FRAMENET AND ITS LIMITATIONS. THE CASE OF *ENTITY-SPECIFIC CHANGE-OF-STATE* VERBS*

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1. Introduction

The main concern of this study is to provide a critical examination of the treatment proposed by the FrameNet project (Atkins, Fillmore and Johnson 2003; Fillmore, Johnson and Petruck 2003) for *entity-specific change-of-state* verbs. We have focused on this verbal class in order to demonstrate that these verbs display a much richer variety of valence patterns than has been claimed in Levin (1993), Wright (2002) or elsewhere. Levin (1993) and Wright (2002) highlight only the (non)-participation of the verbs under consideration in the causative/inchoative alternation, thus neglecting constructions such as the intransitive resultative, the intransitive causal, the *way*-construction, the resultative construction, among many others. Although FrameNet serves to document the distributional range of entity-specific change-of-state verbs, it will be shown that this database is often incomplete and it does not offer any conceptual motivation for the lexical-constructional behavior of these verbs. FrameNet is a project developed by Fillmore and his colleagues at the International Computer Science Institute in Berkeley which is based on Fillmore's frame semantics model. A frame is defined as "the knowledge network linking the multiple domains associated with a given linguistic form" (Taylor 1995: 87). Frames are static configurations of culture-based, shared and conventionalized knowledge. Words like for example, *buy, sell, pay, money, spend,* etc., activate the 'commerce' frame. A frame comprises a 'core', which is made up of *sine-qua-non* elements or

participant roles (buyer, seller, merchandise, market and money), and peripheral elements such as the manner of performing the transaction, its purpose, time and setting (e.g. department store, shopping center, etc.).

Levin's (1993: 246) list of entity-specific change-of-state verbs comprises twenty-one verbs which we have divided into three main groups on the basis of their conceptual similarity: (i) verbs which describe an increase in size (e.g. *bloom, blossom, flower, germinate, sprout, swell,* and *blister*); (ii) verbs that describe a negative, destructive change affecting the integrity of an entity (e.g. *burn, corrode, decay, deteriorate, erode, molder, molt, rot, rust, stagnate, tarnish, wilt, wither*);[1] and (iii) the verb *ferment* which is different from the first two categories in the sense that there is no increase in size and the change is not necessarily negative nor does it lead to the disappearance of the entity. The verbs in the first group depict the coming to life/existence of an entity out of a pre-existent one. Thus, when a flower blooms/blossoms/flowers, the plant develops a protuberance (bud/blossom) outside the stem (the plant switches from a vegetative state to a reproductive stage). Both *blister* and *swell* indicate a size or volume increase either of a body part (e.g. *My feet and legs swell when I stand for too long a period*; Sketch engine doc#8227) or of other kinds of surface (a blister can also mean a raised bubble on a painted or laminated surface). All the verbs in the second group involve a total transformation of an entity which suffers a gradual/sudden disintegration. For instance, a plant that withers undergoes a size decrease and starts to die. In the case of *erode* the surface of soil or a rock gradually disappears. The verbs *corrode, tarnish,* and *rust* are conceptually related since they refer to changes undergone by metals (the verb *tarnish* is more specific because the metals affected can only be silver, copper or brass). *Tarnish* and *rust* highlight either a loss of color or the acquisition of a reddish-brown color by oxidation, whilst *corrode* specifically points to the process of destruction of a metal.

This article is structured as follows. In sections 2, 2.1, 2.2, 2.3, 2.4, 3 and 3.1 the frame elements of entity-specific change-of-state verbs will be critically examined and we will show whether they can operate or not as predictors of the syntactic representation of verbs. It is also important to mention that only verbs from the first two groups will be discussed in this article since the verb *ferment* returned no hits in FrameNet. The final section summarizes the findings of our research and also brings forth several critiques of the structure of FrameNet as a whole.

2. Verbs of the First Group in FrameNet

Of the verbs listed in the first category *swell* is the only one that is contemplated in FrameNet. It displays four semantic frames: 'expansion', 'change of position on

a scale', 'causation of expansion' and 'causation of change of position on a scale'. The first two frames were designed to account for intransitive sentences whereas the last two supposedly motivate the use of this verb in causative constructions. As stated by Ruppenhofer *et al.* (2010: 5), FrameNet aims "to document the range of semantic and syntactic combinatory possibilities —*valences*— of each word in each of its senses" (emphasis in the original). Any *lexical unit* (LU; a term borrowed from Cruse 1986), i.e. a pairing of a lexical form and meaning, can evoke one or more semantic frames, which are defined as script-like conceptual structures describing a given situation, object, or event together with its participants or Frame Elements (FEs) and particular role specifications.[2] FrameNet divides FEs into core, peripheral, and extra-thematic. The first are conceptually necessary components of a cognitive scenario which make a frame unique. The second are frame elements that do not refer to additional, independent or distinct events from the main reported event (e.g. time, place, manner, means, degree). The third serve the purpose of situating the main reported event against a backdrop of another state of affairs of the same type or belonging to a larger frame. For example, the Revenge frame groups five core frame elements, such as Avenger, Punishment, Offender, Injury, and Injured_party. An act of revenge is necessarily preceded by an offense and it is directed against someone. The parameters of time, place, manner, etc. can be regarded as instantiations of peripheral FEs (e.g. *The family took brutal revenge on the murderer*). These elements do not solely characterize a frame, and they can be used to describe any semantically appropriate frame. The Iteration (e.g. *He avenged the loss twice*) can be regarded as an extra-thematic FE since it does not conceptually belong to the frame it appears in.

2.1. The 'Expansion' Frame of the verb *swell*

In what follows we will illustrate with corpus examples the 'expansion' frame of the entity-specific change-of-state verb *swell*. Thus, this frame, which refers to an entity becoming larger or rounder in size due to an accumulation of fluid, features only one core FE and twelve non-core FEs, either peripheral or extra-thematic. The *Item* represents the core participant role which undergoes a change in size (e.g. *Feel how your abdomen swells and falls*; Sketch engine doc#1206) whilst the non-core ones are as follows:[3]

(i)   The *Co-variable*, which is the quantity that varies commensurately with the size of the Item (e.g. *My eye pained and swelled* with each throb of my pounding heart *and I wondered if now I would be allowed to speak*; Sketch engine doc#818950, where an increasing heart rate correlates with the amount of swelling);

(ii) The *Degree* to which the expansion process occurs (e.g. *Sprinkle with the gelatin and leave it [mixture] for 5 minutes for it to swell* completely; Sketch engine doc#30805);

(iii) The *Dimension* (e.g. *[…] the cortex of individuals with preclinical Huntington's disease swells* in size *[…]*; Sketch engine doc#210592);

(iv) The temporal *Duration* that the expansion process takes (e.g. *The researchers are also developing a leg socket that can adjust to the changing diameter of the amputated stump as it swells* over the course of the day *[…]*; Sketch engine doc#134250);

(v) The *Group* in which an Item undergoes the change in size (e.g. *[…] the process of release of oocytes from the ovary is by means of a blister-like fluid swelling* among follicle cells adjacent to each oocyte; Sketch engine doc#1634393);

(vi) The *Initial_size*, which is often accompanied by the (vii) *Result_size* (e.g. *I can cope with a ridiculously foreshortened parasitic lifecycle, but the sight of creatures swelling* from miniscule to twice the size of a human *shows that the creators of this film have no idea of conservation of mass*; Sketch engine doc#1193635);

(vii) The *Manner* of the expansion (e.g. *The material that clothes her swells* softly *with the breath of the fluid that shapes it*; Sketch engine doc#960316);

(viii) The *Path* indicating a point on the scale of size (e.g. *Simultaneously, it causes the slug's antennae to swell* up *and glow phosphorescently*; Sketch engine doc#37978);

(ix) The *Rate* at which the expansion takes place (e.g. *[…] the mountain was swelling* about five feet a day *in a northward, lowering direction*; Sketch engine doc#917263);

(x) The *Size_change* (e.g. *[…] my chest measure had swelled* an inch or so *[…]*; Sketch engine doc#268431);

(xi) and the *Time* when the expansion happens (e.g. *It's likely going to swell on him* tomorrow *[…]*; Sketch engine doc#1681066).

Examples compiled from a bigger corpus than the one employed by the FrameNet lexicographers (i.e. The British National Corpus) demonstrate that a verb has a richer distributional pattern and consequently, more frame elements can be added. Thus, we can complete this frame proposal by contemplating Frame Elements, such as:

(xii) The *Location/Place* where this expansion occurs (e.g. *The anger-vein swelled* in his forehead *as he spoke*; Sketch engine doc#166046);

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(xiii) The *External_cause* of the expansion (e.g. *The police, […] kept the body on display for 48 hours as it swelled* in the heat *[…]*; Sketch engine doc#671097);

(xiv) The *Internal_cause* (e.g. *And the mother's heart swelled big* with anguish; Sketch engine doc#1167890);

(xv) The *Subregion* (e.g. *Within 24 hours, the female's back begins to swell* around the eggs; Sketch engine doc#745610);

(xvi) and the *Source* of this process (e.g. *His tongue had swelled* out of his head; Sketch engine doc#2347336).

As will be seen later on, FrameNet has included the cause within the 'causation of expansion' frame. Nevertheless, if we look at the lexicographical definition of the verb *swell* we notice that the increase in size does not occur naturally but as a result of internal pressure. By taking this observation into consideration can we really claim the existence of two separate semantic frames for this verb? At this stage it is important to examine the reasons why FrameNet has decided to separate the causative and the inchoative uses of a verb into two different frames. Ruppenhofer *et al.* (2010: 12) enumerate two main factors motivating this lexicographical decision:

> There may be a legitimate objection about the presence of an AGENT or CAUSE being just a vague linguistic intuition and that we ignore the fact that everything that happens is caused [...] First, there will typically be lexical units that exhibit only one of the two uses. For instance, the verb *gain* only has inchoative uses when referring to scalar change, while the verb *lower* only allows causative uses in the domain of scalar change. Second, cross-linguistic comparison also shows that other languages often distinguish inchoatives and causatives by derivational morphology.

We disagree with the separation of these two frames since the central meaning of the verb *swell* is 'to increase in size or volume', whether we take the causative or the inchoative perspective: *The heat swelled my feet* ('caused the feet to become bigger') or *My feet swelled* ('the feet became bigger'). Causative and inchoative uses of a verb are a matter of the perspective from which we see an event. The frame itself is not affected by perspective. What is more, the perspective is imposed *ad hoc* when the frame is put to use. The causative/inchoative distinction is, thus, a matter of perspective on frames and it should not interfere with the structure of events proposed by frames.

2.2. The Role of Primary Metaphors

Another significant problem is posed by the incorporation of the Path element in the 'expansion' frame. How does FrameNet motivate the conceptual link between the increase in physical size and spatiality without acknowledging the existence of primary metaphors? Lakoff and Johnson's (1980) orientational metaphor MORE

IS UP licenses the combination of the verb *swell* with the preposition *up*, since there is an experiential basis according to which if you add more of a substance or of objects to a container or a pile, the level will go up. In relation to the MORE IS UP metaphor, Taylor (1995: 138) argues that height is literally correlated with quantity and the natural association between quantity and vertical extent has a metonymic basis. This metonymy becomes a metaphor only when more abstract instances of addition are evoked, such as *high prices*. Later on, Radden (2002: 410) takes up this issue and postulates a continuum ranging from literalness via metonymy to metaphor. This notion is tightly connected to the developmental model of primary scenes and primary metaphors and the notion of *deconflation* proposed by Grady (1997) or Grady and Johnson (2002). Radden (2002: 410-412) claims that MORE IS UP is a metonymy-based metaphor which has undergone four stages of evolution: (1) a literal stage in which the concept of verticality is experienced alone; (2) a stage of conflation (UP+MORE) or partial metonymy which emerges from a primary scene in which we see the level of liquid in a container go up when more liquid is poured into it; (3) a stage of deconflation or full metonymy (UP FOR MORE) in which the two concepts start separating; and (4) the final stage or the metaphoric MORE IS UP.

Ruiz de Mendoza (2011) discusses the cognitive operation of integration by *enrichment* whereby the FULL-EMPTY schema is enriched by the implicit VERTICALITY schema underlying the figurative quantity-height correlation. Furthermore, Peña (2003, 2008) claims that the VERTICALITY schema is inherently subsidiary to FULL-EMPTY and demonstrates how the CONTAINER and the PATH schemas blend to give rise to an intransitive resultative construction, e.g. *She was led into a depression*. In this example the subject moves to a resultant state of depression which is understood as a location and the container schema appears in the end-of-path structural slot. The verb *swell* could describe the expansion of an entity on a vertical and also on a horizontal level. The utterance *Tomatoes need a good supply of water when the fruits are swelling up* (Sketch engine doc#54055) makes use of the aforementioned combination between the FULL-EMPTY and the VERTICALITY schemas, whereas in the sentence *The buds of millions of poppy flowers are swelling across Afghanistan* (Sketch engine doc#1363530) the expansion frame is enriched by the SURFACE schema, which is later enriched with the subsidiary motion and path schemas. Thus, there are two primary metaphors at work here, namely SWELLING IS UPWARD AND/OR FORWARD MOTION. Also note that owing to these metaphors sentences like **My foot swelled down* or **The injury swelled back* are impossible. This is so because swelling is accompanied by an increase in height. This obeys the experientially based correlation between quantity and height mentioned above to such an extent that the mind interprets both types of increase as if they were the same. Grady

(1997, 1999) has shown that conflation is also present in other domains of our daily embodied experience, leading to the creation of primary metaphors, such as INTIMACY IS CLOSENESS (e.g. *They are close friends*), AFFECTION IS WARMTH (e.g. *She gave me a warm embrace*), IMPORTANT IS BIG (e.g. *Tomorrow is a big day for my career*), CHANGE IS MOTION (e.g. *My car has gone from bad to worse*), and UNDERSTANDING IS GRASPING (e.g. *She grasped his theory*), to name just a few.

Taylor's (1995: 139) examples of synesthesia, which is a subcategory of metaphor, can also be understood in terms of conflation. Synesthesia results from mapping one sensory domain onto another. Among the most representative examples we list *loud color* (which maps a feature of the auditory domain onto the visual domain), *black mood* (color is mapped onto an emotional state), and *sweet music* (where a gustatory sensation is linked to the auditory domain). Osgood *et al.* (1957) have investigated perceived similarity across different domains and put forward the existence of an 'affective reaction system' which is independent of any sensory modality. The affective reaction system was believed to have three primary dimensions: evaluation, potency, and activity. Identical reactions on these dimensions to stimuli from our environment are what could give rise to metaphor and synesthesia.

Additionally, there is a growing body of empirical studies that support the existence of conflation (also termed co-activation of two domains by one of the reviewers) in primary metaphors. For example, consider the well-known pair of metaphors GOOD IS UP/BAD IS DOWN. Meier, Robinson and Clore's (2004) experiment demonstrates that people recognize positive words faster if these are placed on a higher vertical position on a computer screen and subsequently find negative words faster if they are positioned in the lower part of the screen. These results are in concordance with the idea that people conceptualize abstract notions such as good and bad as being located on a vertical scale, because good experiences are upward (e.g. being alive and healthy implies an upright position) and bad experiences are downward (e.g. sickness and death). Williams and Bargh (2008) explored the correlation between affection and warmth in a study in which people who briefly held warm, as opposed to cold, cups of coffee judged a fictitious person's interpersonal traits as being warmer. Finally, studies using an online lexical priming task revealed that people access conceptual metaphors (e.g. ANGER IS HEATED FLUID IN A CONTAINER) to process idiomatic sentences like *John blew his stack* (cf. Gibbs, Bogdanovich, Sykes and Barr 1997).

2.3. The 'causation of expansion' frame of the verb *swell*

The 'causation of expansion' frame comprises three core FEs and fifteen peripheral or optional FEs. The first group is made up of a human Agent who causes the

change in size (e.g. He *swelled himself up to near double his size*; Sketch engine doc#511390), the Item which undergoes the change and the Cause which is an inanimate entity bringing about the change (e.g. High rainfall *had swollen the waters draining off the reclaimed lands in the River Yar*; Sketch engine doc#22016). The non-core FEs are the following: the Co_Variable, the Dimension, the Elapsed time, the Group in which the Item changes, the Initial_size and the Result-size, the Rate of change, the Place where the Agent causes the expansion, the Manner, the Means, the Size_change, and the Time. In addition, three new components are added to this frame, that is to say, the Instrument with which the Agent causes the expansion of the Item, the Purpose, and the Reason for which the Agent causes the expansion. What FrameNet seems to overlook is the fact that the cause of the swelling may not always be expressed as the subject of a causative construction, as can be observed in *The waters were swelled* with continual rains, *and the low-lands were almost inundated* (Sketch engine doc#41368), where the cause is lexically realized by the preposition *with*. FrameNet shows how these FEs are realized at the grammatical level by including attested examples from the BNC. For the sake of illustration, let us consider the following FrameNet annotations for the 'causation of expansion' frame:

(1)   a. This amount was further SWELLED by a generous donation from Norfolk of £200.

(The Item or the undergoer of expansion is lexicalized by the NP *amount* and the *by*-headed NP represents the Means by which the expansion is carried out).

b. Pity they couldn't actually have joined us because I was last there on a Monday night and my four friends and I SWELLED the numbers beyond double figures.

(*My four friends and I* is the Subject NP and functions as the Agent causing the expansion and the NP *numbers* is the entity that increased in size).

c. The heat SWELLS the metal, so breaking the rusted joint.

(The NP *heat* is the non-animate Cause of the expansion process whilst the Item is expressed by the NP *metal*).

Examples (1) (a)-(c) constitute the most typical combinatory possibilities for the verb *swell*.[4] However, we stumble across the same problem as advanced earlier, i.e. what makes the English speaker's mind establish a link between a literal expansion of the surface of the metal with an abstract swelling of an amount/number? Moreover, we consider that examples (1a) and (1b) evoke a scalar dimension (i.e. the height scale) through activation of the primary metaphor MORE IS UP which connects an increase in number/amount to an increase in height. The vertical scale

thus becomes subsidiary to the concept of quantity and is cued by metaphorical instantiations. On the other hand, physical size does not necessarily involve a scale unless you measure it.

2.4. The 'Change of Position on a Scale' and its Causative Variant

The 'change of position on a scale' frame encompasses eight core FEs and sixteen non-core FEs. The conceptually necessary components are:

(i)   The Attribute or the scalar property of the Item (e.g. *Presently, as the voices swelled* in volume, *the baritone stepped forward*; Sketch engine doc#271446);[5]

(ii) The Difference (e.g. *About 1.3m Americans fell into poverty last year, while the total without medical insurance swelled* by 1.4m, *[…]*; Sketch engine doc#43613);

(iii) The Initial_value and Final_value (e.g. *Taken together, the number of tourists world-wide is forecast to swell* from 673 million *this year* to 1,602 million *in 2020*; Sketch engine doc#36209);[6]

(iv) and the Value_range, which is a portion of the scale along which the value of the attribute fluctuates (e.g. *The exchange rate has fluctuated* between a low point of US$82 and a high point of US$145 *per 100 euro*; Sketch engine doc#10239).[7]

Among the peripheral FEs we should mention:

(i)   The Circumstances (e.g. *One phenotypic expression of this inherited abnormality of Rbc in Beagles was an accelerated rate of RBC swelling* under osmotic stress *[…]*; Sketch engine doc#1386973);

(ii) The Correlate, which is a directional path against which the Attribute is measured (e.g. *After 1985, these networks swelled* with another outflow of migrants *[…]*; Sketch engine doc#790797);

(iii) The Duration (e.g. *The ranks of the disabled have swelled* over the last two decades; Sketch engine doc#640149);

(iv) The Initial_correlate and Final_correlate (e.g. *The Gangsters swelled* from Ashland and Halsted *on the west* to Cottage Grove *on the east*; Sketch engine doc#207148);

(v)   The Group (e.g. *[…] an inane debate swelled* among active gays *over a novel nomenclature […]*; Sketch engine doc#55600);

(vi) The Speed (e.g. *Estimates range from 150,000 to 350,000, swelling* by 5 to 10 percent a month; Sketch engine doc#755520);

(vii) The Path that the Item traverses (e.g. *A fast release could cause the sound to swell* up *in volume very quickly*; Sketch engine doc#166538).[8]

Finally, the causative variant of the 'change of position on a scale' frame adds the human Agent (e.g. Kurdish and Afghan refugees *have swelled the ranks of the minority Sunnis […]*; Sketch engine doc#52924) and the Cause (e.g. *[…]* military campaigns *have only swelled the ranks of his followers*; Sketch engine doc#109320). As for the non-core FEs, these are: the Co_Variable, which is the scale that the dependent Variable is measured against, the Difference, the Manner (e.g. *But Ireland and India* greatly *swelled the revenues available to Britain's ruling class*; Sketch engine doc#256596), the Means, the Place, the Path, the Purpose, the Time, the Value_1 and Value_2, and the Speed. FrameNet lists only one example for this 'causation of change of position on a scale' frame, e.g. *Useful contributions from the tail SWELLED* the score *to 451, leaving India a distant victory target of 372.* In this sentence the *score* is the undergoer that changes its position to a final value due to *contributions* (cause).

3. Verbs of the Second Group in FrameNet

Only seven verbs of the second group were found in FrameNet, namely *corrode, rust, tarnish, rot, decay, molder,* and *burn.* The first three verbs are conceptually related in the sense that there is an overlap of the frames they activate. Thus, the verb *corrode,* which displays two main frames, i.e. 'corroding' and 'corroding_caused', shares its first frame with *rust* and its second frame with *tarnish.* The main difference between the 'corroding' and the 'corroding_caused' frame is that the latter adds two more core FEs beside the undergoer, viz. the Agent and the Cause. The Agent is always an individual that causes the corrosion (e.g. *At first he corroded the surface of the stone with aquafortis […]*)[9] whereas the Cause can be an animate or inanimate entity, a force or an event (e.g. *The acid corroded the metal*). What we find surprising is that FrameNet has listed only the 'corroding' frame for the verb *rust.* This predicate can also evoke the 'causation of corrosion' frame as illustrated by transitive sentences like *The moist air rusted the latch on the door* or *Keep up your bright swords, for the dew will rust them* (*Merriam Webster Online Dictionary*). It is common knowledge that a metal cannot rust by itself. It is always the action of air, water or an acid which causes the metal to acquire a reddish brown color. By the same reasoning, the intransitive use of the verb *tarnish* can evoke a 'corroding' semantic frame, which is not included for this verb in FrameNet (e.g. *Gold does not tarnish easily*). The formation of rust on a metal is produced by an external cause just as the discoloration of a metal surface is.

Exactly like *corrode,* the verb *rot* has two main semantic frames: a 'rotting' and a 'cause to rot' frame. The first frame was postulated in order to account for the intransitive uses of this predicate, whilst the second one accounts for its transitive

use by the inclusion of an Agent (cf. *She said that 'he rotted the blinds' by keeping his window open*)[10] or a Cause (e.g. *Leprosy rotted the flesh from their bones;* COCA 1992). As was the case with the verb *corrode,* the Agent is mentioned as a core FE in the 'cause to rot' frame, but there are no examples that could substantiate these assumptions. Both *decay* and *molder* share the 'rotting' frame which has no cause for the decomposition undergone by an entity. Although the transitive use of these verbs is becoming obsolete, we have come across examples which activate the 'causation of decomposition' frame, e.g. *Pollution has decayed the surface of the stonework on the front of the cathedral* (*Cambridge Online Dictionary*); *Winter mouldered the footprints of besmirching snow […].[11]* FrameNet annotations for these verbs instantiate the most typical combinatory affordances of a predicate, as evidenced by the following sentences:

(2) a. *Acid water trouble* corrodes *pipework.*

b. *Hairsprays, nail enamels and make-up could* tarnish *the gold.*

c. *Our old metal gutters are* rusting *badly – what should I replace them with?*

d. *Linen and lace had* rotted *into cobwebs on the beds, where now there were only twisted brass bones.*

e. *Their flesh* decays, *their shells and their bones become scattered and turn to powder.*

f. *Athelstan had returned but his brother's body still lay* mouldering *in some forgotten field in France.*

Examples (2) (a)-(f) constitute literal instantiations of the predicates under scrutiny, where the undergoer (pipework, gold, metal gutters, linen and lace, flesh, body) is always an organic entity that suffers a process of gradual decomposition, which in some cases is externally caused (acid water trouble, hairsprays, nail enamel and make-up).

Although FrameNet is useful because it helps us "to identify verb classes based on their ability to describe similar types of scenes or situations" (Boas 2011: 216), it has the disadvantage of disregarding more unusual configurations that are contemplated in other corpora. FrameNet lists only one figurative use of the verb *corrode* (cf. *His disappointment had corroded his concentration*) but nothing is said about what motivates the occurrence of this verb in this metaphorical environment. What is more, Boas himself (2010: 57) argues that "while the role of metaphor in structuring language has been amply demonstrated in the literature, its role in licensing particular argument structure constructions remains a matter of debate" and "it is not entirely clear how metaphorical extensions can be systematically restricted to avoid unacceptable sentences". Nevertheless, metaphor and metonymy can act as licensing factors of syntactic behavior. Among the metaphors and

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metonymies that underlie grammatical processes, we can mention the following: (i) THE TIME FOR ACTION metonymy (see Kövecses and Radden 1998), which allows the noun *summer* to undergo categorial conversion, thus, becoming a verb 'to spend the summer' (e.g. *An injured bird also summered at Darwell Reservoir in 1958*); (ii) A SOUND ACT IS AN EFFECTUAL ACTIVE ACCOMPLISHMENT (cf. Baicchi and Benedetti 2010) permits the subcategorial conversion of a *sound emission* verb like *wail* which changes into an active accomplishment predicate (e.g. *Police car wailed its way towards them up Wimbledon Hill*; BNC 68235 HR8); (iii) the GENERIC FOR SPECIFIC metonymy (see also Ruiz de Mendoza and Díez 2002, 2004), which motivates the parametrization process whereby a generic lexical item stands for a more specific one (e.g. *What's Tom?*, where the generic *what is* question is a specific way of asking either about Tom's job, i.e. an architect or Tom's role, i.e. a leader). So, limiting our study to literal utterances in which an organic entity undergoes decomposition would result in a rather impoverished analysis.

3.1. The semantic frames of the verb *burn*

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Regarding the verb *burn*, this predicate displays four semantic frames: 'experience_ bodily harm', 'cause_harm', 'perception_body' and 'emotion_heat'. In the first frame, an experiencer injures a part of his/her body on an injuring entity (cf. *Melanie burned her mouth on scalding tea;* COCA 1993). In the second frame an Agent injures a Victim (cf. *They burnt him alive in the village square;* BNC CJP 620). The 'perception_body' frame refers to an experience that perceives high temperature on some part of his/her body (cf. *Evelyn went cold inside and her skin burned all over;* COCA 1990). The last frame describes a (usually negative and uncontrollable) emotion experienced by an individual as in *Her lips tightened and a flame of anger burned across the cheekbones Montgomery had admired* (COCA 1988). However, even if FrameNet lists this figurative use of the verb *burn*, it still falls short of accounting for how *burn* is used within a metaphorical expression. In this respect, we contend that the association of a negative emotion like *anger* with the verb *burn* is not a random connection. Kövecses (1990) points out that there is a clear connection between the cultural model of the physiological effects of anger and the conceptual expressions coding this emotion. Anger manifests itself in the body through increased body heat, increased heart rate and blood pressure. Therefore, it is not surprising that anger is expressed by means of verbs related to fire which produces extreme heat. The previous example is motivated by Kövecses's (1990: 58) primary metaphor ANGER IS FIRE which has an experiential basis. This metaphor displays the correspondences illustrated in Table 1 below:

SOURCE	TARGET
Fire	Anger
Entity burning	Angry person
Cause of fire	Cause of anger
Intensity of fire	Intensity of anger
Physical damage to burning entity	Mental damage to angry person

TABLE 1: Kövecses's metaphor ANGER IS FIRE

Furthermore, the capacity of the entity burning to fulfill its normal function correlates to the capacity of the angry individual to function normally, whereas the entity at the point of being consumed by fire in the source domain corresponds to the person whose anger has reached its limit in the target domain.

Consider the sentence *Kate's eyes burned with a fury that was fast reducing her to speechlessness* (COCA 1993). Following FrameNet's rationale, we could simply assign the NP *fury* the semantic role of cause and leave the reader do all the inferential work. Nonetheless, we claim that such a sentence is grounded in a metaphor according to which eyes are objects in combustion.

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4. FrameNet's Limitations

Although the FrameNet database is undoubtedly a useful tool, several limitations have been identified:

(i)   The use of what seems to have become a small size corpus, such as The British National Corpus, has direct consequences for the distributional pattern of lexical units. As we have demonstrated in the previous sections, semantic frames are sometimes incomplete and could be enriched through the inclusion of additional frame elements. As outlined in section 2.1, the 'expansion' frame of the verb *swell* can be enriched through the addition of five different FEs, such as the Location, the External_cause and the Internal_ cause of the expansion, the Subregion and the Source of this process.

(ii)   Only a small number of entity-specific change-of-state verbs were found in this database, namely *burn, corrode, decay, molder, rot, rust, swell*, and *tarnish*. In most cases, only literal examples were provided for the verbs under scrutiny, and even when a metaphorical use is listed no motivation is given for the subsumption of a particular verb into a figurative sentence.

(iii)   In some cases there is a high degree of overlap between frames and frame elements. In section 3 it has been shown that the verb *corrode* shares the

'corroding' frame with the verb *rust* and respectively, the 'corroding_caused' frame with *tarnish*. To illustrate the overlap between frame elements, consider the sentence *This program will not survive* [with everybody going in different directions].[13] In this example the phrase between brackets can express the Circumstances that facilitate a state of affairs and supply an Explanation for the occurrence of the events described by the verb.

(iv) Despite the fact that it postulates inheritance relationships between semantic frames, FrameNet displays a limited kind of paradigmatic information for words. In this database there are no hierarchical arrangements for the hyponyms of a verb. In this connection, frame elements may reflect the complementation pattern of a lexical unit but they do not predict their syntactic behavior. FrameNet does not focus on the peculiarities of a single verb but on the common semantic features of a frame. This broad treatment cannot help us pinpoint the exact semantic properties that determine a difference at the syntactic level. Thus, *contribute* and *give,* which have been classified by Levin (1993) as change of possession verbs, behave syntactically in different ways, i.e. *contribute* cannot participate in the ditransitive construction, but, according to the FrameNet lexicographers, they belong to the same semantic frame, namely the 'giving' frame. The same holds true for *pay* and *disburse*. While the former can occur in the ditransitive construction, the latter can only appear in the dative construction. If they evoke the same frame (viz. the 'commerce_pay' semantic frame) how can we account for their different syntax?

(v) The lexical units in FrameNet are not provided with any phonological, morphological or etymological information. Also, words in the FrameNet database are not associated with any pragmatic features (information about users and user communities, contexts of use, emotional affect, etc.).[12]

As the reader will have realized, some of the criticisms enumerated above are exclusively directed at the analysis provided for entity-specific change-of-state verbs (see [i], [ii], and [iii]), whereas the remaining points concern the structure of FrameNet as a whole.

Notes

[1]. Levin (1993) mistakenly includes the verb *stagnate* among entity-specific change-of-state verbs. However, this verb does not evoke any change schema since its meaning encodes cessation of motion or progress.

[2]. Unlike Dik's (1997) model, which proposes a threefold distinction for the functions of a word (i.e. semantic, syntactic, and pragmatic), FrameNet identifies only two functions: the semantic one, which is characterized by frame elements, and the grammatical one (e.g. the subject, the object, and the complement expressed by means of phrase types, such as NPs, PPs, APs, etc.). Frame elements are specifications of the more abstract thematic roles of agent, patient, and theme. For example, the Buyer is an agent in the 'commerce' frame.

[3]. At this point it should be noted that we will illustrate the 'expansion' frame for the verb *swell* with examples extracted from our own corpus (i.e. the Sketch engine) since FrameNet provides no examples for this verb in this particular frame.

[4]. The reader should not confuse the term typical with prototypical. The former signals frequency of occurrence of specific items or tokens. The latter derives from psycholinguistic work on quality of ratings by experimental subjects. A prototype is the best example of a category. Prototypicality usually correlates with frequency of use (cf. Stubbs 2004), but not necessarily so. This means that a highly typical realization can be a prototypical one. Even though Fillmore *et al.* do not calculate frequency of occurrence (cf. Ruppenhofer *et al.* 2010: 22), they claim that they discard occurrences that are marginal, i.e. those for which they have obtained very few hits.

[5]. In this example the voice is the Item, i.e. the entity undergoing a change of position on a scale.

[6]. No examples for the Initial_state and the Final_state were found in our corpus.

These two FEs differ from the Initial_value and Final_value in that they express an Item's state after or before the change in the Attribute's value, as an independent predication. Also, FrameNet uses the verb *increase,* not *swell,* to exemplify the Initial_ state and the Final_state (e.g. *Diesels have increased* from having a 20% market share in 1995 *to just over 30% in 2004; It was never bad (1 or 2 seizures a year), but this past decade, it has increased* to having them 1 day a month *[…]*).

[7]. The Value_range frame element could not have been exemplified with the verb *swell* whose unidirectionality is incompatible with oscillation between two points on a scale.

[8]. Eight peripheral FEs were left out from this 'change of position on a scale' frame, i.e. the Containing_event, the Degree, the Manner, the Particular_iteration, the Period_of_iterations, the Place, the Result, and the Time. These were not illustrated here owing to the fact that no examples were found in our corpus. Nevertheless, FrameNet lists no examples for this frame.

[9]. Google Books: *Chats on old prints,* by Arthur Hayden (1923). Accessed on February 17, 2012. It should also be noted that although FrameNet lists the Agent as one of the FEs of the 'corroding_caused' frame, no example is provided to support their claim.

[10]. Google Books: *A biography of Edward Marsh,* by Christopher Hassal (1959). Accessed on February 17, 2012.

[11]. Google Books: *Glasgow: fabric of a city,* by Maurice Lindsay (2001). Accessed on February 17, 2012.

[12]. These disadvantages are also made evident in the work of Atkins *et al.* (2003: 271-272) or in Fillmore, Johnson & Petruck (2003: 248).

[13]. This example has been extracted from Ruppenhofer *et al.* (2010: 147).

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