PART IV

LEXICAL DECOMPOSITION

CHAPTER 14

LEXICAL DECOMPOSITION IN GRAMMAR

DIETER WUNDERLICH

14.1 Overview and general issues

Under a naive view, simple (underived) lexical items (or 'roots') such as *house, man*, *die* constitute the atoms of meaning which combine syntactically, forming structured utterances. Such a view could be supported by the role of simple words in human categorization. In the hierarchy of conceptual categories there is a privileged level of abstraction, called the basic level (Rosch et al., 1976*b*). It is the level at which the subjects are fastest at identifying category members, at which conceptual priming most easily obtains, at which information is most easily remembered over time, and at which a single mental image can reflect the entire category. Basic-level categories tend to be the first ones acquired by young children, and also tend to be expressed by the simplest words. 'In general, the basic level of abstraction in a taxonomy is the level at which categories carry the most information, possess the highest cue validity, and are, thus, the most differentiated from one another.' (Rosch et al. 1976*b*: 383f.). For example, in (14.1), *house* is at the basic level, while the composite noun *courthouse* is more specific, and the derived noun *building* is more general.

(14.1) *building*
house
courthouse *dwelling house*

Under a more sophisticated view, however, even simple lexical items could be seen as internally complex, consisting of more atomic pieces of meaning. Given the number of fairly simple nouns referring to specific types of houses (such as *barracks, cabin, castle, hostel, hut, lodge, palace, villa*), one could either infer that the basic level is in fact lower than *house*, or that these nouns have HOUSE as one of their components.

(In the following, italics refer to words, while small capitals refer to concepts or parts of meaning.)

Componential analysis (Nida, 1951) aims at analysing the conditions under which semantically related words are differentially used, for example in determining the components by which *barracks*, *cabin*, etc. are more specific than *house*. Turning to another, often-discussed example, the word *bachelor* obviously relates to an unmarried man. The respective components, listed in (14.2a), are, of course, more general than the prime concept, so that they can be held to be entailed (14.2b). A decomposition is not necessarily a definition in the sense that it is exhaustive.

(14.2) a. *Bachelor*: ADULT, HUMAN, MALE, UNMARRIED.
b. If x is a bachelor, then x is an unmarried adult human male. (Katz, 1972: xviii, xxi)

If there is a set of intuitively related words that can be contrasted in pairs, componential analysis yields a semantic paradigm such as (14.3) for a very simple set of words, here ordered along the two independent dimensions of species and gender.

(14.3) Names of domestic animals

	MALE	FEMALE
HORSE	*stallion*	*mare*
CHICKEN	*rooster*	*hen*

Some of the more atomic concepts could be universal because they are triggered by the biological nature of human beings, while others are culturally determined, such as UNMARRIED. This feature also plays a role for *widow*, denoting a female person who was married to a man who died, so a certain history of that person becomes relevant, see (14.4).[1]

(14.4) $\text{WIDOW}(x, t_0) : \lambda x\, \lambda t_0 [\text{FEMALE}(x)\ \&\ \exists y\ \exists t_1 [\text{MARRIED}\ (x, y)(t_1)\ \&\ \text{DEAD}(y)(t_0),$ with $t_1 < t_0$.

Various approaches have been developed to deal especially with verbs, which, as the basis of grammatical clauses, are more structured than nouns. Generative Semantics (Lakoff, 1970; McCawley, 1968, 1971; Morgan, 1969; Ross, 1972) explored the idea that the inherent structure of verbs conforms to the syntactic structure of sentences, and therefore should be studied by means of complex paraphrases. For example, McCawley (1971) proposed that *persuade* (14.5a) should be decomposed into a structure built from predicates such as DO, CAUSE, BECOME, and INTEND, conforming to the paraphrase in (14.5b). By a series of prelexical transformations (corresponding to head movement in more recent terminology) the bundle of predicates in (14.5c) is obtained, and it is checked whether there is a single word corresponding to it. The corresponding semantic representation is shown in (14.5d).

[1] One might add a clause expressing that x is not married at t_0; however, if x remarries, x still remains the *widow of y*. In any case, the example demonstrates that the semantic components of a word can be highly structured.

(14.5) a. Sally persuaded Ted to bomb the Treasury Building.
b. What Sally did was cause Ted to get the intention to bomb the Treasury Building.
c. $_{\mathrm{V}}$DO $_{\mathrm{V}}$CAUSE $_{\mathrm{V}}$BECOME $_{\mathrm{V}}$ INTEND
d. *persuade*: $\lambda P\ \lambda y\ \lambda x\ \exists\phi\ [\textsc{do}(x,\phi)\ \&\ \textsc{cause}\ (\phi,\ \textsc{become}\ (\textsc{intend}(y,P)))]$

One argument in favour of decomposition was that an adverbial can have scope over some internal structure (Morgan, 1969). The sentence (14.6a) can have several readings, among them (14.6b) with external scope, and (14.6c) with the innermost scope of *almost*, which are clearly distinct. Therefore, some internal part of the verb's meaning must be visible for the adverb.

(14.6) a. Sally *almost* persuaded Ted to go dancing.
b. What Sally *almost* did was persuade Ted to go dancing.
c. What Sally did was cause Ted to *almost* get the intention to go dancing.

Von Stechow (1995, 1996) and Rapp and von Stechow (1999) took up this argument. In order to analyse internal scope of 'again' and 'almost', they opted for syntactic decomposition in a more recent framework. Problems of this account have been noted by Jäger and Blutner (2000), and Wunderlich (2001). Hale and Keyser (1993, 1997) advocate a minimalist syntactic decomposition, the atoms of which, however, remain more or less undefined semantically.

A different way of reflecting syntactic realization was proposed by Katz (1972), who used complex syntactic indices for the argument variables occurring in a semantic decomposition. In his representations, however, some of the components are merely listed, as, for example, the three subcomponents PHYSICAL, MOVEMENT, and PURPOSE, characterizing *x*'s activity of chasing more narrowly in (14.7a), slightly simplified from Katz (1972: 106). Apart from the high-ranked predicates that could be taken from a general type hierarchy, Katz's analysis of *chase* thus amounts to what is given in (14.7b).

(14.7) a. *chase*: $[\textsc{activity}\ [\textsc{physical},\ \textsc{movement}\ [\textsc{speed:fast}\ [\textsc{following}\ y^{\mathrm{obj}}]],\ \textsc{purpose}\ [\textsc{to catch}\ y^{\mathrm{obj}}]]]\ x^{\mathrm{subj}}_{\mathrm{animal}}$
b. *chase*: $\lambda y\ \lambda x\ [\textsc{fast}(\textsc{follow}(x,y))\ \&\ \textsc{try}(x,\ \lambda u\ \textsc{catch}(u,y))]$

Within the logical literature, decomposition is usually performed by means of meaning postulates. An early example is found in Montague (1960, 1974: 167), who analysed the verb *seek* into TRY and FIND by the meaning postulate in (14.8).

(14.8) $\textsc{nec}\ \forall x \forall y\ [\textsc{seek}(x,y) \Leftrightarrow \textsc{try}(x,\ \lambda u\ \textsc{find}(u,y))]$

Dowty (1979) clarified and further elaborated the insights of Generative Semantics within Montague Grammar, an influential semantic framework at those times. In particular, he characterized the Vendler (1967) classes of verbs by means of generally available predicates, such as DO for activities, BECOME for achievements, and CAUSE BECOME for accomplishments (Dowty 1979: 124).

Jackendoff's (1990) Conceptual Semantics proposes a number of basic conceptual categories such as EVENT, STATE, ACTION, PLACE, PATH, PROPERTY, and AMOUNT, as well as formation rules that combine these categories. Lexical items are interpreted by a conceptual structure built with these rules. The decomposition can be rather fine-grained, as the example for *drink* in (14.9) shows, meaning 'cause a liquid to go into one's mouth' (Jackendoff, 1990: 53).

(14.9) *drink*: $[_{\text{event}}$ CAUSE $(_{\text{thingi}}, [_{\text{event}}$ GO $([_{\text{thing}}$ LIQUID$]_{j},$
$[_{\text{path}}$ TO $([_{\text{place}}$ IN $([_{\text{thing}}$ MOUTH OF $(_{\text{thingi}})])])])])])]$

Jackendoff also includes an action tier, which describes the affectedness relation between individuals, and thus reconstructs the semantic notions of agent and patient. Example (14.10b) shows a slightly simplified representation of the sentence (14.10a) (Jackendoff, 1990: 143; INCH for 'inchoative', AFF for 'affect').

(14.10) a. The car hit the tree.
b. *hit*: [INCH [BE (CAR, AT [TREE])]]
AFF (CAR, TREE)

The lexical semantic structures proposed in Pinker (1989), as well as in the work of many other authors, are influenced by Jackendoff's view of conceptual structure.

Generative Lexicon Theory (Pustejovsky, 1991, 1995) aims to account for the multiplicity of readings of polysemic words (such as *apple*: a tree or fruit, *opera*: a building, an ensemble or a piece of music, etc.). It rejects the idea of an exhaustive decomposition of lexical items, and instead proposes partial functions that map the meaning of a word onto several representation levels such as argument structure, event structure, and qualia structure.

Lexical Decomposition Grammar (LDG; Gamerschlag, 2005; Kaufmann and Wunderlich, 1998; Stiebels, 1996; Wunderlich, 1997*a*,*b*, 2000) distinguishes between semantic form (SF) and conceptual structure, following proposals by Bierwisch (1983, 1997) and Bierwisch and Lang (1989). The SF of a lexical item is intended to capture only those aspects of its meaning that are grammatically relevant, in particular argument structure, and omits information that can be inferred from more general resources, so SF is a partial semantic structure. In contrast, conceptual structure is enriched by contextual information of various kind, and can be made more fine-grained in any direction that matters. Jackendoff's representations in (14.9) and (14.10b) are certainly not part of SF. The last three approaches, Jackendoff's, Pustejovsky's, and LDG, are compared in Wunderlich (1996*a*).

Lexical Conceptual Structure (LCS), proposed by Guerssel et al. (1985) and further elaborated in the work of Levin and Rappaport Hovav (1991, 1995, 1999) is similar to SF in that it serves to capture only those facets of meaning that determine the grammatical behaviour of (classes of) verbs, including argument alternations. An LCS representation consists of a general 'event type' structure, characteristic for a class of verbs and formed by a few primitive predicates, in which the respective root, representing the idiosyncratic meaning of the word, instantiates the variable position; see (14.11), in which *BROKEN* substitutes for the variable *STATE* (Levin and Rappaport Hovav, 1995: 94).

(14.11) a. Causative verb: [[x DO-SOMETHING] CAUSE [y BECOME *STATE*]]
b. *break*: [[x DO-SOMETHING] CAUSE [y BECOME *BROKEN*]]

Different from all these approaches is the Natural Semantic Metalanguage (NSM) account (Wierzbicka, 1972, 1996; Goddard and Wierzbicka, 2002), which analyses concepts/words by reductive paraphrases using a small collection of semantic primes (*plants*: {living things, these things can't feel something, these things can't do something}; *sky*: {something very big, people can see it, . . . }). The inventory of these primes, believed to be present in all human languages, includes, among others, mental predicates such as THINK, KNOW, WANT, FEEL, SEE, HEAR, eventive predicates such as DO, HAPPEN, MOVE, PUT, GO, LIVE, DIE, SAY, existence THERE_IS, possession HAVE, temporal relations such as NOW, AFTER, BEFORE, spatial relations such as ABOVE, BELOW, FAR, NEAR, INSIDE, and also the 'logical' concept BECAUSE. Most of the decompositions proposed by other accounts could in principle also be described in NSM; a major difference, however, is that NSM aims to give a set of explicative paraphrases, while other approaches are looking for more formal representations that allow inferences to be made regarding parts of the meaning.

In Davidson (1967), as well as in the various versions of a neo-Davidsonian account (Krifka, 1989, and others), the verbal predicate itself is used as an undecomposed name of an event, while all information concerning number and type of arguments is delegated to extra predicates. Hence, transitive *watch* is represented by (14.12) rather than as WATCH(x, y).

(14.12) *watch*: $\lambda e\ \lambda x\ \lambda y$ [WATCH(e) & AGENT(e, x) & THEME(e, y)]

A different take is to assume that every verb has an eventive argument, so that one gets RAIN(e) for a weather verb, DANCE(e, x) for an intransitive verb, and WATCH(e, x, y) for a transitive verb. This eventive argument is usually bound by the mood or tense operator applying on verbs. The individual subpredicates of a decomposition structure can often be related to subevents; for instance, three of the four predicates in (14.5d), namely DO, BECOME, and INTEND, relate to different subevents. We will return to this view in the next section, in which the status of CAUSE is clarified.

As might have become clear, the model of lexical decomposition to be chosen essentially depends on the goal one is pursuing. Semantic properties of the verb determine to a large degree the syntactic realization of arguments and the ability to take part in valency alternations. They also determine selectional restrictions for arguments, the co-occurrence with particular types of adverbials, and the possible scope behaviour of adverbs. Moreover, they determine how the verb contrasts with items of the same semantic field. A particular decomposition of the verb can usually satisfy only some of the goals, even if one concedes that the type of the respective components is independently given. It is, however, always possible to add information in the same way as in (14.12); for instance, if one wants to state that the entailment (14.13a) follows from the fact that a catch-event always contains a grasp-event as a proper part, one can use the neo-Davidsonian framework, as in (14.13b).

(14.13) a. 'Stefan caught the ball' entails 'Stefan grasped the ball'.
b. catch: $\lambda e\ \lambda x\ \lambda y$ [$\textsc{catch}(e)$ & $\textsc{ag}(e, x)$ & $\textsc{th}(e, y)$ & $\exists e_1$ [$e_1 \subset e$ & $\textsc{grasp}(e_1)$ & ...]]

However, this is not decomposition in the strict sense. One would still need a further meaning postulate for inferring 'Stefan had the ball'.

Fodor and Lepore (1998, 1999, objecting to Pustejovsky's and Hale and Keyser's work, respectively) are sceptical about all approaches to lexical decomposition which aim at supporting inferences about the semantic structuring of the lexicon. They assume that lexical meaning only specifies denotations and not senses, and therefore must be atomic. What they might accept is lexical decomposition in the syntax. To Hale and Keyser's (1993) claim that the denominal verb *to cow* (as used in **It cowed a calf*, meaning 'A cow had a calf') is impossible because the derivation of this verb violates syntactic rules, Fodor and Lepore (1999) object that *to cow* could be a primitive lexical item, not violating those rules. Mateu (2005), however, accepting both Hale and Keyser's syntactic view and Fodor and Lepore's point of criticism, argues that *to cow* cannot be a primitive item because it has a relational meaning. It is important for this argument that lexical items are decomposed only for their argument structure; while the noun *cow* is primitive, the respective verb is not (see also Section 14.6).

14.2 Causative verbs

Lexical items such as *dead, die*, and *kill* have in common that they are related to the concept DEAD, although they are increasingly complex. *Dead* is a simple stative predicate, while both *die* and *kill* are transition predicates entailing the result of being dead. Their argument structure differs: *die* has only one argument (the patient or undergoer), while *kill* has an additional actor argument. Similar triples can be easily found; words such as *open* and *empty* allow for all three functions, as shown in (14.14).[2]

(14.14)	a. The bear is dead.	The door is open.	The pool is empty.
	b. The bear died.	The door opened.	The pool emptied.
	c. Mary killed the bear.	Mary opened the door.	Mary emptied the pool.

In view of these similarities and differences, the following representational ingredients are reasonable:

[2] It is a contingent property of English that *kill-die-dead* are maximally distinct. Mateu (2005) claims that *kill* should be decomposed into [x [CAUSE [y [TCR (= BECOME)KILL]]]]. Such an option is particular for English; in Basque, both 'die' and 'kill' are expressed by the same verb (*hil* in the perfect), so that KILL would be identical with DIE (which is absurd). Moreover, KILL is not a predicate referring to a state, and the alternative KILLED is a derived predicate. Therefore, DEAD is the best corresponding 'root' predicate for *kill*.

(14.15) Semantic Form (SF)

a. statives:	*dead*:	$\lambda y \quad \lambda t$			DEAD(y)	(t)
b. inchoatives:	*die*:	$\lambda y \quad \lambda e$		BECOME	DEAD(y)	(e)
c. causatives:	*kill*:	$\lambda y\ \lambda x\ \lambda e$ [ACT(x) &		BECOME	DEAD(y)]	(e)

BECOME is the transition operator. Roughly, BECOME(p) is true at a time interval t at whose initial bound $\neg p$ holds and at whose final bound p holds (Dowty, 1979: 140). A representation such as (14.16) (simplified from Katz, 1972: 358) is unnecessarily complex.

(14.16) *open* (intrans.): (at t_1 : x is positioned to prevent passage between inside and outside)
(at t_2 : x is positioned to allow passage between inside and outside), with $t_1 < t_2$.

ACT(x) is an activity predicate. Roughly, ACT(x) is true in e if there is some subevent of e which is instigated and controlled by x. ACT is similar to DO (Ross, 1972; Dowty, 1979: 118), but relates to an event rather than to what is done. Pietroski (1998) distinguishes between grounding and culminating events. In this sense, ACT(x) in (14.15c) is a grounding subevent, while BECOME P(y) is a culminating (and temporally terminating) subevent. Conceptually, these two subevents are integrated by the assumption that they stand in a causal relation, with the grounding subevent as the causal factor, and the culminating one as the effect.

In (14.15), however, the causal relationship between ACT(x) and BECOME(p) is not expressed. How does this reading come about? Note first that '&' is considered to be asymmetric ([ACT(x) [& BECOME(p)]]), thus, '&' is possibly stronger than logical 'and' and can be incremented by additional information. Second, there should be a principle under which '&' can achieve a CAUSE-reading contextually.

Such a principle in fact is needed for independent reasons. It is generally felt that a verb can denote only a coherent event, with respect to both the timescale and the participants involved (Kaufmann, 1995*b*; Pustejovsky, 1995: 186). Concerning the timescale, the idea is that the components of a single event must be 'available' for each other, either because they are situated in the same time-slot or because one component triggers the other.[3] This is formulated in (14.17) (Kaufmann and Wunderlich 1998).

(14.17) COHERENCE: A lexical SF conjunction is either contemporaneously or causally interpreted.

Interestingly, the debate of what is possibly expressed in a verb–verb compound or in a serial verb construction, and what is not, centres around a concept of event coherence similar to (14.17). Differently from what one observes for verbs simpliciter, the coherence of a verb–verb construction also includes cases in which the second conjunct is not really caused by the first one (as in 'buy and eat a fish'), but is the natural and commonly expected consequential action of it (Gamerschlag, 2005: 82, 206). Thus, most important is not causation itself but whether something 'belongs together'.

[3] In the latter case, the parts of the event don't need to be temporally adjacent, e.g., cause and effect of a poisoning event can be separated temporally.

How does COHERENCE determine the causative reading of (14.15c)? ACT denotes an activity extended in time, and BECOME denotes a transition; these different types of events clearly cannot be contemporaneous, so their relationship must be causal. It is therefore ruled out that 'Mary killed the bear' is true if Mary did some arbitrary action (such as blowing her nose) and the bear died. Mary's action must have been a causal factor: if she had not done it, the bear wouldn't have died. (Of course, there could be other events, even simultaneous ones, that bring the bear to death.)

The two options offered by COHERENCE can effectively be studied in the case of secondary predication. Consider the sentence in (14.18), where the adjective *hot* is added to a transitive verb expressing an activity. In principle, *hot* could be predicated of either one of the arguments, *x* or *y*, and the time span at which HOT(α) holds can overlap the beginning or the end of the activity. In the latter case, the change predicate BECOME has to be added. Which of these interpretational alternatives is chosen highly depends on context and world knowledge. Reading (14.18a) is true in traditional ironworks, (14.18c) is favoured if one thinks of producing heat or sparks by hammering on metal, and (14.18b) is possible in a context of high emotion. Only (14.18d) seems to be out; usually a reflexive is used to trigger such a reading (*Max hammered himself hot*).

(14.18) Max hammered the metal hot.
- a. 'Max hammered the metal, when it was hot.' HAMMER(x, y) & HOT(y)
- b. ¿Max hammered the metal, when he was hot.' HAMMER(x, y) & HOT(x)
- c. 'Max hammered the metal, and it became hot.' HAMMER(x, y) & BEC HOT(y)
- d. *'Max hammered the metal, and he became hot.' HAMMER(x, y) & BEC HOT(x)

In verb–verb compounds (14.19a), as well as in serial verb constructions (14.19b,c) across the world, one often finds an (intransitive or transitive) activity verb combined with an inchoative verb, which yields a causal relationship. There is no linker visible, and none of the verbs includes CAUSE in its meaning. One can conclude that CAUSE is inferred from COHERENCE, which independently checks whether such a verb–verb combination is possible.

(14.19) a. Verb–verb compound in Japanese (Gamerschlag 2005: 44)

Watasi	wa	haikingu	de	tyotto	aruki-tukare-ta.
I	TOP	hike	AT	a.little	walk-become.tired-past

'I became tired from walking at the hike.' WALK(x) & BECOME TIRED(x)

b. Serial verb construction in Edo (Stewart 2001: 15)
Òzó dé wú.
Ozo fall die
'Ozo fell, and (so he) died.' FALL(x) & DIE(x)

c. Serial verb construction in Vietnamese (Kuhn 1990: 279)

Giáp	δung	cái	to:	be:.
Giap	push	CLASSIF	bowl	break

'Giap pushed the bowl, and (so it) broke.' PUSH(x, y) & BREAK(y)

There is a continuing debate about whether lexical decomposition is a legitimate means of semantic analysis; Fodor (1970) was the first who denied this. One of his arguments was that the decompositional paraphrase can be true, while the sentence with the non-decomposed verb is false. Consider the case in which Mary gave the bear some poisoned food on Monday, so that the bear died the next day. In this case, (14.20b) is true, while either variant of (14.20a) is false.

(14.20) a. Mary killed the bear {$^{(on\ Monday),\ (on\ Tuesday)}$}.
b. What Mary did $^{(on\ Monday)}$ caused the bear to die $^{(on\ Tuesday)}$.

Syntactic paraphrasing allows for each of the involved subevents to be specified separately, which results in *two* events rather than *one* event. COHERENCE, however, requires that *kill* expresses only *one* event (to be specified by a temporal expression only once). The difference between *kill* (14.20a) and *cause to* die (14.20b) is often described as one between direct and indirect causation. This effect is explained by COHERENCE; the most direct influence is possible in a single coherent event, while in an event chain (i.e. causal chain) many other factors can intervene.

To another counterargument of Fodor (1970), saying that semantic decomposition of words might be costly for the processing of words, Jackendoff (1990: 38) replied that lexical complexity is learned just as any other sensomotoric complexity and so does not increase the processual expense. I would like to suggest that the one-event-restriction by COHERENCE, going hand in hand with the one-word restriction, facilitates the processing of complex words vis-à-vis their corresponding paraphrases.

In contrast to the representations given in (14.15c) and (14.18c), most researchers assume that CAUSE must occur in the decomposition of a causative verb (see also (14.11) above). Bierwisch (2002) argues that CAUSE belongs to the repertoire of SF because words such as *cause* and *because* have to be described by CAUSE anyway; although that is true, there is still no necessity for specifying verbs such as kill by CAUSE. These verbs are probably much older than the complementizer, so they can have worked without an explicit notion of cause.

Nevertheless, let us ask how the representations would look like if CAUSE were added. Lewis (1973) and Dowty (1979: 99–110) consider causation primarily as a relation between events. Roughly, CAUSE(e_1, e_2) is true if and only if both e_1 and e_2 occur, and if e_1 had not occurred then e_2 would not have occurred. Since this counterfactual analysis needs propositions rather than events, Lewis uses the occurrence predicate O(e), alternatively 'sentences' as complex names of events. Relying on Lewis' work and considering a number of intricate problems not to be discussed here, Dowty determines the truth conditions for CAUSE(p, q) in three steps: (i) whether q depends causally on p (by means of the counterfactual); (ii) whether p is a causal factor for q (by means of a series $p,\ p_1, \ldots p_n,\ q$, in which each member depends causally on the previous one); (iii) whether p is the most adequate causal factor for q (by means of similarities between possible worlds).

In any case, CAUSE is incremental on AND, with something like the counterfactual CF being added under certain conditions (14.21a). However, the verb *cause* can use an individual term as subject; the same is found in many decompositions of the literature;

in this case, one can define the related notion DO-CAUSE instead (14.21b) (Bierwisch 1997: 241), see also (14.11).

(14.21) a. $\text{CAUSE}(p, q) \Leftrightarrow p \,\&\, q \,\&\, \text{CF}(\neg p, \neg q)$
b. $\text{DO-CAUSE}(x, q) = \text{df}\ \exists \varphi\ \text{CAUSE}(\varphi(\text{x}), q)$

In order to see how CAUSE fits into a more complex structure, let us consider the resultative sentence (14.22a), in which the subject's action is specified by the verb *water* (whereas it was unspecified in *kill* above). Representations such as (14.22b) (simplified from Jackendoff 1990: 232) and (14.22c) (Pustejovsky 1991: 65) are unnecessarily complex because BY is just a variant of CAUSE. So (14.22d) might be more appropriate. In (14.22e), the type of relation between WATER and BECOME FLAT is left unspecified, so it can and must be specified conceptually due to COHERENCE.

(14.22) a. Max watered the tulips flat.
b. *to water flat*: $\text{CAUSE}(x,\ \text{INCH BE}(y,\ \text{AT FLAT}))$
$\text{AFF}(x, y)$
$\text{BY CAUSE}(x,\ \text{INCH BE}(\text{WATER},\ \text{ON}y))$
$\text{AFF}(x, y)$
c. *to water flat*: $\lambda y\ \lambda x\ \lambda e\ [\text{CAUSE}(\text{ACT}(x, y), \text{BECOME FLAT}(y))\ \text{BY WATER}(x, y)]\ (e)$
d. *to water flat*: $\lambda y\ \lambda x\ \lambda e\ [\text{CAUSE}(\text{WATER}(x, y), \text{BECOME FLAT}(y))]\ (e)$
e. *to water flat*: $\lambda y\ \lambda x\ \lambda e\ [\text{WATER}(x, y)\ \&\ \text{BECOME FLAT}(y)]\ (e)$

Note that Jackendoff's (14.22b) includes an analysis of the verb *water* by means of the nominal concept WATER, meaning thatMax pours water on the tulips (but see Section 14.7). Now, if $\text{WATER}(x, y)$ itself is decomposed by means of CAUSE, (14.22c) turns into (14.23a), and (14.22d) into (14.23b).

(14.23) a. $\ldots\ [\text{CAUSE}\ (\text{CAUSE}\ (\text{ACT}(x), \text{BECOME}\ (\text{WATER ON}\ y)), \text{BECOME FLAT}(y))]\ (e)$
b. $\ldots\ \text{ACT}(x)\ \&\ \text{BECOME}\ (\text{WATER ON}\ y)\ \&\ \text{BECOME FLAT}(y)\ (e)$

The latter rightly shows the chain of events that matter in this case, while (14.23a) is inappropriate for obvious reasons: since $\text{CAUSE}(p, q)$ itself doesn't relate to an event, it cannot be an argument of CAUSE. Therefore, (14.22d) must be rejected as well. Example (14.23a) could be improved by introducing subevents that are causally connected, as in (14.24).

(14.24) $\ldots\ \exists e_1\ \exists e_2\ \exists e_3\ \text{CAUSE}(e_1, e_2)\ \&\ \text{ACT}(x)(e_1)\ \&\ \text{BECOME}(\text{WATER ON}\ y)\ (e_2)$
$\&\ \text{CAUSE}(e_2, e_3)\ \&\ \text{BECOME FLAT}(y)(e_3)$

There could, however, be alternative readings, namely that *x*'s action is the causal factor for e_3, too, or that the state brought about by *x*'s action (that there is too much water on the tulips) is the causal factor for e_3. (Dowty (1979: 103) admits the possibility of 'stative' causatives). Given the multiplicity of readings of the actual causal chain, it is questionable whether CAUSE belongs to the lexical knowledge of the items or constructions considered here. It seems more reasonable to assume that the lexical items contribute something that is unspecified for CAUSE, such as (14.23b). For deriving a more fully specified conceptual structure, one needs at least the following preparations: (i) Each predicate is part of a type hierarchy, and so gets assigned a proper event type; (ii) The subevents are arranged according to their temporal order, and COHERENCE checks whether there are subevents that are causally connected. For example, the two occurrences of BECOME in (14.23b) can be ordered simultaneously: then ACT(x) is the common causal factor; or they are ordered sequentially: then either these two transitions are causally connected, or the first result state causes the second transition.

Note that our account is also able to deal with duality. Dual items such as *become/remain* and *make/let* differ from each other by a combination of outer and inner negation. The inventory of primitives can therefore be reduced, as shown in (14.25).

(14.25) a. The door remained open: $\neg\exists e$ BECOME $\neg$OPEN(*the door*)(e)
b. Anna let the door open: $\neg\exists e$ ACT(*Anna*) & BECOME $\neg$OPEN(*the door*)(e)

By coherence one gets the more articulated reading 'Anna did nothing which caused the door to get closed'.

14.3 Lexical alternations

The lexical decomposition account has advantages in dealing with various lexically-triggered alternations. Cross-linguistically, it can explain why languages that widely differ in their vocabulary nevertheless have the capacity to express similar states of affairs, namely because they share the same semantic templates. Intra-linguistically, it can explain why certain verbs behave similarly in that they systematically vary in the types of constructions they allow for. For instance, intransitive verbs are often paired with a causative variant, which can, but does not need to, be marked explicitly. The unmarked causative alternation, illustrated in (14.26), can be accounted for by the assumption that an additional CAUSE (or a corresponding ACT) either is present or is not present in the meaning of the verb. The causative alternation is much more frequent with inchoative (non-agentive) verbs (14.26a) than with agentive verbs (14.26b). The latter is a marked option because there is already an agent present, while a theme is missing.

(14.26) Causative alternation
a. The stick broke.
John broke the stick.
b. The horse galloped.
John galloped the horse.

Several other types of alternations can be dealt with by the assumption that the lexical meaning is enriched in the more articulated variants; an additional lexical predicate either introduces a further argument to be expressed (as in the causative alternation) or leads to a different argument realization. Consider briefly the strong resultative alternation in (14.27b) vs. (14.27a) (Levin and Rappaport Hovav, 1995: 37; Washio, 1997; Kaufmann and Wunderlich, 1998), in which a result predicate together with a new argument is added, which is not selected by the verb. The result can be passivized (*the wine cellar was drunk empty*); in German it is also possible to further add a dative beneficiary (14.27c), which comes about by an additional POSS. (When I was affected by the guests drinking the wine cellar empty, I was in a sense the possessor of the wine (cellar).) The German example can also undergo *kriegen*-passive (14.27d).

(14.27) Strong resultative alternation

a. The guests drank all of the wine. $\textsc{drink}(x, y)$

b. The guests drank the wine cellar empty. $\ldots\ \&\ \textsc{become}\ \mathrm{P}(z);\ \mathrm{P} = \textsc{empty}$

c. Die Gäste tranken *mir* den Weinkeller leer. $\ldots\ \ldots\ \&\ \textsc{poss}(u, z)$

d. Ich kriegte den Weinkeller leer getrunken.
lit. 'I got drunk the wine cellar empty.'

e. $\lambda\mathrm{P}\ \lambda z\ \lambda u\ (\lambda y)\ \lambda x \textsc{drink}(x, y)\ \&\ \textsc{become}\ \mathrm{P}(z)\ \&\ \textsc{poss}(u, z);\ \mathrm{P} = \textsc{empty}$

The combination of resultative and benefactive yields something like (14.27e) as a quite enriched meaning of 'drink'. On the basis of this formula, the argument roles *z, u, x* are predicted to be realized by accusative, dative, and nominative, in this order, while *u* (the stuff drunk) cannot be realized,[4] according to the principles of LDG (Wunderlich, 1997*a*,*b*). In particular, *y* is blocked from the structural case because it doesn't satisfy the condition for structural arguments in (14.28) (Wunderlich, 1997*a*: 41; Wunderlich 2006*b*: 31).

(14.28) STRUCTURAL ARGUMENT.
An argument is structural only if it is either the lowest argument or (each of its occurrences) lexically commands the lowest argument.

Intuitively, this condition minimizes the number of structural arguments, and simultaneously guarantees that each predicate of the complex formula is made visible in the argument structure realized. Other decompositional approaches would have to invoke semantic (or syntactic) reasons to explain why the object of the simple verb *drink* is blocked in the resultative, which, however, are hard to identify. Carrier and Randall (1992) observed that the verb must allow an unspecified object, which clearly is only a precondition and not the triggering factor.

Another type of alternation is the *wipe* alternation shown in (14.29) (see also Levin, 1993: 53, 125). In (14.29a), *wipe* combines with a locative PP that adds a certain piece of

[4] In the default reading one can, however, infer that the guests drank whatever occupied the wine cellar (probably wine), although more marked readings are possible, as usually.

meaning syntactically, that is *wipe* is subcategorized for some general locative predicate P (e.g. *wipe the crumbs away*). When the locative information, more specifically, is incorporated into the verb (14.29b), one is again confronted with the situation that the new argument role (z) must be realized, while the previous argument role (y) is blocked from realization, according to (14.28). Finally, (14.29c) derives from (14.29b) by adding a result predicate.

(14.29) Wipe alternation

a. Marga wiped the crumbs from the table.	$\text{WIPE}(x, y)$ & $\text{P}(y)$	
b. Marga wiped the table.	... & $\text{BECOME}\ \neg\text{LOC}(y, \text{AT}\ z)$	
c. Marga wiped the table clean.	... ...	& $\text{BECOME CLEAN}(z)$

Similar to the case just discussed is what is called locative alternation, shown in (14.30) (see Levin, 1993: 49, 117). In (14.30a), the directional locative information is realized by a syntactic PP, while it is incorporated into the verb in (14.30b). Again, the previous object role cannot get structural case, it can, however, be realized obliquely (which is not excluded by (14.28)).

(14.30) Locative alternation

a. The peasant loaded the hay on the wagon.	$\text{LOAD}(x, y)$ & $\text{P}(y)$
b. The peasant loaded the wagon with hay.	... & $\text{BECOME LOC}(y, \text{AT}\ z)$

An even stronger piece of evidence for lexical decomposition comes from examples in which the role of a recipient alternates with that of a goal, leading to different argument realizations. The recipient role, realized as the primary object in a double object construction (14.31a), is described by BECOME POSS, while the goal role, realized as a prepositional object (14.31b), is described by BECOME LOC (Krifka, 2004; Wunderlich, 2006*a*).

(14.31) 'Dative' alternation

a. Oscar sent the publisher his manuscript.	(double object, DO)
b. Oscar sent his manuscript to the publisher.	(prepositional object, PO)

In order to see the relevance of this distinction, one first has to look at POSS and LOC inmore detail.

14.4 POSS AND LOC

Nearly every language provides means to express the two most general stative relations, namely location (LOC) and possession (POSS). LOC can, for instance, be instantiated by local prepositions, see (14.32). *The book is on the table* means that the book can be found within a certain neighbourhood region of the table, let's call it the ON*-region. Each preposition defines its own type of neighbourhood region; if the language at hand only has one general local preposition, the region can be abbreviated as AT*. The Japanese construction in (14.33) shows the decomposition into a relational marker (LOC) and a region-forming operator such as ON* most clearly, because ON* is here explicitly expressed by a region noun.

(14.32) a. The book is on the table / under the table / in the library.
b. LOC(*the book*, ON* *the table*/UNDER* *the table]*/IN* *the library*)

(14.33) Locative construction in Japanese ((TOP = topic, GEN = genitive)

a. Hon	wa	teeburu	no	ue/shita	ni	aru.
book	TOP	table	GEN	on-/under-region	LOC	be

lit. 'The book is located in the on-region/under-region of the table.'

b. Hon	wa	tosho-kan	no	naka	ni aru.
		library	GEN	in-region	

lit. 'The book is located in the in-region of the library.'

The possession relation (POSS) holds between two individuals if the first one, often animate, disposes of or has control over the second one. Thus, POSS includes ownership, the part–whole relationship, as well as other, more contingent relations. POSS is quite generally expressed by means of possessor affixes or possessive pronouns, and sometimes also by rather specific syntactic constructions.

Interestingly, POSS and LOC-AT often alternate with each other. Several languages express possession, besides using possessive pronouns, by means of a locative construction, among them Russian.

(14.34) Possessive construction in Russian

a. U	menja	kniga.
at	me.GEN	book

'I have a/the book.'

b. U	nego	bylo	mnogo	druzej.
at	him.GEN	was	many	friends.GEN

'He had many friends.'

This suggests that LOC and POSS could be converse to each other. In German or English, one can indeed find a free alternation in the expression of the part–whole relationship.

(14.35) POSS ≈ LOC alternation in German and English
Das Haus hat drei Bäder. ≈ Drei Bäder sind im Haus.
The house has three bathrooms. ≈ There are three bathrooms in the house.

That POSS(*x,y*) and LOC-AT(*y,x*) are at least weakly equivalent can intuitively be justified. If *x* controls *y*, or has some ownership on *y*, then *y* must be located near to *x* for being able to exert control. Conversely, if *y* is located near to *x* then *x* is enabled to achieve control over *y*. The choice of construction is determined by various factors such as topic and focus (which are preferentially matched with subject vs. object), definiteness, and animacy. There are certainly circumstances under which POSS(*x*, *y*) and LOC-AT(*y*, *x*) are equivalent.

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14.5 Two types of ditransitive verbs, and the DO–PO alternation

Ditransitive verbs typically express an action that leads to a change of state, either change of possession (POSS) or change of location (LOC). Change of possession verbs (such as *give, lend, buy*) have a recipient argument, usually realized by dative in a case language like German. English has the double object (DO) construction in (14.36); note that *buy* can also be used transitively, so the BECOME POSS extension is optional.

(14.36) a. Anna gave Max a book.
b. Anna bought Max a book.
c. *give*: $\lambda z\ \lambda y\ \lambda x\ \lambda e\ \textsc{act}(x)\ \&\ \textsc{become poss}(y, z)(e)$
buy: $\lambda z\ \lambda y\ \lambda x\ \lambda e\ \textsc{buy}(x, z)\ \&\ \textsc{become poss}(y, z)(e)$

Change of location verbs (such as *throw, put, dip, splash, glue*) usually require a prepositional phrase (PP) to realize the goal argument. In a sentence such as (14.37a), the goal is an argument of the preposition (*behind*), while the directional PP is an argument of the verb *throw*, so the goal is only 'indirectly' linked to the verb. Example (14.37b) shows the composition of the phrase.

(14.37) a. He threw the book behind the tree.
b. *throw*: $\lambda \mathrm{P}\ \lambda y\ \lambda x\ \lambda e\ \textsc{throw}(\mathrm{x,y}) \& \mathrm{P}(y)(e)$
behind the tree: $\lambda u\ \textsc{become loc}(u,\ \textsc{behind}^{*}\textbf{\textit{the tree}})$,
BECOME is optional
throw behind the tree: $\lambda y\ \lambda x\ \lambda e \textsc{throw}(x, y)\ \&\ \textsc{bec loc}(y,\ \textsc{beh}^{*}\textbf{\textit{the tree}})(e)$

If LOC is incorporated, the goal becomes a direct argument of the verb, as in *enter* (BECOME LOC (x, AT y)). However, in alternating verbs of English like *give* (*Anna gave Max the book; Anna gave the book to Max*), the preposition is fixed to *to*, which functions as an oblique marker for goals. The DO–PO alternation ('dative' alternation) is found rather frequently, only few ditransitive verbs do really resist. The DO construction often is possible only with a pronominal receiver, for example in verbs of imparting a force (*push, pull, carry, lift, lower*) and in verbs of communication (*whisper, yell, mumble, mutter*), see (14.38), (14.39). Conversely, there are verbs that allow the PO construction only with a pronominal theme, see (14.40). (All examples are from Bresnan and Nikitina, 2007.)

(14.38) Verbs of imparting a force
a. *Susan pushed John the box.
b. Susan pushed the box to John.
c. Susan pushed **him** the chips.

(14.39) Verbs of communication
a. *Susan whispered Rachel the news.

b. Susan whispered the news to Rachel.
c. Susan whispered **me** the answer.

(14.40) Verbs of 'prevention of possession'
a. The car cost Beth $5,000.
b. *The car cost $5,000 to Beth.
c. It would cost **nothing** to the government.

Similar observations have been made with respect to definiteness, topi-chood, length of expression, etc. The more definite, topical, or shorter the expression is for the recipient, the better it fits with the DO construction. This follows from the recipient's position in the decomposition structure. If one assumes that the DO construction conforms to the change of possession template and the PO construction to the change of location template (Pinker, 1989; Krifka, 2004; Wunderlich, 2006*a*), then recipient/goal and theme exchange their positions in the hierarchy of arguments; consider *y* and *z* in (14.41). This semantic difference does not need to concern the truth conditions because POSS and LOC-AT *can* be equivalent when they exchange their arguments.

(14.41) a. DO: $\lambda z\, \lambda y\, \lambda x\, \lambda e\, \textsc{act}(x)\ \&\ \textsc{become poss}(y, z)(e) \quad x > y > z$
b. PO: $\lambda y\, \lambda z\, \lambda x\, \lambda e\, \textsc{act}(x)\ \&\ \textsc{become loc}(z,\ \textsc{at}\ y)(e) \quad x > z > y$

Barss and Lasnik (1986) proposed several tests for argument hierarchy. Binding is one of them: A quantifier in the higher argument can bind the possessor of a lower argument, but not conversely. Usually this test is applied to the relation between subject and object, however, it also works in the relation between the higher and lower object of a ditransitive verb (Larson, 1988). Example (14.42) shows that the recipient binds the possessor of the theme in the DO construction. Conversely, the theme binds the possessor of the recipient/goal in the PO construction, shown in (14.43).

(14.42) a. They gave every woman_i her_i baby.
b. *They gave its_i mother every baby_i.

(14.43) a. They gave every baby_i to its_i mother.
b. *They gave her_i baby to every woman_i.

Another test is markedness, which came under consideration only when differential object marking was discussed (Aissen, 2003). In a number of dimensions, the higher argument preferably realizes the more prominent semantic value, so it is more frequently animate, definite, a 1st or 2nd person, a pronoun, or the topic than the lower argument. This holds for the relation between subject and object, but also for the relation between higher and lower object. According to markedness, a linguistic construction might only be tolerated if it realizes the higher argument pronominally rather than nominally; exactly this was observed in (14.38) to (14.40) above. Therefore, if the semantic values are given, one has to make a choice between two constructions. The choice predicted in (14.44) has been proved to be overwhelmingly true in Standard English (Collins, 1995).

(14.44) DO–PO competition:[5]
a. If the Recipient is less marked than the Theme, the DO construction is chosen (alternatively, PO is blocked).
b. If the Recipient is more marked than the Theme, the PO construction is chosen (alternatively, DO is blocked).

In the Kwa languages of West Africa, the DO construction alternates with a serial verb construction (14.45).

(14.45) DO–SV alternation in Fongbe (Kwa)

a. Ùn xlɛ Kofí fòtóò.
   1sg show Kofi picture
   'I showed Kofi a picture.'

b. Ùn só fòtóò xlɛ Kofí.
   1sg take picture show Kofi
   I showed the picture to Kofi.'

Lefebvre and Brousseau (2002: 455, 463) show that these constructions behave similarly to the English ones with respect to binding, so that one can conclude that the serial verb construction (14.45b) is an instance of change of location. Sedlak (1973) contributed data from Akan, a related language, in which the DO construction is preferred with a nominal or indefinite theme, while the serial verb construction requires the theme to be pronominal or definite.

A neo-Davidsonian account doesn't say anything about the hierarchy of arguments, so it must be stated separately. An advantage of a strictly guided decomposition account is that it entails argument hierarchy.

14.6 Regularities in the formation of denominal verbs

One of the strongest arguments for lexical decomposition comes from denominal verbs. Sortal nouns such as (a) *box, cage, shelter*, referring to an individual thing, or (b) *butter, fuel, salt*, referring to a substance, canonically can have only one argument (BOX(x), ...), while when these words are used as verbs, they not only instead refer to an event or action, but can also have more arguments than one. Consider the verbs *box* and *butter* in (14.46); what types of actions are they referring to?

(14.46) a. Jane boxed the bagels. (location verb)
b. Jane buttered the bagels. (locatum verb)

[5] If one of the constructions can be blocked with a certain distribution of semantic values one expects it to be a property that is sensitive to particular subclasses of ditransitive verbs, which indeed is the case (Rappaport Hovav and Levin, 2008).

Obviously, these verbs must contain the concepts BOX or BUTTER as one of their components. All other components must be inferred, in virtue of the context in which the verb is used, and in considering what the noun is usually used for ('if an action is named after a thing, it involves a canonical use of the thing', as Kiparsky (1997) noted). Boxes are containers—something can be put into them, thus, (14.46a) seems to express that the bagels are put into a box. The box becomes a location for the bagels, therefore, *box* is called a location verb here. In contrast, a substance such as butter can be located somewhere, or something can be provided with it; therefore, *butter* in (14.46b) is called a locatum verb.

The best view on the formation of denominal verbs is that the respective noun is incorporated into an abstract verbal template. Following a general requirement of functional application, the noun then has to realize the lowest (most deeply embedded) argument role available (Kiparsky, 1997, Stiebels, 1998). Transitive denominal verbs like those in (14.46) therefore correspond to a ditransitive template. The verb *box*, as it is used in (14.46a), can be represented by (14.47a) because z is the lowest argument role in this formula. The verb *butter* in (14.46b), however, cannot be represented by the same template (because then it would have to realize a non-lowest argument role), rather a predicate in which the argument roles are reversed has to be chosen, as in (14.47b).

(14.47) a. *box*: $\lambda z\ \lambda y\ \lambda x\ \lambda e\ [\text{ACT}(x)\ \&\ \text{BECOME LOC}(y, \text{AT } z)](e)$, with $z \approx$ BOX
b. *butter*: $\lambda z\ \lambda y\ \lambda x\ \lambda e\ [\text{ACT}(x)\ \&\ \text{BECOME POSS}(y, z)](e)$, with $z \approx$ BUTTER

In general, if one wants to know what a denominal verb means, one needs a complex event (or action) predicate in which the referent of the noun functions as the lowest (or verb-nearest) participant. Therefore, a particular denominal verb can have more than one reading, while, simultaneously, the set of possible readings must be severely restricted. Examples (14.48a,b) show *shelve* as a verb with either the location or the locatum reading. It is not possible to get a mixture of these readings, nor can a context overwrite the particular decomposition.

(14.48) a. Paul shelved his books. (Paul put his books onto shelves.)
b. Paul shelved his study. (Paul equipped his study with shelves.)

The number of possible denominal verb types is indeed very restricted. A noun can be predicative or referential, thus, a noun can saturate either a predicative or an individual role of a template. Denominal verbs with predicative nouns can have copula (14.49), inchoative (14.50), or causative readings (14.51).

(14.49) Paul gardenered the whole day. (He behaved temporarily as a gardener.)
$\lambda x\ \lambda t\ \boldsymbol{\mathit{GARDENER}}(x)(t)$

(14.50) The woodwork splintered. (The woodwork turned into splints.)
$\lambda x\ \lambda e\ \text{BECOME}\ \boldsymbol{\mathit{SPLINTER}}(x)(e)$

(14.51) Paul bundled the sticks. (He made the sticks to form a bundle.)
$\lambda y\ \lambda x\ \lambda e\ \text{ACT}(x)\ \&\ \text{BECOME}\ \boldsymbol{\mathit{BUNDLE}}(y)(e)$

The incorporated noun can also saturate an individual argument, which then is existentially bound. The above-mentioned location and locatum verbs, as well as instrumental verbs, belong to this major type. Within each class a certain variation is possible: a location verb can have the IN- or ON- reading (14.52), a locatum verb can have the reading of adding or removing (14.53), an instrumental verb can be intransitive or transitive (14.54), etc.

(14.52) a. Anne cellared the wine.
$\lambda y\ \lambda x\ \lambda e\ \exists z\ \textsc{act}(x)\ \&\ \textsc{become loc}(y,\ \textsc{in}^{*}z)\ \&\ \boldsymbol{\mathit{CELLAR}}(z)(e)$

b. Anne shouldered the bundle.
$\lambda y\ \lambda x\ \lambda e\ \exists z\ \textsc{act}(x)\ \&\ \textsc{become loc}(y,\ \textsc{on}^{*}z)\ \&\ \boldsymbol{\mathit{SHOULDER}}(z)(e)$

(14.53) a. Anne saddled the horse.
$\lambda y\ \lambda x\ \lambda e\ \exists z\ \textsc{act}(x)\ \&\ \textsc{become poss}(y, z)\ \&\ \boldsymbol{\mathit{SADDLE}}(z)(e)$

b. Anne scaled the fish.
$\lambda y\ \lambda x\ \lambda e\ \exists z\ \textsc{act}(x)\ \&\ \textsc{become}\ \neg\textsc{poss}(y, z)\ \&\ \boldsymbol{\mathit{SCALE}}(z)(e)$

(14.54) a. Anne biked.
$\lambda x\ \lambda e\ \exists z\ \textsc{move}(x)\ \&\ \textsc{instrument}(z)\ \&\ \boldsymbol{\mathit{BIKE}}(z)(e)$

b. Anne mopped the floor.
$\lambda y\ \lambda x\ \lambda e\ \exists z\ \textsc{manipulate}(x, y)\ \&\ \textsc{instrument}(z)\ \&\ \boldsymbol{\mathit{MOP}}(z)(e)$

A decompositional account makes clear predictions about possible and impossible readings. For example, *saddle the horse* cannot mean 'put a saddle on the horse' (even if a saddle usually is put on the back of a horse) because then a non-lowest argument role would be saturated—in fact, a horse wouldn't be said to be saddled, if the saddle were just placed anyhow or anywhere on the horse. (Even more obvious is the case with *bridle*, a structurally and functionally similar verb; one doesn't just put a bridle on the horse.) Similarly, *church the money* cannot mean 'provide the church with money', but it can mean 'put the money into a church' (see also Hale and Keyser, 1993). It is hard to see how a neo-Davidsonian account (with a flat argument structure) could achieve those insights.

14.7 Manner and result

Talmy (1985: 70, 63) observed that in the Romance languages it is preferable for the direction of motion to be specified in a simple verb of motion (e.g. Spanish *entar* 'move in', *salir* 'move out', *pasar* 'move by', *subir* 'move up', *bajar* 'move down', *cruzar* 'move across'), while in the Germanic languages it is the manner of motion (*swim, run, roll, slide, float, blow, kick*). None of the languages does both in a simple verb. This does not exclude that English also has simple verbs of motion specifying the direction or goal rather than the manner of motion (*cross, enter, arrive, come*).

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Considering the general template (14.55a), it seems that a verbal root can only specify either ACT or the result state (including direction), as expressed in (14.55b).

(14.55) a. ACT(x) & BECOME < result state >(e)

b. Lexicalization constraint: 'A given root can modify ACT or be an argument of BECOME, but cannot do both within a single event structure.' (Levin and Rappaport Hovav, 2007)

Both manner verbs and instrumental verbs specify ACT, leaving open what type of result (or direction) can occur; for example *roll* is a verb that entails movement, but does not specify where. By contrast, verbs that specify the type of result state leave open what type of action has to be done (*open, empty, box, saddle*). Verbs such as *poison, strangle, stab* specify various ways of bringing someone to death, however, they do not entail that the person dies, whereas *kill*, which entails death, does not specify by which action. A potential counterexample could be *whisper*, which clearly specifies ACT but is also used in specific result constructions (see (14.39) above); the possibility of DO–PO alternation in fact neutralizes any specificity of the result. Note that derivational elements such as prefixes (German *ver-giften, er-würgen, er-dolchen*), as well as syntactic complements (*roll into the box*; *wipe the table clean*), are able to specify the respective complementary aspect of an event.

Levin and Rappaport Hovav (2007) argued that the complementarity of manner and result is a constraint of possible verb meanings that limits the complexity of verb meanings. Kaufmann (1995*a*: 221) suggested that in a decomposition structure such as [A & B & C . . .], any subsequent element can only specify the preceding one. Thus, BECOME(p) can specify the result of ACT, but it cannot specify a manner expressed in *roll, float, swim* more narrowly, while if ACT is left unspecified and BECOME(p) is added, then p can be specified more narrowly.

The exact nature and scope of those constraints have still to be studied. Whatever they may look like, if something of such a restriction exists, it strongly supports the lexical decomposition account.

14.8 SUMMARY

Concerning verbs, most linguists plead for lexical decomposition, serving to predict grammatical behaviour, especially argument structure. A decomposition can be a flat ('neo-Davidsonian') or a more hierarchical structure; the latter is more restrictive and therefore preferred if it can be done consistently. Verb classes share the same type of decompositional structure ('template'), which often (but not necessarily) includes an idiosyncratic *root* signalling the simplest use of the predicate in question; rather general verbs such as 'kill' and 'give' (in contrast to 'crucify' or 'donate') might be decomposed without such an idiosyncratic rest. Many *roots* can potentially occur in several, increasingly complex templates. Lexical decomposition thus allows for relating

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argument alternations to a single core meaning, placed into various contexts. It does not define a word meaning exhaustively (so there could be another level of meaning, conceptually more articulated). The components of a template can be viewed as semantic primitives, available to all languages, or, in approaches of syntactic decomposition, as 'light' verbs, which have a special status in that they contribute more structure than meaning. Denominal verbs (such as *to shelve, to bridle*) most clearly show the function of those templates, and therefore can be taken as a probe into the inventory of templates: to find the reading of a denominal verb, one necessarily has to look for a template. Despite many debates about details, various lines of research converge in the view that linguistic meaning is structured and hence not purely denotational. Proponents of an atomistic view of meaning (notably Fodor and Lepore) have to live against this insight as a minority.