived word. They just have a different value.

5 Conclusions

In this paper, I offered a frame-semantic approach to word formation and argued that the semantic relationships between bases, affixes, and derived words cannot be generally analyzed in terms of metonymy. Although metonymy is a well-established strategy in word formation, as for example in nominal bahuvrihi compounds of the *redhead* type, the assumption that derived words are metonymic extensions from their respective bases is problematic in several respects.

The first problem with the metonymy approach to word formation is that derived words are not metonymical expressions. In particular, the mechanism underlying the use of >university< as >campus< and the derivation of >driver< from >drive< is not the same. As I argued, it is not theoretically judicious to claim that a base stands for its derivative (e.g. *drive* stands for *driver*). In particular, in bare metonymies (e.g. >university< as >campus<) there is no marker flagging the new concept that is accessed via metonymy and, thus, “conflation” of source and target is possible. In overt affixation, however, this “conflation” is not possible since we observe a change in the form of the base lexeme.

The second problem is that an overgeneral notion of metonymy does not advance our understanding of word formation phenomena. Although one can devise metonymies ad libitum in order to account for contiguity, this does not mean that every associative relationship in language should be treated as metonymical. As I showed, with respect to the products of word formation, this relationship can be explained in terms of the compositional and associative nature of morphological processes.

The third problem with the metonymy approach is that it cannot account for processes in which information is added. The referent of >walker<, for example, is a participant in the >walk< event, and, thus, an argument already present in the frame of the base concept.

Negation, however, introduces semantic information that is not already part of the frame of the base concept.

Instead of using metonymy as a general mechanism for the products of word formation, I argued for the introduction of lexical rules into the inventory of Frame Semantics. Such rules can account for the derivation of words and for the associative relationships between bases and derived words. As I showed in the analysis of the prefix *non-*, lexical rules can offer a detailed account of the semantics of word formation phenomena and allow us to express scope. Future research could extend the proposed analysis to other readings in lexical negation and to affixes that have scope over arguments already present in the frame of the base (e.g. event nominalizations).

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