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Article

From 'back' to 'again' in Dutch: The structure of the 're' domain

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Abstract

On the basis of a model-theoretic analysis of the polysemy of the Dutch adverb *terug* (covering 'back' and 'again') and its partial synonyms, a semantic map is constructed that (i) explains how backward direction in space relates to repetition in time and what role counterdirectionality plays in that relation, (ii) integrates, in a semantically motivated way, various meanings that have been identified in separate strands of research, and (iii) allows polysemous items living in this domain to have a coherent semantic basis.

1. INTRODUCTION

The goal of this paper is to construct a (partial) map of the semantic structure of what I call the 're' domain, on the basis of a detailed formal-semantic analysis of the senses of the Dutch adverb *terug* 'again, back'. This word provides an excellent perspective on this domain, because its current use in the Dutch language area stretches across a range of meanings that are covered by different items in other languages, like *back* and *again* in English. This allows us to determine how the spatial counterdirectionality of 'back' is related to the temporal iteration of 'again' within one lexical item, synchronically. In doing so, we combine the intuitive 'maps' of Fabricius-Hansen (2001) (for *wieder/again*) and Allan (1995) (for *back*) and ground them in compositional semantic definitions of the senses involved. The resulting map also puts the recent analyses of *again* in Beck & Gergel (2015) and Pedersen (2014) in a wider perspective and offers opportunities for systematic typological studies.

The 're' domain is a family of meanings that includes the well-known *repetitive* and *restitutive* senses of *again* in (1a) and (1b), respectively, but also the counterdirectional or *responsive* sense of *back* in (1c) and its *reditive* ('return') sense in (1d). The fact that the prefix *re-* also lives in this domain is reflected in the alliterative terminology for the different senses and this allows us to speak of a 're' domain here, although just for mnemonic reasons.

(1) a. Ada sneezed again.
b. Ada fell asleep and then she woke up again.
c. Bob wrote back to Viv.
d. Bob drove back.

It has become increasingly clear that we have a close-knit family of meanings here, because of the way multiple meanings can be expressed by one and the same expression. The close relation between repetition and restitution (in fact, their identity, according to some) is well known from the rich literature about *again* (and German *wieder*).[1] Some have argued for a distinct counterdirectional sense of these items, sometimes only attested in older stages, as the historical source of restitution and repetition.[2] *Back*, and its counterparts in other languages, has received much less attention, but Allan (1995) describes how this word developed distinct senses of 'returning' and 'reversing' and a restitutive sense is observed (Beck, Berezovskaya, & Pflugfelder 2009; McIntyre 2012; Larsen 2014), that makes *back* a competitor of *again* for this sense. Typological work has also demonstrated connections between these senses in a wide variety of languages.[3]

However, although we know now that there is a domain of meanings that are closely related to each other, what we do not have at the moment is a semantically motivated representation and explanation of the structure of that domain. What the literature provides us is either intuitive (in the sense that it is not based on a proper semantic analysis of the meanings involved) or restricted (because it covers only part of the domain). Fabricius-Hansen (2001, p. 121) gives, in the form of a tree, an "overview of the main varieties of *wieder* viewed as extensions or abstractions from the [...] counterdirectional-restitutive variety to the standard variety of *wieder* as a[n] [...] adjunct of repetition/iteration on the one hand, and as an abstract contrastive-adversative adverb (or particle) on the other hand", which she admits to be "sketchy and somewhat speculative". The typological literature (Heine & Kuteva 2002, pp. 259–260; Lichtenberk 1991, p. 504; Moyse-Faurie 2012, p. 252) gives similar grammaticalization paths, with only informal considerations about their semantic underpinnings. Allan (1995) probes much deeper into the (cognitive) semantics of *back*, but that lexical item does not cover the important restitutive/repetitive corner of the domain. The work of Pedersen (2014) and especially Beck & Gergel (2015) is very important in understanding the relation between different senses of *again* in formal semantic terms, but it still leaves out most of what is covered by *back* and it does not present an overall picture of the 're' domain that makes the kinship relations between the different meanings sufficiently clear.

There are various reasons for this lack of a semantically grounded analysis of the 're' domain. Apart from the fact that much semantic work is based on single items (especially *again* and *wieder*) that only cover part of the domain and therefore misses the bigger picture, there is a lack of attention of the *paradigmatic* dimension of meaning, to use de Saussure's term: how are different concepts (like repetitive, restitutive, responsive, reditive)

1 See Dowty (1979), Fabricius-Hansen (1983), Kamp & Roßdeutscher (1994), von Stechow (1995, 1996, 2003), Jäger & Blutner (2000, 2003), Pittner (2000, 2003), Klein (2001), Huitink (2003), Beck (2005, 2006), Bale (2007), Gründer (2011), Pedersen (2014), Lechner et al. (2015), among others.

2 See Fabricius-Hansen (2001), Patel-Grosz & Beck (2013), Pedersen (2014), Schöller (2014), Beck & Gergel (2015), Gergel & Beck (2015).

3 See Lichtenberk (1991), Wälchli (2006), Moyse-Faurie (2012), Stoynova (2013).

semantically organized in relation to each other and how does that organization constrain how lexical items express these concepts. The analyis of the restitutive use of *wieder* and *again* as resulting from a basic repetitive meaning applying at a certain (abstract) syntactic level (von Stechow 1995, 1996), might be seen as an example of how a paradigmatic phenomenon (lexicon, polysemy) is reduced to a *syntagmatic* phenomenon (syntax, scope). Although such explanations have their role to play (especially when clearly supported by syntactic properties), they should not obstruct our understanding of the lexical-semantic infrastructure that underlies the widespread occurrence of polysemy and which this paper intends to map out for the 're' domain on the basis of Dutch *terug*.

The structure of this paper is as follows. Section 2 gives a descriptive overview of the semantics of *terug*, identifying the relevant senses, against the background of the literature mentioned in this introduction. Section 3 provides model-theoretic definitions of these senses, in a Neo-Davidsonian framework enriched with spatial and scalar notions. How these definitions combine into one structured family of meanings is shown in Section 4. Section 5 concludes the paper.

2. THE SENSES OF TERUG

Like its German counterpart *zurück*, the adverb *terug* is a fossilized PP consisting of the preposition *te* [tə] 'at, to' and the noun *rug* 'back' [rʏx], usually pronounced as [trʏx] in combination, without the schwa. Although it can be modified (*ver terug* 'far back', *één stap terug* 'one step back', *een paar jaar terug* 'a few years back'), I will largely restrict myself to non-modified uses and, more specifically, adverbial uses, ignoring occurrences of *terug* as a modifier of PPs (*terug naar Oegstgeest* 'back to Oegstgeest') or nouns (*de weg terug* 'the road back', *terugweg* 'return road'). For the purposes of this overview, I am taking the notion adverbial in a wide sense here, covering all instances of *terug* accompanying a verb, including those cases where it is usually classified as a verb particle or separable prefix. The sense distinctions that I make are a refinement of what can already be found in the most widely used Dutch dictionaries (*Woordenboek der Nederlandsche Taal*, WNT, http://gtb.inl.nl/search; *Dikke Van Dale*, www.vandale.nl) and traditional grammar (*Algemene Nederlandse Spraakkunst*, ANS, http://ans.ruhosting.nl/e-ans), against the background of what is known from semantic studies of English *back* and *again* and German *wieder*.

Three criteria are used to recognize distinct senses *S* and *S′* of the word *terug*. The first and most important criterion is semantic: if in one and the same situation a sentence with *terug* can be true or felicitous (under reading *S*) and false or infelicitous (under reading *S′*). The second criterion is lexical: if an occurrence of *terug* allows for a lexical alternative (preserving truth and felicity conditions) under reading *S*, but not under reading *S′*. The third criterion is 'combinatorial': if *terug* combines with a particular class of verbs or other elements under reading *S*, but not under reading *S′*.

2.1. REARWARD *sense*

Close to the bodily meaning of the noun *rug* 'back' we find the sense that I call REARWARD. *Terug* helps here describe situations in which a person or object moves backward, i.e with the back leading. Allan (1995, p. 26) uses the term 'reversing' here, in relation to the English verb *to back*. This use is limited to a few verb roots (*deinzen* 'shrink', *dringen* 'push', *slaan* 'hit', *treden* 'step', *trekken*, *wijken* 'draw'), with which *terug* combines in often specialized

meanings (2ab).[4,5] The productive word to use for this sense, that can be used with an open class of motion verbs is *achteruit* 'backward' (lit. behind-out) (2c).[6]

(2) a. Ada deinsde terug/achteruit.
Ada shrank terug/achteruit
'Ada shrank back.'
b. Het geweer sloeg terug.
the rifle hit terug
'The rifle recoiled.'
c. Bob liep/reed/gleed/leunde achteruit.
Bob walked/drove/slid/leaned achteruit
'Bob walked/drove/slid/leaned backward.'

Importantly, this use does not entail that the moving person or object returns to an earlier position (although this will usually be the case). Ada might have arrived at a position vertically from the air before she made the movement described in (2a). This distinguishes this sense from the RETURNATIVE sense, which does presuppose earlier positions (2.3). The direction of the movement is entirely characterized relative to the intrinsic axes of what moves, independently of earlier movements or the environment.

2.2. RETROGRADE *sense*

This sense is illustrated in (3):

(3) a. Kun jij van honderd tot één terug tellen?
can you from hundred to one terug count
'Can you count backward from 100 to 1?'
b. De laatste zin verwijst terug naar de eerste zin van de column.
the last sentence refers terug to the first sentence of the column
'The last sentence refers back to the first sentence of the column.'
c. De kindersterfte loopt terug.
the child-mortality walks terug
'Child mortality is dropping.'

Terug is used here to describe a process that has a direction opposite to what is canonical or default, which is the less-to-more direction in which we usually count in (3a), the writing/reading direction in (3b), and the default 'up'/'more' direction (3c). There is no moving object here that provides a backside (which distinguishes this sense from the REARWARD sense) and no presupposition of a preceding movement or process in the opposite direction (which distinguishes it from the RETURNATIVE and RESTITUTIVE sense discussed below). (3c) can hold in a situation in which child mortality has only ever decreased. What

4 In glossing the Dutch examples, I chose to leave *terug* and its kin untranslated.

5 The REARWARD sense is spatial, but allows for figurative extensions. *Terugdeinzen* 'shrink back, recoil' is mostly used to express hesitation or fear without any motion associated. A special case is the adjective *terughoudend* lit. back-keeping 'reserved', which seems to be based on a literal spatial sense that does not involve motion, but rather staying *behind* with respect to a desired or imaginary motion forward.

6 Sometimes *naar achteren* lit. to behind-en can also be used for this meaning, but this PP can also mean 'to the back'. See Zwarts (2016) for more discussion.

terug expresses here is that the direction of change is non-canonical. Let's call what (3) illustrates the RETROGRADE sense. Sometimes, *achteruit* can be used as a synonym of *terug* in this sense (although not in (3b) and (3c)).[7]

2.3. RETURNATIVE *sense*

Terug is probably used most often to refer to a person or thing moving to or toward an earlier position.[8] Although the term 'reditive' has been used in the literature, I use the somewhat more descriptive label RETURNATIVE for the sense that we see exemplified in (4) (also corresponding to Allan's RETURNING meaning for English *back*, Allan (1995, p. 25)).

(4) a. De feestgangers liepen (weer) terug (naar de tent).
the partygoers walked (weer) terug (to the tent)
'The partygoers walked back (to the tent).'
b. Ada gaf het mobieltje (weer) terug (aan Bob).
Ada gave the cellphone (weer) terug (to Bob)
'Ada gave the cellphone back (to Bob).'
c. Het licht kaatste terug (tegen het schilderij).
the light bounced terug (against the painting)
'The light was reflected (against the painting).'

In this case *achteruit* is completely excluded as a synonym. In older stages we find *weer* or *weder* for this returnative sense, as in *weder keren* 'go back, return' (now *terug keren*) and *weder geven* 'give back, return' (now *terug geven*).[9,10] Often it is possible to reinforce this use of *terug* with *weer*, which is not possible with the REARWARD and RETROGRADE uses. The RETURNATIVE sense of *terug* in a sentence like (4a) requires a context in which the partygoers already visited the place that they are walking towards. A REARWARD sense for *terug* in (4a) would require that the partygoers walk in the direction of their back, possibly to a location where they have not been yet. The RETROGRADE sense of (4a) would be satisfied in a situation in which the partygoers walk on a road that is usually walked in the opposite direction. In this way, the three senses can be shown to have truly distinct conditions. The RETURNATIVE use of *terug* is also distinct because it allows close combinations with PPs, as shown in (4), but also with other phrases that are indicative of its spatial nature (e.g., *tien meter terug* 'ten meters back', *direct terug* 'directly back').

2.4. RESPONSIVE *sense*

What I call the RESPONSIVE sense is found in the following examples:

(5) a. Zij schreef terug dat ze kwam.
she wrote terug that she came
'She wrote back that she came.'

7 *Achteruit* can have a negative connotation, implying deterioration. Using *achteruit* instead of *terug* in (3c) conveys the suggestion that it is a bad thing that child mortality is dropping, for instance.

8 Like any spatial adverb or PP, RETURNATIVE *terug* can also be part of metaphorical expressions where this returning motion has to be taken non-literally, like in *Ga terug naar de bronnen* 'Go back to the sources'.

9 Combinations are given here in the order adverb > verb, reflecting the basic Dutch word order.

10 Sometimes the variant with *weer* is more specialized. *Terug kaatsen* covers both 'bounce back' (e.g. of a ball) and 'reflect' (of light and sound), but *weerkaatsen* (with *weer* as an inseparable prefix) only has the latter meaning.

b. Toen hij werd uitgescholden, schold hij niet terug.[11]
when he was reviled, reviled he not terug
'When he was reviled, he did not revile in return.'

What we find in these examples is an agent acting in response to an earlier action. Sometimes the term counterdirectional is used for this sense, in relation to the behaviour of *again* in older stages of English (Beck & Gergel, 2015; Gergel & Beck, 2015). Larsen (2014) uses the term reciprocal for this use of *back*. We typically find communicative events here ('talk', 'write', 'answer', 'call', 'yell'), but also other types of interaction ('love', 'strike', 'fight').[12] Older stages of Dutch had *weder* here[13] and we find *tegen* 'against' (cognate of English *again*) in nominal compounds such as *tegenbezoek* 'return visit', *tegenprestatie* 'something in exchange', *tegenvraag* 'counter question'. Although the RESPONSIVE is similar to the RETURNATIVE, it can be distinguished from it on the basis of the distinct verb types that it combines with: RESPONSIVE goes with actions, RETURNATIVE goes with movements.

2.5. RESTITUTIVE *sense*

We now come to two uses of *terug* that are mainly restricted to Belgian Dutch, namely the RESTITUTIVE and REPETITIVE uses.[14] We find the RESTITUTIVE sense in the following examples:[15]

(6) a. De deur gaat terug open.
the door goes terug open
'The door opens again.'
b. Alles moet terug opgebouwd worden in Afghanistan.
everything must terug up-built be in Afghanistan
'Everything has to be restored again in Afghanistan.'

11 1 Peter 2:22 in the *Bijbel in Gewone Taal* ('Bible in Plain Language'). The King James has *reviled not again*, illustrating the now obsolete use of *again* for the RESPONSIVE sense (Beck & Gergel, 2015; Gergel & Beck, 2015).

12 The boundaries of what can or cannot count as a responsive action are not clear. An anonymous reviewer suggested that one cannot 'weep back' or 'be silent back' (at least not in German: ∗*zurückweinen*, ∗*zurückverstummen*), but such examples can easily be found with Dutch *terug*, and they confirm the responsive action nature of this use.
a. En dan kan je ipv terug-schelden gaan terug-huilen
and then can you instead.of terug-scold go terug-weep
'and then instead of screaming back you can weep back'
b. Ik heb geleerd dat terugzwijgen je enige wapen is
I have learned that terug-be.silent your only weapon is
'I have learned that responding with silence is your only weapon'

13 The *Statenvertaling* (1637) renders 1 Peter 2:22 as:
Die als hy gescholden wiert, niet *weder* en schold
who as he reviled was, not weder not reviled

14 The extent and sociolinguistic dimensions of these uses are unclear and obviously deserve further study, but that would go beyond the scope of this paper. See section 3.7 and 4.2 for discussion about the relation between these two senses.

15 Dutch does allow restitutive *terug* to some extent, but not as generally as Belgian Dutch.

c. Hij heeft terug een job.
he has terug a job
'He has a job again.'

In this case an earlier process (of closing, destruction, losing a job), is reversed and the earlier state (of being open, whole, employed) restored.[16] This can even lead to two *terug*s in one sentence (7a), the first of which is RESTITUTIVE, the second RETURNATIVE:

(7) a. De werken gaan terug terug naar de musea waar ze hingen. (Belgian Dutch)
b. De werken gaan weer terug naar de musea waar ze hingen. (Netherlandic Dutch)
The works go again back to the museums where they hung
'The works returned to the museums where they were at display.'

Like English *re-*, the prefix *her-* can also have this restitutive meaning, as in *her-bouwen* 'rebuild' (a close synonym of *terug opbouwen* in (6b)).

It is not possible to eliminate the RETURNATIVE and RESPONSIVE sense in favour of one general RESTITUTIVE sense. This would leave no natural way to explain why modern Dutch (and other languages) can make such a sharp lexical distinction: *terug* 'back' (and not *weer*) for RETURNATIVE and RESPONSIVE in all varieties and *weer* 'again' for RESTITUTIVE in all varieties (and *terug* only in Belgian Dutch). (8) also shows the need to distinguish a RETURNATIVE sense: the balloon can go up again (RESTITUTIVE) without returning to an earlier position (RETURNATIVE).

(8) De ballon steeg terug.
(i) The balloon rose back. (RETURNATIVE)
(ii) The balloon rose again. (RESTITUTIVE)

2.6. REPETITIVE *sense*

The REPETITIVE reading can be seen in the following examples:

(9) a. De tandarts heeft terug een foto genomen.
the dentist has terug a photo taken
'The dentist has taken a photo again.'
b. Onze school heeft terug de beker gewonnen.
our school has terug the cup won
'Our school has won the cup again.'
c. Er was terug iemand zwanger.
there was terug somebody pregnant
'Again somebody was pregnant.'

Here the use of *terug* indicates that an earlier event (of taking a picture, winning a cup, becoming pregnant) is repeated. Netherlandic Dutch has *weer* here, but also *opnieuw* or

16 The term 'restitute' in ordinary language usually means that an earlier *state* is restored, but I am using the term RESTITUTIVE here for senses which involve the reversal of an earlier *process*. Although sentence (6a) also presupposes a prior state of the door being open, and this state is being repeated once the door is opened again, what characterizes (6a) as an instance of RESTITUTIVE is that it reverses the prior open-to-closed change of state. The restoration of the open state is subsumed by this characterization.

Table 1 Senses of Dutch *terug*

	Description	Productivity	Alternatives
REARWARD	'backward'	restricted	*achteruit*
RETROGRADE	'contrary to the usual direction'	productive	*achteruit* (sometimes)
RETURNATIVE	'to an earlier position'	productive	*we(d)er* (in older stages and lexicalized combinations)
RESPONSIVE	'in return'	productive	*weder* (in older stages), *tegen* (in compounds)
RESTITUTIVE	'to an earlier state'	only productive in Belgian Dutch	*weer*, *her-*
REPETITIVE	'once more'	only productive in Belgian Dutch	*weer*, *her-*, *opnieuw*, *nogmaals*

nogmaals 'once again', which are adverbs specialized for the REPETITIVE sense (but see section 4.4 below).[17] For some verbs the prefix *her-* is possible with this meaning, e.g. *her-lezen* 'reread'. A sentence like (6a) can be ambiguous between the RESTITUTIVE and REPETITIVE reading of *terug*: in a context in which the door started its existence in an open state, was closed and then opened, the RESTITUTIVE sense is satisfied, but not the REPETITIVE sense.

The senses that were discussed in this section are summarized in Table 1. The notion of 'counterdirectionality', used in Fabricius-Hansen (2001) and Beck & Gergel (2015), among others, is here replaced by a more precise inventory of labels. There is much more to say about the lexical, morphosyntactic, sociolinguistic, and diachronic aspects of each of these senses, but what suffices at this point is the recognition that *terug* has these distinct senses. Our priority is the semantic characterization of these senses, so that we can also get a clearer view on how they are related.

3. DEFINING THE SENSES OF TERUG

3.1. *Preliminaries*

In order to come to grips with the formal semantics of *terug*, I make the assumption that each sense can be treated as having the type-logical shape of a Davidsonian event modifier, more specifically, as a function from sets of events to sets of events, where event and *e* are taken in the general aspectual sense of 'eventuality':

(10) REARWARD, RETROGRADE, ... $= \lambda E \lambda e$ [$E(e) \wedge$ ... (e)...]

The capital *E* corresponds to the set of events denoted by the verb or verbal phrase that *terug* (under a particular interpretation) applies to and from which it selects events *e* with a certain 're' property. I will occasionally refer to a set of events as an *event type*, for

17 Specialized repetitive meanings might be found also in Netherlandic Dutch in the combinations *terug bellen* 'phone back' and *terug zien* 'see, meet again'. If one failed to reach a person by phone, one can say *Ik bel terug* 'I phone back'. When two people say goodbye, they can promise *We zien elkaar terug* 'We'll meet again'.

convenience.[18] The question to be answered in this section is then what condition(s) each sense imposes on the event that is represented by the variable *e*.

Treating the different meanings of *terug* as event modifier functions, allows for their compositional integration in the sentence. I follow the well-known Neo-Davidsonian strategy of treating verbs and their projections as predicates of events and (non-quantificational) arguments and modifiers as adding further information to these predicates through various thematic functions that map the events to participants (agent, theme, ...) and properties (time, space, manner). Both verbs and verb phrases will correspond to sets of events to which *terug* can apply, with different degrees of specification of the arguments involved, as shown in (11), assuming a verb-final word order (and using ➡ for 'denotes') :

(11) a. [terug [rijden]] ➡ RETURNATIVE(λe [**drive**(e)])
'drive back'

b. [terug [de beker winnen]] ➡REPETITIVE(λe [**win**(e) $\wedge$ THEME(e) = **the-cup**])
'win the cup again'

At a certain point existential closure will apply to turn the event predicate into a proposition by 'replacing' the lambda operator with an existential quantifier (loosely speaking).

Defining the different senses of *terug* as functions from event types to event types satisfies the basic requirement for their formal, compositional treatment, but all by itself this does not and can not answer all the questions that we might have about their behaviour. It does not tell us the whole story about which verbs a particular sense (like REARWARD or RESPONSIVE) combines with, because this might also depend on ill-understood lexical (collocational) restrictions. It also does not tell us with what morphosyntactic level *terug* combines under a particular sense (e.g., verb, verb phrase, sentence), because that involves specific syntactic assumptions and considerations that go beyond semantic compositionality. Finally, the interaction of event modifiers in general with other modifiers and with quantified arguments (Maienborn & Schäfer 2011; Winter & Zwarts 2011; Champollion 2015) requires additional theorizing that is neither specific for *terug* or the 're' domain, nor directly relevant for developing an account of the polysemy in that area.

Going beyond pure event semantics, a crucial concept for most of the *terug* senses is that of a path.[19] I assume that many events describe a path (trajectory, trace, curve) through some real or conceptual space and that there is usually a participant in the event that moves or develops along that path in the course of the event, what is traditionally called the theme. The event *e* of driving in (11a) has a path PATH(e), and THEME(e) moves along PATH(e) during TIME(e), the 'running time' of *e*. A path is represented here as a function from the real interval [0,1] (or some discrete subset of it that contains at least 0 and 1) to some space, which is an abstract way to put positions from that space in a particular sequence.

18 It is probably more adequate to ultimately have an intensional object here or an event kind in the sense of Gehrke & McNally (2011), something that I leave for future exploration.

19 See Zwarts (2005, 2006) for detailed discussion of most of the concepts relevant here and references to earlier work and Beck & Gergel (2015) for a recent application of the notion of path to counter-directional *again* that is largely similar in spirit to the one offered here. Unfortunately, an extensive motivation and defense of the use of paths in comparison to other semantic mechanisms is not possible in this paper.

PATH(e)(0) then represents the initial position of the path that the theme occupies in event e, PATH(e)(1) the final position, and every i between 0 and 1 for which the path function is defined gives us an intermediate position PATH(e)(i). What it means for a theme to move along a path is formulated in the definition of the predicate TRAVERSE in (12), that I assume to hold of the events of every verb that involves motion or development along a path. In that definition, AT is a three-place predicate holding between an entity, moment of time, and position if that entity is located at that position at that moment of time. Note that we quantify over *moments* of time (temporal 'points') and not over intervals, in (12) and in the definitions below.

(12) For every event e, TRAVERSE(e) iff there is a continuous function μ from TIME(e) = $[t_0,t_1]$ onto [0,1] such that $\mu(t_0) = 0$ and $\mu(t_1) = 1$ and for every $t_i \in [t_0,t_1]$ for which the PATH function is defined, AT(THEME(e), t_i, PATH(e)($\mu(t_i)$)), i.e., THEME(e) is located at PATH(e)($\mu(t_i)$) at t_i.

Being a TRAVERSE event guarantees that the theme of that event is located at subsequent points of its path at subsequent moments of time, which is roughly speaking what the continuity of the μ function contributes, but it leaves open the possibility that the theme is stationary at some point or even backs up, as long as it starts at the beginning of the path and finishes at the end.

Traversal of a path can also characterize non-motion events. The event e of a door opening in (6a) has a path that maps to points on a scale with different degrees of 'aperture'. In this case, PATH(e)(1) is a degree of the open part of this scale and the door is 'located' at that degree. In general, change of state verbs can be treated in this way, allowing incorporation of the scalar analysis of such verbs (e.g. Pedersen, 2014) in a more general framework that integrates the spatial and the scalar domain in a natural way. Nevertheless, the distinction between spatial paths (mapping to locations) and non-spatial paths (mapping to states) is real and we need some way to acknowledge this. In the remainder, LPATH is the partial function mapping events to paths in physical space, while SPATH is the partial function mappings events to paths in some state or scalar space and PATH is the union of those two. We will meet yet another type of path in section 3.5.

3.2. REARWARD *sense*

Having this general framework for representing *terug* senses in place, we now take a closer look at the REARWARD meaning (that can also be expressed by *achteruit* in Dutch and *backward* in English). This meaning requires that the moving object of the event (the theme) has a designated side that counts as its back and which, as Allan (1995) explains, depends on the much more important front. In order to know where the back is of an object x (if it has one), I assume a partial function FRONT that assigns a unit vector to x at time t on the basis of its intrinsic features ('interactive side', 'leading edge'). This vector starts at the center of the object and points forward, representing an intrinsic axis. Inverting this vector gives us a representation of the back of x at t: -FRONT(x,t).[20] This notion will be defined

20 Vectors play a much larger part in representing directions, positions, and other spatial properties than needs to be explained here and this particular use of vectors here is a natural part of that. See Zwarts (2003) for instance.

for human beings, but also for objects consisting of or used by humans (e.g. armies, guns, body parts) and for animals.[21]

We now would like to express that the direction of a path of motion of an object is aligned in a particular way with an intrinsic axis of it, i.e. that it is moving forward, sideways, or backward. Let us assign to each moment of time t of an event e a unit vector that represents the direction of the path of e at that point: DIR(e,t).[22] An event e in which the theme moves backward throughout the event satisfies the condition in (13):

(13) $\forall t$ [$t \in$ TIME(e) $\rightarrow$ -FRONT(THEME(e),t) = DIR(e,t)]

'At every moment of time during the event, the back of the theme of the event is oriented in the same direction as the path of the event.'[23]

This allows us to define the rearward meaning as in (14):

(14) REARWARD = $\lambda E \lambda e$ [$E(e) \wedge \forall t$ [$t \in$ TIME(e) $\rightarrow$ -FRONT(THEME(e),t) = DIR(e,t)]]

Note how different 'parameters' of the event (time, theme, path) are extracted from the event in a Neo-Davidsonian fashion, through 'thematic' functions. This allows us to refer to properties of the theme and the path without having argument positions for these; they are implicitly brought along with the event. When (14) is applied to a verb meaning, say λe [**step**(e)] for *deinzen*, then the combination *terug deinzen* has the interpretation in (15a), which reduces to (15b).[24] When a theme subject is brought in, as in the tenseless sentence *Ada terug deinzen* 'Ada shrink back', the interpretion in (15c) results, after existential closure.

(15) a. REARWARD(λe [**step**(e)])
b. λe [**step**(e) $\wedge \forall t$ [$t \in$ TIME(e) $\rightarrow$ -FRONT(THEME(e),t) = DIR(e,t)]]
c. $\exists e$ [**step**(e) $\wedge$ THEME(e) = **ada** $\wedge \forall t$ [$t \in$ TIME(e) $\rightarrow$ -FRONT(THEME(e),t)=DIR(e,t)]]

The presence of FRONT and DIR in the definition of REARWARD imposes an important restriction on the verbs that this sense of *terug* can combine with, namely those that involve a motion event of something that can be assigned a front.

The definition in (14) is actually too strong for some uses of *terug*. Imagine that an army is retreating (*terug trekken* in Dutch), then they are most likely not walking backward all the time; they will turn 180 degrees and then move. In other words, they move in the direction that their back has at the beginning of the event. Let's call this REARWARD$_0$. It requires only a small change in REARWARD, with t_0 standing for the initial moment of TIME(e). It does not

21 See Allan (1995) for the ambiguity of the notion of 'back' for animals and how this relates to the complex structure of that concept.

22 This function DIR can be defined as the tangent of LPATH(e) at t using differential calculus, given a well-defined underlying structure of space, but an intuitive understanding will suffice here.

23 Ultimately, a bit of vagueness is required in what counts as the 'same' direction, so = should ultimately be replaced with a relation that allows for some pragmatic 'slack'.

24 It should be noted that in present-day Dutch *deinzen* is not an independent root, but always requires *terug*. It is more adequate, therefore, to treat *terug deinzen* as an idiom with the meaning in (15a)/(15b), without requiring a free lexeme *deinzen* with the meaning **step**. Other combinations with *terug* might have such an idiomatic composition too. However, we can still identify the semantic contribution of *terug*.

rule out that at times *later* than t_0 the direction of motion is the direction of the theme's back. As a result, for every E, $\textsc{rearward}(E) \subseteq \textsc{rearward}_0(E)$, so that $\textsc{rearward}_0$ can be seen as a generalization of the stricter REARWARD sense.

(16) $\textsc{rearward}_0 = \lambda E \lambda e\,[\, E(e) \wedge \forall t\,[\, t \in \textsc{time}(e) \rightarrow \text{-}\textsc{front}(\textsc{theme}(e), t_0) = \textsc{dir}(e,t)\,]\,]$

The verb *terug trekken* 'withdraw' (lit. back pull), applied to armies and similar themes, then receives the definition in (17), but $\textsc{rearward}_0$ in general can apply to any object with a front:

(17) terug trekken $\rightarrow \textsc{rearward}_0(\textbf{move}) =$
$\lambda e\,[\, \textbf{move}(e) \wedge \forall t\,[\, t \in \textsc{time}(e) \rightarrow \text{-}\textsc{front}(\textsc{theme}(e), t_0) = \textsc{dir}(e,t)\,]\,]$

3.3. RETROGRADE *sense*

Terug in its RETROGRADE sense expresses that the event of the verb it modifies happens in a direction that is opposite to what is canonical, as illustrated in (3) above. The events in (3) have paths in non-spatial domains. Counting is moving through the 'space' of numbers, cross-references go through the space of words, and quantitative developments along a scale. All of these are spaces in the general sense of Gärdenfors's conceptual spaces (Gärdenfors, 2000, 2014), which are essentially sets of values structured in such a way that we can talk about distances, dimensions, paths, and directions in those spaces. As we saw above, the canonical direction of counting is from less to more, which we can represent as a unit vector again (say, the vector pointing from 0 to 1, or simply the ordered pair $\langle 0,1 \rangle$). An event of counting backward has a path with a directional vector that is opposite to this vector. This gives us the denotation for *terug tellen* 'count backward' in (18).

(18) $\lambda e\,[\, \textbf{count}(e) \wedge \forall t\,[\, t \in \textsc{time}(e) \rightarrow \text{-}\textsc{canonical}(\textbf{count}) = \textsc{dir}(e,t)\,]\,]$
'the events of counting that have a path that has a direction that is opposite to the direction that is canonical for counting'

Verb meanings that license RETROGRADE *terug* provide a canonical direction, not only **count**, but also **cross-refer** (for *verwijzen*, (3b)) and **develop** (as the change of degree meaning of *lopen* 'run', (3c)), in virtue of the orientation of the space over which they are defined. Numbers, texts, and scales have an 'arrow' that is pointing away from a starting point. There are also predicates, like **step**, **walk**, **drive**, and **sail** that derive a canonical direction from the intrinsic features of the theme. Animals and means of transportation canonically move with their fronts leading.[25]

Through λ-abstraction over the verb meaning in (18) we get the RETROGRADE meaning of *terug* (and English *back*(*ward*)) in (19).

(19) $\textsc{retrograde} = \lambda E \lambda e\,[\, E(e) \wedge \forall t\,[\, t \in \textsc{time}(e) \rightarrow \text{-}\textsc{canonical}(E) = \textsc{dir}(e,t)\,]\,]$

25 I will get back to this in Section 4, when I discuss the relation between the REARWARD and RETROGRADE direction, and the items *terug* 'back' and *achteruit* 'backward'.

3.4. RETURNATIVE *sense*

As a first step towards a definition of RETURNATIVE, we could try to define this meaning as in (20a), with a presupposition that is similar to what is widely assumed for (repetitive) *again* in the literature: (i) there is an event e' of the same type E as e and (ii) e' and e are temporally separate and e' completely precedes e in time ($e' < e$).[26] Moreover, this event has a path with a REVERSE direction (to be defined shortly). If this function applies to the set of events in (20b), it gives the set of events in (20c). Relevant presuppositions will be given between a colon and a full stop, adopting the notation of Heim & Kratzer (1998) for presuppositions somewhat.

(20) a. RETURNATIVE (to be revised) =
$\lambda E \lambda e{:}\exists e' [\ e' < e \wedge E(e') \wedge \text{REVERSE}(\text{LPATH}(e),\text{LPATH}(e'))\ ].[\ E(e)\ ]$
b. Ada lopen 'Ada walk' ➡ $\lambda e [\ \textbf{walk}(e) \wedge \text{THEME}(e) = \textbf{ada}\ ]$
c. Ada terug lopen 'Ada walk back' ➡ RETURNATIVE((19b)) =
$\lambda e{:}\exists e' [\ e' < e \wedge \textbf{walk}(e') \wedge \text{THEME}(e') = \textbf{ada} \wedge \text{REVERSE}(\text{LPATH}(e),\text{LPATH}(e'))\ ].$
$[\ \textbf{walk}(e) \wedge \text{THEME}(e) = \textbf{ada}\ ]$

However, the definition in (20a) is too strong. There are uses of RETURNATIVE *terug* in which the presupposed event e' has a predicate (21a), theme (21b), or both (21c) different from the asserted event e.

(21) a. Ada fietste naar school. Ze liep terug.
'Ada cycled to school. She walked back.'
b. Bob emigreerde in de jaren 50. Zijn familie keerde onlangs terug naar Holland.
'Bob emigrated in the fifties. His family returned to Holland recently.'
c. Ada gooide een bord naar Bob. Bob schopte een kussen terug.
'Ada threw a plate to Bob. Bob kicked a pillow back.'

We clearly need a more flexible relation between what is presupposed and what is expressed than would be allowed by the shared variable E in (20a). Because a consideration of those mechanisms would lead us too far astray from the main line of this paper, I will assume a free variable E' that specifies what is already in the common ground concerning e', apart from its being earlier and opposite in direction.[27]

(22) $\text{RETURNATIVE} = \lambda E \lambda e{:}\exists e' [\ e' < e \wedge E'(e') \wedge \text{REVERSE}(\text{LPATH}(e),\text{LPATH}(e'))\ ].[\ E(e)\ ]$

This will clearly overgenerate, by allowing far too many cases of non-identity of participants between the asserted and presupposed event description. It is very well possible that non-identity of participants is a matter of how focus is assigned, but such mechanisms are

26 About (i): to keep things simple, the presupposed event e' is existentially quantified, even though it can be argued that the presupposition is referential and anaphoric in nature (see Beck & Gergel 2015 and references cited there, as well as Abrusán 2016). About (ii): see von Stechow (1996, p. 96) for a formulation of this separateness in terms of maximal events. I assume it here to be part of the $<$ ordering, for convenience.

27 Definition (20a) could be saved, to a certain extent, if we would allow *terug* to take scope low enough to leave material outside its scope also outside its presupposition. This is what Bale (2007) argues, with respect to repetitive *again*, for subjects of non-stative, transitive verbs (that allow *again* to have VP-level scope). While this might be an option for the REPETITIVE sense, to be discussed later, the RETURNATIVE *terug* data in (21) seem too flexible for such an approach.

largely orthogonal to what is at issue in this paper. For this paper, what is particularly important about the presupposition of RETURNATIVE, and other 're' meanings, is not the relation between E and E' or the referential status of the e', but the spatial and temporal relations that hold between e and e'. As we will see in section 4, the lexical structure of the 're' domain is determined by how such spatio-temporal properties are distributed over the different meanings.

When are two paths each other's REVERSE? The examples in (21) already show, what (23) makes even clearer, namely that LPATH(e) cannot be the exact reversal of LPATH(e'), that is, the same spatial locations in the opposite order, as suggested by Beck & Gergel (2015, p. 185) for counterdirectional *again*.

(23) Ada reisde van Utrecht naar Haarlem via Amsterdam en reisde terug via Den Haag.
'Ada traveled from Utrecht to Haarlem via Amsterdam and traveled back via The Hague.'

Instead, I propose the definition in (24):

(24) For any two paths p and p', REVERSE(p,p') if and only if (i) $p(0) = p'(1)$ and (ii) there is a $j \in (0,1]$ and an $i \in [0,1)$ such that $p(j) = p'(i)$.

The first condition states that p starts where p' stops.[28] The second part says that some non-initial position of p is identical to some non-final position of p'. In other words, what counts for counterdirectionality, as defined by REVERSE in (24), is that there is at least one other point that p and p' have in common apart from what corresponds to $p(0) = p'(1)$. This common point could correspond to $p(1) = p'(0)$, giving the 'loop' suggested by (23). However, it also allows for situations in which Ada does not go back all the way to Utrecht, but to one of her earlier stations, and maybe moves on from there.

3.5. RESPONSIVE *sense*

This sense covers situations in which the *actions* have opposite directions. We find this sense of *terug* primarily with dynamic verbs, like *kijken* 'look', *plagen* 'tease', *praten* 'talk', *schelden* 'curse', *schoppen* 'kick', *slaan* 'hit', but sometimes even with stative verbs, like *beminnen* 'love'. There is only partial, independent evidence for the existence of a path here, in the occasional use of goal prepositions like *naar* 'to' or *tegen* 'against' (e.g. *kijken naar* 'look at', *praten tegen* 'talk against') and the nature of such a path is not as clear as with the RETURNATIVE sense. Following Talmy's (1996) notion of 'fictive motion', I assume that an event denoted by one of these verbs is always associated with a path, defined by the action 'going' from one participant to another participant. To keep things simple, I take this 'action path' of e, written as APATH(e), to simply be the pair of the participants that are connected by this action path. This path then encodes the thematic directionality of an action, based on the intuitive idea that we always find a situation here that has a person at one end of the path (where the action starts) and another person at the other end of the path (where the action ends) and that involves an implicit (and often abstract) theme moving along the path, like a sign or message with communicative actions, a body part or weapon

28 As suggested by an anonymous reviewer, we seem to find even weaker relations between p and p' than in (24): *Ada left for LA, but she came back from New York*. The end point of Ada's first path (*for LA*) does not seem to be the starting point of her second path (*back from New York*). I assume that the interpretation of this sentence involves some way of filling in the path between LA and New York, so that Ada's path p from New York to her starting point can follow her earlier path via LA to New York.

with acts of aggression, and one's gaze with perceptual acts.[29] With a small variation on the RETURNATIVE meaning, we can then define the RESPONSIVE meaning in (25):

(25) RESPONSIVE = $\lambda E \lambda e{:}\exists e'$ [$e' < e \wedge E'(e') \wedge$ REVERSE(APATH(e),APATH(e'))].[$E(e)$]

This definition (with the underlying notion of APATH that it is based on) implies that RESPONSIVE applies to asymmetric verbs with two human (or at least animate) participants. That may not be enough to characterize fully what kind of verbs RESPONSIVE selects, but it will at least help us to distinguish it from and relate it to the other senses.[30]

Let us consider how this sense applies in example (5b), repeated here as (26a). The adverbial *toen*-clause introduces the information that satisfies the presupposition triggered by *terug* in the main clause. The soldiers reviled Jesus in e' (i.e. APATH(e') = [0→**soldiers**,1→**jesus**], or the ordered pair ⟨**soldiers**,**jesus**⟩) and Jesus did not revile the soldiers (i.e. there is no event e such that APATH(e) = [0→**jesus**,1→**soldiers**], or the ordered pair ⟨**jesus**,**soldiers**⟩).

(26) a. Toen hij werd uitgescholden, schold hij niet terug.
when he was reviled, reviled he not terug
'When he was reviled, he did not revile in return.'
b. terug schelden ➡ RESPONSIVE(**revile**) = $\lambda e{:}\exists e'$ [$e' < e \wedge$ **revile**(e') $\wedge$ REVERSE(APATH(e),APATH(e'))].[**revile**(e)]

The identity of event types that we see here does not always obtain, because one can hit *terug* 'back' as a response to being kicked, for instance.

3.6. RESTITUTIVE *sense*

There are two types of sentences with *terug* that could in principle be classified as involving a restitutive meaning (according to Fabricius-Hansen (2001)): those, like (27a), that describe a change of state (recovering) that reverses an earlier change of state (falling sick) and those, like (27b), that describe the final state (being healthy) of such a reversal.[31]

(27) a. Ada is terug genezen.
Ada is terug healed
'Ada recovered again.'
b. Bob is terug gezond.
Bob is terug healthy
'Bob is healthy again.'

29 Beck & Gergel (2015, p. 187) do not have a path argument in their analysis of this sense, but a notion of 'opposite' that they do not define. Obviously, it is necessary to define the different types of counterdirectionality in a systematic way, as I try to do here.

30 An anonymous reviewer makes the suggestion to define RESPONSIVE in terms of social distance between the participants. Although the notion of distance would allow us to relate RESPONSIVE closely to the spatial RETURNATIVE, the problem is that the REVERSE relation that we use in the RETURNATIVE and RESTITUTIVE would no longer work with the RESPONSIVE. If A greets B and B returns A's greeting, then in both events the social distances decrease, while the REVERSE relation would require a decrease of social distance to be responded with the reverse, an increase of social distance.

31 The focal stress in these examples is on the verb *genezen* 'recovered' in (27a) and the adjective *gezond* 'healthy' in (27b). In spite of the superficial similarity, (27a) and (27b) have different grammatical structures: in (27a) the perfect auxiliary *is* combines with the perfect participle *genezen*, but in (27b) the copula *is* combines with the adjective *gezond*.

In order to see how restitutive might be defined in the counterdirectional spirit of Fabricius-Hansen (2001), Pedersen (2014), and Beck & Gergel (2015), consider what *genezen* 'recover' means in terms of scalar paths. Every recovery event e can be assigned a scalar path SPATH(e) that has its values on a scale (strictly ordered set) that represents degrees of sickness and health, including a monotone increasing subset of degrees that count as healthy. Given this we can define **recover** as in (28).

(28) **recover** $= \lambda e$ [$\neg$**healthy**(SPATH(e)(0)) $\wedge$ **healthy**(SPATH(e)(1))]
'the set of events that have a scalar path that leads from a non-healthy to a healthy degree'

The theme of a **recover** event is subsequently 'located' at the degrees of this path (because of TRAVERSE, (12)), with the result that at the end of the event, Ada is assigned a degree in the **healthy** region of the scale. The RESTITUTIVE sense has the definition in (29), which only differs from the RETURNATIVE and the RESPONSIVE sense in the scalar nature of the path.

(29) RESTITUTIVE $= \lambda E \lambda e{:}\exists e'$ [$e' < e \wedge E'(e')$ $\wedge$ REVERSE(SPATH(e),SPATH(e'))].[$E(e)$]

After applying this function to **recover** in (28), we derive (30) as the denotation of *terug genezen* 'recover again':

(30) terug genezen $\rightarrow$ RESTITUTIVE(**recover**) $= \lambda e{:}\exists e'$ [$e' < e \wedge$ **fall-sick**(e') $\wedge$ REVERSE(SPATH(e),SPATH(e'))].[$\neg$**healthy**(SPATH(e)(0)) $\wedge$ **healthy**(SPATH(e)(1))]

Necessarily, e' will be an event of falling sick, because it has a path that starts with a healthy degree and ends with a non-healthy degree. Note that REVERSE does not require that the degree of health at the end of e is the same as the degree of health at the beginning of e'. For REVERSE it is sufficient that the scalar path of e reaches *at least* a non-final point of the scalar path of e'.[32] Definition (29) cannot be directly applied to (*is*) *gezond* '(is) healthy' in (27b), because that phrase, being stative, is not associated to a change of state path, but to a single state, while the RESTITUTIVE function selects a change of state. One option is to assume that this sortal mismatch is solved by implicitly shifting between states and events. Another option would be to take (27b) as an instance of the REPETITIVE meaning, the meaning to which I now turn.

3.7. REPETITIVE *sense*

For the REPETITIVE I assume the fairly standard definition in (31):

(31) REPETITIVE $= \lambda E \lambda e{:}\exists e'$ [$e' < e \wedge E(e')$].[$E(e)$]

32 This point can be clarified with the following scalar example:

(i) Contexts: The temperature fell from 23 to 21 degrees and then rose to 22/23/24 degrees.
Sentence: *De temperatuur steeg terug* 'The temperature rose again'.

The sentence applies in each of the contexts because the scalar path of its event always passes through a point where the scalar path of the presupposed event has already been (namely, at 22 degrees). Whether its reaches the original temperature or stops above or below it is not important. Thanks to an anonymous reviewer for pointing out that an earlier definition of REVERSE was not general enough to capture counterdirectionality in an adequate way.

Take example (8a), here repeated as (32a). *Terug* applies here in the REPETITIVE meaning to the set of events in (32b), leading to the set of events in (32c).

(32) a. De tandarts heeft terug een foto genomen.
the dentist has terug a photo taken
'The dentist has taken a photo again.'
b. een foto nemen → λe [**take-photo**(e)]
c. terug een foto nemen → REPETITIVE((32b))
= λe:$\exists e'$ [$e' < e \wedge$ **take-photo**(e')].[**take-photo**(e)]

The restitutive sense that we observed for (27b) above, can now be analyzed as a REPETITIVE, (33).

(33) REPETITIVE(λe [**be-healthy**(e) $\wedge$ THEME(e) = **bob**]) =
λe:$\exists e'$ [$e' < e \wedge$ **be-healthy**(e') $\wedge$ THEME(e') = **bob**].
[**be-healthy**(e) $\wedge$ THEME(e) = **bob**]

If we assume e' and e to be separate eventualities (states, actually), then there must be an intermediate state in which Bob is *not* healthy. But then there are also opposite transitions: an earlier event in which Bob falls ill (from healthy to non-healthy) and a later event in which he recovers (from non-healthy to healthy). So, every restitution involves the repetition of its final state and every repetition of a state constitutes its restitution.

This well-known 'dualism' between REPETITIVE and RESTITUTIVE is the basis for the approach to reduce every instance of the RESTITUTIVE to the REPETITIVE, in von Stechow (1996) and much subsequent work, also in a sentence like (27a), assuming syntactic decomposition of *genezen* 'recover' as [BECOME **healthy**] and an analysis of *terug genezen* 'recover again' as [BECOME [REPETITIVE **healthy**]]. Clearly, such a reductive analysis of the RESTITUTIVE meaning is only possible in a model that allows such syntactic decompositions in every case where we seem to find this meaning.

The semantic analysis that I provided here recognizes the RESTITUTIVE in its own right, as part of the polysemy of *terug* (the Fabricius-Hansen, Jäger & Blutner, and Pedersen line). Note that this does not rule out the possibility (pointed out in Pedersen 2014 for *again*) that a situation of restitution could be described by a REPETITIVE use of *terug* in sentences with a syntactically explicit result phrase, as in (34).

(34) a. Sally hammered the metal [flat again].
b. Sally hamerde het metaal [terug plat].
Sally hammered the metal terug flat

If the adverbs *again* in (34a) and *terug* in (34b), under their REPETITIVE interpretation, could apply to the resultative adjectives *flat* and *plat*, respectively (assuming an event-based analysis of these adjectives), then these sentences would effectively describe restitutions of the original flat state of the metal.

4. A MAP OF THE 'RE' DOMAIN

In the previous section I distinguished six meanings that can be expressed by one and the same lexical item, *terug*, in Dutch. A natural assumption to make is that it is the semantic relatedness of these meanings, independent from any linguistic expression, that allows them to be expressed by one item. The goal of this section is to make those relations explicit,

given the definitions we set up in the previous section, and to construct a 'map', a graph of these relations, that shows the semantic structure of the 're' domain, underlying Dutch *terug*, but also other items living in this domain.

4.1. *Relations between 're' meanings*

There are potentially many ways in which two meanings of the same item might be related to each other, as the voluminous and varied literature on polysemy and grammaticalization has demonstrated. It is impossible to do justice to that variety here and it is also unnecessary, because we can limit ourselves to one natural type of semantic relation. For the 're' domain, in which meanings R and R' are functions from sets of events to sets of events, I propose the relation of *involvement* on the set of meanings RE = { REARWARD, RETROGRADE, RETURNATIVE, RESPONSIVE, RESTITUTIVE, REPETITIVE } that is defined in terms of a more basic notion of defeasible implication > (Asher & Morreau 1991) between those meanings. For $R, R', R'' \in RE$:

(35) a. R involves R'' if and only if $R > R''$ and there is no R' such that $R > R' > R''$.
b. $R > R'$ is short for: for every event type E, $\exists e$ [$R(E)(e)$] > $\exists E' \exists e$ [$R'(E')(e)$].

Defeasible implication, $\varphi > \psi$, 'normally if φ then ψ', is the kind of implication that allows for exceptions, on the basis of a modal frame that defines what is normal through its accessibility relation. This is needed because in some (but not all) cases meaning R *typically* implies meaning R'. An intuitive recognition of defeasible implications will have to suffice here, pending the formulation of explicit diagnostics (but see Winter 2017 for work in this direction). Let me first lead the reader through the different meaning relations to explain how (35b) works, before returning to the involvement relation in (35a), which is defined as direct implication between meanings.

REARWARD > RETROGRADE: An object moving backward is always moving opposite to its canonical direction of motion. People, for instance, usually walk in the direction they are facing; if they walk backward they walk non-canonically. So, for every E for which REARWARD is defined, REARWARD(E) $\subseteq$ RETROGRADE(E) and therefore REARWARD > RETROGRADE according to the condition in (35b), without exceptions in this case. Note that there is no implication in the other direction, because there are many RETROGRADE processes that are not REARWARD (because they do not involve a theme with a front and back).

REARWARD > RETURNATIVE: Typically (but not always), a situation in which a person walks in the direction of her back, either in the stricter REARWARD version or the more general REARWARD_0 version, after first turning around, is also a situation in which that person ends up in an earlier position, hence $\exists e$ [REARWARD(**walk**)(e)] implies $\exists e$ [RETURNATIVE(**walk**)(e)].[33] The atypical possibility of walking backward to a new position shows that the relation between REARWARD and RETURNATIVE does not have a

33 There is also a much weaker implication in the opposite direction. If a person goes back to an earlier position, then this will, in stereotypical situations, be a position that was *behind* her, in the direction of her back (see Allan (1995) for related considerations).

logical character, but relies on a strong but defeasible regularity observed in the world about how certain objects (animals and humans and their artifacts) move.[34]

RESPONSIVE > RETURNATIVE: If I write back to somebody in response to an earlier message by that person to me, then $\exists e$ [RESPONSIVE(**write**)(e)] (the reversal of agent-patient roles) implies $\exists e$ [RETURNATIVE(**move**)(e)] (that my letter ends where the earlier message started). In general, as we saw in 3.5, in most of the RESPONSIVE examples we can discern themes moving in opposite directions (like body parts or messages). This motivates the defeasible implication relation from RESPONSIVE to RETURNATIVE, that in this case involves a different predicate E' (the general motion predicate **move**) in the consequent of (35b). This does not mean that RESPONSIVE can be subsumed under RETURNATIVE: there are still RESPONSIVE situations in which no theme 'returns'.

RETURNATIVE > RESTITUTIVE: A concrete movement along a spatial path also defines a more abstract development along a scalar path. When Ada goes back home, she is also reversing a path along a scale of distances from home and when Bob is climbing back down a hill there is also a reversal of a scalar height path: $\exists e$ [RETURNATIVE(**climb**)(e)] therefore implies $\exists e$ [RESTITUTIVE(**rise**)(e)]. It is the property of physical and conceptual spaces to allow for such scales (in which adjectives like *near/far* and *high/low* find their denotations) that explains that RETURNATIVE implies RESTITUTIVE. This implication between senses does not mean that RETURNATIVE can be reduced to RESTITUTIVE and be dropped from our inventory or senses: recognizing RETURNATIVE as a distinct spatial sense of *terug* is still necessary to distinguish its polysemy in Netherlandic and Belgian Dutch. Obviously, the RESTITUTIVE does not imply the RETURNATIVE, because there are many changes of state that do not involve movement. The REARWARD and the RESPONSIVE meanings imply RESTITUTIVE only indirectly, because they imply RETURNATIVE and RETURNATIVE implies RESTITUTIVE, and defeasibly.

RESTITUTIVE > REPETITIVE: As we saw in the previous section: the restitution of a state involves the repetition of that state. For instance, if $\exists e$ [RESTITUTIVE(**recover**)(e)] is true, then this implies $\exists e$ [REPETITIVE(**be-healthy**)(e)], because the presupposed **fall-sick** process starts with a **be-healthy** state. In general, if RESTITUTIVE(E) holds for a transitional event type E, then REPETITIVE(E') holds for its final state E'. There is no inverse implication because there are many types of events that can be repeated without a restitution taking place, like with *coughing*. The REARWARD, RESPONSIVE, and RETURNATIVE also imply the REPETITIVE, but indirectly, because they imply the RESTITUTIVE and the RESTITUTIVE implies the REPETITIVE.

The implication relations that are highlighted in this overview are the direct ones, for which I use the term involvement. R involves R'' iff there is no R' implied by R and implying R'' (with R, R', and R'' elements of RE). There is no involvement between REARWARD and RESTITUTIVE because RETURNATIVE 'intervenes': it is implied by REARWARD and it implies RESTITUTIVE. In this way, involvement captures the idea that RETURNATIVE is closer to

34 As suggested by an anonymous reviewer, one might assume that this implication from REARWARD to RETURNATIVE is an effect of the way we mentally model the world in the simplest possible way. This is not incompatible with the idea of a modal frame that underlies this regularity and it also corresponds with the cognitive linguistic 'journey schema' of Allan (1995).

REARWARD than RESTITUTIVE is and it is this 'closeness' that we would also like to represent in the map of the 're' domain.

The involvement relation between meanings in the 're' domain is closely related to particular meaning relations that are recognized in works on semantic change, like the pragmatically oriented *Invited Inferencing Theory of Semantic Change* (Traugott & Dasher, 2001), which also plays a role (but not under this name) in Evans & Wilkins (2000), who speak about meanings being "functionally equivalent" in certain contexts, and the more semantic *Constant Entailments* principle of Beck & Gergel (2015). These approaches assume that a form F can have two meanings M and M' because there are contexts in which either M' can be inferred from M (the pragmatic approach) or M and M' share entailments (the semantic approach). My notion of involvement is different because it abstracts away from linguistic forms and from the dynamics of the historical process, in order to arrive at a synchronic 'grid' that determines which meanings can be taken together ("colexified", François (2008)) in a polysemous form. In the next section we will see what that 'grid' looks like.

4.2. *Towards a map of the 're' domain*

The involvement relations that we discussed in the previous section can be diagrammed in a simplified way through the network (graph) in Figure 1 (leaving out REARWARD_0).

Note that it is not the orientation of the lines (horizontal, vertical) or the arrangement of the meanings that matters in this diagram, but only the fact that a direct involvement relation holds between two meanings, as represented by an arrow. Note also that the direct involvement relations define indirect connections between the meanings. For instance, REARWARD is not directly connected to REPETITIVE, but indirectly, with a path (in the graph-theoretic sense) that necessarily leads through RETURNATIVE.

Figure 2 shows how *terug* in standard and Belgian Dutch covers different regions of meaning. Figure 3 shows the areas of the other polysemous items in Dutch. I have separated these to avoid making the diagram too cluttered and I have left out items that only cover one sense, like *tegen* 'against' voor RESPONSIVE and *nogmaals* 'once again' for REPETITIVE.

The reader might have already recognized Figure 2 and 3 as semantic maps in the sense of Haspelmath (1997, 2003) and others. Figure 1 is what Haspelmath calls a 'conceptual space', the universal structure underlying a language-specific distribution of forms over meanings, but I will use the term semantic map for this structure too. Mathematically speaking, this structure is a *graph*, a set of objects (vertices) with links between them (edges). A semantic map constrains the polysemy of forms through the requirement of *contiguity*: the set of meanings in a semantic map covered by any polysemous form in any language must constitute a *connected* subgraph. In graph theory, a graph is connected if there is a path (sequence of edges) between every pair of vertices. As the reader can check in Figure 2 and 3, the Dutch words are contiguous areas of the semantic map, corresponding to connected

Figure 1 Structure of the 're' domain

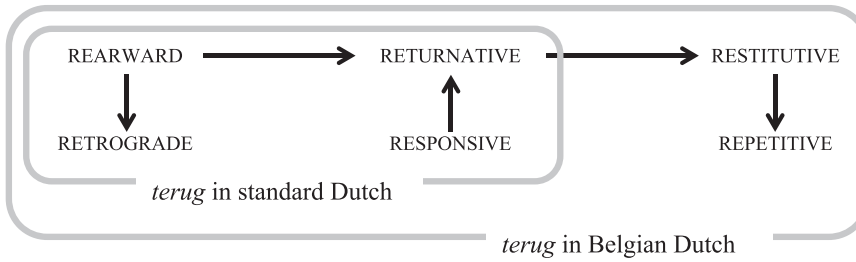

Figure 2 *Terug* in standard and Belgian Dutch

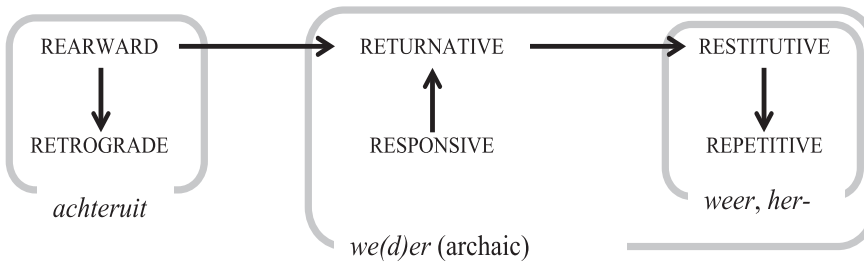

Figure 3 Other Dutch 're' items

subgraphs. The contiguity of the Dutch 're' forms thereby presents an important piece of evidence for the way we built up the structure of meanings in Figure 1 on the basis of the semantic relation of involvement.

Given the contiguity principle for polysemy, we can conclude that the set of meanings that *terug* carves out cannot be a haphazard collection, specific to Dutch, but must be a coherent 'family' independent of the Dutch lexicalizations, in the sense that its member meanings have connections that are cross-linguistically valid. This does not imply that there are necessarily many languages like Dutch, having an adverb that stretches all the way from REARWARD to REPETITIVE. Languages might cut up the domain in different ways, taking their starting point from different source meanings, and using different lexical or grammatical categories. However, the expectation is that they still respect the semantic connections that hold between the different meanings on the basis of involvement. Neither does contiguity rule out the possibility that the next language that we look at would reveal a meaning between, say, RESPONSIVE and RETURNATIVE, that we missed on the basis of our study of Dutch. But contiguity would require that this meaning is covered by *terug* in Dutch (and *weder* in older stages).

Figure 2 and Figure 3 might suggest that some meanings are more closely related than other meanings, because they are more often expressed by the same form. The RESTITUTIVE and REPETITIVE meaning, for instance, are co-expressed by *weer* and *her-* in standard Dutch and by *terug* in Belgian Dutch (as well as by *again* in modern English and *wieder* in German). If this is a cross-linguistically robust pattern, then it shows the need for a richer 're' map, with stronger and weaker connections, but it might also be that semantic and syntactic factors conspire to promote this type of polysemy, as we saw at the end of section 3.

4.3. *Beyond the borders of the 're' map*

The map in Figure 1 integrates in a coherent way relevant parts from 'maps' that can be found (explicitly or implicitly) in Allan's (1995) cognitive work on *back*, Fabricius-Hansen's (2001, p. 122) formal-semantic work on *wi(e)der* and *again(st)*, and typological work on 'return' words as a source for repetitive markers (Lichtenberk (1991, p. 504) and Moyse-Faurie (2012, p. 252)). Each of these authors also deals with more senses than the six analyzed here, and there are two senses in particular that deserve some attention in the context of Dutch, but also as an illustration that the network of meanings in Figure 1 is part of a bigger network of which the boundaries are yet unknown.

Beck & Gergel (2015, p. 184) analyze a counterdirectional meaning expressed by the preposition *against* (*again* in older stages of English), as in the PP *against the current*, that involves two simultaneously opposite paths: that of the current and that of the event expressed by the verb. In her discussion of German *wieder*, Fabricius-Hansen (2001, p. 114) mentions the similar "contrariness" that is part of the preposition and particle *wider* 'against'. In both cases we are dealing with a type of counterdirectionality that involves more than a reversal of directions, but rather seems to involve opposite *forces*. Let us use the term COUNTERACTIVE to distinguish this sense within the larger counterdirectional family. In Dutch the adverbs *tegen* (cognate of English *again(st)*, German *gegen*) and *we(d)er* (cognate of German *wi(e)der*) can be used to express this sense (although the last one not in a very productive way anymore), as in the combinations in (36a):[35]

(36) a. *tegen/weer spreken* (speak) 'contradict, deny', *tegen/weer houden* (hold) 'hold back, stop', *tegen werken* (work) 'counteract, oppose', *weer staan* (stand) 'resist, oppose'
b. Ada sprak Bob tegen.
Ada spoke Bob tegen
'Ada contradicted Bob.'
c. Een woordvoerster weersprak de geruchten.
a spokeswoman weer-spoke the rumors
'A spokeswoman denied the rumors.'

These combinations express that the subject and object referent do not only 'operate' in opposite ways, but that there is a force-dynamic interaction between them in the sense of Talmy (1988), as between agonist and antagonist. At the moment we can only see the rough outlines of how this might be represented semantically. If we assume that the forces involved have a directional nature (maybe as a vector, following Wolff (2007), Zwarts (2010), Gärdenfors (2014)), then we could represent the COUNTERACTIVE meaning as in (37), with an appropriate generalization of the REVERSE relation and the presupposition of an event that is not necessarily prior to the asserted event.

(37) $\text{COUNTERACTIVE} = \lambda E \lambda e{:}\exists e' \, [\, E'(e') \wedge \text{REVERSE}(\text{FORCE}(e),\text{FORCE}(e')) \,].[\, E(e) \,]$

Let us assume that the function FORCE assigns to an event the 'tendency' of that event towards a particular outcome. If people disagree and contradict each other, then their speaking events have opposite forces. They are 'pushing' in opposite directions, in a sense. Given (37), we can represent the meanings of (36bc) as in (38).

35 *Tegen* behaves as a separable particle and carries stress and *weer* as an unstressed prefix.

(38) a. $\lambda e{:}\exists e'$ [**speak**(e') $\wedge$ AGENT(e) = **bob** $\wedge$ REVERSE(FORCE(e),FORCE(e'))].[**speak**(e) $\wedge$ AGENT(e) = **ada**]

b. $\lambda e{:}\exists e'$ [**rumour**(e') $\wedge$ REVERSE(FORCE(e),FORCE(e'))].[**speak**(e) $\wedge$ AGENT(e) = **a-spokeswoman**]

The COUNTERACTIVE meaning involves the RESPONSIVE meaning in the sense that opposition to an action will typically be in response to an action. A situation in which A contradicts B is typically a situation in which A replies to B, for instance. We could therefore extend the structure in Figure 1 by drawing the COUNTERACTIVE meaning underneath the RESPONSIVE meaning.

At another edge of the map, we find a meaning that has been called CONTRASTIVE (Fabricius-Hansen, 2001) or ADDITIVE (Lichtenberk, 1991; Moyse-Faurie, 2012). (39) gives Dutch uses of the adverb *weer* (not replaceable by *terug*) that are translations of the German examples with *wieder* that Fabricius-Hansen (2001, p. 121) labels as CONTRASTIVE.

(39) a. (giving route directions)
Ga naar rechts en dan gelijk weer naar links.
go to right and then immediately weer to left
'Go to the right and then immediately to the left.'

b. (about the tones of pipes of an organ)
De een is te hoog, de ander is weer te laag.
the one is too high the other is weer too low
'One is too high, the other too low.'

In this case, the events of the two clauses are each other's opposite in a more general sense, as (39b) clearly shows. Given the meaning of CONTRASTIVE in (40), with an appropriate characterization of different types of opposites that I leave undefined here, we can represent the meaning of (39b) in (41):[36]

(40) CONTRASTIVE = $\lambda E \lambda e{:}\exists e'$ [$E'(e')$ $\wedge$ OPPOSITE(E',E)].[$E(e)$]

(41) $\lambda e{:}\exists e'$ [THEME(e) = **one** $\wedge$ **be-too-high**(e') $\wedge$ OPPOSITE(**be-too-high**,**be-too-low**)].[THEME(e) = **other** $\wedge$ **be-too-low**(e)]

Obviously, there is a connection between CONTRASTIVE and RESTITUTIVE, since every instance of the latter (a directional opposite) is also an instance of the former (an opposite in general). This allows us to connect CONSTRASTIVE to RESTITUTIVE in the map of Figure 1 and to explain why *weer* in Dutch (and *wieder* in German) can include a non-directional contrastive meaning in its polysemous spectrum. English shows that not all languages exhibit this type of polysemy, however. The ADDITIVE meaning that is observed in the typological literature involves a generalization of the CONTRASTIVE meaning (by dropping the requirement of contrast) or of the REPETITIVE sense (by dropping the temporal order), but I will not explore those options here.

4.4. *Directionalities on the map*

Although this paper is not a diachronic study, it does inevitably touch on the historical issue of how items like *terug* and *again* spread over the map in the course of time. There is an

36 Obviously, the notion of opposition necessary here is much more general than the opposition that involves reversal of paths of different types.

interesting observation to make about the directions in which that spreading can happen. The word *terug* conveniently carries its etymological origin (*rug* 'back') on its sleeves and it is on that basis that we can conclude that the REARWARD meaning of *terug* is more original than other meanings. From that REARWARD meaning, *terug* has extended its coverage, at the expense of *we(d)er*, to other meanings.

With respect to English *again*, we know from Beck & Gergel (2015) that that word appeared on our map with the COUNTERACTIVE meaning and expanded from there across the 're' domain. Not only does this show that there are different historical *origins* for 'counterdirectional' expressions, which is far from uncommon, of course, but that there are also different *directions* in which forms can expand their coverage. Dutch *terug* shows a pathway from REARWARD to RESPONSIVE, necessarily going via RETURNATIVE, while English *again* shows a development expanding from RESPONSIVE. Given the connections in Figure 1, we can then conclude that there can be opposite semantic changes on a map and connections should not necessarily be taken as relating to a unidirectional change.

This is also illustrated by the fact that we can occasionally find RESTITUTIVE uses of *opnieuw* 'anew, once again' (lit. at-new) in addition to *weer* in standard Dutch and *terug* in Belgian Dutch. The examples in (42) use *opnieuw* for situations in which an earlier state is restituted: a normal situation in Haiti, grey whales in Europe, the natural state of the park Virunga.[37] The events described by the events (normalization of Haiti in (42a), introduction of whales in (42b), giving Virunga to nature in (42c)) are not repetitions of an earlier event of the same type, so it is not a REPETITIVE in our sense.

(42) a. De situatie in het getroffen gebied in Haïti herstelt heel langzaam. Maar er moet nog veel gebeuren voor de toestand *opnieuw* normaliseert.
'The situation in the stricken area in Haiti is recovering very slowly. But a lot has to happen before the situation normalises again.'

b. In 2005 riepen Owen Nevin en Andrew Ramsey [...] op om de grijze walvis *opnieuw* te introduceren in Europese wateren.
'In 2005 Owen Nevin and Andrew Ramsey call for a reintroduction of the grey whale in European waters.'

c. Met deze nieuwe campagne willen we geld inzamelen om Virunga *opnieuw* terug te geven aan de natuur.
'With this new campaign we want to raise money to give Virunga back to nature again.'

It is generally assumed in the literature that German counterparts of Dutch *opnieuw*, like *erneut*, only have the REPETITIVE sense (von Stechow, 1996). If this claim used to be true of Dutch, then there seems to have been an extension of the coverage of *opnieuw* from the REPETITIVE to the RESTITUTIVE sense. If that is the case we find two opposite directions of change between these two meanings: English *again* extended its coverage from the RESTITUTIVE to the REPETITIVE (as Beck & Gergel (2015) have shown) and Dutch *opnieuw* is extending its domain from the REPETITIVE to the RESTITUTIVE, which is also remarkable because the direction of this change goes against the semantic direction of involvement.

37 Examples from the Corpus Hedendaags Nederlands, chn.inl.nl.

5. CONCLUSION

This study of the polysemy of the Dutch adverb *terug*, that stretches from spatial 'backward' to temporal 'once more', has given us insight in the semantic structure of the 're' domain, by demonstrating how notions like returning, repetition, and restitution hang together. Not only does this give insight in the coherent basis of the polysemy of this single Dutch item, but it also sheds light on related items in Dutch (*tegen* 'against', *we(d)er* 'again', *achteruit* 'back') and West-Germanic cognates (*again(st)*, *wi(e)der*). The result is a map based on semantic considerations that integrates insights from separate domains or approaches and that has the potential to be extended with more senses and semantic relations and to be applied to more languages and linguistic dimensions.

A semantic map based on a few words from a few languages can only be partial. The typological and semantic literature on 're' forms also mentions a 'reconstructive' ('to do over, better') and 'reversive' ('to undo') (Stoynova, 2013), a 'reflexive' ('to do to oneself') (Moyse-Faurie, 2012), 'continuative' ('still') and 'incremental' ('one more') (Tovena & Donazzan, 2008). The map proposed here will have to be extended in different directions to accommodate these and other meanings, based on careful semantic modeling and there is no reason why this could not be done along the lines laid out above. However, there is probably no end to the connectivity of meanings: every meaning will have connections with other meanings, opening up other domains. This means that partiality is also an inevitable methodological ingredient of mapping a domain of meaning by abstracting away from neighbouring domains.

The semantic map of the 're' domain proposed here is based on an inferential relation of involvement between meanings. This is clearly not the only possible relation that might hold between the senses of a polysemous item. For the 're' domain, the question remains what role figurative mappings like metaphor and metonymy might play in defining the map, if we understand these as rooted in language-independent conceptual relations between domains. For instance, the RESTITUTIVE meaning might be seen as metaphorically related to the RETURNATIVE meaning, as part of a more general conceptual mapping from the spatial source domain to the scalar target domain.

The map of the 're' domain is a synchronic representation of meaning relations that defines one part of the infrastructure for semantic change, in the sense that the contiguity requirement on polysemy also constrains how the area of a polysemous items on the map can become larger or smaller over time. The question is whether there are more semantic constraints that might also be relevant for the diachronic dimension. The impression of section 4 is that Dutch *terug* has pushed *we(d)er* out of the RETURNATIVE/RESPONSIVE area, which suggests that overlap between different items in the 're' domain is avoided. This competition between items is similar to what Gergel, Blümel & Kopf (2016) observe about the disappearing use of Middle English *eft* for 'again' because of the rise of *again*. Such hypotheses could be tested on a larger scale, with more synchronic and diachronic data.

Syntactic aspects of *terug* and its lexical relatives have not received much attention in this paper. We have not been concerned with what kind of phrasal level a particular form combines with, or what its other grammatical properties are, but restricted ourselves to the way these meanings are 'colexified' by a particular item. There are different aspects of the morpho-syntactic dimension that have to be taken into account. I mentioned that applying REPETITIVE to an explicit resultative predicate could lead to a restitutive interpretation. Beck & Gergel (2015) argue for English *again* that this is also the context in which the earlier RESTITUTIVE sense of *again* has been reanalyzed as the REPETITIVE sense of Modern English.

If this is true, then the lexical polysemies on the 're' map might interact with structural ambiguities in an intricate way. Structural properties are also important for the distinction between light and heavy 'again' expressions made by Wälchli (2006). Light expressions are less emphatic and closer to the verb (like the prefix *re-*) and heavy expressions (like the adverb *again*) are more emphatic and less closely tied to the verb. Wälchli (2006, p. 78) concludes that this distinction is 'largely' independent of the particular meaning, but that lexicalization is a more important factor. Furthermore, it might be interesting to use the map to study 're' words in non-verbal contexts, as modifiers of nouns or in the company of modal verbs (Van Riemsdijk 2002). It seems that *terug*, for instance, can only be used with the REARWARD (41a), RETROGRADE (41b), and RETURNATIVE (41c) senses in the latter context.

(43) a. Het kanon kan niet terug/achteruit/naar achter.
the canon can not terug/achteruit/naar achter
'The canon can not go back(wards).'
b. De kindersterfte moet terug.
The child-mortality must terug
'The child-mortality must drop.'
c. Ik wil terug.
I want terug
'I want to go back.'

These senses correspond to a contiguous area of the map, which involves the kind of quite general path meanings that would correspond with the empty light verb GO that can be assumed for these structures. The RESTITUTIVE and RESPONSIVE require more specific scalar and thematic information and the REPETITIVE does not involve paths. The map of 're' meanings developed here provides one central dimension for studying this type of interactions between meaning and form.

Presupposition plays a central role in the 're' domain and this role deserves much more attention than I have been able to give it here. Apart from the proper representation of the presuppositions themselves, the deeper explanation of their existence, and the understanding of their role in discourse, one important question concerns the obligatoriness of their expression. While restitution and repetition are obligatorily expressed in one language in a particular context, this might not be true for another language, as pointed out in Wälchli (2006) on the basis of a comparison of translations of the Gospel of Mark. It is interesting to note in this respect that one modern Dutch translation has both *weer* and *terug* where the original Greek has no explicit marker of the RETURNATIVE, as an example of wider patterns of divergence:[38]

(44) a. De apostelen kwamen weer terug bij Jezus.
the apostles came again back with Jesus
'The apostles returned to Jesus.'
b. kai sunagontai hoi apostoloi pros ton Iēsoun
and came.together the apostles with the Jesus

38 Verse 6:30 of the Gospel of Mark in the Nieuwe Bijbelvertaling (New Bible Translation).

The 're' domain is a potentially interesting area for studying the conditions for 'obligatory presuppositions' (see Amsili & Beyssade, 2010; Bade, 2016, and many others).

Finally, what I have left undiscussed in this paper are the possibilities for combining the different functions of the 're' domain with each other. We have seen that RESTITUTIVE *terug/weer* can be combined with RETURNATIVE terug (example (4ab) and (7ab)). REARWARD can also be composed with RETURNATIVE (e.g. *achteruit terug lopen* 'walk back backward') and we can even have them all three together (*achteruit weer terug lopen* 'walk back backward again'). It is an open question what combinations are theoretically possible and which of these are empirically attested.

Even though many aspects of the 're' domain remain to be explored, I hope to have shown in this paper the possibility and usefulness of a semantically informed paradigmatic approach to the meanings in this domain (how they relate to each other), that can complement the compositional syntagmatic approach (how they individually combine with other meanings) and ultimately lead to a more complete formal semantic understanding of polysemy in this domain and in other domains.

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