# TOWARDS A FRAME-CONSTRUCTIONAL APPROACH TO VERB CLASSIFICATION

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ABSTRACT

This paper proposes a novel approach towards identifying English verb classes by combining insights from Componential Analysis (Katz and Postal), Verb Descriptivity (Snell-Hornby), and Frame Semantics (Fillmore, "Frames"). It differs from syntactico-centric and event structure approaches in that frame-semantic information is shown to directly influence a verb's ability to occur in grammatical constructions. This frame-constructional approach emphasizes the importance of form-meaning correspondences between the information specified in semantic frames and their different syntactic realizations, leading to a more fine-grained classification of English verbs.

KEY WORDS: Componential analysis, verb descriptivity, frame semantics, frame-constructional approach.

RESUMEN

Este artículo propone un nuevo enfoque para la identificación de las clases verbales del inglés. Para ello combina aspectos del análisis componencial (Katz and Postal), la "descriptividad" verbal (Snell-Hornby) y la semántica de marcos (Fillmore, "Frames"). Se diferencia tanto de las propuestas sintáctico céntricas como de las que se basan en la estructura eventual en que la información de los marcos semánticos se presenta como un aspecto que influye directamente en la capacidad que un verbo muestra para formar parte de las construcciones gramaticales. Asimismo, este enfoque "marco-construccional" pone de manifiesto la relevancia de las correspondencias entre forma y significado, esto es, entre la información especificada en los marcos semánticos y sus diferentes realizaciones sintácticas, lo que permite establecer una clasificación más exhaustiva de los verbos del inglés.

PALABRAS CLAVE: análisis componencial, descriptividad verbal, semántica de marcos, enfoque marco-construccional.

## 1. INTRODUCTION

One of the main goals of lexical semantic theories is to classify the lexical items of a language into classes predictive of their syntactic and semantic expressions (Pustejovsky 8). Studies of English verb classes have often focused on identi-

fying specific syntactic features that allow for broad-scale generalizations. For example, Levin proposes a syntactic classification of argument alternations to classify verbs into unique classes. In later work, Rappaport Hovav and Levin ("Building", "English", "Event") develop a model that builds on previous accounts using lexical conceptual structures (LCSs) to represent systematic alternations in a verb's meaning and to define the set of verbs which undergo alternate mappings to syntax (Jackendoff, *Structures*; Hale and Keyser "Argument"; Wunderlich; Van Valin and LaPolla). On this view, verbs with multiple meanings have multiple lexical semantic representations, one for each meaning, where meanings are modeled by event structure templates. This approach has the advantage that the different meanings —represented in terms of event structures— make it possible to determine the various syntactic structures that a verb can be found in.

Recently, however, Baker and Ruppenhofer, Boas (*Constructional*), and Nemoto, among others, have noted empirical problems for such accounts. These findings call into question the role of LCSs and the status and number of predicates used in the event structure representations proposed by Rappaport Hovav and Levin ("Building", "English", "Event"). In fact, several authors (Iwata; Langacker; Boas, "Frame-semantic") have proposed that the lexical semantic representations necessary for defining verb classes are best explained by appealing to more fine-grained semantic descriptions. In this article I propose a comprehensive semantic account of verb classes, in which the explanatory burden is borne by frame-semantic descriptions (Fillmore, "Frame"; Fillmore and Atkins) of the various senses of verbs, a detailed constructional inventory covering each sense of a verb, and an exact inventory of form-meaning correspondences listing the combinatorial possibilities (valencies). My approach maintains the wide empirical coverage of syntactic accounts such as Levin, without suffering from their shortcomings. In addition, I demonstrate that event structure representations of the type proposed by Rappaport Hovav and Levin ("Building", "English", "Event") do not cover the full range of empirical data. The alternative frame-constructional approach to verb classification outlined in this paper thus follows Langacker's (186) proposal that "semantic and grammatical analyses are best pursued in parallel, each informing and constraining the other."

This paper is structured as follows. In section 2, I provide an overview of Rappaport Hovav and Levin's ("Building", "English", "Event") event structure approach and show that it fails to cover the full range of data. In section 3, I review Baker and Ruppenhofer's comparison of FrameNet's verb classes with those proposed by Levin. I argue that while it is important to pay closer attention to frame-semantic information underlying the interpretation of specific senses of verbs, one should not lose sight of syntactic information when determining membership in individual verb classes. In section 4, I propose a unified frame-constructional approach to verb classification that emphasizes the importance of form-meaning correspondences between the information specified in semantic frames and their different syntactic realizations. Section 5 concludes and offers suggestions for further research.

## 2. VERB CLASSIFICATION BASED ON EVENT STRUCTURES

Before discussing the details of Rappaport Hovav and Levin's ("Building", "English", "Event") event structure approach to verb meaning, a brief overview of earlier accounts incorporating Lexical Conceptual Structures (LCSs) is in order. One of the goals of LCSs and related forms of predicate decomposition is to overcome some of the problems associated with the lists of thematic roles proposed by Fillmore ("Frame") and Gruber, as well as the different types of thematic relations suggested by Jackendoff (*Semantic*).[1] For instance, Guerssel *et al.* intend to catalogue those elements of meaning that determine grammatical facets of behavior, including argument realizations. Consider the following sentences involving the transitive verbs *cut* and *break*.

(1) a. Lena cut the cake.
b.*The cake cut.
c. Lena cut at the cake.
(2) a. Rosa broke the vase.
b. The vase broke.
c.*Rosa broke at the vase.

The examples illustrate that *cut* exhibits a conative use (1c), but not an intransitive noncausative use (1b). In contrast, *break* exhibits an intransitive noncausative use (2b), but not a conative variant (2c). Guerssel *et al.* (51-59) therefore propose different LCSs to explain the variation in intransitive noncausative use between the two verbs as follows.

(3) a. *break*: *y* come to be BROKEN
b. *break*: *x* cause (*y* come to be BROKEN)
(4) a. *cut*: *x* produce CUT in *y*, by sharp edge coming into contact with *y*
b. *cut*: *x* causes sharp edge to move along path toward y, in order to produce CUT on *y*, by sharp edge coming into contact with *y*.

The LCS of *cut* does not exhibit a meaning constituent [come to be in STATE], although the LCS of *break* does (see (3b)). Therefore, a mapping to syntax for *y* is possible with *break*, but not with *cut*, according to Guerssel *et al*. Conversely, the LCS of *break* lacks a meaning constituent including a contact component, whereas the LCS of *cut* exhibits one. A mapping from *y* to syntax is thus possible with *cut*, but not with *break*. The examples illustrate how LCSs are used to capture variations in verb meaning, which, in turn, have an effect on how the arguments of verbs are realized morpho-syntactically.[2]

[1] See Dowty, and Levin and Rappaport Hovav (*Argument*) for details.

[2] See Hale and Keyser, "View¨; Laughren; Rappaport, Levin and Laughren; Levin and Rappaport Hovav, *Unaccusativity*, for similar types of analyses.

Throughout the 1990s, researchers developed different versions of LCSs to represent a limited stock of basic event types, in the hope of arriving at broad-scale generalizations about the morpho-syntactic behavior of verbs based on the largest common meaning denominator. To achieve this goal, Rappaport Hovav and Levin ("Building", "English", "Event") suggest that a verb's meaning consists of two parts: (1) an event structure, also called a lexical semantic template, which it shares with other verbs in the same semantic class; (2) a root, representing the idiosyncratic aspects of a verb's meaning, thereby setting it apart from other members of the same semantic class. To illustrate, the class of noncausative verbs of change of state exhibit a predicate decomposition consisting of a predicate BECOME describing the notion of change of state as in (5), together with the specified result state indicated in italics (cf. Rappaport Hovav and Levin, "Building" 108).

(5) [BECOME [x <*STATE* >]]

The event structure representation in (5) illustrates the common meaning shared by all noncausative verbs of change of state, such as *dry*, *widen*, and *dim*. At the same time, these verbs differ in their roots, i.e., their idiosyncratic meaning components, which are specified in terms of an attribute of an entity whose value is specified as changing. Compare, for example, the LCSs of *dry*, *melt*, and *freeze* in (6).

(6) a. *dry*: [BECOME [*y* <*DRY* >]]
b. *melt*: [BECOME [*y* <*MELTED* >]]
c. *freeze*: [BECOME [*y* <*FROZEN* >]]



According to Levin and Rappaport Hovav (*Argument*, "Lexical", *Unaccusativity*) a description of verb meaning in terms of event structures does not necessarily entail providing a complete semantic analysis. Instead, it focuses on isolating those facets of meaning which recur in significant classes of verbs and on determining key facets of the linguistics behavior of verbs. In the case of the verbs in (6), the event structure represents the fact that all three verbs license a noncausative change of state as in sentences like *The shirt dried*, *The butter melted*, or *The water froze*.

One of the main ideas of Rappaport Hovav and Levin's event structure approach to semantic classification and analysis is that verbs exhibiting multiple argument realizations must be associated with distinct event structures. According to this view, each distinct event structure gives rise to an appropriate argument realization when verb roots are integrated into different event structure templates. They can either occur in an argument position of a primitive predicate as in (6) above, or they can modify a predicate, as is the case with activity verbs in (7) and (8), where the subscript signals the modification of the predicate.

(7) *Gavin ran*
[*x* $\text{ACT}_{<RUN>}$]

(8) *Natasha wiped the table*
[*x* $\text{ACT}_{<WIPE>}$ *y*]

According to the Rappaport Hovav and Levin ("Building"), verb roots are of different ontological types, which in turn determine the event structures with which they can be associated. Consider, for example, the difference between the roots of verbs from the same semantic field such as *clean* and *scrub*. *Clean* has a result root specifying a state that typically results from some activity, and result verbs such as *clean* therefore lexicalize the result of some sort of activity in their root, as can be seen in (9).

(9) $[[x \text{ ACT}_{<MANNER>}]$ CAUSE [BECOME [$y$ <*CLEAN*>]]]

Levin and Rappaport Hovav propose that the only way in which result verbs such as *clean* and *empty* differ from each other is the end state specified by their roots: the root of *clean* represents the absence of any materials that could be considered as dirty, while the root of *empty* represents the absence of any materials in a container. This common meaning allows roots of result verbs to be associated with a causative change of state LCS like the one in (9). In contrast, verbs such as *scrub*, *wipe*, and *sweep* have a manner root specifying an activity that is conventionally carried out to achieve a particular result. Such verbs are associated with an activity LCS, as in (10).

(10) $[x \text{ ACT}_{<SCRUB>}]$

Levin and Rappaport Hovav suggest that manner verbs describe activities that are identified by some sort of means, manner, or instrument. They characterize the difference between manner verbs as follows:

> [T]he manner verbs *scrub* and *wipe* both describe actions that involve making contact with a surface, but differ in the way the hand or some implement is moved against the surface and the degree of force and intensity of this movement. (...) Despite the differences in the way the instruments are used linguistically all these verbs have a basic activity LCS. (Levin and Rappaport Hovav, "Lexical" 6-7)

Besides being associated with an activity LCS, Levin and Rappaport Hovav claim that manner verbs also entail a specific result, i.e. "cleanness." In their view, this entailment "explains the intuition of relatedness between the manner verb *scrub* and the result verb *clean*" (6). To achieve this interpretation, the LCS of all activity verbs as in (10) can be augmented by an additional result state, thereby yielding a causative LCS as in (9).[3] This generative process of Template Augmentation in (11) is constrained by the Argument Realization Condition in (12), which imposes well-formedness conditions on the mapping from event structure to syntax.

[3] Rappaport Hovav and Levin ("Building" 108) distinguish five different types of event structure templates: activities, states, achievements, externally caused accomplishments (also known as causative change of state), and internally caused accomplishments.

(11) *Template Augmentation*
Event structure templates may be freely augmented up to other templates in the basic inventory of event structure templates. (Rappaport Hovav and Levin, "Building" 111)

(12) *Argument-per-subevent-condition*
There must be at least one argument XP in the syntax per subevent in the event structure. (Rappaport Hovav and Levin, "Event" 779)

Rappaport Hovav and Levin ("Event" 779-780) claim that the basic inventory of event structures, including activity LCSs associated with manner verbs and causative change of state LCSs associated with result verbs, suffices to capture a verb's syntactic behavior, together with Template Augmentation and the Argument-per-subevent condition. The Argument-per-subevent-condition ensures that complex event structures of the type in (9) always give rise to sentences with a subject and an object, because both event participants "x" and "y" need to be overtly realized, hence the unacceptability of **Tracy broke* (compare *Tracy broke the dishes*) (Rappaport Hovav and Levin, "Building" 119). In contrast, simple activity event structures of the type in (10) only require a subject, because the well-formedness condition on argument realization in (12) only requires one event participant "x" to be realized (as the subject), but not necessarily an object (cf. *Phil swept* and *Phil swept the floor* (Rappaport Hovav and Levin, "Building" 115)).

Let us now return to the question of why manner verbs can be associated with both simple and complex event structures (cf. *Phil swept* / *Phil swept the floor* / *Phil swept the floor clean*).[4] To explain this syntactic behavior, Rappaport Hovav and Levin suggest that verb meanings are built up incrementally through Template Augmentation (cf. (11)). This process allows basic activity templates, like that associated with *scrub* in (9), to enter into other possible event structure templates that are more complex like that in (10), "as long as the resulting complex event structure meets the well-formedness conditions of syntactic realization" (Rappaport Hovav and Levin, "Building" 73). Summarizing their classification of verbs, the authors point out the following:

> [B]ecause the template associated with a verb like *break* cannot be augmented further, no other achieved state or location can be added to a sentence with *break*, even with the normal direct object. (...) Thus, the properties that distinguish the verb *break* from the verb *sweep* can be accounted for through the interaction of their event structure representations, the operation of Template Augmentation, and the well-formedness conditions. (Rappaport Hovav and Levin, "Building" 122-23)

[4] Another difference between manner and result verbs is that the former are more flexible with respect to their subcategorization restrictions on the object, whereas the latter are not. For details, see Rappaport Hovav and Levin ("Event" 779-780).

Rappaport Hovav and Levin's event structure account has been quite successful in explaining a range of syntactic behaviors based on the types of LCSs associated with the roots of verbs. However, their approach has a number of limitations to which I now turn. To begin, let us take a look at the range of data covered by their approach. Following their verb classification based on LCSs, the authors claim that English allows the LCSs of all activity verbs to be "augmented" by the addition of a result state, giving rise to causative LCSs. Indeed, as the examples in (13)-(15) illustrate, Rappaport Hovav and Levin's analysis accounts for a range of activity verbs that are associated with both a simple activity event structure and with a complex causative change of state event structure.

(13) a. Terry swept.
b. Terry swept the floor.
c. Terry swept the crumbs into the corner.
d. Terry swept the leaves off the sidewalk.
e. Terry swept the floor clean.
f. Terry swept the leaves into a pile.
(Rappaport Hovav and Levin, "Building" 97/98)

(14) a. Kim whistled.
b. Kim whistled at the dog.
c. Kim whistled a tune.
d. Kim whistled a warning.
e. Kim whistled me a warning.
f. Kim whistled her appreciation.
g. Kim whistled the dog to come.
h. The bullet whistled through the air.
i. The air whistled with bullets.

(15) a. Pat ran.
b. Pat ran to the beach.
c. Pat ran herself ragged.
d. Pat ran her shoes to shreds.
e. Pat ran clear of the falling rocks.
f. The coach ran the athletes around the track.
(Rappaport Hovav and Levin, "Building" 98)

The verbs *sweep*, *whistle*, and *run* are activity verbs and are thus associated with simple event structures such as those in (7) and (8). Per the *Argument-per-subevent-condition* in (12), the simple activity event structure requires the syntactic realization of one event participant, compare (13a)-(15a)), or two event participants, compare (13b) and (14c). Per Rappaport Hovav and Levin's *Template Augmentation* mechanism in (11), these simple activity event structures can be augmented to yield more complex event structures of the type in (9). As already discussed above, the event participants of these causative change of state event structures are obligatorily mapped to syntax per the *Argument-per-subevent-condition*, resulting in sentences like (13c)-(13f), and (15c), (15d), and (15f).

Note, however, that not all activity verbs allow template augmentation similar to the ones in (13)-(15). For example, other *wipe* verbs (Levin 125-128) similar in meaning to *sweep*, such as *erase*, *purge*, *squeeze* and *suction*, do not allow the full range of argument realization as *sweep*, as the following examples demonstrate.

(16) a. *Terry erased the marks into the corner. (cf. (13c))
b. *Terry purged the leaves into a pile. (cf. (13f))
c. *Terry squeezed the floor clean. (cf. (13e))
d. *Terry suctioned the leaves into a pile. (cf. (13f))

According to Rappaport Hovav and Levin, verbs such as *erase*, *purge*, *squeeze*, and *suction* should be categorized as activity verbs associated with the same activity event structure as *sweep*. As such, one would expect that these simple event structures can be augmented per *Template Augmentation* (cf. (11)), leading to a complex event structure of the type in (9). Given the *Argument-per-subevent condition*, we would expect the two event participants to be syntactically realized as in (16a)-(16d). However, the unacceptability of these sentences shows that the event structure account lacks crucial features that prevent *Template Augmentation* from generating unacceptable event structures, which in turn license unacceptable sentences. Note that this is not an isolated problem, as it also occurs with other verbs discussed by the authors. For example, verbs similar in meaning to *whistle* in (14) and *run* in (15) also exhibit a syntactic behavior that is unexpected under the event structure account. First, consider the syntactic behavior of manner of motion verbs in (17) and (18).



(17) a. Pat ran her shoes to shreds. (cf. (15d))
b. Pat walked her shoes to shreds.
c. ?Pat tiptoed her shoes to shreds.
d. ?Pat crawled her shoes to shreds.
e. *Pat crept her shoes to shreds.
f. *Pat meandered her shoes to shreds.
g. *Pat swam her shoes to shreds.

(18) a. The coach ran the athletes around the track. (cf. (15f))
b. ?The coach jogged the athletes around the track.
c. ?The coach promenaded the athletes around the track.
d. *The coach staggered the athletes around the track.
e. *The coach roamed the athletes around the track.
f. *The coach ambled the athletes around the track.

In (17) and (18), not all manner of motion verbs allow the same syntactic pattern as *run*. This distribution is not expected under Rappaport Hovav and Levin's proposal which predicts that the LCSs of all activity verbs can be augmented by the addition of a result state. Thus, *Template Augmentation* and the *Argument-per-subevent-condition* are not sufficient for preventing the licensing of unacceptable sentences as in (17) and (18) (Boas, *Constructional*; "Determining").

In my view, the problems faced by Rappaport Hovav and Levin's approach are caused by a verb classification system that is too coarse grained. Their account

relies too much on the distinction between different types of LCSs expressed as types of event structures, which in turn can be augmented. I have shown that *Template Augmentation* is not appropriately constrained and thus leads to over-generation. Distinguishing between different event structure types may be useful for explaining certain types of phenomena such as aspectual behavior of verbs (Tenny; Smith), but, as demonstrated above, closer examination of the linguistic facts reveals that event structures are not sufficient to explain linguistic idiosyncrasies such as why certain verbs exhibit a wide range of argument expression while other verbs closely related in meaning do not. The lexicon thus once again successfully resists the efforts of linguists to make it neat and clean. In the following section I discuss two alternative approaches to verb classification.

## 3. VERB CLASSIFICATION BASED ON SYNTACTIC OR SEMANTIC FRAMES?

Baker and Ruppenhofer compare how Levin and FrameNet (Fillmore *et al.*) classify English verbs. In summarizing Levin's seminal work, they point out that her approach relies on intuitive semantic groupings as well as the syntactic behavior of verbs, specifically their participation in valence alternations. Based on data taken from the linguistic literature, Levin arrives at a total of 193 verb classes whose members participate in more than 60 syntactic alternations such as the locative alternation (*Mary loaded the wagon with hay* vs. *Mary loaded hay onto the wagon*), and other syntactic constructions such as the Cognate Object Construction, the Reaction Object Construction, and the Resultative Construction, among others.

In contrast, FrameNet's verb classification relies on semantic frames (Fillmore, "Frame") that underlie the understanding and interpretation of words. Based on corpus evidence from the BNC, FrameNet groups words together that are semantically similar, i.e. they evoke the same semantic frame (Petruck). Another difference to Levin's or WordNet's (Fellbaum) classification is that verbs, nouns, and adjectives are all classified with respect to the same underlying semantic frame. Words are distinguished based on the frames they evoke. For example, *fill* is a lexical unit (LU), a word in one of its senses, which evokes the Filling frame, whose description specifies scenes in which containers are filled and areas are covered with some thing, things or substance (the Frame Element (FE) THEME). The area or container can appear as the direct with all these verbs, and is designated GOAL because it is the goal of motion of the THEME. Corresponding to its nuclear argument status, it is also affected in some crucial way, unlike goals in other frames. A frame-semantic description of *fill* includes the frame description, as well as a lexical entry summarizing how the FEs are realized syntactically, together with a list of annotated example sentences illustrating these uses.[5]

[5] See Fillmore et al. and Boas, "Theory" for details.

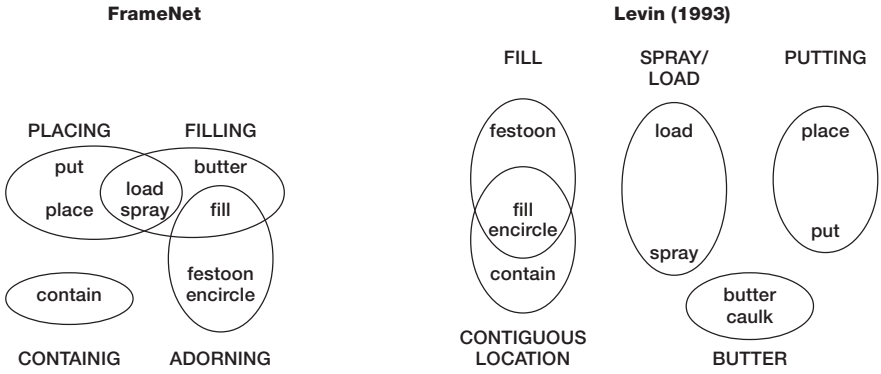


Figure 1: *Load*, *fill*, and related verbs in FrameNet and Levin. (Baker and Ruppenhofer 28)

In contrast to Levin, FrameNet does not view valence alternations as a primary means for identifying verb class membership. In fact, in FrameNet "verbs which share the same alternation might be represented in two different semantic frames" (Baker and Ruppenhofer 27). For example, FrameNet's Filling frame is evoked by both *fill* and *load*. *Load* additionally evokes the Placing frame, whereas *fill* also evokes the Adorning frame. This classification shows that Filling is causative (Theme-Object) and Adorning (Theme-Subject) is not. Figure 1 illustrates how Levin's account and FrameNet's approach classify verbs differently.

The main difference between the two approaches is that Levin regards a verb's syntactic ability to alternate as a deciding factor for verb class membership, whereas FrameNet does not. Thus, Levin does not allow alternating and non-alternating verbs in the same class, while FrameNet does. This difference in methodology leads to important variations in how verb classes are defined in the two approaches. For example, Baker and Ruppenhofer (31) discuss cases where Levin's verb class is narrower than the comparable frame underlying FrameNet's verb classification. They point out that Levin identifies verbs of putting and placing based on a verb's morphological relation to a noun denoting the goal location. Verbs that do not exhibit this morphological relation do not belong to the same class. FrameNet, however, does not apply such morphological principles to verb classification. Instead, it presumes that the incorporated argument is interpreted as an indefinite null instantiation (Fillmore,"Pragmatically"), i.e., it is implicitly understood. Verbs of putting and placing are thus classified differently by FrameNet than by Levin. This difference also leads to cases where Levin's verb classes are broader than FrameNet's classes based on frames. Baker and Ruppenhofer (31) discuss Levin's classes of social interaction, including *correspond*, *marry* and *meet* verbs, which are defined syntactically in terms of alternations indicating reciprocality, such as the Simple Reciprocal Alternation, the Understood Reciprocal Alternation, and the Collective Subject NP.

TABLE 1: SOME OF LEVIN'S VERBS OF SOCIAL INTERACTION. (BAKER AND RUPPENHOFER 32).

| CORRESPOND VERBS | MARRY VERBS | MEET VERBS |
|---|---|---|
| *agree*, *argue*, *banter*, *bargain*, *bicker*, *brawl*, *clash*, *coexist*, *collaborate*, *collide*, *combat*, *commiserate*, *communicate*, *compete*, *concur*, *confabulate,* (...), *struggle*, | ...*court*, *cuddle*, *date*, *divorce*, *embrace*, *hug*, *kiss*, *marry*, *muzzle*, *pass*, *pet*, | ...*battle*, *box*, *consult*, *debate*, *fight*, *meet*, *play*, *visit*, ... |

TABLE 2: SYNTACTIC CRITERIA FOR IDENTIFYING VERB CLASSES IN LEVIN (*ENGLISH*). (BAKER AND RUPPENHOFER 31).

| | |
|---|---|
| Collective Subject NP | *The committee bantered/met* |
| Simple Reciprocal Alternation | *Pat bantered/met/*married with Kim* |
| Understood Reciprocal Object | *Pat married/met/*bantered Ki*<br>*Pat and Kim bantered/married/met* |

One problem with this methodology is that the alternations used to identify the verb classes are not diagnostics of reciprocality, according to Baker and Ruppenhofer. For example, they point out that the encoding of one argument slot by a reciprocal is also available with events that are not inherently reciprocal (cf. *Larry and Moe looked at each other*). More problems arise in cases when the actions of the participants are not directed at each other but are simply jointly or simultaneously undertaken, since plural, coordinate and collective subjects are also acceptable in such cases as in the following examples.

(19) John and Sue jogged.
(20) John jogged with Sue.
(21) The group jogged. (Baker and Ruppenhofer 31)

These observations lead the authors to conclude that "verbs of social interaction, in so far as they are understood as involving reciprocal action of the participants, cannot be identified with the help of the above constructions", i.e. those in Table 2 (Baker and Ruppenhofer 31). Instead, they propose that semantic criteria are more useful to establish a coherent classification than syntactic criteria. To illustrate, Baker and Ruppenhofer discuss how FrameNet employs semantic criteria to classify Levin's verbs of social interaction (see Table 2 above). Among Levin's correspond verbs *argue*, *bicker*, *chat* and *gossip*, along with other communication verbs are classified as evoking the Communication_conversation frame because of their shared semantics. In contrast to Levin's classification, *struggle*

does not belong to the same class, but is classified as evoking the Hostile_encounter frame.

Baker and Ruppenhofer (33) also point out that not all syntactic frames occurring with verbs in Levin's classes constitute a heterogeneous semantic group. They show that the transitive and *with*-PP uses of verbs such as *box*, *play* and *meet* of Levin's (*English*) *meet*-class encode different types of meanings. Thus, *box* with a transitive syntactic frame in (22b) has more of a competition sense than *box* with a *with*-PP frame in (22a).[6] Other comparable meaning differences arise with *play* and *meet* in (23) because of the various syntactic frames, according to the authors.

(22) a. I ended up boxing with him.
b. Tyson will box Lewis.

(23) a. My son played/met with your son.
b. My son played/met your son. (Baker and Ruppenhofer 32)

Data such as in (19)-(23) lead Baker and Ruppenhofer (33) to the conclusion that "the meaning which is to be associated with a Levin class is often hard to define. (...) In addition, many verbs are cross-listed in classes which pick out one aspect of their meanings but do not capture separate senses." To overcome such problems, the FrameNet approach relies on semantic criteria and would for each verb in (22) and (23) distinguish between two different lexical units, each evoking a separate semantic frame. For example, the *with*-PP frames of *box* and *play* in (22a) and (23a) would evoke a more general Activity frame, while the transitive frame in (22b) and (23b) would evoke the Competition frame (with parts of the semantics inherited from the Activity frame.[7]

On the whole, Baker and Ruppenhofer's arguments convincingly demonstrate that the importance of syntactic information for identifying verb classes has been overrated. Instead, detailed frame-semantic criteria offer a more coherent way of identifying shared meaning components, thereby leading to a more unified way of classifying verbs. At the same time, FrameNet captures the types of syntactic regularities described by Levin (*English*) by categorizing alternating verbs as two LUs evoking two different yet often related semantic frames. Nevertheless, what is still at issue here is the question of whether FrameNet's semantic classification of verbs can be improved to result in a more fine-grained semantic analysis capturing how specific meaning elements influence the syntactic realization of FEs. Consider, for example, verbs in the Self_motion frame such as *run*, *jog*, *walk*, *parade*, etc., which all evoke the same semantic frame yet differ quite widely in their idiosyn-



[6] In this paper, the term "frame" is used in two different ways. First, it denotes semantic frames that describe particular scenes or scenarios, including frame elements (FEs). Second, it denotes syntactic frames specifying syntactic order and phrase type, e.g., [NP V NP PP].

[7] See Johnson on inheritance relations.

cratic meanings. In the following section, I first follow Taylor in arguing that such semantic differences have syntactic repercussions. Building on insights from Boas ("Frame-semantic") I then argue that a verb's descriptivity (Snell-Hornby) influences the range of constructions in which a verb may occur. Finally, I outline a more fine-grained frame-constructional analysis of verbs in the Self_motion frame that allows us to explain how specific elements of meaning are syntactically relevant.

## 4. FINE-GRAINED FRAME-SEMANTIC COMPONENTS THAT ARE SYNTACTICALLY RELEVANT

Taylor claims that an account of syntactic behavior should also include a characterization of encyclopedic knowledge. Arguing against the claims of Jackendoff (*Structures*), he discusses how the meanings of *run* and *jog* differ. He claims that the meaning of *jog* should be characterized against an Idealized Cognitive Model (ICM) (Lakoff) that stands for a particular lifestyle including health, fitness, physical well-being, and which is embraced by members of middle classes in affluent first-world societies. According to Taylor, the ICM of *jog* crucially differs from that of *run* in that a jogger typically jogs for exercise, jogging is not a competitive activity, and one does not jog to beat the world record or to beat fellow joggers. In contrast to *jog*, the essential meaning aspect of *run* is speed (it is faster than walking), involving more vigorous bodily movements. Taylor's main point is that although the two verbs occur in many identical syntactic environments, the differences in meaning between them actually have direct consequences for the syntactic environments in which they occur as the following examples illustrate.

(24) a. Bruce ran against Phil.
b. *Bruce jogged against Phil.

(25) a. He ran a mile in less than four minutes.
b. *He jogged a mile in less than four minutes.

(26) a. The race will be run tomorrow.
b. *The race will be jogged tomorrow.

(27) a. He ran to catch the bus.
b. *He jogged to catch the bus.

(28) a. I've been running up and down all morning.
b. *I've been jogging up and down all morning. (Taylor 27)

The difference in acceptability between (24a)-(26a) and (24b)-(26b) is caused by the absence of a competition component in the meaning of *jog*. Similarly, the unacceptability of (27b) vis-à-vis (27a) is explained by a particular conventionalized meaning inherent to *run*, but not to *jog*, i.e. the idea to move fast in order to reach a goal in a focused manner. Finally, the difference in acceptability between

(28a) and (28b) can be attributed to an interpretation associated with *run* (but not with *jog*) that implies some type of purpose or intended goal. Taylor summarizes his view of how detailed knowledge about a verb's semantics is relevant for its syntactic distribution as follows:

> At the end of the day, it is our knowledge of what jogging actually is —knowledge which in turn is based in stereotypical conceptions of postindustrial lifestyles, and which goes way beyond the action pattern stereotypes that Jackendoff envisages— that motivates the kinds of contexts in which the word jog can be appropriately used, in contradistinction to those contexts in which run is appropriate. (Taylor 32)[8]

Following Taylor's ideas, Boas ("Frame-semantic") analyzes the syntactic distribution of a wider range of motion verbs to determine to what degree a verb's meaning influences its syntactic distribution. Boas observes that the Self_motion frame is evoked by a wide array of verbs whose semantics differ considerably from each other. To capture the differences in meaning between these verbs and to develop a more principled distinction between meaning components in Frame Semantics, he adopts Snell-Hornby's notion of verb descriptivity. It distinguishes two main meaning components: the act nucleus (ANu) and the modificants (Mod). For example, the act nucleus of the verb *strut* constitutes the underlying semantics shared by all verbs evoking the Self_motion frame. This meaning is typically associated with the most prototypical verb of that frame, in this case *walk*. In contrast, the modificant, also known as the modifying adverbial, is a semantic bundle further analyzable into distinct physical characteristics (*stiff*, *erect*), and (negative) value-judgments passed on the character of the agent and his manner of walking (*self-satisfied*, *proud*, *pompous*, *with affected dignity*). Verbs such as *strut*, which exhibit a high degree of verb descriptivity are called descriptive verbs (DVs) (Snell-Hornby 25-26; Boas, "Frame-semantic" 138). To capture the relationship between the two meaning components, Snell-Hornby proposes the formula in (29), where *x* is understood "as an optional element without evaluative properties and not expressible in terms of adjectives or manner adverbs" (25-26).[9]



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[8] See Iwata's lexical-constructional approach for further arguments that particular meaning components are grammatically relevant. Arguing against Pinker, Iwata demonstrates that the syntactic distribution of manner-of-motion verbs crucially depends on the make-up of the MANNER component. On this view, image-schematic structures associated with a verb's sense plays a crucial role in determining whether verbs such as roll and bounce can alternate or not *(roll the doll into a blanket vs.?bounce/?slide/?*skid the doll into a blanket, roll a blanket around the doll vs. *bounce/?slide/*skid a blanket around the doll)*.

[9] According to Snell-Hornby, there are two different types of verb descriptivity: direct verb descriptivity describes scenes in which the modificant refers directly to the activity described by the verb, as in *shout*. Indirect verb descriptivity captures scenes in which "the modificant refers to a participant (or participants) or a circumstance (or circumstances) behind the action or a combination of these," as is the case with a speaker's value judgments about the agent of a verb such as *strut*

(29) DV = ANu + Mod (+x)

Snell-Hornby points out that the relationship between the act-nucleus and the modificant is crucial in determining the degree of verb descriptivity. Thus, a verb has a higher degree of descriptivity whenever the modificant takes up more semantic weight vis-à-vis the act-nucleus. An example of a highly descriptive verb discussed by Snell-Hornby is *bustle*, where the act-nucleus is not clearly definable, and can best be paraphrased as *behave*, *move about*. In contrast, the modificant of *bustle* is clearly definable and complex, involving descriptions such as *excitedly*, *energetically*, *often with apparent purpose, but usually noisily or inefficiently*. *Shout* is a verb low in descriptivity because its modificant is relatively simple when compared to modificants of highly descriptive verbs such as *bustle*, describing the activity only as *loudly*. In this case, the modificant of *shout* does not take up more semantic weight vis-à-vis the act-nucleus, which can be described as *say*, *speak* or simply *cry out* (Snell-Hornby 33-34; Boas, "Frame-semantic" 139).

Reviewing the syntactic range of some verbs, Snell-Hornby claims that "the higher the degree of descriptivity (in other words the more that it is specified by the modificant), the narrower the verb's range of application is likely to be" (35). Boas ("Frame-semantic" 141-145) tests Snell-Hornby's proposal by integrating it into Frame Semantics to determine the range of descriptivity of LUs evoking the Self_motion frame.[10] He starts by comparing dictionary definitions of *walk*, *parade*, *totter* and *stagger*, all of which evoke the *Self_motion* frame, in order to get an indication of the semantic make-up of the SELF_MOVER of each verb. He finds a wide range in how the SELF_MOVER is described for each of the four LUs.[11] While the description of the SELF_MOVER of *walk* only implies that someone is moving on foot, the description of the SELF_MOVER of *parade* presents a close-up view of the moving activity, focusing on the individual steps taken in a controlled regular manner, often in an energetic way and as a part of a procession to show off. The SELF_MOVER of *totter* is different in that its steps deviate from the norm of regular intervals, often having difficulties to maintain an upright position, which may be the cause of weakness or intoxication. Finally, the SELF_MOVER of *stagger* appears to have even less control over its movements than the SELF_MOVER of *totter*. Its steps are even less controlled while its upright posture is not maintained easily, often due to balancing problems. Based on these differences, Boas ("Frame-semantic" 142) proposes a ranking of the four LUs according to their degree of descriptivity.

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(see above). This type of descriptivity is usually made up of dynamic adjectives, which are susceptible to subjective measurement and express a distinct attitude of the speaker, i.e. speaker-evaluation (Snell-Hornby 30; Boas "Frame-semantic" 138). For further details, see Snell-Hornby (30-66) and Boas ("Frame-semantic" 137-140).

[10] Definition of Self_motion frame: The SELF_MOVER, a living being, moves under its own power in a directed fashion, i.e. along what could be described as a PATH, with no separate vehicle.

[11] In this paper I use the term "verb" to mean a verb in one of its senses, evoking a particular semantic frame. Thus, I use the terms "verb" and "lexical unit (LU)" interchangeably.

TABLE 3: LUS IN THE SELF_MOTION FRAME RANKED BY THEIR DEGREE OF DESCRIPTIVITY (BOAS,"FRAME-SEMANTIC" 142).

| VERB | ANU | MOD |
|---|---|---|
| *walk* | **AG** [S→P→G] | (a, ...) |
| *parade* | **AG** [S→P→G] | (a, b, c, ...) |
| *totter* | **AG** [S→P→G] | (a, b, c, d, ...) |
| *stagger* | **AG** [S→P→G] | (a, b, c, d, e,...) |

The middle column in Table 3 represents in a very schematic way the act-nucleus common to all four LUs. In this case, the act-nucleus coincides with the semantics of the Self_motion frame and all of its relevant world knowledge. The schematic representation indicates that an AGENT (AG) (i.e., the SELF_MOVER) is moving from a SOURCE (S) along a PATH (P) towards a GOAL (G). The decreasing font size represents a lesser prominence of the act-nucleus, i.e., the schematic directed motion semantics associated with the Self_motion frame. Thus, the semantics of the act-nucleus is most prominent in the meaning of *walk* (which may be regarded as the most prototypical verb evoking the frame), and the least prominent in the meaning of *stagger*. The column on the right side in Table 3 represents the prominence of the modificant in a verb's meaning. For example, the modificant of *walk* contains only very few semantic attributes, such as *using feet*, and perhaps *upright posture*. The small font size indicates that the modificant is only of minor weight vis-à-vis the act-nucleus; hence *walk* exhibits a relatively low degree of verb descriptivity. In contrast, *parade* exhibits a comparatively higher degree of descriptivity, indicated by more semantic attributes contained in its modificant and a concomitantly larger font size (Boas, "Frame-semantic" 143).

Table 3 illustrates the idea that a verb's semantics can only encode a certain "amount" of modification vis-à-vis its act-nucleus, and not more. Located on opposite ends of what I call the descriptivity continuum there are two divergent ways of expressing the combined semantics (act-nucleus and modificant) of verbs in the Self_motion frame. On one end we find verbs with a relatively low level of descriptivity such as *walk*. The meaning of such verbs consists of a very prominent act-nucleus and a very minimal modificant. On the opposite end of the continuum we find verbs with a very high level of descriptivity such as *bustle*, with a modificant so detailed and prominent that its act-nucleus is rather vague and is only implicitly understood.[12] Other verbs in the Self_motion

[12] This description is only for the Self_motion frame. While I suspect that similar tendencies can be observed among verbs in other frames, I do not claim that the same dynamics hold for these other frames. I expect further research to show that the variables and attributes will differ between frames, as will the descriptivity continuum with respect to the specifications for the modificant.

frame are located between these two opposite ends of the descriptivity continuum, with the prominence of a verb's act-nucleus depending on the extent of its modificant.

With this systematic way of analyzing verb descriptivity in hand, Boas ("Frame-semantic" 143-145) explores whether there is a correlation between the degree of descriptivity and the types of syntactic patterns in which a LU can occur. To this end, he investigates whether the four LUs discussed above can appear in a number of grammatical constructions and alternations discussed by Levin. They include (1) zero-related nominals corresponding to the inclusion of a location PP with the respective verbs (*Gerry walked down the street/a walk*), (2) the resultative construction (*Cathy walked {herself to exhaustion/Pat off the street}*) (Levin 1993: 99), (3) the locative preposition drop alternation (*Julia walked across the town/Julia walked the town*) (Levin 43-44), (4) the induced action alternation (*Claire walked the dog down the street/The dog walked down the street*) (Levin 31), and (5) adjectival passive participles (*the walked dog*) (Levin 86-87).

Table 4 summarizes his findings with respect to the ability of *walk*, *parade*, *stagger*, and *totter* to occur in these syntactic patterns.

TABLE 4: SUMMARY OF SYNTACTIC DISTRIBUTION OF *WALK*, *PARADE*, *STAGGER*, AND *TOTTER* (BOAS, "FRAME-SEMANTIC" 144).

| | WALK | PARADE | STAGGER | TOTTER |
|---|---|---|---|---|
| Location PP | + | + | + | + |
| Zero-related Nominal | + | + | + | + |
| Resultative Construction | + | ? | - | - |
| Caused-motion Construction | + | - | - | - |
| Preposition Drop Alternation | + | + | - | - |
| Induced Action Alternation | + | + | - | - |
| Adjectival Passive Participle | + | ?? | - | - |

A comparison of Table 4 with Table 3 shows that there is indeed a correlation between a LU's level of descriptivity and the range of syntactic constructions in which it may occur. More specifically, LUs with a low level of descriptivity such as *walk* occur in a wider range of syntactic contexts than LUs with a higher level of descriptivity such as *totter* (Boas, "Frame-semantic" 144). Although there is an obvious correlation between a LU's level of descriptivity and the range of syntactic constructions in which it occurs, a number of open questions remain. First, does this correlation only hold for the four LUs investigated by Boas, or also for a wider range of verbs evoking the Self_motion frame? Second, how do we go about systematically integrating detailed descriptions of a LU's level of descriptivity, i.e., the make-up of its modificant, into existing semantic frames? Finally, are there any particular mean-

ing components of LUs that contribute more to a verb's descriptivity than other components and thereby have a direct impact on a LU's syntactic distribution?

### 4.1. Correlation between verb descriptivity and range of syntactic patterns

To answer these questions, let us first consider the syntactic distribution of a larger number of LUs. To this end, I expand Table Y by including sixteen additional LUs evoking the Self_motion frame, namely *amble*, *bustle*, *crawl*, *creep*, *frolic*, *hike*, *jog*, *jump*, *limp*, *meander*, *scurry*, *swim*, *trot*, *wade*, *waltz*, and *wander*. Table 5 summarizes their syntactic distribution with respect to the seven syntactic patterns discussed by Boas ("Frame-semantic").

TABLE 5: SYNTACTIC DISTRIBUTION OF 20 LUS IN THE SELF_MOTION FRAME.

| | walk | parade | amble | meander | wander | hike | jog | stagger | totter | limp |
|---|---|---|---|---|---|---|---|---|---|---|
| Location PP | + | + | + | + | + | + | + | + | + | + |
| Zero-related Nominal | + | + | - | - | + | + | + | + | + | + |
| Resultative Construction | + | ? | - | - | - | + | + | - | - | - |
| Caused-motion Construction | + | - | - | - | - | - | + | - | - | - |
| Preposition Drop Alternation | + | + | + | - | + | + | + | - | - | - |
| Induced Action Alternation | + | + | - | - | - | - | - | - | - | - |
| Adjectival Passive Participle | + | ? | ? | - | - | - | - | - | - | - |

TABLE 5 CONTINUED

| | jump | waltz | wade | swim | scurry | trot | frolic | crawl | creep | bustle |
|---|---|---|---|---|---|---|---|---|---|---|
| Location PP | + | + | + | + | + | + | + | + | + | + |
| Zero-related Nominal | + | + | + | + | + | + | + | + | + | + |
| Resultative Construction | + | + | - | + | - | - | - | - | - | + |
| Caused-motion Construction | - | + | - | - | - | - | - | - | - | + |
| Preposition Drop Alternation | + | - | - | + | - | - | - | - | - | - |
| Induced Action Alternation | - | + | + | - | - | - | - | - | - | - |
| Adjectival Passive Participle | - | - | - | - | - | + | - | - | - | - |

Table 5 shows that the twenty LUs fall into roughly four groups with respect to their syntactic distribution. The first group is syntactically the most flexible and includes only *walk*. Members of the second group, including *jog*, *jump*, and *waltz*, are a bit less flexible syntactically. The third group includes LUs that are even less flexible, i.e. *bustle*, *hike*, *parade*, *swim*, and *wander*. Finally, the fourth group includes the least flexible LUs, namely *amble*, *crawl*, *creep*, *frolic*, *limp*, *meander*, *scurry*, *stagger*, *totter*, *trot*, *wade*, and *wander*. Interestingly, there is a correlation between verb descriptivity and syntactic distribution as the following discussion of the meaning differences between these twenty LUs shows.

As argued above, *walk* differs from all other LUs in the Self_motion frame in that it is the least descriptive. Besides evoking the basic semantics of the frame (represented as the act-nucleus, see above), it does not offer much more information about the motion event except for that it takes place on foot, presumably at a normal speed, and with an upright posture. The absence of further inherent meaning suggests that the modificant of *walk* is very minimal vis-à-vis its act-nucleus. Support for this view comes from the broad semantic range of DEPICTIVE and MANNER FEs providing further details about the many different ways of walking. Examples of these FEs found in FrameNet include *with the sinuous grace of a cat*, *in a daze*, *with posed uncertainty*, *calmly*, *fiercely*, *aerobically*, *springily*, *silently*, *purposefully*, *like drunk soldiers in from the war*, *quickly and secretly*, and *curiously*. These semantic specifications cover a wide range of concepts, such as agility, different types of mental states, level of energy and intensity, intent, speed, disguise, loudness, and interest. In my view, these semantic specifications are possible only because the modificant of *walk* is very minimal and does not imply any type of meaning that would be incompatible as is the case with verbs that are more descriptive. Compare, for example, the unacceptable semantic specification of the modificant of *bustle* as in **Kim bustled calmly out of the house*, where *calmly* is incompatible with the implied meaning of the modificant of *bustle* specifying it as *energetically*, *excitedly*, etc. I thus regard the broad variety of possible modifications of *walk* as an indicator of its low level of descriptivity.

Members of the second group differ from *walk* in that their modificants are slightly more complex. They provide up to three additional meaning components specifying concepts that can either be measured on a scale (e.g., speed, level of energy, casualty), or that are binary opposites of each other (e.g., feet on the ground/feet not on the ground). For example, *jog* implies a higher speed than *walk* combined with an element of exercise. *Jump* denotes quickness and suddenness, implying that the feet leave the ground. In addition, both verbs express a higher energy level than *walk*. *Waltz* is different from *walk* in that its modificant expresses lightness, casualness, or inconsiderateness, thereby contributing more meaning to the act-nucleus. The make-up of these slightly more complex modificants can be tested by inserting DEPICTIVE and MANNER FEs that express incompatible information vis-à-vis the modificants. This is relatively simple in cases where the concepts involve binary opposites such as *feet on the ground*/*feet not on the ground* (cf. **He jumped with his feet on the ground*) or *exercise*/*no exercise* (**They jogged around the track without exercising*). In cases involving concepts measured against scales it is not as easy to find DEPICTIVE and MANNER FEs that are straightforwardly incompatible, as

is illustrated by *They jogged slowly around the track* or *?She waltzed out of the house with a limp*.

LUs belonging to the third group exhibit a higher level of descriptivity than the previous two groups because their modificants are even more complex, providing up to six additional concepts that modify the act-nucleus. For example, the modificant of *hike* implies several concepts that are not combined in such a way in any of the other LUs discussed so far. These include (1) duration and distance (a hike is typically longer than a walk or a jog), (2) purpose (one typically hikes for recreational reasons), (3) location (hiking usually takes place outdoors, often in forests or mountains), and (4) path (hiking typically takes place along a predetermined path). The modificant of *parade* also exhibits a more complex combination of concepts, involving (1) display (usually intended to be viewed publicly), (2) organization (typically a (long) moving line of people or vehicles), (3) celebration (often performed on special occasions to express pride), (4) uniformity (all units of a parade move at the same speed and perform specific activities simultaneously or according to a choreographed plan), (5) path (parades typically move along a predetermined path), and (6) place (often in a square, down a street, outside of a building, or in front of a particular person). There is an interesting difference between the six concepts implied by the modificant of *parade*. The first four concepts can all be subsumed under the FE MANNER of the Self_motion frame and are implicitly understood. This explains why *parade* in its default interpretation does typically not appear with any additional phrases providing information about display, organization, celebration, and uniformity. Thus, such additional information is only expressed when there is a particular need for it, such as profiling a specific aspect of a scene described by *parade* that is either non-prototypical, or so important to the speaker that it deserves mentioning in that context. In contrast, the other two concepts that make up the modificant of *parade* are directly connected to the FEs PATH and PLACE. They are usually more relevant as they provide crucial information that help distinguish the types of PATH and PLACE FEs from those of other LUs in the Self_motion frame.



Members of the fourth group display the highest level of descriptivity because their modificants are the most complex among the twenty LUs discussed here. The modificants of *amble*, *meander*, and *wander* describe the motion as it were from a distant perspective. Snell-Hornby (133) proposes that these LUs do not provide information about the physical properties of the agent (as is the case with *limp*) or details of his gait (as is the case with *jump*). Instead, they focus "on the background, the atmosphere, and the agent's attitude, typically favoring an outside setting, usually over a wide area, and without prescribing any particular goal or any impediment to terminate the action." More specifically, *amble* implies a leisurely, easy-going attitude of the Self_mover, an easy pace and even movement, and a positive evaluation by the speaker. In contrast, *meander* describes motion or progress that is random or casual, while *wander* indicates movement over a larger area, focusing on an unsettled aimlessness, without route or destination, usually slow or idle in manner (cf. Snell-Horny 134).

Next, consider *limp*, *stagger*, and *totter*, whose modificants describe a deviant or impeded mode of walking, caused either by the agent's physical or mental state, or by external factors. More specifically, *limp* indicates irregular, laborious walking caused

by lameness or injury. Often, this is caused by a disability and the speaker evaluation is typically sympathetic towards the Self_mover. In contrast, both *stagger* and *totter* describe unsteady movements. The modificant of *stagger* involves unsteady, irregular movement and uncertain balance of someone not in complete control of the movement, usually caused by intoxication, a serious injury to the head, or a heavy weight carried by the Self_mover. The modificant of *totter* focuses on the coordination of movement by describing a feeble, shaky walk, as of an agent who has lost control of his movement (in particular lack of coordination and control of the limbs) (cf. Snell-Hornby 139). Finally, consider *frolic*, *scurry*, and *trot*, which involve a more extensive movement of the body and thus typically require agility or a higher level of energy. The modificant of *trot* focuses on the ease of running with quick and short steps, typically covering only short distances and sometimes involving hurriedness (I leave out the use of *trot* to denote the movement of a horse). The modificant of *frolic* is different from that of *trot* in that it involves moving around at a fast speed while playing, with a positive evaluation by the speaker. In addition, it indicates play of a less boisterous and more joyful nature (as opposed to *romp*), typically of small animals. The modificant of *scurry* evokes a different set of concepts, involving short quick steps of a very small animal such as a mouse or a squirrel. When used to describe the movement of humans, it usually refers to the hurried activities of frightened people moving fast to accomplish their goals (cf. Snell-Hornby 140-142). The last set of highly descriptive LUs includes *crawl* and *creep*. These are particularly interesting because their modificants describe a number of concepts not found in this combination in the modificants of other LUs. The modificant of *crawl* typically evokes the concepts of slowness, laborious motion, proximity to the ground, horizontal body posture (on hand and feet), loss of control (by injured or intoxicated people who cannot more standing up), age (typical of babies), and insects.[13] The modificant of *creep* also implies slowness, but in addition emphasizes quietness, caution, secrecy, and the intention of the SELF_MOVER to escape attention while moving (cf. Snell-Hornby 142).

In sum, comparing the level of verb descriptivity among twenty verbs in the Self_motion frame, I have identified four groups of verbs according to their level of descriptivity. Taking these results and comparing them with the syntactic range in which the verbs occur (see Table 5) answers our first question, i.e., it confirms Boas' proposal that a verb's level of descriptivity appears to influence the range of syntactic patterns in which it can occur.

### 4.2. COMBINING FRAME SEMANTICS, VERB DESCRIPTIVITY, AND COMPONENTIAL ANALYSIS

Answering our second question about whether it is possible to systematically integrate detailed descriptions of a LU's level of descriptivity, i.e., the make-up of its

[13] See Fillmore and Atkins for further details.

modificant, into existing semantic frames proves to be more complicated, because we do not yet have a systematic way of identifying and measuring the types of concepts that make up the modificants of the verbs discussed above. However, classifying such meaning components in a way that they can be compared, and perhaps even weighed against each other, is a necessary prerequisite for determining their relative status vis-à-vis each other and with respect to their influence on syntax.

One way of classifying meaning components and the concepts they represent would be to apply the methods of componential analysis as proposed by Katz and Postal, Bierwisc, Hundsnurschner, and Nida, among many others. Adherents of this approach compare and contrast related words and summarize their similarities and contrasts in terms of distinctive semantic components (similar to distinctive features in phonology). For example, a set of words describing humans such as *man*, *woman*, *boy*, and *girl* can be distinguished from each other like binary opposites with the minimal semantic features +/- MALE and +/- MATURE. This approach is successful because it allows a highly explicit and economical account of meaning relations such as hyponymy and incompatibility. At the same time, these semantic features are not intended to describe the full meaning of words, but only those aspects of meaning that are in opposition to each other. Another problem with this approach is that features are purely provisional and always need to be revised depending on the granularity of the analysis, thereby leading to potential circularity. Componential analysis has also been criticized because there are no attempts to standardize the inventory of semantic features or to constrain its size (Goddard 49-50). Snell-Hornby observes that some aspects of componential analysis are applicable to the analysis of descriptive verbs, while others are not. For example, she claims that semantic features lend themselves quite frequently to the analysis of the act-nucleus of descriptive verbs whenever the "components refer to extra-linguistic phenomena of the physical world that are expressible in binary opposites" (63). However, she also points out that componential analysis is not that successful when it comes to hazier areas of subjective evaluation, an important part of the meaning of descriptive verbs. Snell-Hornby supports her critique by pointing to Wotjak's study of 44 German motion verbs, which analyzes their meanings in terms of binary opposites as well as defining words providing more specific information. She argues that the column referring to speed is inadequate, because it only allows a plus or minus specification of *schnell* ('fast'). In her view, such an analysis is insufficient because speed is a relative term that should be expressed by gradation on a scale. She concludes that, although Wotjak's system of binary opposites is quite capable of modeling the meaning components that make up the semantics of the act-nucleus in her framework, it does not provide the necessary means to characterize the details of the modificants appropriately. Interestingly, Snell-Hornby does not offer a "more precise terminology" (64) for characterizing the modificant beyond her introduction of "dynamic adjectives, which are themselves elements of language, relative and not absolute, and dependent on precise wording" (65).

Despite these problems with identifying and measuring meaning elements in the modificant, I propose to develop a preliminary classification system combining insights from componential analysis, Snell-Hornby's approach, and Frame Se-

mantics. This method will allow us to identify semantic features as well as gradable adjectives, both of which are specific meaning elements that need to be understood against the background knowledge of semantic frames. To this end, I focus on four LUs evoking the Self_motion frame, namely *crawl*, *jog*, and *totter*, and *wander*. All four LUs share the same act-nucleus, i.e. the underlying semantics of the Self_motion frame. As such, the components of the modificants must be understood against the semantics of that frame. The discussion is structured as follows. I first isolate the semantic features that set the four LUs apart, focusing on those which can be used to provide more details about the semantic make-up of FE SELF_MOVER. Then, I discuss aspects of meaning that cannot be clearly captured by binary semantic features, focusing again on the SELF_MOVER, which results in a list of descriptors with specific values. A number of points are important to keep in mind. First, the semantic analysis is only an approximation and should not be regarded as the final product. Second, the values of some features and descriptions used to characterize the modificant should only be regarded as default information representing a prototypical instance of that meaning component, which can be modified given the appropriate context. Finally, some features and descriptions do not apply to the analysis of specific LUs since their modificants do not contain any aspect of that particular meaning element.

I begin with those meaning elements of the modificant which provide detailed information about the SELF_MOVER, illustrated in Table 6. The first four rows of Table 6 employ semantic features characterizing the modificant of the four LUs. The first feature "on feet" captures the fact that the SELF_MOVER of *jog*, *totter*, and *wander* moves on its feet, while that of *crawl* does not. The second feature "laborious motion" differentiates *jog* and *totter* from *crawl* and *wander*. The third and fourth feature, "steady movement" and "controlled body movement" set *totter* apart from *crawl*, *totter*, and *wander*. The last four rows in Table 6 contain gradable descriptors used to characterize those aspects of the modificant that cannot be described successfully with semantic features. Each of these descriptors are measured against a scale with opposite ends whose middle value is somewhat equal to the meaning of the prototypical LU of that frame, namely *walk*. Consider the descriptor "speed" in Table 6 which is specified as "slower than walking" for *totter*. This specification differs from the one for *jog,* which is comparatively higher on the scale. In contrast, the speed of *crawl* is specified as "flexible," capturing the fact that this LU is not inherently specified for a particular value. The descriptor "energetic" does not apply to *wander*; hence there is no specification for it (the same holds for "steps," "posture," and "speed"). In contrast, the descriptor "mood" only applies to *wander* because its SELF_MOVER is typically aimless. The other three LUs do not describe any particular mood of the SELF_MOVER, which is why the remaining cells in Table 6 are left blank.

It is important to keep in mind that when a meaning element is not specified this does not entail that a particular descriptor does not apply to a FE. Instead it means that the modificant of that verb does not provide that meaning element. For example, the absence of a specification for "mood" for *crawl* does not entail that its SELF_MOVER does not have a particular mood. It just means that the modificant of *crawl* does not

provide any such specific meaning element. At the same time, this meaning element can be provided by context (e.g. *The baby crawled happily to her mother*).

TABLE 6: SEMANTIC FEATURES AND DESCRIPTORS CHARACTERIZING THE SELF_MOVER[a]

| | crawl | jog | totter | wander |
|---|---|---|---|---|
| on feet | - | + | + | + |
| laboriousmotion | - | + | + | - |
| steady movement | + | + | - | + |
| controlled body movement | + | + | - | + |
| speed | flexible | rather quickly | slower than walking | |
| energetic | regular | very | less than walking | |
| steps | Short | longs | horter than walking | |
| posture | horizontal | vertical | bent over | |
| mood | aimless | | | |

[a] I have not included other meaning elements such as "speaker evaluation," "age," or "fitness" in the description of the modificant of the SELF_MOVER. These elements, as well as many others, should be included in future work to determine their syntactic relevance.



Note that the data in Table 6 serve only to compare and contrast four LUs in the Self_motion frame against each other. As such, the list of features and descriptors in Table 6 serves only as a first step towards systematically characterizing the modificants of all LUs in the Self_motion frame. It will grow as the analysis is extended. For example, expanding the list of LUs in Table 6 to include *waddle* and *shamble* would necessitate the inclusion of the descriptor "speaker evaluation" and the feature "dragging feet." Similarly, an analysis of *stumble* and *trip* would lead us to incorporate the feature "external obstruction" into Table 6. Besides including in our account the full range of LUs of the Self_motion frame, it will also become necessary to provide a detailed analysis of other FEs. Applying the same methodology as above will yield a clearer picture of the semantic make-up of the modificant, including information about the features and descriptors that characterize all other FEs. For example, the FE PATH can be characterized in the modificant by including a semantic feature "clear and directed." *Totter* and *wander* would have a minus specification while *crawl* and *jog* would have a plus specification. Similarly, the size of the FE AREA of *wander* can be characterized as "large," while *crawl*, *jog*, and *totter* do not provide specific information about this FE.

Clearly, our discussion of the SELF_MOVER is only a first approximation of its semantic make-up. At this point, it is not clear how large the inventory of features and descriptors will be. Earlier studies on componential analysis by Wotjak

and by Nida suggest that it will be rather extensive. The challenge will not only be to arrive at a complete inventory capable of characterizing the modificants of all LUs in a frame. In addition, we will be interested in capturing generalizations across frames to see whether certain parallels emerge. For example, the descriptor "mood" used to characterize *wander* in Table 6 also appears to be an integral part of the modificant of the LUs in the Complaining frame, such as *bitch*, *complain*, *grumble*, and *whine*. While I have shown that it is in principle possible to integrate important aspects of componential analysis and verb descriptivity into Frame Semantics to arrive at a more systematic characterization of the similarities and differences between LUs in the same frame, some important tasks remain. First, how do we go about thoroughly integrating detailed descriptions of a LU's level of descriptivity, i.e., the make-up of its modificant, into existing semantic frames? While the preliminary analysis of four LUs from the Self_motion frame has highlighted some crucial differences between features and descriptors, we still need to develop a thorough methodology that allows us to combine the various types of information. Second, we need to develop more sophisticated strategies to methodically discover and determine the list of features and descriptors that make up the modificant. Prior studies in this area by Bülow, Hundsnurscher, Wotjak, Nida, and Meliss, among others, will be instructive. Third, we are interested in finding methods that will help us "weigh" components of verb meaning against each other to determine what aspects of a verb's semantics is most relevant, both in its default context as well as in other contexts. Achieving this goal will make it possible to overcome one of the main problems with traditional componential analysis, that is, the fact that bundles of features are of evenly distributed importance. Finally, and perhaps most interesting, is our third research question formulated above, i.e., are there any particular meaning components in a verb's meaning that directly influence its syntactic distribution? In the following section I briefly outline the cornerstones of a frame-constructional approach that seeks to answer this question.

### 4.3. Syntactically relevant units of meaning in a frame-constructional approach

Instead of focusing on abstract meaning components such as LCSs to determine a verb's syntactic distribution, I propose to pay close attention to the structure of its modificant. More specifically, I am interested in identifying a particular combination of semantic features and descriptors that directly influence a LU's syntactic distribution in a specific grammatical construction. To illustrate, consider the distribution of the LUs in one of the constructions discussed in Tables 4 and 5 above, namely the English Resultative Construction.

The resultative has received a great deal of attention (Jackendoff, *Structures*; Goldberg, *Constructions*, *Work*; Levin and Rappaport Hovav, *Argument*; Boas, *Constructional*; Goldberg and Jackendoff; Boas, "Determining"; Wechsler) because it is not fully productive and appears to apply only selectively to specific classes of verbs. For example, Goldberg (*Constructions, Work*) posits an independently exist-

ing resultative construction with its own meaning that is capable of fusing with senses of verbs, thereby providing additional semantics and allowing verbs to occur with the syntactic pattern of the resultative as in *Lena walked herself to exhaustion* or *Claire sneezed the napkin off the table*. Goldberg's constraints on the application of the resultative construction appear to be very detailed at first sight. However, Boas (*Constructional*, "Determining", "Theory") points out a broad range of counterexamples where some verbs can occur in the resultative while others closely related in meaning cannot. This observation leads him to suggest that Goldberg-style constructions are not sufficient for explaining the distribution of resultatives from the perspective of encoding (as opposed to decoding). Instead, Boas (*Constructional*) proposes so-called mini-constructions in which each sense of a verb constitutes its own conventionalized pairing of form and meaning, together with appropriate syntactic, semantic, and pragmatic subcategorization restrictions. This alternative account provides detailed event-based frame semantic information for each mini-construction that allows Boas to explain the distribution of the resultative appropriately.

Adopting the idea that mini-constructions inherently specify their subcategorization restrictions allows us to view our data above in a new light. Parallel to Boas' (*Constructional*) analysis I suggest that the combination of act-nucleus and modificant constitute the semantic core of a mini-construction (i.e., the sense of a verb). Assuming that all LUs in a frame share the same act-nucleus it then becomes possible to focus on the make-up of the modificant of each individual LU to isolate meaning components that are syntactically relevant. That is, when looking at the syntactic distribution of the four LUs discussed in Table 6 above, we see that *jog* appears with a resultative pattern, while *crawl*, *totter*, and *wander* do not, as the following data illustrate:



(30) a. Kim jogged Pat off the street.
b. *Kim crawled Pat off the blanket.
c. *Kim tottered Pat off the sidewalk.
d. *Kim wandered Pat off the street.

Using these data we are now interested in identifying meaning components in the modificants of the four LUs to see whether they may influence their distribution in the resultative construction. Comparing the values of the semantic features in Table 6 suggests that they do not directly influence the syntactic distribution. Thus, while *jog* has positive values for all four features "on feet", "laborious motion," "steady movement," and "controlled body movement," the other LUs all have a varied distribution that do not appear to make any differences at first sight. Taking a look at the descriptors of the four LUs we see that *jog* differs from the other three LUs in that it has a higher speed and is also associated with a higher level of energy. To test whether these descriptors might be relevant for syntactic distribution in the resultative I provide additional information through context as in the following examples:

(31) a. Kim jogged Pat off the street.
b. Kim was excited and crawled very fast. Kim crawled Pat off the blanket.
c. ?Kim was drunk and wanted to walk fast to get home. When exiting the bar, Kim tottered Pat off the sidewalk.
d. *Kim didn't know where she was going and moved around quickly. By accident, Kim wandered Pat off the street.

In contrast to (30b), the basic semantics of the modificant of *crawl* in (31b) is amended by contextual background information about the activity, more specifically the higher degree of speed and energy of the SELF_MOVER. The addition of this information from the prior sentence changes the default value of the "speed" and "energetic" descriptors of *crawl* to become closer to the values associate with *jog*. It is because of this additional background information that (31b) sounds more acceptable than (30b). Similarly, *totter* in (31c) sounds a bit more acceptable than in (30c), yet not as acceptable as *crawl* in (31b). This difference is probably due to the difference in semantic similarity between *jog*, *crawl*, and *totter*. While contextual background information provides a different value for "speed" and "energetic" to both *crawl* and *totter* in (31b) and (31c), it does not provide information to change the semantic features "steady movement" and "controlled body movement" from minus to plus for *totter*. As such, even the amended modificant of *totter* is too different from the modificant of *crawl* or *jog*, both of which exhibit positive values for "steady movement" and "controlled body movement." This example suggests that although semantic default information encoded in the descriptor of the modificant can be changed by contextual background information this is not the case for binary semantic features. Finally, consider wander in (31d), which remains unacceptable in the resultative despite additional contextual background information. Perhaps one of the reasons why the modificant of *wander* is not open to contextual background information is that its descriptor is not assigned any value at all. As such, it may not allow modification that would change its basic meaning to be closer to that of *jog* (or the prototypical LU of the frame, *walk*). This point, like so many others discussed in this section, requires further investigation.

Despite the preliminary nature of my analysis, I hope to have shown that certain meaning elements of the modificant are more relevant for syntactic behavior than others. The limited data on the ability of four LUs from the Self_motion frame to occur in the resultative construction suggest that the descriptors "speed" and "energetic" are relevant for determining whether an LU can occur in the resultative. The preliminary data also illustrate that contextual information can override the default values of descriptors more easily than that of semantic features. This difference is probably due to the fact that the values of descriptors are measured against a scale, and can thus be modified, while the values of semantic features are either plus or minus, and can thus not be amended.

## 5. CONCLUSIONS AND OUTLOOK

I have argued that frame-semantic information directly influences a verb's ability to occur in grammatical constructions, hence my label "frame-constructional." Combining key insights from Frame Semantics, verb descriptivity, and componential analysis has led me to propose a methodology for systematically identifying syntactically relevant units of meaning. Differentiating between a more general act-nucleus and a more specific modificant (made up of semantic features and descriptors) also helps us to distinguish the semantics of LUs in the same frame from each other in a more precise way. In my view, this bottom-up usage-based approach overcomes many of the shortcomings of other analyses discussed in sections 2 and 3 above.

Clearly, my alternative proposal is only a first step towards a more comprehensive frame-constructional account of verb classification. To develop this approach further, future work will first have to provide a complete analysis of all LUs in the Self_motion frame, similar to the methodology sketched out above. This phase will focus on the ability of these LUs to occur in the resultative construction alone, thereby identifying additional relevant meaning components. One of the main obstacles ahead will be the search for a more vigorous methodology that goes beyond the relatively unstructured use of contextual background information as in (31) to identify meaning components. Once the relevant meaning elements are identified, a procedure must be devised that allows us to measure them against a scale. This will allow us to determine their importance with respect to syntactic distribution in the resultative construction. The next phase will apply the same methodology to determine which meaning elements of LUs in the Self_motion frame are syntactically relevant when it comes to other syntactic constructions, such as the *way*-construction (Goldberg, *Constructions*; Israel), the ditransitive construction (Goldberg, *Constructions*), and the *a-hole-through-y*-construction (Boas, "Resolving"), among many others. Based on the work by Goldberg and Jackendoff and on Boas (*Constructional*, "Determining", "Theory"), I expect that each construction will imply a unique grid of syntactically relevant units of meaning for the LUs in the Self_motion frame. Once the relevant meaning components are identified for all LUs in this frame vis-à-vis the full range of constructions, we need to expand our methodology further to cover the remaining LUs in the other frames of the English verb lexicon. This methodology will eventually result for each semantic frame in a list of grammatical constructions that specifies for each construction the relevant range and weight of syntactically relevant units of meaning that determine whether a LU may occur in that construction.

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