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Underspecification in the semantics of word-formation.

The case of denominal verbs of removal in Italian

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Abstract

This paper analyzes a case of Italian word-formation, in which the semantics of the derived words appears to contain mutually exclusive ambiguities. Italian productively derives verbs of removal from nouns. These verbs have the general semantic form *A removes X from Y*. However, there are two subtypes that differ in whether the nominal base of the derived verb is taken to be the *FIGURE* or the *GROUND*: *scremare* ‘to skim’; (*crema* ‘cream’) is a *FIGURE-verb*, and *stanare* ‘to make come out of the burrow’ (*tana* ‘burrow’) is a *GROUND-verb*. Traditional approaches are at a loss to give a uniform account for the semantics of derivational processes of these two kinds. In this paper, a uniform analysis is proposed. It is based upon the model of lexical semantics known as two-level semantics. Two-level semantics makes a distinction between a layer of meaning which is defined by grammar, and a level of interpretation, which is based upon conceptual knowledge. We propose that the derivation of Italian denominal verbs of removal of both types starts from a single underspecified representation, which is then specified at the conceptual level; depending on the concept type of the base, the denominal verb is either a *FIGURE-verb* or a *GROUND-verb*. In general, this paper argues that the two-level approach to semantics can be fruitfully improved by combining it with the notion of underspecification. And on a more general level, it is an example of how language specific semantics may be embedded in cognitive structure.

0. Introduction

In this paper we will discuss a case of systematic meaning variation, which appears in Italian denominal verbs of removal (henceforth DVRs). We can distinguish two subtypes of DVRs, as listed in (1) and (2):

- | | | |
|-----|---------------------------------|------------------------------------|
| (1) | FIGURE-verbs | |
| | <i>scremare</i> ‘to skim’ | cf. <i>crema</i> ‘cream’ |
| | <i>sbucciare</i> ‘to peel’ | cf. <i>buccia</i> ‘peel’ |
| | <i>sfasciare</i> ‘to unbandage’ | cf. <i>fascia</i> ‘strip, bandage’ |
| | <i>spennare</i> ‘to pluck’ | cf. <i>penna</i> ‘feather’ |
| | <i>scartare</i> ‘to unwrap’ | cf. <i>carta</i> ‘paper’ |
| | <i>sfollare</i> ‘to evacuate’ | cf. <i>folla</i> ‘crowd’ |

- (2) GROUND-verbs
- | | |
|--|------------------------------|
| <i>stanare</i> 'to make come out of the burrow'; | cf. <i>tana</i> 'burrow' |
| <i>snidare</i> 'to drive out' | cf. <i>nido</i> 'nest' |
| <i>scarcerare</i> 'to release (from prison)' | cf. <i>carcere</i> 'prison' |
| <i>scassare</i> 'to remove from a box' | cf. <i>cassa</i> 'box; case' |
| <i>sganciare</i> 'to unhook; to unfasten' | cf. <i>gancio</i> 'hook' |
| <i>sbarcare</i> 'to unload; to disembark' | cf. <i>barca</i> 'boat' |

Both types of DVRs are causative verbs of removal of an object X from another object Y. We call the movable object FIGURE, and the unmovable one GROUND. Thus, DVRs can be assigned the general semantic structure *A removes figure X from ground Y*. The two subtypes differ in the way the two locative slots FIGURE and GROUND are filled by the nominal base. In FIGURE-verbs, the nominal base fills the FIGURE-slot (cf. *scemare* 'to remove the cream from something') and in GROUND-verbs, it fills the GROUND-slot (cf. *stanare* 'to remove something from the burrow'). The question is whether we can account for both types of DVRs with one derivational process, or whether we have to assume two processes. In this paper, we argue that one underspecified derivational process can account for the two subtypes. The difference between the subtypes is only spelled out at the conceptual level. This is confirmed by the observation that the concept type of the base determines to which class a DVR belongs.

The paper is organized as follows: In the first part (section 1), we discuss some general assumptions which underlie this study. We give a descriptive account of Italian DVRs (section 2) and propose a rule which generates them with an underspecified semantics (sections 3 and 4). We then discuss the problem of how this underspecification is resolved (section 5) and how nouns must be represented in the lexicon in order to make the resolution possible (section 6).¹

¹ Earlier versions of this paper have been presented at the *Workshop on Verbs, Arguments, and Polysemy*, Konstanz, SFB 471, July, 23-25, 2001, at the *Conference on Predicative Morphosyntax: Parameters of Variation in Romance*, Palermo, November, 22-24, 2001, at the *Berkeley Linguistics Colloquium*, April, 1, 2002, and at the *Conference Zwischen Laut und Sinn*, Düsseldorf, June, 28, 2002. We like to thank the audiences at these occasions for constructive comments and suggestions, and in particular Patrick Farrell for detailed comments, as well as Bernard Fradin and Françoise Kerleroux for a long discussion on this issue. We also want to thank Bruce Mayo and Katrin Lotter for their help with the English text and Christina Maier for checking the final version of the text. The first author likes to acknowledge that his research was supported by a Heisenberg fellowship of the Deutsche Forschungsgemeinschaft.

1. Four basic assumptions

This study is based upon four basic assumptions, namely, that lexical morphology is an autonomous subsystem of grammar, that lexical morphology defines forms as well as meanings, that lexical meaning is organized at two connected levels, and, that lexical meaning may be underspecified.

1.1 Derivational morphology as a generative subsystem of grammar

More specifically, the first assumption is that lexical morphology can be represented in terms of rules which generate words and assign them an internal structure and certain grammatical properties. Regardless of the format of these rules, they must specify constraints on their input and on their output. Furthermore, there must be a lexical inventory of morphological segments, described in such a way that they can be matched with the constraints.

1.2 The semantics of derived words in lexical morphology

The second assumption is that the rules of lexical morphology not only define derived word forms and their syntactic properties, but also derived lexical meanings. This means that these rules operate on morphological segments as well as on their semantic representations. To give an example: the rule which, in Italian, defines verbs such as *scnettere* 'disconnect', applies to both, a basic morphological segment (*connett-*), and its meaning, as given in (3):

- (3) *connettere*
CAUSE (x, CHANGE (s₁, s₂))
& s₁ = -CONNECTED (y, z) & s₂ = CONNECTED (y, z)

In general, it is not always easy to discover and formulate the rules of lexical morphology, and even more so regarding their semantic component. This is due, to a large extent, to lexicalization. Every rule of word formation feeds the supply of mentally stored lexical items, and lexicalized derived words may have their own semantic evolution, in such a way that they are no longer analyzable within the generative system. They may, however, still be analyzable by virtue of general rules of polysemy, which indistinctly apply to derived and simple words. As an example, take the meanings of Engl. *kindness*:

- (4) *kindness* a. 'the state or quality of being kind'
b. 'a kind act, a favor'

Only meaning *a.* is defined by a morphological rule; meaning *b.* is derived by a rule of polysemy, which can tentatively be formulated as (5):

- (5) P₁ quality P₂ action characterized by P₁

Processes of this kind create data that cannot be accounted for in lexical morphology.

A similar difficulty arises from the interplay of morphological change and lexical memory. When a rule of word formation changes or disappears from the generative system, the lexicalized words it created are still present in the lexicon and may stay there for a long time, in such a way that they leave fossilized, recurrent structures which are mere patterns. The Engl. "prefix" *a-*, as in (6), seems to be such a case:

- (6) *abroad, abreast, across, adrift, afloat, afoot, alike, anew, ashore, away*

The rule which derived these words has disappeared from the grammar of English. A similar case is the Italian suffix *-accio*, which in modern standard Italian means 'bad' or 'ugly', as in (7), but which in the past meant 'big' – a reading which is still present in various lexicalized nouns, be it in combination with the idea of badness, as in (8), or without it, as in (9):

- (7) *tempo* 'weather' *tempaccio* 'bad weather'
(8) *coltello* 'knife' *coltellaccio* 'big, dangerous knife'
(9) *colombo* 'pigeon' *colombaccio* 'a kind of big wild pigeon'

These diachronic processes, combined with lexicalization, have brought about polysemies which are not systematic, and which speakers of Italian must learn as idiosyncrasies. Difficulties like these certainly have contributed to the fact that the semantics of word formation has not been considered an attractive field of investigation by semanticists. But they can be overcome if an adequate conception of the lexicon and lexical processes is available.

1.3 Lexical meaning, polysemy and two-level semantics

The term polysemy is often used in a loose, descriptive sense, and specific theories of polysemy explore various aspects of the phenomena covered by this term. One of these theories is the hypothesis of two-level semantics, which was first formulated by Bierwisch (1982, 1983). It claims that word meanings have two strata: the semantic stratum, which is part of the grammatical structure of the language, and the conceptual stratum, which belongs to the more general cognitive system of the speakers. At the semantic level, representations of lexical meaning are monosemous. They integrate lexical semantics into the compositional semantics of the sentence, and they are mapped onto syntactic structure via the lambda-calculus. At the conceptual level, the semantic representation is linked to a central concept, and partial aspects of the central concept are listed in order to account for variation of interpretations. Pause et al. (1995) and Schwarze & Schepping (1995) have applied this approach to problems of polysemy. In Pause's conception, the semantic representation of a polysemous

word contains a core meaning and its various readings. These readings are derived by rules of usage, which refer to the conceptual stratum (Pause et al. 1995:279). Schwarze & Schepping (1995) share the position that variation of lexical meaning can be represented via a core meaning and its conceptually induced variants. Looking at examples of cross-linguistic variation of polysemy, they confirm the hypothesis that conceptual structure as such does not trigger, but only motivates polysemy.

After its first formulation in the 1980s, two-level semantics was further elaborated in the 1990s (Pause et al. 1995, Schwarze & Schepping 1995, Bierwisch & Bosch 1995), and it was also applied to the semantics of word formation (Mayo et al. 1995, Schwarze 1995, Stiebels & Wunderlich 1995, Wunderlich 1997). In the present paper it will be shown how the two-level approach can be improved by combining it with the notion of underspecification.

1.4 Lexical underspecification

In phonology, a lexical representation is underspecified if it leaves a feature open to be specified on the basis of contextual information during the derivation. An example is Italian /n/, whose place of articulation is not lexically specified: in surface representations, /n/ is dental, labial, or velar; cf. (10):

- | | | | |
|------|------------|-----------|--------------------------|
| (10) | dental /n/ | [nazzo] | <i>naso</i> 'nose' |
| | labial /n/ | [unbatio] | <i>un bacio</i> 'a kiss' |
| | velar /n/ | [un'kame] | <i>un cane</i> 'a dog' |

The underspecified feature is labial before a labial, velar before a velar, and dental elsewhere. Lexical /m/ differs from /n/ inasmuch as its place of articulation is not underspecified: /m/ is labial by definition.

We can use the notion of underspecification in lexical morphology in exactly the same way. A lexical representation is underspecified if one or more features are left open at the stage of semantic representation, but must be specified at some point of the derivation.

Notice that lexical underspecification is different from vagueness or abstraction. An underspecified feature must at some point become specified; otherwise the word cannot be used in an utterance, whereas a vague meaning may be left open in an utterance. As an example, take the difference between a noun with a vague meaning, such as *vehicle*, as opposed to Italian denominal nouns with the suffix *-aio*; cf.:

- | | | | |
|------|-----------------------------|---------------|--|
| (11) | <i>giornale</i> 'newspaper' | + <i>-aio</i> | <i>giornalaio</i> 'a newspaper vendor' |
| (12) | <i>vespa</i> 'wasp' | + <i>-aio</i> | <i>vespaio</i> 'a wasps' nest' |
| (13) | <i>rottame</i> 'scrap' | + <i>-aio</i> | <i>rottamaio</i> a. 'a person who trades with scrap'
b. 'a junk yard' |

As these examples show, denominal nouns suffixed with *-aio* may refer to persons, as in (11), or to places, as in (12), or to both, as in (13). The lexical properties of the suffix leave that categorization open. But when the derived nouns are used, they are not vague; the category must be specified: speakers must know whether the referent is a person or a place. Similarly, the lexical meaning of a vague noun like *vehicle* leaves almost all properties of particular vehicles open, but unlike the derived *-aio*-nouns, the word can be used in an utterance with these properties left unspecified, as demonstrated by (14):

- (14) The museum exhibits all kinds of vehicles.

2. Descriptive analysis of Italian denominal verbs of removal

Italian denominal verbs of removal (DVRs) with prefix *s-* are numerous in the lexically stored vocabulary, as illustrated in (1) and (2), repeated here as (15) and (16):

- (15) FIGURE-verbs
- | | |
|---------------------------------|------------------------------------|
| <i>scremare</i> 'to skim' | cf. <i>crema</i> 'cream' |
| <i>sbucciare</i> 'to peel' | cf. <i>buccia</i> 'peel' |
| <i>sfasciare</i> 'to unbandage' | cf. <i>fascia</i> 'strip, bandage' |
| <i>spennare</i> 'to pluck' | cf. <i>penna</i> 'feather' |
| <i>scartare</i> 'to unwrap' | cf. <i>carta</i> 'paper' |
| <i>sfollare</i> 'to evacuate' | cf. <i>folla</i> 'crowd' |
- (16) GROUND-verbs
- | | |
|---|------------------------------|
| <i>stanare</i> 'to make come out of the burrow' | cf. <i>tana</i> 'burrow' |
| <i>snidare</i> 'to drive out' | cf. <i>nido</i> 'nest' |
| <i>scarcerare</i> 'to release (from prison)' | cf. <i>carcere</i> 'prison' |
| <i>scassare</i> 'to remove from a box' | cf. <i>cassa</i> 'box; case' |
| <i>sganciare</i> 'to unhook; to unfasten' | cf. <i>gancio</i> 'hook' |
| <i>sbarcare</i> 'to unload; to disembark' | cf. <i>barca</i> 'boat' |

The rule that underlies these forms has been productive for centuries and is still productive: native speakers can analyze and understand invented verbs of the DVR type (cf. Appendix 1). These verbs take their stems from their nominal bases and do not take a derivational suffix. The prefix *s-* has, loosely speaking, a negative meaning. For convenience, we give the derivation for the two paradigm forms *scremare* and *stanare* in (17):

- (17) a. *crem-a* 'cream' *s-crem-a-re* 'to skim'
b. *tan-a* 'burrow' *s-tan-a-re* 'to make come out of the burrow'

Syntactically, the derived verbs are transitive; i.e. they govern two grammatical functions, a subject and a direct object. Semantically, they refer to events of caused motion. They fall into two types, according to whether the verb stem encodes, in terms of Talmy (1985), the FIGURE or the GROUND. The term FIGURE refers to an object or a substance that can easily be moved, while GROUND refers to an object or place that is not easily movable, but fixed to its position. In one type, which we will call FIGURE-verbs, the verb stem lexicalizes the (movable) FIGURE, and the direct object is GROUND, as in *scremare* 'to remove the cream from X'. In the other type, which we will call GROUND-verbs, the verb stem lexicalizes the (fixed) GROUND, and the direct object is the movable FIGURE, as in *stanare* 'to remove X from the burrow'. These two subcases of DVRs can be understood as a result of two different morphological processes. The derivation of DVRs would then be ambiguous. In section 4, however, we account for the two subclasses by

- (22) *fame* 'hunger' *sfamare* 'to appease someone's hunger'
brama 'longing' *sbramare* 'to appease someone's longing'
colpa 'guilt' *scolpare* 'to prove someone's innocence'

This is the consequence of a general rule of polysemy, according to which terms referring to spatial motion may also refer to changes of abstract states. The component 'to take away', which is characteristic of DVRs, undergoes the same process. It is interesting to see that not the DVR as such, but one of its meaning components is responsible of this polysemy. This is one of the reasons why the semantics of DVRs requires decomposition of meaning, as will be shown below.

Another kind of meaning variation concerns abstract FIGURES. Some FIGURE-verbs, in fact, do not refer to the separation of two entities, but to a situation where only the GROUND is an entity, the FIGURE being a quality which is stripped from that entity; cf.:

- (23) *chiesa* 'church' *schiesare* 'to cancel the quality of being a church'
dottore 'doctor' *sdottorare* 'to deprive someone of the title of doctor'
vergine 'virgin' *sverginare* 'to deflower'

Again, this meaning variation (treating a quality as an object) does not concern the verbs as such, but only components of their meanings.

3. Morphological analysis

Regarding morphological constituency structure, the question is whether DVRs are directly derived from nouns, or whether an intermediate stage must be assumed, with an unprefixated denominal verb, which then is prefixed in a separate process. Schepping & Pause (1999) have referred the latter alternative. Arguments in favor of their longer chain of derivations stem from the following facts:

- i. Even though *s-* may be also prefixed to adjectives (24), it is more typically a verb prefix.

- (24) *comodo* 'comfortable' *scomodo* 'uncomfortable'
piacevole 'pleasant' *spiacevole* 'unpleasant'

- ii. There is a productive rule of *s*-prefixation for underived transitive verbs, as in (25). *S*-prefixation would then receive a unified treatment. The two-stage derivation from a noun allows a uniform treatment of *s*-prefixation for all verbs.

- (25) *connettere* 'to connect' *sconnettere* 'to disconnect'
legare 'to tie' *slegare* 'to untie'

Prefix *s-* ought to have a uniform semantic effect on the verbs to which it is added, regardless of whether they are hypothetical intermediate denominal verbs or non-derived verbs. In both kinds of derivation, this effect is the reversal of a previous state, brought about by the event denoted by the unprefixated verb. In fact, the meaning of the underived verbs which are candidates for *s-* prefixation, such as *connettere* ‘to connect’ or *legare* ‘to tie’, is resultative. They refer to events in which two states are involved, an initial state s_1 and a resulting state s_2 , where s_1 is defined as the negation of s_2 . Thus the lexical meaning of *connettere* may be represented by the notation we proposed above in (3), and which we repeat as (26):

- (26) *connettere*
 CAUSE (x, CHANGE (s_1, s_2)) & $s_1 = \neg$ CONNECTED (y, z)
 & $s_2 =$ CONNECTED (y, z)

Now *s-* prefixation denotes a further reversal: state s_2 , in (26), changes to a third state s_3 , which is identical with s_1 in (26). Thus the representation of *sconnettere* ‘to disconnect’ is (27):³

- (27) *sconnettere*
 CAUSE (x, CHANGE (s_2, s_3)) & $s_2 =$ CONNECTED (y, z)
 & $s_3 = \neg$ CONNECTED (y, z)

Consider the examples of hypothetical intermediate denominal verbs such as *cremare*, *tanare* required for the two-stage derivation. Given the semantics of reversal just described, if *scremare* means ‘to remove the cream’, then hypothetical *cremare* must mean ‘to bring about the presence of cream’. Likewise, hypothetical *tanare* must mean ‘to put into a burrow’; cf. (28) and (29) respectively:

³ Patrick Farrell pointed out to us (p.c.) that there is an alternative view of the derivation process of DVRs in Italian. He suggests (following others) that the derivation from the nominal stem to the verbal stem determines the meaning of the DVR according to the conceptual preferences. The addition of the prefix *s-* does not give an additional meaning component (reversal), rather it confirms the meaning of the derived form. This can be exemplified with the English prefix *in-* which is redundant in forms like *incage* (cf. *cage*), or not necessary at all (cf. *bottle*, *pocket*, *jail* etc.). See Farrell (2001). While we acknowledge this view for English, we think that prefixes have a much more predominant function in Italian. This can be illustrated on the prefix *s-* to verbal stems:

- | | | |
|-----|---------------------------------------|------------------------------------|
| (i) | <i>caricare</i> ‘to load (something)’ | <i>scaricare</i> ‘to unload’ |
| | <i>legare</i> ‘to tie up, bind’ | <i>slegare</i> ‘untie, unbind’ |
| | <i>connettere</i> ‘to connect’ | <i>sconnettere</i> ‘to disconnect’ |

In these cases, the prefix *s-* can be understood as a semantic operator expressing reversal. There are many more examples in Italian (and other Romance languages) that show that prefixes have a clear semantic function. One could think of different (typological) preferences with respect to the function of prefixes: Italian has a preference for semantically relevant functions of prefixes, while English might have a preference for redundant functions of prefixes. We must leave open this issue for further research. For the time being, we assume that the prefix *s-* has a determined function, namely the reversal of the situations involved in the semantics.

(28) **hypothetical cremare**

CAUSE (x, CHANGE (s₁, s₂)) & CREMA (y) & s₁ = ¬LOCATED (y, z)
& s₂ = LOCATED (y, z)

(29) **hypothetical tanare**

CAUSE (x, CHANGE (s₁, s₂)) & TANA (z) & s₁ = ¬LOCATED (y, z)
& s₂ = LOCATED (y, z)

To evaluate this hypothesis, two questions can be asked:

- i. Are there lexicalized examples of these kinds of verbs?
- ii. Is the semantics attributed to the hypothetical verbs reasonable?

The first of these questions can be answered positively for the FIGURE-verbs. Italian has lexicalized verbs of this type:

- (30) *acqua* 'water' *acquare* 'to water'
sale 'salt' *salare* 'to salt'
sella 'saddle' *sellare* 'to saddle'

Notice, however, that Italian does not present the abundance which English shows in this domain of the lexicon (*to butter, to oil, to water* etc.)⁴, and that words like those in (30) do not seem to have a high rank in usage. The normal verb for *to water* is not *acquare*, but *annaffiare*, *to butter* or *to oil* do not have literal equivalents in Italian: the translation of *to oil* is *lubrificare*, and the translation of *to butter* is prefixed *imburrare*.

For the GROUND-verbs, such as the hypothetical *tanare*, (cf. Engl. *to bottle, to frame*) the situation is similar. There are a few lexicalized verbs of this kind, but they generally have a prefixed variant, which is preferred in usage (31), and most equivalents of English GROUND-verbs only show the prefixed variant (32):

- (31) *cornice* 'frame' *corniciare, in-corniciare* (preferred) 'to frame'
carcere 'jail' *carcerare, in-carcerare* (preferred) 'to jail'
- (32) *bottiglia* 'bottle' *im-bottigliare* 'to bottle'
scatola 'can' *in-scatolare* 'to can'
sacco 'sack' *in-saccare* 'to sack'
tasca 'pocket' *in-tascare* 'to pocket'

⁴ For lists of English affixless denominal verbs of location, see Clark & Clark (1979:770f) and Levin (1993:96f, 120f).

4. The semantic representation of denominal verbs of removal

4.1 The role of conceptual structure in spatial expressions

The choice between a FIGURE- and a GROUND-verb results from the conceptual knowledge that speakers have of the base noun and the direct object and of the relationships between both. Speakers actually have the ability to decide, for pairs of objects that are located with respect to each other, which is the FIGURE and which is the GROUND. The effects of this ability can easily be observed in the use of converse spatial prepositions; cf. (35) and (36):

- (35) a. The car is in front of the supermarket.
b. The supermarket is behind the car.
- (36) a. The bird is on the fence.
b. The fence is under the bird.

Only under very special circumstances would one use the *b.* sentences. This is explainable by the semantics of spatial prepositions and by a principle of conceptual structure. Spatial prepositions imply that the noun phrase they govern is the GROUND. And there is a principle of conceptual structure, which assigns the roles of FIGURE and GROUND:⁶

- (37) If objects *x* and *y* are located with respect to each other, and object *x* is more salient and less mobile than *y*, then *x* is the GROUND and *y* the FIGURE.

Of course there are further principles of this kind, e.g. (38):

- (38) If objects *x* and *y* are located with respect to each other, and object *x* is a part of *y*, then *x* is the FIGURE and *y* the GROUND.

But is it necessary, in the case of DVRs, to compare, from case to case, the two objects involved in the location? Such an intricate model of lexical specification should be avoided for two reasons.

First, the examples of spatial prepositions concern the faculty of discourse production, and not the generative system of word formation. There is no need to generalize from one to the other.

⁶ Clark & Clark (1979:791) distinguish between *Placeables* and *Places*: "Briefly, the parent nouns can be classified according to their predominant features roughly as follows: Placeables: The parent nouns of locatum verbs denote placeables – things whose conventional role is to be placed with respect to other objects. (...) Places: For location verbs, the parent nouns denote places – things with respect to which other objects are conventionally placed."

Second, postulating that the meaning of DVRs can only be completed when the direct object is lexically filled, stands in contradiction to lexical integrity, and more specifically, to the notion of underspecification, as defined above. In other words, if the full specification of the meaning did not take place until after the direct object were lexically filled, the resolution of the role assignment would have to take place at the level of the sentence, and, if the direct object were a personal pronoun, at the level of the text. In this case, our proposed treatment in terms of underspecification would turn out to be inadequate. The kind of resolution which takes place at the sentence and text level is disambiguation; hence we would have to analyze DVRs not as underspecified, but as ambiguous.

We will search, then, for a solution in which it suffices to look at the base noun alone. And the data show that such an approach is actually promising. In a randomly collected sample of 30 frequent lexicalized DVRs (see Appendix 2), 15 are FIGURE-verbs and 15 are GROUND-verbs. When one looks at the relationship between the conceptual type of each DVR and its base noun, one gets the following picture (39):

(39) Concept Types of DVRs in Italian

Concept type of the base	Number of FIGURE-verbs	Number of GROUND-verbs
Part of body, plant or artifact	6	0
Artifact, excluding container and support	4	0
Substance	3	0
Collective	2	1
Place	0	7
Container	0	3
Support	0	2
Vehicle	0	1

One can conclude from this table that DVRs derived from nouns belonging to PLACE, CONTAINER, SUPPORT and VEHICLE are liable to be GROUND-verbs, and that those derived from the conceptual types PART and SUBSTANCE are liable to be FIGURE-verbs. The situation for unspecific ARTIFACT is too unclear to be generalized, and the appearance of COLLECTIVE in both verb categories shows that there are conceptual classes that do not show a preference for either. In fact, the FIGURE-verb *sfollare* 'to evacuate (the crowd from a city)' could also be a GROUND-verb meaning 'to extract someone from a crowd'. In this case, the resolution of underspecification is random, as long as the derived verb is not lexicalized.⁷

⁷ Cf. Clark & Clark (1979, 793) note with respect to the conceptualization of English denominal verbs: "Some concrete objects have predominant features that lead to a remarkable type of

4.2 The semantic representation of DVRs

Semantically, all DVRs imply the same predicate, which is three-place, namely

(40) REMOVE (x, y, z)

In order to represent the semantics of DVRs, the predicate REMOVE must be decomposed. It implies a caused change of state, and the type of state is location. Thus (40) can be decomposed as follows:

There are

- an initial state s_1 , in which an entity y is located in or with (on, around etc.) an entity z ;
- a subsequent state s_2 , in which y is no longer located in or with z ;
- an entity x , typically a person, which causes s_1 to change into s_2 .

Accordingly, (40) may be rewritten as (41), where y is the FIGURE and z is the GROUND:

(41) **Decomposing REMOVE (x, y, z)**
CAUSE (x, CHANGE (s_1, s_2)) & $s_1 = \text{LOCATED (y, z)}$ & $s_2 = \neg\text{LOCATED (y, z)}$

Notice that (41) only decomposes the predicate REMOVE; it does not represent the specific meanings of the DVRs, which, as has been shown above, convey information about the FIGURE or the GROUND which participate in events of removal.

4.3 The derived predicate

Let us now assume, in accord with section 1.2, that morphological segments have lexical entries, such as words do. Then, again in the notation of LFG, the lexical entry for prefix *s-* is (42):⁸

(42) *s-*, v-prefix
(DPRED) = DIS

ambiguity. Two predominant features in the generic theory [i.e. conceptual structure, Ch. S. & K. v. H.], for 'milk', for example, are that milk is a substance put into or onto certain foods (its potential roles) and that it is a substance extracted from the mammary glands (its ontogeny). Consequently, *milk*, has developed two meanings. In *milk the tea* it means 'put milk in'; in *milk the cow* it means 'take milk out'."

⁸ We do not discuss the relationship between the prefixes of DVRs and the *s-* which is prefixed to verbs, nor do we treat the homonymous *s-* which appears in verbs like *sferragliare* 'to rattle', from *ferraglia* 'scrap iron'.

4.4 Representing the underspecification of DVRs

The analysis leading to (43) and (44) is, however, not yet the solution we want, because it postulates two distinct semantic forms for a single morphological form. In this section, we propose an underspecified representation for the two subtypes of DVRs in Italian, which is shared by derived FIGURE- and GROUND-verbs. In the last subsection, we have demonstrated that the main difference between the representation of FIGURE-verbs on the one hand, and GROUND-verbs on the other, is the association of the base predicate with the FIGURE- or the GROUND-slot of the predicate LOCATED. Here we will propose two underspecified representations that account for that difference: (i) by underspecification of the argument for the base predicate P, or (ii) by underspecification of the association of the base predicate with either the FIGURE- or the GROUND-slot.

Before discussing the two lexical representations, let us first present our views on underspecified representations in general. We represent the underspecification of a lexical item α for a feature F with respect to the potential values a or b as exclusive disjunction, as in (45):

(45) ***Schema of underspecified representation***

The item α is underspecified for a feature F with respect to the values a or b : $F(a) \underline{\vee} F(b)$

In the first version of underspecification, the open part of the meaning may be expressed by a disjunction, i.e. by saying that the predicate of the base noun, P, is applied to either the first or the second argument of the predicate LOCATED:

(46) ***Underspecification I***

CAUSE (x, CHANGE (s₁, s₂)) & [P (y) $\underline{\vee}$ P (z)]
& s₁ = LOCATED (y, z) & s₂ = \neg LOCATED (y, z)
where $\underline{\vee}$ is exclusive disjunction

In the alternative representation, the base predicate is always applied to argument y , and y can be either GROUND or FIGURE, these semantic roles being encoded as the argument slots of the predicate LOCATED ($_Figure$, $_Ground$)¹⁰:

(47) ***Underspecification II***

CAUSE (x, CHANGE (s₁, s₂)) & P (y)
& {[s₁ = LOCATED (y, z) & s₂ = \neg LOCATED (y, z)]
 $\underline{\vee}$ [s₁ = LOCATED (z, y) & s₂ = \neg LOCATED (z, y)]}

¹⁰ The idea to use sortal restriction on arguments (or variables) for representing conceptual information was first suggested in von Heusinger (2002:18).

In the following, we adopt this second formulation for at least two reasons: first, it allows us to use a single mapping relation between the semantic representation and the grammatical functions, as illustrated in (47a). In the representation (46) we would need two mapping relations.

(47a) **Mapping of the underspecified representation**

x	P y	z
cause (x, change (s ₁ , s ₂)) &	DVR	DIRECT OBJECT
SUBJECT		

p (y) & [s₁= LOCATED (y, z)....

Second, the underspecification (47) allows for a compositional interaction of the conceptual information of the base with the semantic information of the predicate LOCATED: If the base is a FIGURE-concept, it is associated with the first argument of LOCATED in (47), and a GROUND-concept is associated with the second argument. In (46), there is no direct interaction between semantic properties of P (which actually does not provide any semantic information) and the conceptual information of the base. For the remainder, we use the underspecified representation (47).

5. The resolution of underspecification

As has been said above, a word with a vague meaning can be used in a sentence, but an underspecified meaning cannot be used. In order to fully derive the meanings of the DVRs, the underspecification must be decidable without access to the syntactic context. The hypothesis that we are going to propose is that the conceptual information associated with the base predicate *P* suffices to resolve the underspecification.

More specifically, we assume that the base nouns of the derivation come with a conceptual restriction, which is matched to the argument instantiations of the predicate *LOCATED*(_{Figure}, _{Ground}): We will show this only with respect to two conceptual categories, *SUBSTANCE* and *CONTAINER*, supposing that nouns that carry other conceptual categories behave in a similar manner.

The meaning of the *FIGURE*-verb *scremare* is derived in the following way: It is assumed that the base predicate *CREMA* (*x*) is conceptually categorized as a *SUBSTANCE*, and that substances fit into the *FIGURE* position (by a general rule $x [P(x_{\text{Substance}}) \rightarrow P(x_{\text{Figure}})]$). Hence the instantiation of *P* with *CREMA* is type compatible with the first term of the disjunction given in (47). Since only one of the two disjunctive terms can be chosen, the second term is discarded; cf.

- (48) Resolving the underspecification of a *FIGURE*-verb (*scremare*)
 CAUSE (*x*, CHANGE (*s*₁, *s*₂)) & CREMA (*y*_{Figure})
 & {[*s*₁ = LOCATED (*y*_{Figure}, *z*) & *s*₂ = ¬LOCATED (*y*_{Figure}, *z*)]
 ∨ [*s*₁ = ¬LOCATED (*z*, *y*) & *s*₂ = ¬LOCATED (*z*, *y*)]}

As to the *GROUND*-VERB *stanare*, its nominal base, *tana* ‘burrow’, is conceptually categorized as a *CONTAINER*, and containers fit with *GROUND*. Therefore, the first term of the disjunction is discarded and the second instantiated:

- (49) Resolving the underspecification of a *GROUND*-verb (*stanare*)
 CAUSE (*x*, CHANGE (*s*₁, *s*₂)) & TANA (*y*_{Ground})
 & { [*s*₁ = ¬LOCATED (*y*, *z*) & *s*₂ = ¬LOCATED (*y*, *z*)]
 ∨ [*s*₁ = LOCATED (*z*, *y*_{Ground}) & *s*₂ = ¬LOCATED (*z*, *y*_{Ground})] }

In such a treatment, it is possible to systematically bind the arguments. What follows is the lexical representation with the mapping relation in form of lambda abstraction (cf. (47a)):

- (50) Projection of the underspecified representation for DVRs
 $\lambda s_1 \lambda x \lambda z \lambda s_2 \lambda y$ CAUSE (*x*, CHANGE (*s*₁, *s*₂)) & P (*y*)
 & {[*s*₁ = LOCATED (*y*, *z*) & *s*₂ = ¬LOCATED (*y*, *z*)]
 ∨ [*s*₁ = LOCATED (*z*, *y*) & *s*₂ = ¬LOCATED (*z*, *y*)]}

5.1 Other kinds of base nouns

Notice that the matching relationships between conceptual categories for nouns and the FIGURE vs. GROUND dichotomy comprise far more categories than just SUBSTANCE and CONTAINER.

Some nouns, such as *carta* ‘paper’ may be categorized as both, SUBSTANCE or CONTAINER. Accordingly, a verb may be derived as both, a FIGURE-verb or a GROUND-verb; accordingly, *scartare* (*X*) may be translated as ‘take the paper away from *X*’ or ‘take *X* out of the paper’ — but not both together. In a given sentence, *scartare* can take only one of the two possible meanings.

This approach also explains those cases in which a nominal base fails to produce an acceptable DVR, such as *lettera* ‘letter’. *Sletterare* is fine from the formal point of view, but one does not know what it might mean, and the explanation is that ‘letter’ does not carry a conceptual category that could be mapped onto FIGURE or GROUND.

6. Consequences for the lexicon

Conventionally, the conceptual aspects of lexical semantics are represented with respect to three points of view:

- the selection among similar lexical items in the activity of naming (e.g. the lexical difference between *to walk* and *to run*);
- the processes of inferring (e.g. the relationship between *car* and *vehicle*);
- syntactic wellformedness (e.g. the [\pm] animate distinction needed for the selection of pronouns or event-type distinctions needed for auxiliary selection).

It is a consequence of the procedures for resolving semantic underspecification which have been looked at above, that an additional point of view should be taken into account in the representation of lexical meaning, namely the role which certain conceptual categories play in the semantics of word formation. Lexical entries for nouns, to take the example of the phenomena which we have treated, must include attributes like PLACE, CONTAINER, SUPPORT, VEHICLE, PART, SUBSTANCE¹¹, and other conceptual categories may turn out to be crucial for a realistic model of lexical morphology.

¹¹ Of course the semantics of DVRs must be investigated on a larger empirical base, and other types of word formation must be examined.

Appendix 1: Interpretation of non-lexicalized DVRs

A list of 53 non-lexicalized DVRs was presented to a native speaker of Italian. She was told that these verbs are not in the dictionary and asked to try to understand them and to illustrate her understanding with an example. She did so for 38 of these verbs. Some of these verbs are listed below with the examples, which are classified according to the distinction between FIGURE-verbs (F) and GROUND-verbs (G). In addition, the base is given with its meaning.

Sbacinare

L'acqua è stata sbacinata dalla diga.

'The water was drained from the basin by the dam.'

G; *bacino* 'basin'.

Sbambinare

Ti devi sbambinare un po'!

'It's time you grew up a bit!'

F; *bambino* 'child' (taken as the quality of childishness).

Sbirrare

Hanno sbirrato la spina.

'They removed the beer from the barrel.'

F; *birra* 'beer'.

Sbustare

Sbusta questa lettera e leggila ad alta voce.

'Take this letter out of the envelope and read it aloud.'

G; *busta* 'envelope'.

Scantinare¹²

Il vino non può essere scantinato prima di due mesi.

'The wine shouldn't be taken out of the cellar before two months have passed by.'

G; *cantina* 'cellar'.

Scaprare

I ragazzi sono ancora troppo rozzi. Vanno scapрати un po'.

'The boys are still too rough. They will become somewhat soften.'

F; *capro* 'he-goat', taken as the quality of being coarse.

¹² *Scantinare* is lexicalized, but not as a DVR, with the meaning 'to play out of tune'.

Scasare

Ci hanno scasato improvvisamente.

'They suddenly threw us out of the house.'

G; *casa* 'house'.

Scuffiare

Non scuffiarti prima di uscire dalla piscina.

'Don't take off your bathing cap before leaving the swimming pool.'

F; *cuffia* 'cap', understood as bathing cap.

Sdolorare

Ti sei sdolorata facendo un bel viaggio?

'Did you get rid of your pain making a nice journey?'

F; *dolore* 'pain'.

Sdrogare

In comunità sono riusciti a sdrogarlo.

'In the community, they managed to make him quit taking drugs.'

F; *droga* 'drug', used for the quality of being a drug-addict.

Smagazzinare

Bisogna smagazzinare il cibo.

'The food must be removed from the warehouse.'

G; *magazzino* 'warehouse'.

Spalazzare

Gli inquilini rumorosi sono stati spalazzati.

'The noisy tenants were thrown out (of the building).'

G; *palazzo* 'building'.

Spietrare

Mi hanno spietrato il marciapiede.

'They removed the stones from my sidewalk.'

F; *pietra* 'stone'.

Spoltronare

La giunta ha spoltronato il sindaco.

'The council voted out the mayor.'

F or G; *poltrona* 'armchair', used metaphorically.

Stascare

In tram mi hanno stascato il portafoglio.

'In the streetcar, they stole my billfold out of my pocket.'

Ho dovuto stascare un bel po' di soldi per la macchina.

'I had to spend quite a lot of money for the car.'

G; *tasca* 'pocket'.

Stendare

Stendate la tenda quando è asciutta.

'Pack up the tent when it is dry.'

Volete stendarvi e andare a preparare il pranzo?

'Will you (please) get up and go and prepare lunch?'

F, G; *tenda* 'tent'.

Stubare

Deve venire l'idraulico a stubarmi il tubo del lavandino.

'The plumber has to come and clean the (blocked) pipe of my washbasin.'

G; *tubo* 'pipe'.

Svespare

Bisogna svespare il garage.

'The garage has to be freed from wasps.'

F; *vespa* 'wasp'.

Svetrinare

La commessa ha svetrinato la merce dalle vetrine.

'The sales clerk removed the goods from the shop windows.'

G; *vetrina* 'shop-window'.

Appendix 2: A sampling of lexicalized DVRs

Derived verb	Nominal base	Concept type
<i>sbandare1</i> to disperse	<i>banda</i> band; group, gang	COLLECTIVE
<i>sfollare</i> to evacuate	<i>folla</i> crowd	COLLECTIVE
<i>sborsare</i> to fork out; to shell out	<i>borsa</i> purse	CONTAINER
<i>sbucare</i> to pop out of/from	<i>buco</i> hole	CONTAINER
<i>scassare</i> to remove from a box	<i>cassa</i> box; case	CONTAINER
<i>scatenare</i> to remove the chains	<i>catena</i> chain	OBJECT
<i>sdebitare</i> to rid of debts	<i>debito</i> debt	OBJECT
<i>sfasciare</i> to unbandage	<i>fascia</i> strip; bandage	OBJECT
<i>smascherare</i> to unmask	<i>maschera</i> mask	OBJECT
<i>stappare</i> to uncork; to uncap	<i>tappo</i> cork; cap	OBJECT
<i>sbavare</i> to clean a welding seam	<i>bava</i> dribble, slaver	PART
<i>sbottonare</i> to unbutton	<i>bottone</i> button	PART
<i>sbucciare</i> to peel	<i>buccia</i> peel	PART
<i>sfogliare</i> to pluck the petals off	<i>foglia</i> leaf	PART
<i>spellare</i> to skin	<i>pelle</i> skin	PART
<i>spennare</i> to pluck	<i>penna</i> feather	PART
<i>sbandare2</i> to skid	<i>banda</i> band, strip	PLACE
<i>scarcerare</i> to release (from prison)	<i>carcere</i> prison	PLACE
<i>scovare</i> to drive out; to unearth	<i>covo</i> den, lair	PLACE
<i>snidare</i> to drive out	<i>nido</i> nest	PLACE
<i>spostare</i> to move; to shift	<i>posto</i> place	PLACE
<i>stanare</i> to drive out	<i>tana</i> lair, den; burrow	PLACE
<i>stonare</i> to sing/play out of tune	<i>tono</i> tone	PLACE (?)
<i>sbilanciare</i> to throw off balance	<i>bilancio</i> balance	STATE
<i>scartare</i> to unwrap	<i>carta</i> paper	SUBSTANCE
<i>sfamare</i> to satisfy someone's hunger	<i>fame</i> hunger	SUBSTANCE (?)
<i>spolverare</i> to dust	<i>polvere</i> dust	SUBSTANCE
<i>scardinare</i> to take off its hinges	<i>cardine</i> hinge	SUPPORT
<i>sganciare</i> to unhook; to unfasten	<i>gancio</i> hook	SUPPORT
<i>sbarcare</i> to unload; to disembark	<i>barca</i> boat	VEHICLE

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