Explicating the English lexicon of ‘doing and happening’

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Abstract: This study proposes NSM semantic explications for a cross-section of the English verbal lexicon of ‘doing and happening’. The twenty-five verbs are drawn from about a dozen verb classes, including verbs for non-typical locomotion (*crawl, swim, fly*), other intransitive activities (*play, sing*), manipulation (*hold*), activities that affect material integrity (*cut, grind, dig*), creation/production (*make, build, carve*), actions that affect people or things (*hit, kick, kill*) or cause a change of location (*pick up, put, throw, push*), bodily reactions to feelings (*laugh, cry*), displacement (*fall, sink*) and weather phenomena (*rain, snow*). Though the verbs explicated are specifically English verbs, they have been chosen with an eye to their relevance to lexical typology and cross-linguistic semantics (many are drawn from the Verb Meanings List of the Leipzig Valency Patterns project) and it is hoped that the analytical strategy and methodology exemplified in this study can be a useful model for research into other languages. The study demonstrates the application of the NSM concept of semantic templates, which provide a clear “skeletal” structure for explications of considerable internal complexity and which help account for shared semantic and grammatical properties of verbs of a given subclass.

1. Introduction

This study maps out a substantial part of the diversity of lexical semantic structures in the English lexicon of verbs of doing and happening, using the NSM approach to semantic analysis (Gladkova 2010; Goddard 2011; Goddard & Wierzbicka 2002; Goddard & Wierzbicka 2014a; Levisen 2012; Peeters 2006; Wierzbicka 1996; Ye in press). Semantic explications are proposed for twenty-five verbs from a dozen or so subclasses. The general assumptions and procedures of NSM semantic analysis will not be summarised here, except to say that NSM explications are reductive paraphrases composed in a highly constrained vocabulary consisting of putatively universal semantic primes and a small set of non-primitive, but relatively basic, lexical meanings known as semantic molecules (marked in the explications with the notation [m]). The semantic primes and molecules are listed in Appendix A and Appendix B.

The study builds on existing NSM work on verb semantics (Barrios & Goddard 2013; Goddard & Wierzbicka 2009; Goddard 2011, in press; Goddard, Wierzbicka & Wong in press; Sibly 2011; Wierzbicka 2009; Ye 2010). A key assumption is that explications for verbs with similar meanings and grammar conform to a shared structural pattern; in NSM parlance, a **semantic template**. For example, it is believed that physical activity verbs, e.g. *walk, run, cut, chop, grind, dig*, follow a four-

part template whose sections can be labelled as follows: Lexicosyntactic Frame, Prototypical Scenario, Manner (including any short-term incremental effect) and Potential Outcome.

The top-level components, i.e. those in the Lexicosyntactic Frame, are very general and largely account for the ‘macro’ morphosyntactic properties of a given verb. For example, explications for locomotion verbs like *run*, *swim*, and *climb* begin with the components shown in (a) below, or variants thereof, while explications for *put* and related verbs of induced change of location begin with the components shown in (b), or variants thereof.

- a. someone X is doing something somewhere for some time (at this time)
because of this, this someone is moving in this place during this time as this someone wants
- b. someone X did something to something Y (at this time)
because he/she wanted this thing to be in the same place for some time after this
this someone did it with the hands [m]

Grouping verbs according to shared Lexicosyntactic Frames is the most direct analogue in the NSM framework for the notion of “verb class” (Goddard in press; Levin 1993; Levin & Rappaport Hovav 2005). In this study, about a dozen different Lexicosyntactic Frames are identified. No claim is made that this number is exhaustive, even for the domain of doing and happening.

As in previous work, the present study adopts the further assumption that it is possible (and necessary) to identify, for every verb, a **semantically basic grammatical context**, and that it makes sense to first explicate any given verb as it is used in this context. For example, for durative verbs like *walk*, *run*, *eat*, *drink*, *dig* and *rain*, the semantically basic context is ‘activity in progress’. In English, naturally-occurring examples tend to appear in the Progressive form. For punctual verbs like *jump*, *throw*, and *hit*, the basic context is ‘perfective’. In English, naturally-occurring examples tend to appear in the Simple Past. We will term the sense found in this context the **semantically basic sense**. Once the semantically basic sense of a verb has been explicated, this sense can then be used to give a semantic account of tense-aspect transpositions, e.g. from Progressive to Simple Past or vice versa, and an account of any specialised constructions (syntactic alternations) in which the verb participates

(Goddard 2012, in press). These issues will not be pursued further here. Each verb is explicated in one grammatical context only.

The 25 explications proposed in this study are for English verbs and many of the semantic details are undoubtedly English-specific. Nonetheless, it may be that the same or similar template structures are found in many other languages and that similar, if not identical, components occur in many languages. As for the selection of verbs, this has been partly guided by the list of 80 Verb Meanings investigated by the Valency Patterns Leipzig (ValPaL) project (Hartmann, Haspelmath & Taylor 2013; Malchukov & Comrie in press). As the ValPaL Project Description puts it: “[t]hese verbs are conceived of as representative of the verbal lexicon”. We selected the following ‘doing and happening’ verbs from the Leipzig List: *build, cut, dig, grind, hit, kill, laugh, play, push, put, rain, sing, sink, throw*.¹ For most of these, we added one similar verb to provide a relevant lexical contrast, e.g. to supplement *build* we added *make* and *carve*, to supplement *laugh* we added *cry*; for *rain* we added *snow*, and so on. We also added *crawl, swim* and *fly*, because they are related to and supplement *run* (on the Leipzig List but explicated in other NSM work); and *hold* and *pick up*, because of the importance of verbs of manual manipulation.

In order to cover 25 verbs in the compass of a journal article, we have had to make some compromises: our review of related work in other semantic paradigms is not very detailed; we have made only limited reference to corpora (chiefly WordBanks Online); and, above all, our discussion of the individual verbs is abbreviated. We offer mere lexical sketches of the verbs, rather than the full ‘lexicographic portraits’ they deserve (Apresjan 2000), and in many cases our explanation of the details the explications could be elaborated if space permitted. The structure of the remainder of the paper is as follows. Section 2 presents explications for the selected verbs of doing and happening. This comprises the bulk of the paper. Section 3 discusses the NSM work in comparison with two other approaches to lexical semantic analysis (Generative Lexicon and FrameNet) and draws out

¹ Other Verb Meanings from the Leipzig List whose English versions have been explicated in NSM work (Goddard in press; Goddard & Wierzbicka 2014a; Goddard, Wierzbicka & Wong in press; Wierzbicka 2009; Wierzbicka 2014) include: *ask for, break, carry, climb, eat, feel cold, feel pain, give, go, be hungry, be sad, sit, run, pour, steal, tell*. The Leipzig List also includes the following words, which are recognised in the NSM framework as semantic primes: *die, live, think, know, see, say, touch, hear*.

implications for future work in cross-linguistic semantics and lexical typology.

2. ‘Doing and happening’ verbs, in ten groups

2.1 Non-typical locomotion: *crawl, swim, fly*

Much of the semantic spadework on locomotion verbs has been done in Goddard, Wierzbicka & Wong (in press), which focusses on English *walk* and *run*, and their nearest counterparts in German. The particular verbs dealt with below (*crawl, swim, fly*,) represent non-typical modes of locomotion. They share the following Lexicosyntactic Frame. Notice that the final phase (‘as this someone wants’) conveys the idea that the motion is under the actor’s control.

someone X is doing something somewhere for some time (at this time)

because of this, this someone is moving in this place during this time as this someone wants

Following the Lexicosyntactic Frame comes Prototypical Scenario, which is introduced as follows: ‘at many times when someone does this in a place, it is like this:’. What follows usually involves some specifications about the place, together with the actor’s intention – portrayed using primes THINK and WANT – to be somewhere else in this place after some time.² (The term “prototypical” correlates with the presence of the introductory sub-component ‘at many times’. In templates for other kinds of verb, the corresponding section may be termed simply Scenario, if it depicts an existing current situation, or Prior Scenario, if it depicts pre-conditions.)

The subsequent Manner section depicts some characteristic actions with parts of the body, which have the effect of causing the actor’s body to move somewhat. This section is introduced as follows: ‘when someone does this, something like this happens many times: ...’. The claim is that *crawling*, *swimming*, and *flying* are conceptualised as consisting of brief recurring episodes. One question is how

² The English verb *intend* is complex and can be decomposed into a combination of WANT and THINK (Goddard 2003). From cross-linguistic point of view, it is also notable that, as one might expect of a semantically complex verb, many languages lack exact equivalents of ‘intend’.

to depict the limited and localised movements, the so-called ‘incremental effect’, involved in *crawling* (*swimming, flying, etc.*), as opposed to the potential cumulative effect of this continuing for some time. In the explications below, we state the incremental effect in terms of the location of the actor’s body. In effect, this says that any amount of *crawling, swimming, etc.*, brings about some limited bodily displacement. The final section, Potential Outcome, states that if this continues for some time, the person can end up some distance away, i.e. ‘somewhere not near the place where he/she was before’ Notice that this component is phrased in terms of the potential location of the actor him or herself, rather than in terms of the actor’s body.

Crawl. The semantically basic sense of *crawl*, shown in sentences like the following, is explicated in [1] below. Note that the subject is human (cf. Fillmore & Atkins 2000). (We will not provide attestation details for the sentences in (1) or in subsequent examples. Some of our examples are in fact from WordBanks Online. Others were found using Google searches, and still others were constructed by the authors, usually by adapting a naturally-occurring sentence.)

- (1) a. When does a baby start to crawl?
 b. There were a few people crawling out of the wreckage.
 c. I was crawling towards cover, trying to keep my head down.

[1] Someone X is **crawling** (at this time).

someone X is doing something somewhere for some time (at this time) because of this, this someone is moving in this place during this time as this someone wants	LEXICOSYNTACTIC FRAME
at many times when someone does this in a place, it is like this: – this someone thinks like this: “I want to be somewhere else in this place after some time” – this someone can’t move the legs [m] as people do at many times when they want to be in another place not far from the place where they are at this time	PROTOTYPICAL SCENARIO
when someone does this, something like this happens many times: – this someone moves the legs [m] for a short time, at the same time this someone moves some other parts of the body – because of this, many parts of this someone’s body touch the ground [m] in many places during this time – because of this, after this, this someone’s body is not in the place where it was before, it is somewhere near this place	MANNER + EFFECT
if someone does this for some time, after this, this someone can be somewhere not near the place where he/she was before	POTENTIAL OUTCOME

Consistent with the explication, corpus data from WordBanks Online shows that when *crawl* has a human subject, it collocates strongly with certain body-parts (*hands, knees, belly, fours*), with locational words (*along, under, across, back, up, down, over, through*), with words like *ground, floor, mud*, and *sand*, and with words and expressions designating enclosed places (*cave, tunnel, sewer; under the table/fence*, etc.). As for the subject of *crawl*, one of the most salient human nouns is *baby*. (It should be noted that non-human subjects, especially the names of various ground-dwelling species, such as *ants, spider, fly, bugs, insects, maggots, crabs, beetle, worm* and *snake*, are extremely common with *crawl*. We regard such uses as instances of a different-but-related meaning *crawl*₂.)

Swim. The semantically basic sense of *swim*, shown in sentences like the following, is explicated in [2] below.

- (2) a. I waded out into the water and started swimming.
 b. She swam across the river in less than 15 minutes.
 c. I learnt to swim when I was about five or six.

[2] Someone X is **swimming** (at this time).

someone X is doing something for some time (at this time) in a place where there is much water [m] because of this, this someone is moving in this place during this time as this someone wants	LEXICOSYNTACTIC FRAME
at many times when someone does this in a place, it is like this: – many parts of this someone's body are inside water [m] in this place – this someone's body is not touching anything else at this time – this someone thinks like this: "I want to be somewhere else in this place after some time"	PROTOTYPICAL SCENARIO
when someone does this, something like this happens many times: – this someone moves some parts of the body for a short time – because of this, these parts of this someone's body touch the water [m] in many places during this time – because of this, after this, this someone's body is not in the place where it was before, it is somewhere near this place	MANNER + EFFECT
if someone does this for some time, after this, this someone can be somewhere not near the place where he/she was before	POTENTIAL OUTCOME

Typical collocates for English *swim* in the relevant sense include (not surprisingly) *water, pool, river, lake, sea*; also *shore* and *beach*; and directional words like *away, towards, across, closer*, and *ashore*. Note that this explication includes the prototypical actor's idea of 'getting somewhere' as part of the Prototypical Scenario. (For a study of the Russian counterpart verb, different in many ways to

English, see Koptjevskaja-Tamm et al. 2010.) A separate meaning *swim*₂ is needed for sentences about *fish* (*dolphins, whales, etc.*) *swimming*; cf. our treatment of *fly* below.

Fly. The explication has ‘creature [m]’ as the subject, because the prototypical actors that fly are creatures such as birds, insects and bats. In contrast to the previous two explications, the Prototypical Scenario for *flying* does not include any intention component. This is because it would seem strange to imagine lowly creatures like flies and butterflies ‘wanting to be somewhere else in this place’, let alone **thinking** ‘I want to be somewhere else in this place’.

[3] Creature X is **flying** (at this time).

creature [m] X is doing something somewhere for some time (at this time) because of this, this creature [m] is moving in this place during this time as this creature [m] wants	LEXICOSYNTACTIC FRAME
at many times when a creature [m] does this in a place, it is like this: – this place is somewhere above the ground [m] – this creature [m] has wings [m]	PROTOTYPICAL SCENARIO
when a creature [m] does this, something like this happens many times: – this creature [m] does something with the wings [m] for a short time – because of this, these wings [m] move many times in the same way – because of this, after this, this creature's [m] body is not in the place where it was before, it is somewhere near this place	MANNER + EFFECT
if a creature [m] does this for some time, after this, this creature [m] can be somewhere not near the place where it was before	POTENTIAL OUTCOME

2.2 Verbs for other intransitive activities: *play, sing*

It is widely accepted that both playing and singing, in a broad sense, are universal human behaviours, which no doubt helps explain their presence on the Leipzig List and on field linguistics word-lists such as Comrie & Smith's (1977) 200-odd item list (cf. Bower 2008). Though we are explicating English *play* and *sing*, we expect that very similar, if not identical, meanings are likely to be found in all or most languages. In English, both verbs allow ‘cognate object’ constructions, with both generic and specific object NPs, e.g. *play a game, play chess/tennis/football, etc.*; *sing a song, sing a hymn/lullaby/aria, etc.* We will not pursue these constructions here, but stick with the simple intransitive frames.

Play. The semantics of *game* has been much discussed in linguistic philosophy, in the wake of Wittgenstein's famous discussion of the family resemblance concept (cf. Wierzbicka 1996: 157–160 on *game*). There is a significant literature about the concept of ‘play’ in education studies, child

psychology, anthropology, ethology, and even evolutionary biology. Brown (1991) includes ‘play’ and ‘pretend play’ as human universals. With the exception of Alexander (2006), however, there has been little lexical-semantic analysis.

One influential theme in these various writings is that play is prototypically manifested by children (and by the young of other species, such as puppies and kittens). The most notable feature of explication [4] below is that, following Alexander (2006), it includes, and relies heavily on, the semantic molecule ‘children [m]’ (explicated in Goddard & Wierzbicka 2014a: Ch 2). Another leading idea about play, both in the psychological and linguistic literature, is that it is ‘social’. Levin (1993: 62–64, 200–202) lists *play* as a ‘verb of social interaction’, pointing out that it participates in the so-called simple reciprocal alternation, i.e. the near-paraphrase relationship between NP₁ *play* [*with* NP₂]_{PP} and [NP₁ *and* NP₂]_{NP} *play*. In explication [4], the social aspect is captured by the component ‘doing something with someone else’ in the Lexicosyntactic Frame.

A third idea in the literature is that *play* involves a shared understanding among the participants that ‘this is not real’, ‘not serious’, that it is ‘simulation’, etc. We see this theme as reflecting a focus on imaginative play, rather than on play generally, and we have not included it in the explication, except to the extent that the Prototypical Scenario says that children who are *playing* do it ‘because they want to feel something good when they do it, not because anything else’. Note the presence of the Evaluation component at the end of the explication.

[4] Someone X is **playing** with someone else (at this time).

someone X is doing something with someone else for some time (at this time) because he/she wants to do it	LEXICOSYNTACTIC FRAME
children [m] do this at many times they do it because they want to feel something good, not because of anything else	PROTOTYPICAL SCENARIO
when someone does for some time, this someone can feel something good because of this	EFFECT
people think like this: “it is good if children [m] do this at some times”	EVALUATION

Sing. The explication below has several notable features. The prototypical actor’s thought begins with a double-barrel component: ‘if I do this, people in this place can hear some words for some time because of this; at the same time they can hear something not like words’. This is intended to capture the fact that singing (prototypically) involves audible words, but equally that when one hears someone

singing, one hears more than words alone. An awareness that ‘when I do this, I can feel something good because of this’ is attributed to the prototypical actor (i.e. singer), suggesting an emotional or aesthetic dimension.

The Manner section indicates the involvement of the mouth and the relationship with ‘saying something to someone’; namely, that in *singing* one uses the mouth in a way similar to speaking, but at the same time one is doing something else which is not typical of normal speech. There is an Evaluation component at the end of the explication, saying that people value someone being able to ‘do this well’. Presumably a similar ‘performance’ component would be present in related words such as *dance*, *play (a musical instrument)*, *draw*, and *paint* (in the relevant sense).

[5] Someone X is **singing** (at this time).

someone X is doing something somewhere for some time (at this time) because he/she wants to do it	LEXICOSYNTACTIC FRAME
at many times when someone does this, this someone thinks like this: “if I do this, people in this place can hear some words for some time because of this, at the same time they can hear something not like words when I do this, I can feel something good because of this I want this”	PROTOTYPICAL SCENARIO
when someone does this, this someone does something with the mouth [m] like people do at many times when they want to say something to someone at the same time, this someone does something else with the mouth [m] not like people do at many times when they want to say something to someone	MANNER
when someone does for some time, this someone can feel something good because of this	EFFECT
people think like this: “it is good if someone can do this well”	EVALUATION

2.3 Verbs of manipulation: *hold*

Hold is one of the most basic English verbs of manual manipulation. It serves as a semantic molecule in the explications for many other verbs that involve instruments and for nouns for diverse items that are handled, such as tools, weapons, implements, and fruits. It clearly involves ‘hands [m]’ as a key semantic molecule.

- (3) a. Petrol spilt onto her clothes while she was holding the funnel.
b. Can you hold this for me?

The Prototypical Scenario portrays the prototypical actor's intention as involving wanting to do something with the thing being held. Of course, in some cases a real actor's intention may be somewhat different, e.g. as in example (3b) above. Explication [6] has been devised to ensure that it does not extend to, say, resting one's hand on something. Needless to say, the explication applies only to 'holding something', not to 'holding onto something', for which a separate explication will be needed. Likewise, a separate explication is necessary for 'holding someone by the hand (etc.)'.

[6] Someone X is **holding** something (at this time).

someone X is doing something to something for some time (at this time) this someone is doing it with the hands [m]	LEXICOSYNTACTIC FRAME
at many times when someone does this to something, this someone thinks about this something like this: "I want to do something with this thing now I want to do it for some time during this time I want it to be all the time in the place where my hand [m] is"	PROTOTYPICAL SCENARIO
when someone does this to something, this someone's hand [m] touches this thing on all sides as this someone wants because of this, if this hand [m] doesn't move, this thing doesn't move at the same time, if this hand [m] moves, this thing moves at the same time in the same way	MANNER + EFFECT

Hold has a partial perfective counterpart in *pick up*, which is explicated in section 2.7, along with related verbs like *put* and *throw*.

2.4 Activities that affect 'material integrity': *cut*, *grind*, *dig*

In this section we explore a couple of prototypically transitive verbs depicting activities that result, or at least can result, in a lasting impact on the object. Their meanings are significantly complex. It is helpful at the onset to remind ourselves of the conceptual difference between activities and acts, and of the strong natural tendency for transitive activity verbs to be associated with concrete physical objects (things). As Goddard & Wierzbicka (2009) put it:

To judge by linguistic evidence, physical activities focused on a goal and extended in time seem to be more salient in human experience than physical acts with an immediate result. Examples of the former type include activities such as 'cutting', 'chopping', 'grinding', 'mowing', 'kneading', 'cooking', 'digging', 'painting', 'slicing', 'peeling', and so on, while examples of

the latter type include acts like ‘killing’ and ‘breaking’. It can hardly be an accident that human languages tend to have extensive sets of verbs designating “physical activities” (rather than “physical acts”); while conversely, those areas of the verbal lexicon which do designate “acts” in a strict sense are chiefly devoted to acts directed at people or at other living things, rather than at physical objects; for example, many languages have extensive sets of verbs designating speech acts (rather than “speech activities”) or other interpersonal acts (e.g. ‘kill’, ‘hit’, ‘kiss’). Presumably, the underlying reason is that to achieve a desired impact on the physical world one usually has to engage in activities of some duration, often involving an instrument (‘doing something to something with something for some time’). It is often much simpler, in terms of time and effort, to make an impact on a person or other living thing. (Goddard & Wierzbicka 2009: 68)

We will look at *cut*, *grind* and *dig* as examples of canonical physical activity verbs involving instruments. In section 2.5, we look at *hit* and *kick* as examples of physical acts, then finally at *kill*.

Cut. For previous NSM work in this area, see Goddard & Wierzbicka (2009) on *cut* and *chop*, and revised versions of those explications in Goddard (2011). Note that the incremental effect, i.e. the final component of the Manner + Effect section, is stated as follows, referring to the places where the sharp part of the instrument contacts the object: ‘because of this, after this, this thing is not like it was before in these places’. This conveys the idea that any amount of *cutting* brings about some kind of permanent (albeit partial) effect on the object.

[7] Someone **is cutting₁** something (e.g. bread, paper) (at this time).

someone is doing something to something for some time (at this time) because of this, something is happening to this something during this time as this someone wants this someone is doing it with something else	LEXICOSYNTACTIC FRAME
at many times when someone does this to something, it is like this: – a short time before, this someone thought like this about this something: “I don’t want this thing to be one thing anymore, I want it to be two things because of this, I want to do something to it for some time after this when I do this, I want something to happen to it all the time as I want”	PROTOTYPICAL SCENARIO
when someone does this to something, it happens like this: – this someone holds [m] one part of something else with one hand [m] all the time – this part of this other something is not sharp [m], another part of it is sharp [m] – this someone moves his/her hand [m] for some time	MANNER + EFFECT

– because of this, the sharp [m] part of this other thing touches this thing in some places as this someone wants	
– because of this, something happens to this thing in these places as this someone wants	
– because of this, after this, this thing is not like it was before in these places	
if someone does this to something for some time, after this, this thing can be two things	POTENTIAL OUTCOME

As observed in earlier work, explication [7] is not suitable for uses of *cut* in which the object is something very thin, such as string, thread or ribbon. This is because cutting things like these does not involve an activity carried out over a period of time, nor is there any possibility of exercising ongoing control; on the contrary, the agent does something and the effect happens ‘in one moment’. A different (but related) *cut*₂ explication is needed for examples like these. As one would expect, examples of *cut*₂ strongly tend to occur in past perfective contexts, e.g. *She finished off the last stitch, and cut the thread with her nail scissors.*

Grind. It would seem that most cultures have some kind of technology for “grinding”, and this may give the semantics of English *grind* some broader interest, notwithstanding that there must be language-specific aspects. Aspects of the explication draw on previous NSM work into the semantics of mass nouns (Goddard 2010b; Wierzbicka 1985). One interesting detail is that ‘flour [m]’ appears as a semantic molecule in the Prototypical Scenario and Potential Outcome. The Manner section has been constructed so as to accommodate not only using handheld grindstones, mortar and pestle, etc., but also using a hand-operated grinding machine, such as a coffee-grinder or salt grinder.

[8] Someone X is **grinding** something (of one kind) (at this time).

someone X is doing something to something (of one kind) for some time (at this time) because of this, something is happening to this something during this time as this someone wants this someone is doing it with something else	LEXICOSYNTACTIC FRAME
at many times when someone does this to something (of this kind), it is like this: – this something has many small parts, these small parts are hard [m] – a short time before, this someone thought like this about this something: “I don’t want it to be like this, I want it to be like flour [m] I want to do something to it because of this”	PROTOTYPICAL SCENARIO
when someone does this to something, the same thing happens many times it happens like this: – some parts of this something are touching two very hard [m] things – these two very hard [m] things are on two sides of this something – one of these very hard [m] things moves for a short time because this someone does something to it with the hands [m] – because of this, something happens to many parts of this something – because of this, after this, these parts of this something are not like they were before	MANNER + EFFECT
if someone does this to something for some time, after this, this something can be like flour [m]	POTENTIAL OUTCOME

Dig. *Dig* requires a separate template because of its specific relationship with a ‘locus’ place, i.e. an implicit locational argument. We assume that the semantically basic frame is as shown in sentences like: *She is digging in the garden*. Note that the incremental effect (at the end of the Manner + Effect section) states that ‘because of this, after this, some of the ground [m] in this place can be not in the place where it was before’. That is, to *dig* somewhere (even briefly) necessarily causes some limited displacement of the ground in that place.

[9] Someone X is **digging** somewhere (at this time).

someone X is doing something somewhere for some time (at this time) because of this, something is happening to something in this place during this time as this someone wants this someone is doing it with something else	LEXICOSYNTACTIC FRAME
at many times when someone does this in a place, it is like this: – a short time before, this someone thought like this: “I want some of the ground [m] in this place to be after some time not in the place it is now because of this, I want to do something to the ground [m] in this place for some time”	PROTOTYPICAL SCENARIO
when someone does this in a place, the same thing happens many times it happens like this: – this someone holds [m] something for some time – at the same time this someone does something to this thing with parts of this someone's body – because of this, part of this thing is inside the ground [m] in this place for a short time – during this time, this thing moves as this someone wants – because of this, something happens to the ground [m] at this time – because of this, after this, some of the ground [m] in this place is not in the place where it was before	MANNER + EFFECT
if someone does this in a place for some time, after this, much of the ground [m] in this place can be not in the place where it was before	POTENTIAL OUTCOME

The verb *dig* can also occur in constructions with an ‘object’ NP, e.g. *I dug a hole in the garden*, *They were digging a tunnel (grave, well, etc.)*. These require a separate *dig*₂ explication that incorporates the semantically basic sense explicated above (Goddard in press).

2.5 Verbs of creation/production: *make*, *build*, *carve*

Make. Given the importance of tools and artefacts in human life, there can scarcely be a more interesting and important verb than ‘make’. Though only a brief vignette is possible here, it deserves a full study in its own right. Although ‘make [m]’ is surely an indispensable semantic molecule in explications for artefact words in all languages (in a component like ‘people make things of this kind

(because ...))', it is clear that English *make* has a significantly different range of use than its counterparts in many languages, including other European languages. It appears that '*make* words', both in English and in other languages, tend to be highly polysemous. We hypothesise that there is a shared core meaning, with the polysemic extensions varying to a greater or lesser extent across languages. If so, we need to be careful when nominating a basic frame and typical examples of *make* to ensure that they are not English-specific. We propose the following as canonical examples of the desired basic sense of *make*. Notice that the direct object depicts a 'kind' of thing.

- (4)
- a. He made a toy out of wood.
 - b. She made a nice skirt for herself.
 - c. They made a raft out of oil drums and wood, lashed together with rope.

Although these sentences in the Simple Past are good examples of the sense of *make* which we regard as basic, we do not mean to imply that the 'perfective' Simple Past is its semantically basic grammatical context. Actually, in many ways *make* more closely resembles physical activity verbs like *cut* and *dig*, than classic perfective verbs like *kill* or *hit*. For one thing, *making something* involves 'doing something for some time' and, moreover, doing it with physical things. Likewise, *making something* requires a degree of forethought and intention: having a clear outcome in mind. The difference between *make*, on the one hand, and verbs like *cut* and *dig*, on the other, is that with *cutting* and *digging* the actor's focus is on achieving an effect on the objects at hand, whereas with *making* the actor's focus is on creating something new.

Explication [10] below attempts to balance these considerations. The Lexicosyntactic Frame begins with a familiar-sounding line 'someone X is doing something to some things in a place for some time', but this is immediately followed by a novel 'motivation' component: 'because this someone wants there to be something of one kind in this place'. The Prototypical Scenario indicates the availability of some materials and the actor's awareness that if he/she uses them appropriately they can become

‘parts of something of one kind’. The ongoing Effect of the activity on the materials is not described in any detail: it is only said that ‘something happens to these things as this someone wants’.³

[10] Someone X is **making** something (of one kind) (at this time).

someone X is doing something to some things in a place for some time (at this time) because this someone wants there to be something of one kind in this place after this	LEXICOSYNTACTIC FRAME
at many times when someone does this, it is like this: – there are some things in the place where this someone is – this someone thinks like this: “if I do something to these things for some time, after this, there can something of one kind here as I want”	PROTOTYPICAL SCENARIO
when this someone does this, something happens to these things as this someone wants because of this, these things are not as they were before	EFFECT
if someone does this for some time, after this, there can be something of one kind in this place as this someone wanted	POTENTIAL OUTCOME

Build. The verb *build* is more language-specific than *make*. Some languages, such as Yankunytjatjara, have no such word, lexically distinct from ‘make’ (Goddard 1996). In the case of Yankunytjatjara, this is no doubt connected with the fact that Yankunytjatjara people traditionally did not ‘build’ any permanent structures. Although *build* is often batched together with *make* in a putative class of “verbs of production”, on closer examination one finds many semantic and grammatical differences between them (Boas 2011); for example, *make* allows the ‘material/product’ construction/alternation, e.g. *She made the wool into a lovely jumper*, but *build* does not.

The verb *build* is of course polysemous. The semantically basic sense, as we see it, is compatible with two kinds of prepositional phrase: ‘**of** stone (brick, wood, etc.)’ and ‘**on/in/at** a place’; that is, with expressions specifying the materials, on the one hand, and the place, on the other. According to WordBanks Online, typical grammatical objects of *build* are *house, home, bridge, road, castle, dam, tower*, and *buildings*. One can also *build a fence, a retaining wall, a staircase, or a chicken-coop*. We interpret things all of these kinds as having in common a special relationship to a particular place,

³ Explications for many artefact words presumably include a component like ‘things of this kind are made of [m] wood (stone, metal, etc.)’. It is worth noting therefore that the relationship between the expression ‘made of [m]’ and the verb ‘make’, as explicated here, is not as straightforward as one might expect from the English morphology. The molecule ‘made of [m]’ seems to require its own separate explication, independent from that of ‘make’.

namely, that they can be seen as ‘like a part of a place’. As well, we think that part of the process of *building* something involves doing something to the ground in the place in question.

[11] Someone X is **building** something (of one kind) in a place (at this time).

someone X is doing something in a place for some time (at this time) because this someone wants there to be something of one kind in this place after this	LEXICOSYNTACTIC FRAME
at many times when someone does this in a place, it is like this: some time before, someone thought about this place like this: “I want something of one kind to be in this place I want it to be like a part of this place” at the same time, this someone thought about some things in this place like this: “if I do something to these things for some time, after this, there can something of one kind here as I want”	PROTOTYPICAL SCENARIO
when someone does this in a place, it happens like this: – this someone does some things to the ground [m] in this place – after this, this someone does something to some things in this place for some time – because of this, after this, these things are not in the places where they were before at the same time they are not like they were before, they are parts of something in this place	MANNER + EFFECT
if someone does this in a place for some time, after this, there can be something of one kind in this place as this someone wanted	POTENTIAL OUTCOME

In many naturally-occurring examples, the subject of *build* is not a single specific individual. Either the subject is plural in number or the individual identity or identities of the builder(s) are (seemingly) of little interest. (In corpus materials, *build* is often found in the passive: e.g. *The castle had been built by ...*, *The house was built in the 1950s.*) We experimented with wording the explication in terms of a collective subject (‘some people’), but it was difficult to reconcile the resulting explications with the fact that it is certainly possible for a single person to build something (the example of Robinson Crusoe springs to mind).

A second and distinct meaning of *build* (which does not relate in any special way to a particular place) involves *building*₂ a large and complicated device. To judge by the data in WordBanks Online, this is commonly a *bomb* or an *aeroplane*, but equally one can *build*₂ a *steam engine*, a *ship*, etc. Other common expressions involving *build* are the phrasal verbs *build on* (e.g. *Einstein built on Newton’s work*) and *build up* (e.g. *Clouds had been building up all day*). These expressions provide indirect evidence that literal *build*₁ includes a reference to first doing something on or to the ground, before doing other things for some time after that.

Carve is often regarded as a ‘verb of production’, like *make* in this respect. However, it has detailed Manner specifications that resemble those of *cut*, involving using a sharp instrument with a high degree of control. There is also a partial resemblance with *chop*, inasmuch as *carving* involves part of the blade penetrating into the material as it exerts its effect (Goddard & Wierzbicka 2009: 71–74). Usually the material is hard or very hard (*stone, wood, bone, ivory, ice*, etc.). In the explication below we assume that in its semantically basic sense *carve* implies a ‘hard’ material.⁴

Carve is found in two types of examples, as shown in (5) and (6) below. In the first type the object produced is a ‘representation’, e.g. a statue or figurine, of the body of a person or animal. In the second type the object is a kind of thing, usually a functional item like a *comb, canoe*, or *coffin*.

- (5) a. He (Pygmalion) carved a woman out of ivory.
- b. He carved a whale out of/from a piece of driftwood.

- (6) a. So she carved a comb out of bone and started brushing ...
- b. Daniel Boone carved a sixty-foot canoe from one tree to carry his family.

We believe that explication [12] will work for examples of both types, perhaps with some slight adjustments. One of the key ideas is that *carving* works by repeatedly removing part of an object from the body of that object, using a sharp instrument.⁵

⁴ We regard *carving meat* as a distinct lexicalised expression. One piece of distributional evidence is the range of use of the verb *carve* without any direct object: someone *carving meat* can hardly be described as engaged in *carving*. The same goes for the occasional situations in which the verb *carve* is used with the object word *cake*.

⁵ The wording of the component ‘part of this thing is not part of this thing any more’ requires comment. Used like this, i.e. without any specifier, the word ‘part’ is here functioning as a language-specific allolex of the semantic prime SOME (rather than standing for the semantic prime PART). Essentially, in current NSM thinking PART is thought always to occur with a specifier or quantifier, e.g. in phrases like ‘this part’, ‘two parts’, ‘many parts’, etc., so that it clearly designates something with a discrete quality, typically with a fixed shape. To refer to a non-discrete and/or shapeless portion of a substance (mass noun), the appropriate semantic prime is SOME, e.g. ‘some of the water’, but in English (and some other languages, such as French and Polish), there are certain mass noun contexts where ‘part’ functions as an allolex of SOME. This situation is, admittedly, confusing at first blush; but the absence of a specifier is a clear indicator that the form ‘part’ is ‘not itself’, so to speak.

[12] Someone X is **carving**₁ something out of something (at this time).

someone X is doing something to something in a place for some time (at this time) because this someone wants there to be something in this place after this time this someone is doing it with something else	LEXICOSYNTACTIC FRAME
at many times when someone does this to something, it is like this: – this something is something hard [m] – a short time before, this someone thought about this something like this: “if I do something to this thing with something sharp [m] for some time, after this there can be something here (people can see this something) it can be like this because at this time part of this thing will not be part of this thing anymore I want this”	PROTOTYPICAL SCENARIO
when this someone does this to something, the same thing happens many times it happens like this: – this someone holds [m] one part of something else with the hands [m] – this part of this other thing is not sharp [m], another part of it is sharp [m] – at the same time this someone moves the hands [m] for a short time – because of this, the sharp [m] part of this other thing touches this thing in some places as this someone wants – when it touches this thing, it is for a very short time inside this thing – because of this, something happens to this thing in these places as this someone wants – because of this, after this, part of this thing is not part of this thing anymore	MANNER + EFFECT
if someone does this for some time, after this, there can be something in this place as this someone wanted	POTENTIAL OUTCOME

In modern Anglo culture, *carving* is a specialised activity undertaken mainly by craftspeople and artists, i.e. it requires special skills. It is not clear whether this ought to be reflected directly in the explication (for example, by adding some reference to the value of being able to ‘do it well’).

2.6 Verbs for actions that affect people or things: *hit*, *kick*, *kill*

The verbs *hit*, *kick*, and *kill* depict acts or actions, rather than activities, i.e. they do not involve ‘doing something for some time’. Relatedly, the Outcome happens (or is thought of as happening) at the same time as the action.

Hit. The following explication is based on Sibly (2008), by somewhat simplifying and merging her explications for ‘hit someone else’ and ‘hit someone else with a hand-held instrument’ (one of Sibly’s key insights is that the basic frame for *hit* is one in which someone hits another person.) The Lexicosyntactic Frame depicts an act as occurring at a particular time accompanied by a simultaneous effect. There is no component indicating that the action is deliberate or under conscious control (consistent with the fact that one can ‘accidentally hit’ someone). The explications are phrased so as to be compatible both with contact with the hand and with a hand-held implement.

[13a] Someone X **hit**₁ someone else (at this time).

someone X did something to someone else (at this time) because of this, something happened to this someone else at the same time	LEXICOSYNTACTIC FRAME
at many times when someone does this to someone else, it is like this: – this someone feels something bad towards this other someone at this time – because of this, this someone wants this other someone to feel something bad somewhere in the body at this time	PROTOTYPICAL SCENARIO
when someone does this to someone else, it happens like this: – this someone moves one hand [m] quickly [m] for a very short time – because of this, after this, something touches this other someone's body somewhere in one moment	MANNER + EFFECT
because this someone X did this to this other someone, this other someone could feel something bad in the body at this time	OUTCOME

A separate explication is needed for *hit*₂ *something*. In English, probably the most common collocation involving *hit*₂ is *hit a ball*, but also very common is *hit a nail with a hammer*.

[13b] Someone X **hit**₂ something (at this time).

someone X did something to something (at this time) because of this, something happened to this something at the same time	LEXICOSYNTACTIC FRAME
at many times when someone does this to something, it is like this: – there is something near this someone's body – it is not something big – this someone wants this something to be after a very short time not in the place where it was before	PROTOTYPICAL SCENARIO
when someone does this to something, it happens like this: – this someone moves one hand [m] quickly [m] for a very short time – because of this, after this, something touches this something in one moment	MANNER + EFFECT
because this someone X did this to this something, this something could move for a short time	OUTCOME

Presumably, a third distinct sense is required for examples involving *hitting*₃ an insect, snake, etc., with something (usually something hard) with the intention of killing it, e.g. *hitting a cockroach with a shoe*, *hitting a snake with a shovel*; cf. the ‘hit/kill’ polysemy found in many languages. Yet another distinct sense is needed for when we speak about a moving object *hitting*₄ (i.e. coming into rapid contact with) something stationary, e.g. *It hit the ground*, *It hit the wall*. Here the focus of interest is the effect on the moving object, rather than on the stationary object.

Kick. Explication [14] is based on Sibly (2008), who argues that among the various uses of *kick*, the semantically simplest is *kick something*, typically a ball, in order to cause it to move. In her data (taken from Cobuild), examples that fit the frame [kick something] greatly outnumber those in the frame [kick someone else]. The prevalence of motional adjunct phases points to the importance of

“induced motion” as the principal motivation for *kicking* something. Sibly writes: “*Kick* was used in many other ways that suggest that ‘kicking’ things to move them is a primal human action, exploiting the flexibility and power of the human leg for economy of effort in moving something that is near the feet” (Sibly 2008: 178).⁶

[14] Someone X **kicked**₁ something (e.g. a ball, a stone) (at this time).

someone X did something to something (at this time) because of this, something happened to this something at the same time this someone did it with part of his/her body	LEXICOSYNTACTIC FRAME
at many times when someone does this to something, it is like this: – there is something on [m] the ground [m] near the place where this someone is – it is not something big – this someone wants this something to be after a short time far from the place where this someone is	PROTOTYPICAL SCENARIO
when someone does this to someone else, it happens like this: – one of this someone's legs [m] moves quickly [m] for a very short time as this someone wants – because of this, after this, one part of this leg [m] touches this something in one moment	MANNER +EFFECT
because this someone X did this to this something, this something could move for a short time	OUTCOME

If *kick something* is the basic frame for *kick*, it means that *hit* and *kick* are converses so far as the status of the ‘Verb someone’ and ‘Verb something’ combinations is concerned. This explains why the explication for *kick*₁ is closer to *hit*₂ than to *hit*₁. We will not explicate *kick*₂ *someone* here.

Kill. Probably no verb has been more discussed in linguistics than *kill*, mainly on account of its exemplar status in debates about causative verbs. The NSM tradition has long rejected the standard story that ‘kill = cause to die’ (Wierzbicka 1975, 1980), arguing instead for a more elaborate structure that separates out an action by the subject on the person denoted by the direct object, an effect on that person’s body, and a subsequent outcome, namely, the cessation of that person’s life (Goddard 2011[1998]).

From the point of view of explication structure, there are two stand-out features of explication [15a]. The first is the lack of any Prototypical Scenario, presumably because *kill someone* is not associated with any typical or standard situation (but cf. specialised verbs such as *slay* and *assassinate*). The second is the absence of any Manner components.

⁶ In some languages the verb for ‘kick’ can also be used to mean stamping on or pressing with the foot, e.g. using the pedals when driving.

[15a] Someone X **killed**₁ someone else (at this time).

at some time, someone X did something to someone else (at this time) because of this, something happened to this someone else at this time	LEXICOSYNTACTIC FRAME
because of this, something happened somewhere in this other someone's body	EFFECT
because of this, after this, this other someone was not living anymore	OUTCOME

A distinctive feature of this analysis (not discussed here) is that it does not include the semantic prime DIE. The idea is that to *kill someone* is conceptualised as ‘terminating life’, so to speak, rather than as inducing death (cf. Goddard 2011[1998]).

A distinct explication is needed for when we speak of *killing*₂ something other than a human being, as in Sapir’s famous example sentence: *The farmer killed the duckling*. Explication [15b] simply substitutes ‘a living thing (of one kind)’ in place of ‘someone else’. It is worth considering the possibility that *kill*₂ could include a Prototypical Scenario section. If so, it would presumably have to envisage several possible motivations, e.g. killing for food, killing to rid a place of unwanted animals or insects. There is no space to pursue these issues here.

[15b] Someone X **killed**₂ a living thing of one kind (at this time).

at some time, someone X did something to a living thing of one kind (at this time) because of this, something happened to this living thing at this time	LEXICOSYNTACTIC FRAME
because of this, something happened somewhere in this living thing's body	EFFECT
because of this, after this, this living thing was not living anymore	OUTCOME

A parting comment: Given that *kill* is unusual in so many ways, its status as an exemplar of ‘verbs of affect’ generally is really rather unfortunate.

2.7 Actions that cause change of location: *pick up, put, throw, push*

The verbs considered in this section are all ‘actions’ whose Lexicosyntactic Frame describes the actor as wanting to effect a change in location of the object. All four also involve the idea of the actor doing something with the hands (like *hold* in this respect; cf. section 2.3).

Pick up. Canonical examples of the sense of *pick up* we are interested in include:

- (7) a. He picked it up and put it in his pocket (or: gave it back to me).
 b. Seeing his diary on the desk, I picked it up and started leafing through it.
 c. She picked it up and rubbed it, and lo-and-behold a Genie appeared.

Pick up is not exactly durative, but it is not punctual either (in the sense of happening ‘in one moment’). In the Lexicosyntactic Frame no particular duration component appears. It is simply stated that to *pick something up* means to do something to it (with the hands) ‘at this time’. In the Manner section, however, the hand movements are described as taking ‘a short time’. To depict the positional change involved in *picking something up*, we make use of the prime ABOVE and also the semantic molecule ‘(be) on (something)’.

[16] Someone X **picked up** something (at this time).

someone X did something to something (at this time) because this someone wanted this thing to be not in the place where it was before this someone did it with the hands [m]	LEXICOSYNTACTIC FRAME
at many times when someone does this to something, it is like this: – this something is on [m] something else, this something else is below the place where this someone’s hands [m] are – this someone thinks about it like this: “I want this thing not to be on [m] this something else anymore, at the same time I want it to be above the place where it is now”	PROTOTYPICAL SCENARIO
when someone does this to something, it happens like this: – this someone’s hand [m] touches this thing in some places as this someone wants – at the same time, this someone moves this hand [m] as this someone wants	MANNER
because this someone X did this to this something, after this, this thing was not on [m] something else anymore, at the same time it was above the place where it was before as this someone wanted	OUTCOME

There is evidently a strong relationship between *pick up* and *hold*, but it would not be right to say that the purpose of picking something up is necessarily to hold it; for example, one can pick something up in order to throw it away, without any intention of holding it for any time. In addition, it sounds slightly odd to speak of *holding* very small objects, such as berries and pins, even though it sounds very normal to speak of *picking up* something like this. We conclude that ‘hold’ is not a semantic molecule in the explication of *pick up*, although the two words are closely related on account of shared semantic components.

Other distinct meanings of *pick up*, requiring separate explications, are found in contexts such as: *She picked it up from a repair shop (post office, pharmacy)*, *He picked me up from the station (airport, work, etc.)*, and *to pick up an infection (an accent, a tune)*.

Put. This verb, and its near-equivalents in other languages, has been much discussed in the syntactic and lexical-typological literature, e.g. Pauwels (2000). One important property of *put* is that it requires a place (sometimes termed a ‘locational object’) to be specified as the ‘destination’ for the thing whose position is affected. Dixon (1991: 99) assigns *put* to a PUT subtype which “refers to causing something to be at rest at a Locus”.

Probably the majority of examples of canonical *put* involve the object ending up *on* something or *INSIDE* something, but other ‘positional’ relationships are also possible, e.g. with *under* and *with*, and there are some examples where no particular positional relationship is specified (as in the second set of examples below).

- (8) a. She put it on the table (shelf, dashboard).
- b. He put it in/into his bag (pocket, glovebox).
- c. He put it under his pillow (a rock).
- d. He put his backpack with the other equipment.

- (9) a. I put it in the bedroom.
- b. I put it in a safe place (outside).
- c. I know I put it somewhere, I can’t remember where.

What seems **not** to be possible are locus expressions designating places that are so large that it is hard to envisage any specific positional relationship, e.g. **She put it at the University*, **He put it in Sydney*.

The Prototypical Scenario and the Manner section are pretty schematic, merely involving the actor’s intention that the thing comes to be ‘in the same place for some time’ and the idea of getting this result by a brief use of the hands.

[17] Someone X **put** something Y (at this time) somewhere.

someone X did something to something Y (at this time) because he/she wanted this thing to be in the same place for some time this someone did it with the hands [m]	LEXICOSYNTACTIC FRAME
at many times when someone does this to something, it is like this: – this someone thinks about it like this: “I want this thing to be in the same place for some time it can be like this if it is touching something else for some time”	PROTOTYPICAL SCENARIO
when someone does this to something, it happens like this: – this someone does something to it with the hands [m] for a short time – after this, this thing is touching something else in some places	MANNER + EFFECT
because this someone X did this to this something, after this, this something was in the same place for some time as this someone wanted	OUTCOME

Both the Prototypical Scenario and the effect component in the Manner + Effect section refer to the object ending up ‘touching something else’ for some time. This wording is equally compatible with *putting inside* (*one’s pocket, a bag*, etc.), with *putting on* (*a table, shelf*, etc.), and with examples like *put it under the pillow*. The specification that the thing ends up touching the locus ‘in some places’ accommodates the fact that if one hangs something up on a hook, this could not normally be described as *putting* it somewhere.

Note that the explication is incompatible, as required, with *dropping* something, both because when *dropping* something, one is not concerned about the thing going into a stationary situation and because the Manner sections are not compatible.

Throw. Canonical examples of *throw* include:

- (10) a. I threw it on the ground (out the window, into the water).
b. He threw it away.

Throw has certain things in common with *put*, because both involve doing something to something which results in that thing having a changed location, but there are also important differences. For one thing, though the location of the object certainly plays a part in the meaning of *throw*, the future location is not envisaged with anything like the same specificity as is the case with *put*; the actor’s focus is mainly directed in getting object away from where it is at present. Hence, in the Lexicosyntactic Frame for *throw* the relevant sub-component reads: ‘because he/she wanted this thing

to be somewhere else at this time’. Second, and more obviously, the Manner section for *throw* is much more detailed. Notice that several components indicate the rapidity of the action, i.e. that to *throw* something, one moves one’s hand ‘in one moment’, and that ‘for a short time after this’ the thrown object ‘moves quickly [m] as this someone wanted’.

[18] Someone X **threw** something Y (at this time).

someone X did something to something Y (at this time) because he/she wanted this thing to be somewhere else after a short time this someone did it with the hands [m]	LEXICOSYNTACTIC FRAME
at many times when someone does this to something, it is like this: – this someone thinks about it like this: “I want this thing to be somewhere else after a very short time, not near the place where it is now because of this, I want it to move quickly [m] now I don’t want it to touch the ground [m] when it is moving”	PROTOTYPICAL SCENARIO
when someone does this to something, it happens like this: – this someone holds [m] this something with one hand [m] – this someone moves this hand [m] in one moment – after this, this someone is not holding [m] this thing anymore – for a short time after this, this something moves quickly [m] as this someone wanted	MANNER + EFFECT
because this someone X did this to this something, after this, this something was not in the place where it was before, it was somewhere else as this someone wanted	OUTCOME

Note that the explication is incompatible, as required, with deliberately dropping something, with sliding something across a table, and various other rapid actions that cause something to move and wind up in a different place.

Push. We assume that *push* is a brief action in its basic frame, as in (11). This choice implies that continuous *pushing*, e.g. in expressions like *pushing a trolley*, is an extended-derived meaning.

- (11) a. He pushed the door open.
b. She pushed him into the water.

Although *pushing* does not require much sustained attention and control from the actor, it is still necessary for the Prototypical Scenario to include an explicit reference to the actor thinking something (not just wanting something), because this makes it easy to achieve a ‘first person’ orientation, i.e., to depict a prototypical actor’s intention of not wanting the thing to be ‘in this place now’, i.e. near the actor’s body.

[19] Someone X **pushed** something Y (at this time).

someone X did something to something Y (at this time) because he/she wanted this thing to be somewhere else after a short time this someone did it with the hands [m]	LEXICOSYNTACTIC FRAME
at many times when someone does this to something, it is like this: – this something is near this someone's body – this someone thinks like this at this time: “I don't want this thing to be in this place now because of this, I want it to move for a short time it can move as I want if I do something to it”	PROTOTYPICAL SCENARIO
when someone does this to something, it happens like this: – this someone touches this thing with the hands [m] for a short time – at the same time, this someone does something with some other parts of the body – because of this, this thing moves for a short time as this someone wants	MANNER + EFFECT
because this someone X did this to this something, after this, this thing was not in the place where it was before, it was somewhere else as this someone wanted	OUTCOME

2.8 Bodily reactions to feelings: *laugh*, *cry*

The following explications are from Wierzbicka (2014: 150-156) with minor modifications. The framing component of the Prototypical Scenario is phrased in a slightly different way to those we have seen so far – using PEOPLE instead of SOMEONE, in the expression ‘people often do this when ...’. This seems appropriate for words like *laugh* and *cry*, which represent common human behaviours rather than goal-directed activities or acts.

Going to the details of explication [20], part of the Prototypical Scenario is designed to represent the typical trigger for *laughing* as something ‘funny and unusual’. In the Manner section, there is a notable component that characterises *laughing* as somewhat like a communicative act: ‘... like someone in a place can hear something when someone else is saying something in this place’. Note that the explication has to be compatible not only with *laughing* in reaction to a joke, etc., but also to children *laughing* when they are at play.

[20] Someone X was **laughing** (at this time).

someone X was doing something for some time (at this time) something was happening to some parts of this someone's body because of it	LEXICOSYNTACTIC FRAME
people often do this when they feel something good for a short time because they think like this: “something is happening here now not like at many other times people here can feel something good because of it”	PROTOTYPICAL SCENARIO
when someone does it, it happens like this: – some parts of this someone's mouth [m] move for some time	MANNER

– other people in the place where this someone is can see it – at the same time these people can hear something, like people in a place can hear something when someone is saying something in this place	
often these other people can know because of this how this someone feels	EFFECT

On a point of detail, note that the final component of Manner unequivocally implies that *laughing* is audible. In some languages the word for ‘laugh’ can also be used about smiling, e.g. Chinese *xiao* ‘laugh/smile’. Wierzbicka’s (2014) proposal is that, for such languages, the corresponding component in the explication would include one extra word, namely ‘often’ (= at many times). For Chinese *xiao*, for example, the explications would say that when someone does this, people ‘can **often** hear something, ...’.

The explication for *cry* follows in [21].

[21] Someone X was **crying** (at this time).

someone was doing something for some time (at this time) something was happening to some parts of this someone’s body because of it	LEXICOSYNTACTIC FRAME
people often do this when they feel something very bad for a short time because they think like this: “something very bad is happening to me now”	PROTOTYPICAL SCENARIO
when someone does this, it happens like this: – something happens in this someone’s eyes [m] – because of this, there is water [m] in this someone’s eyes [m] – other people in the place where this someone is can see it – at the same time these people else can hear something because of it like people in a place can hear something when someone is saying something in this place	MANNER
often these other people can know because of this how this someone feels	EFFECT

Regarding audibility, in some languages the word for ‘crying’ is less strongly associated with sound than in English. German *weinen*, for example, can be used in contexts in which *weep* (rather than *cry*) would be appropriate in English. This can be dealt with adding the word ‘often’ or ‘sometimes’ to the final component of Manner.

2.9 “Displacement” verbs: *fall*, *sink*

The explications below assume that the canonical subject for both these verbs is a thing, rather than a person. There are significant parallels in the proposed event structures of the two verbs. Both are assigned Lexicosyntactic Frames which include a change of location: ‘because of this, after this, this

something was not in the place where it was before’. Both are assigned a Prior Scenario in which the subject is depicted as being in a place ‘above’ something else: ‘above the ground [m]’ and ‘above (this) water [m]’, respectively. The Process and Outcome sections both depict downward movement.

Fall. Canonical examples of the sense of *fall* which we regard as semantically basic include:

- (12) a. Leaves were falling from the trees.
 b. Beware of falling rocks.
 c. Rain was falling.

It is interesting these uses of *fall* do not necessarily require a locational complement, and in corpora most examples do not include any locational complement. On the other hand, when *fall* is used about a human subject, it is commonly found with adverbial modifiers, e.g. *fall over*, *fall down*, *fall off*, or with a prepositional phrase, e.g. *He fell from the cliffs*, *She fell down the stairs*, and the like. This suggest that a different-but-related meaning *fall*₂ occurs with human subjects.

Notice that the final line of the Prior Scenario section includes a reference to a ‘triggering event’ in the place where the thing started off. In the Process section, the time specification ‘for a short time’ suggests a rapid fall.

[22] Something X (e.g. an apple, a stone) **fell** (from somewhere) (at this time).

something happened to something X (at this time) because of this, after this, this something was not in the place where it was before	LEXICOSYNTACTIC FRAME
before it happened, it was like this: – this something was somewhere for some time – this place was above the ground [m] – something happened in this place at some time	PRIOR SCENARIO
because of this, after this, this something was moving for a short time	PROCESS
because of this, after this, it was somewhere below the place where it was before	OUTCOME

Sink. Jackendoff (1990: 179) presents a sketch decomposition of *sink* which implies that the verb simply means ‘go down from surface of water’. Our proposed explication is more elaborate because, among other things, it makes explicit the assumption that the amount of water in the place is considerable and that the distance is also considerable.

[23] Something X **sank** (at this time).

something happened to something X (at this time) because of this, after this, this something was not in the place where it was before	LEXICOSYNTACTIC FRAME
before it happened, it was like this: – this something was in a place where there was much water [m] – some parts of it were above this water [m]	PRIOR SCENARIO
after this, this something was moving for some time	PROCESS
because of this, after this, it was somewhere inside this water [m] at this time it was far below the place where it was before	OUTCOME

2.10 Weather verbs: *Be raining, be snowing*

On account of various peculiarities, weather verbs have long had a place on the agenda of linguistic semantics and philosophy of language. Their chief peculiarity concerns two related questions: First, what is the status of the grammatical subject (typically a dummy 3sg item, as in English, or else a zero subject)? Second, what are such sentences ‘about’: are they statements about a place, about a ‘situation’, about the world? According to the Lexicosyntactic Frame of the explications below, *raining* and *snowing* are ‘about’ what is happening in a place at a given time. By itself, this characterisation could apply to many non-meteorological conditions but the details describe an ongoing event which is not caused by human action but which has a potential human significance (‘something can be happening to people in this place because of it’).

The next two sections of the template are labelled Situation Scenario and Subjective Impression. The Situation Scenario sets out the details of the physical events that are taking place. This involves ‘something happening far above this place’ which causes water or ‘cold white stuff’ (in the case of *rain* and *snow*, respectively) to be moving downwards in many places above the ground. The Subjective Impression concerns how this appears to human observers: the impression of there being innumerable tiny ‘bits’ of water or snow moving. The Outcome section depicts the possibility of water or snow on the ground.

[24] It’s **raining** in this place (at this time).

something is happening for some time in this place (at this time), not because people are doing something in this place when this happens in a place, something can be happening to people in this place because of it	LEXICOSYNTACTIC FRAME
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when this happens in a place, at all times it is like this: – something is happening far above this place – because of this, there is water [m] in many places above the ground [m] in this place – this water [m] is moving	SITUATION SCENARIO
when people see this, at many times they can think about it like this: “many very small things are moving above the ground [m] here people can't say how many” people can say the same thing about all these very small things: “this is water [m], very little water [m]”	SUBJECTIVE IMPRESSION
if it happens like this in a place for some time, after this, there can be much water [m] on the ground [m] in this place	POTENTIAL OUTCOME

[25] It's **snowing** in this place (at this time).

something is happening for some time in this place (at this time), not because people are doing something in this place	LEXICOSYNTACTIC FRAME
when this happens in a place, something can be happening to people in this place because of it something like this happens in some places at many times when it is very cold [m] in these places	SITUATION SCENARIO
when this happens in a place, at all times it is like this: – something is happening far above this place – because of this, there is something in many places above the ground [m] in this place, it is white [m] – this white [m] something (= stuff) is moving	
when people see this, at many times they can think about it like this: “many very small things are moving above the ground [m] here people can't say how many”	SUBJECTIVE IMPRESSION
if it happens like this in a place for some time, after this, there can be much of this white [m] something (= stuff) on the ground [m] in this place	POTENTIAL OUTCOME

This concludes our presentation of the NSM explications.

3. Discussion

We hope to have shown in section 2 that complex verb meanings can be successfully decomposed into configurations of NSM semantic primes and semantic molecules. We see this as a proof-of-concept demonstration that the NSM system can provide a “well-motivated theory of lexical semantic representation” (Levin & Rappaport Hovav 2005: 23) that is capable of coming to grips with the verbal lexicon both in its broad outlines and in its fine detail. In this concluding section we aim to broaden the discussion in two ways. In section 3.1, we compare and contrast NSM explications with the representational devices of two other semantic projects, the Generative Lexicon (GL) theory of James Pustejovsky and the FrameNet project initiated and inspired by the late Charles Fillmore. In sections 3.2 and 3.3, we return to the topic of verbs of doing and happening, overviewing the findings

of the present study and drawing out the implications for cross-linguistic semantics and lexical typology.

3.1 NSM compared with Generative Lexicon (GL) and with FrameNet

To begin with, it may be asked: why choose GL and FrameNet as points of comparison? The answer is simply that both are well-developed approaches to lexical semantics, one generative/formal and the other cognitive in orientation. For comparisons with Meaning-Text Theory (Apresjan 2009; Mel'čuk 2012; and other works), the reader may wish to consult Goddard & Barrios (2013). Comparisons with Ray Jackendoff's (1990, 2002) Conceptual Semantics can be found in Wierzbicka (2007) and in Goddard (2011: Ch 3).

In the interests of comparability, we will focus our comparison on the treatment of one verb, namely, *to build*, in the three systems. The NSM explication was given in [11] above, and is repeated here for convenience.

[11] Someone X is **building** something (of one kind) in a place (at this time).

someone X is doing something in a place for some time (at this time) because this someone wants there to be something of one kind in this place after this	LEXICOSYNTACTIC FRAME
at many times when someone does this in a place, it is like this: some time before, this someone thought about this place like this: "I want something of one kind to be in this place I want it to be like a part of this place" at the same time, this someone thought about some things in this place like this: "if I do something to these things for some time, after this, there can something of one kind here as I want"	PROTOTYPICAL SCENARIO
when someone does this in a place, it happens like this: – this someone does some things to the ground [m] in this place – after this, this someone does something to some things in this place for some time – because of this, after this, these things are not in the places where they were before at the same time they are not like they were before, they are parts of something in this place	MANNER
if someone does this in a place for some time, after this, there can be something of one kind in this place as this someone wanted	POTENTIAL OUTCOME

3.1.1 Lexical representation in Generative Lexicon (GL)

Among generative/formal approaches to semantics, GL stands out on account of its interest in lexical semantics; and specifically, its focus on computing how words appear to undergo “modification and modulation in new contexts”, i.e. broadly speaking, with an account of polysemy and interpretation in

context. For this reason, GL adopts what Pustejovsky (2014) describes as a “structured approach” to “full predicative decomposition”. Compared with other formal approaches to lexical decomposition, GL’s lexical representations are relatively rich in detail.⁷ Pustejovsky (2014:10) includes an informal review of characteristics can make up a verb’s meaning: specific properties of the participants of the event; change of being, state, location, relation; causation and agency; manners and means of an activity; temporal and spatial constraints; intentionality of the actor; instrumental information; psychological state of the participants. Expressed in this way, i.e. in ordinary language, this list might seem quite broad and inclusive. Glancing up at the NSM explication for *build*, for example, one could mentally align many of its components with one or other of these semantic parameters.

In GL practice, however, semantic parameters of these various kinds are highly restricted because they are expressed as typed feature representations, i.e. in terms of a restricted set of technical labels and categories. They are distributed across a three-part structure: Event Structure, Argument Structure, and Qualia Structure. The latter is the most distinctive aspect of GL. Qualia can fall into four categories: FORMAL (the basic category which distinguishes it within a larger domain), CONSTITUTIVE (the relation between an object and its constituent parts, including what something is made of), TELIC (purpose and function) and AGENTIVE (factors involved in originating or bringing something about). Within each of these categories, there are number of options.

A GL lexical representation for *build* (from Pustejovsky (1995), but still widely cited), is shown in Figure 1 (cf. Goddard & Schalley 2009). It will be immediately clear that it differs markedly in character from the text-like structure of the NSM explications.

⁷ The review of GL in this section gives a partial picture because it omits reference to the GL ‘generative devices’ (type coercion, selective binding, and co-composition) that are designed to enrich or modify the basic representations in different combinatorial contexts.

Figure 1: GL Lexical representation for *build* (Pustejovsky 1995: 82)

In the representation shown in Figure 1, the Event Structure specifies that *build* involves a foregrounded **process** (e_1) followed by a resultant **state** (e_2). The Argument Structure lists two true arguments (ARG_1 , ARG_2) that are syntactically realized (*John built a house*), and also a ‘default argument’ (D-ARG_1) that participates in the expression of the qualia, but is not necessarily expressed syntactically (*John built a house out of bricks*).⁸ Arguments have their ontological categories and qualia restrictions specified; for *build* ARG_1 is restricted to animate individuals (**animate_ind**) of a physical nature (**physobj**), while ARG_2 is also a physical object, an **artifact** which is made out of **material** designated by D-ARG_1 , which is **mass** in nature. The Qualia Structure outlines that *build* is overall a **create** type, and that what is created comes about by a **build_act** – i.e. the process (e_1) performed by ARG_1 using D-ARG_1 that results in the **exist** state (e_2) of ARG_2 .

One striking difference between Figure 1 and explication (11) is the greater detail provided in the NSM explication. The GL representation has nothing corresponding to ‘doing something in a place’, for example, or, even more specifically, to doing some things to the ground in a place. The lesser specificity of the GL representation is linked, however, with the GL approach to polysemy and this

⁸ Another kind of non-syntactic argument is also recognised in GL theory, namely, ‘shadow arguments’ (S-ARG); for example ‘leg’ appears as an S-ARG in the representation of the verb *walk*. This corresponds to the use of ‘leg [m]’ as a semantic molecule in the NSM explications for *walk*, *run* and similar verbs (Goddard, Wierzbicka & Wong in press).

cannot be properly evaluated without bringing broader considerations into play, which space prevents us from doing here. Leaving this aside, then, three observations can be made.

First, there is a lot of unresolved semantic complexity inherent in GL technical terms such as **create**, **physobj**, **artifact**, **material**. The term **create** in particular conceals a good deal of semantic detail which is spelt out in explication (11).

Second, the bolded feature terms are treated as givens in the lexical representation and yet they do not necessarily have the same range of use as the corresponding words in ordinary English; for example, few speakers of English would regard a *house* as an ‘artifact’, nor would they regard an animate actor such as a person or a bird (building a house or a nest, respectively) as a ‘physical object’. If these terms are to be defined or modelled in a formal semantic system, this would only increase the level of abstractness and further reduce its intuitive accessibility.

Third, the representation does not make visible the logical and causal relationships between the values in the Event Structure and Argument Structure, on the one hand, and the Qualia Structure on the other. The “internal logic” (Goddard & Wierzbicka 2009: 73) of the concept of *building* does not emerge as explicitly as in the NSM explication.

As a final observation, it can be noted that the ‘mechanistic’ character of GL lexical representations is connected with the fact that they are designed to ‘interface’ well with computational (NLP) applications and be amenable to interpretation using techniques of formal semantics. Although Pustejovsky (1995: 6) says that in principle “the meanings of words should somehow reflect the deeper conceptual structures in the cognitive system”, in practice no priority is given to representing the cognitive or conceptual reality of ordinary language users in a transparent or intuitively accessible fashion. This observation is a high-level point of contrast not only with the NSM system (with its decidedly ‘humanistic’ character), but also with the semantic approach behind the FrameNet project, to which we now turn.

3.1.2 *Semantic description in FrameNet*

FrameNet is a project dedicated to the online documentation of English lexicogrammar (Ruppenhofer et al. 2010) in line with the assumptions of frame semantics, a theory of meaning and linguistic

cognition developed primarily by the late Charles Fillmore. Like NSM, frame semantics seeks to be a cognitively realistic system.⁹ FrameNet linguists have a particular interest in the relationship between lexical units (word-senses) and their valence patterns.

The architecture of FrameNet is based around a very large number of posited frames at different levels of generality, which are understood to be representations of real-world knowledge. In frame semantics, “words or word senses are not related to each other directly, word to word, but only by way of their links to common background frames and indications of the manner in which their meanings highlight particular elements of such frames” (Fillmore & Atkins 1992: 76–7). Any given word or set of words aligns with a specific frame, such as BUILDING, CUTTING, or TRAVEL, and also to various higher-level frames, such as INTENTIONALLY_CREATE and INTENTIONALLY_ACT. Frames are characterised by a set of frame-specific Frame Elements and a statement (a Frame Definition) about how they are interrelated. At the lowest level, the Frame Elements are highly situation-specific (in effect, they are situation-specific semantic roles), but higher-level frames employ generic Frame Elements, such as Agent, Patient and Instrument.

As one might expect from its foundational assumptions, FrameNet analysts are not greatly interested in individual word-meanings. Where definitions for individual words are given, they are taken from the *Concise Oxford Dictionary* (COD) and exhibit all the usual faults of conventional definitions (circularity, obscurity, inaccuracy, etc.), e.g. *build*: ‘construct by putting parts or materials together’. Many impressionistically basic words of English, such as *build* and *cut*, are used as labels for Frames and are regarded as lexical instantiations of the Frame (the BUILDING Frame, the CUTTING Frame, etc.).

The BUILDING Frame includes *build*, *assemble*, *construct*, *erect*, and *make*, among others, as well as related nouns. It inherits the higher Frame INTENTIONALLY_CREATE. Frame definitions for both are

⁹ Note that in the NSM view there is no conflict between recognizing that lexical meanings are analyzable (decomposable) and at the same time recognizing that they are often mentally manipulated as units. This view is broadly shared, we believe, by the FrameNet researchers and by the cognitive linguistic community generally, as part of what it means for a system to be ‘cognitively realistic’. On a historical note, it seems appropriate to note that Charles Fillmore and Anna Wierzbicka enjoyed a long and cordial friendship, and both can be rightly seen as among the early pioneers of cognitive linguistics. For some reason, Wierzbicka’s role in the early history of cognitive linguistics has been omitted from some influential accounts; e.g. Geeraerts & Cuyckens (2007).

given below (capitalised words represent Frame Elements)
(<https://framenet2.icsi.berkeley.edu/fnReports/data/frameIndex.xml>, accessed 17/12/2014).

BUILDING Frame definition: This frame describes assembly or construction actions, where an Agent joins Components together to form a Created_entity, which is profiled, and hence the object of the verb.

INTENTIONALLY_CREATE Frame definition: The Creator creates a new entity, the Created_entity, possibly out of Components.

The description given in the Building Frame definition ('assembly or construction actions', 'joins Components together') provides greater detail than the GL version about the kind of activity that constitutes *building* (cf. Boas 2011: 221–3). The reference to Components is also more specific than the GL version's D-ARG **material**. These Frame definitions, however, presuppose an understanding of English expressions like 'assembly or construction' and 'join'. There are as yet no Lexical Entries supplied for the words 'construct' and 'join' (though it is stated that *construct* falls under the BUILDING Frame), and the Lexical Entry for 'assemble' provides no information that clarifies its semantic relationship with *build* (although the valence patterns of the two words obviously differ).

Despite the declared ambition of FrameNet to provide detailed semantic description then, from this example one may draw three conclusions: first, that although FrameNet's degree of semantic granularity is greater than GL's, it is still relatively coarse compared with NSM; second, that the incomplete resolution creates a danger of definitional circularity in FrameNet; and third, that the present level of description relies implicitly on many English-specific words.

Compared with GL, FrameNet descriptions and NSM explications can be seen as similar in one respect, namely, that they are based on standardised versions of natural language rather than a technical notation of types and features, but this is where the similarity ends. FrameNet has shown little concern with metalanguage issues. Frames are apparently identified and constructed on a rather ad hoc basis, which has resulted in a maze of complex interrelated notions. FrameNet's great strength

is its thorough, data-driven documentation of English constructional patterns, but in terms of semantic precision it leaves much to be desired.

3.1.3 *Back to NSM*

Uniquely among current approaches to semantics, the NSM approach is premised on the proposition that the metalanguage of semantic description is necessarily based on ordinary language, and hence that one does not avoid circularity in semantic analysis simply by declaring one's metalanguage to be formal, technical, an 'expert system', or the like. As John Lyons once put it: "[A]ny formalism is parasitic upon the ordinary everyday use of language, in that it must be understood intuitively on the basis of ordinary language" (Lyons 1977: 12). Making a similar point in another classic formulation, Yorrick Wilks once spoke of what called the Escape Fallacy, i.e. the view "that one can in language, or mental representations, or programs escape from the world of symbols to some formal but non-symbolic realm that confers significance" (Wilks 1988: 235f).

The developers of the NSM approach have therefore made a virtue of necessity in investing a great deal of analytical and empirical effort to ensure that the NSM system is grounded in a minimal set of indefinable meanings expressed by words or word-like elements in ordinary language. Furthermore, 'ordinary language' is not being used here to mean, by default, the English language (Wierzbicka 2014). On the contrary, the representational resources of the NSM system can be regarded as essentially language-independent, because, on the balance of current evidence, semantic primes and their patterns of combination appear to manifest themselves in all or most languages.

After a decades-long pursuit of semantic minimality and universality, the NSM system of semantic analysis has, as we see it, matured to the point where it now provides a tool for fine-grained semantic description that has no real parallel on the contemporary scene.¹⁰ The requirement that meanings be represented as reductive paraphrases in terms of semantic primes and molecules not only protects

¹⁰ Needless to say, these virtues do not make NSM an easy tool to use: on the contrary, it usually takes weeks or months of painstaking work to produce viable explications. Nor does it mean that any published explication is perfect: on the contrary, experience shows that most first-time explications subsequently require some adjustment or refinement. These characteristics – high level of difficulty, and amenability to incremental improvement – are only to be expected of serious scientific work.

against implicit circularity but guarantees a very high degree of semantic granularity. This is the level of granularity that is needed to support cross-linguistic comparison (what may be termed ‘lexical typological adequacy’). At the same time, the finding that semantically and syntactically similar words share common semantic templates provides a structuring principle that makes the complex meanings easier to manage and compare.

3.2 Implications of the present study for the lexicon of doing and happening

Returning to the immediate subject-matter of this study, what are the implications for our understanding of the lexicon of ‘doing and happening’? Many semantically-oriented linguists already accept that the verbal lexicon is extremely complex and can be seen as consisting of multiple, partially cross-cutting, sub-classes. It is also widely accepted that inherent aspect is crucial to verbal meaning, in the sense that many other grammatical and semantic properties of a verb are connected with its inherent aspect.¹¹ The present study is broadly consistent with these positions, but indicates that they can and should be taken further. Whether we see Lexicosyntactic Frames or full semantic templates as the nearest analogue to verb classes, the present study indicates that there are a lot more of them than many linguists would expect. Moreover, it is clear that, as Levin (1993) already anticipated, the explanatory key to the intricate combinatorial and grammatical properties of verbs is not to be found at the level of verb classes, but goes down to the semantic components of verb meaning.¹² This calls for fine-grained semantic description, for precision semantics.

¹¹ This may be a convenient time to note that there is no direct relationship between the concept of “verb classes” as used (informally) in NSM practice, and Vendler’s (1967) four aspectual verb classes: activity, state, achievement, accomplishment. Some parameters that underlie Vendler’s categories can be interpreted using NSM components, e.g. the idea of a sudden change of condition (achievement class) is connected with the prime MOMENT; a gradual change of state (accomplishment class) or on-going activity (activity class) is connected with the prime FOR SOME TIME, but there are many other cross-cutting factors.

¹² A great deal of the impetus for talk of ‘verb classes’ came from Beth Levin’s (1993) seminal book *English verb classes and alternations*. This is an ironic outcome because Levin (1993) actually placed more emphasis on meaning components than on verb classes, stressing that meaning components were the basis for grammatical properties. As argued by Boas (2011), however, Levin was unable to effectively drive this point home, because she had no independent method for stating and testing semantic components.

In a similar vein, it seems that the complexity of ‘aspect types’ is greater than usually envisaged. For example, in addition to the durative vs. punctual opposition – in NSM terms, ‘for some time’ vs. ‘in one moment’ – we recognise an unspecified temporal location ‘at some time’ without any duration-related element, and also a “brief duration” component – ‘for a short time’, e.g. for *push* and *pull*.

As for the internal structure of explications for verbs of doing and happening, the present study began with the assumption that most explications start with a general Lexicosyntactic Frame (shared by a number of other verbs), followed by additional sections that supply more detail. Schematically:

- Lexicosyntactic Frame
- Scenario or Prototypical Scenario, Prior Scenario, Situation Scenario
- Manner or Process
- Outcome or Potential Outcome

This general model appears to hold up.¹³ In addition, the following observations have emerged about the relationship between the Scenario section and the kind of verb. (i) In the case of actions and activities, there is a Prototypical Scenario which involves an actor’s intention, i.e. a combination of thinking and wanting. With more or less immediate ‘acts’, such as *pick up*, *throw*, *hit* and *kick*, and also with verbs of locomotion, such as *walk* and *crawl*, this intention can be depicted as contemporaneous with the act of activity itself. (ii) In the case of activities affecting a physical thing and typically involving an instrument, the Prototypical Scenario is more complex because it involves a prototypical actor forming a ‘prior intention’ to undertake the activity. (iii) In the case of pure ‘happening’ verbs, such as weather verbs (also verbs of deterioration, cf. Barrios & Goddard 2013), the scenarios involve physical or environmental conditions or pre-conditions.

As we have observed at various points, there is great variation as to how elaborate the verbs are in respect of Manner. Durational verbs are prone to having more elaborate Manner sections, since a wider time-span allows for greater attention to the detail of how something happens. Conversely,

¹³ It bears noting that metalinguistic labels such as Lexicosyntactic Frame, Prototypical Scenario (Prior Scenario, etc.), Manner, Outcome, etc., are used for expository convenience. They are not part of the explications as such. The real work of dividing the structure into sections is done by recurrent framing components such as: ‘at many times when someone does something like this, it is like this ...’ (for many Prototypical Scenarios), ‘before this, it was like this ...’ (for Prior Scenario), and ‘when someone does this, it happens like this’ (for Manner).

verbs with unspecified or brief time-spans and punctual verbs (depicting something happening ‘in one moment’) are likely to be light on Manner, but to have an immediate and integral Outcome. Hence the tendency for ‘manner-result complementarity’ observed by Levin and colleagues (e.g. Rappaport & Levin 2010). In general, we believe that the notion of ‘Manner’ is seriously under-theorised in general descriptive linguistics.

Outcome and Potential Outcome sections can be based around semantic ‘effects’ of different kinds, depending on the kind of verb and the kind of grammatical object involved. If the object is a thing, the Outcomes of doing and happening verbs typically involve a change in the qualities, location or ‘material integrity’ (part-whole structure) of the thing concerned. If the object is a person, the Outcomes typically involve an effect on the person’s body and/or bodily feelings. For some verbs, the Outcome section is followed by an additional evaluational or attitudinal component, a pattern that has been also observed with speech-act verbs (Goddard & Wierzbicka 2014a: Ch7).

Although most semantic structures fall into distinct sections, it is important not to lose sight of the fact that the different sections are interconnected in content, so that the explication makes sense as a whole. In particular, one can see that there are some consistent relationships between temporal specifications in the Lexicosyntactic Frame, whether or not the Manner includes an “incremental effect” component, and whether or not the explication ends with an inherent Outcome or with a Potential Outcome. Specifically, durational activity verbs imply an incremental effect and a Potential Outcome, whereas non-durational verbs (either unspecified for duration or specified as momentary) imply no incremental effect, but rather an inherent Outcome. Broadly similar observations have often been made in the literature on grammatical aspect.

3.3 Implications for cross-linguistic semantics and lexical typology

Though the verbs explicated in the present study are English verbs, and aspects of the explications are therefore English-specific, we hope that this study can be useful for researchers working on other languages too. First, it can help fieldworkers and descriptive linguists be more aware of the semantic content of the English words (Goddard & Wierzbicka 2014b). This is important because in many field settings and in many academic settings, English is used as a working language of semantic description.

To minimise the risks of Anglocentrism creeping into the descriptions, it helps to understand clearly the content of the key English words.

Second, we hope that the strategy and methodology of semantic analysis exemplified in this paper can be a useful model for research into other languages.

Third, despite the manifold differences between the lexicons of different languages, we suspect that many individual semantic components are likely to recur across languages without radical variation. It may well be that much of the cross-linguistic semantic variability in a given domain can be seen as falling under the headings of ‘mix and match’ and/or ‘variations on a theme’. How much, of course, remains to be seen, and this is one of the principal projects of lexical typology. It may be that some languages employ radically different semantic components to others and/or package them together in distinctive ways. Either way, to get empirical traction on these questions surely requires fine-grained semantic decomposition, right down to the level of semantic primes and molecules, as demonstrated in this study.

Appendix A. Semantic primes (English exponents), grouped into related categories (after Goddard & Wierzbicka 2014a)

I, YOU, SOMEONE, SOMETHING~THING, PEOPLE, BODY	substantives
KIND, PART	relational substantives
THIS, THE SAME, OTHER~ELSE	determiners
ONE, TWO, SOME, ALL, MUCH~MANY, LITTLE~FEW	quantifiers
GOOD, BAD	evaluators
BIG, SMALL	descriptors
KNOW, THINK, WANT, DON'T WANT, FEEL, SEE, HEAR	mental predicates
SAY, WORDS, TRUE	speech
DO, HAPPEN, MOVE	actions, events, movement
BE (SOMEWHERE), THERE IS, BE (SOMEONE/SOMETHING), (SOMETHING) BE MINE/SOMEONE'S	location, existence, specification possession
LIVE, DIE	life and death
WHEN~TIME, NOW, BEFORE, AFTER, A LONG TIME, A SHORT TIME, FOR SOME TIME, MOMENT	time
WHERE~PLACE, HERE, ABOVE, BELOW, FAR, NEAR, SIDE, INSIDE, TOUCH	space
NOT, MAYBE, CAN, BECAUSE, IF	logical concepts
VERY, MORE	intensifier, augmentor
LIKE~AS~WAY	similarity

Notes: • Primes exist as the meanings of lexical units (not at the level of lexemes) • Exponents of primes may be words, bound morphemes, or phrasemes • They can be formally complex • They can have combinatorial variants or 'allolexes' (indicated with ~) • Each prime has well-specified syntactic (combinatorial) properties.

Appendix B. Provisional list of possible universal or near-universal molecules (cf. Goddard & Wierzbicka 2014b)

hands, mouth, eyes, head, ears, nose, legs, teeth, fingers, bottom, breasts, skin, blood	body-parts and products
wings, tail	animal body-parts
children, men, women, mother, father, wife, husband, be born	social categories and family
hard, long, round, flat, sharp, heavy, thick, smooth	physical
sky, ground, sun, fire, water, day, night	environmental
grow (in the ground), creature, bird, fish, tree, egg	life forms and related words
wood, stone	materials
hold, play, laugh, sing	actions and activities
quickly, slowly	manner

References

- Alexander, Dennis. 2006. Literal, figurative, metaphorical: A semantic inquiry into the semantic field of *game* and *play* in English. PhD thesis. University of New England.
- Apresjan, Juri D. 2000. *Systematic lexicography*. (Kevin Windle, Trans.). Oxford: OUP.
- Apresjan, Juri D. 2009. The theory of Lexical Functions: An update. In David Beck, Kim Gerdes, Jasmina Milićević & Alain Polguère (eds.), *Proceedings of the fourth international conference on Meaning-Text Theory*, 1–14. Montreal: OLST.
- Barrios Rodríguez, María Auxiliadora & Cliff Goddard. 2013. ‘Degrad verbs’ in Spanish and English: Collocations, Lexical Functions and contrastive NSM semantic analysis. *Functions of Language*, 20(2). 219–249.
- Boas, Hans C. 2011. A frame-semantic approach to syntactic alternations with *build*-verbs. In P. Guerrero Medina (ed.), *Morphosyntactic alternations in English*, 207–234. London: Equinox.
- Bowern, Claire. 2008. *Linguistic fieldwork: A practical guide*. New York, NY: Palgrave Macmillan.
- Brown, Donald E. 1991. *Human universals*. New York, NY: McGraw Hill.
- Comrie, Bernard & N. Smith. 1977. Lingua Descriptive Series Questionnaire. *Lingua* 42. 1–72.
- Dixon, R.M.W. 1991. *A new approach to English grammar, on semantic principles*. Oxford: Clarendon.
- Dowty, David. 2002. ‘The garden swarms with bees’ and the fallacy of ‘argument alternation’. In Yael Ravin & Claudia Leacock (eds.), *Polysemy: Theoretical and computational approaches*, 111–128. Oxford: OUP.
- Fillmore, Charles J. 1982. Frame semantics. In Linguistic Society of Korea (ed.), *Linguistics in the morning calm*, 111–138. Seoul: Korea.
- Fillmore, Charles J. & B. T. S. Atkins. 2000. Describing polysemy: The case of ‘crawl’. In Yael Ravin & Claudia Leacock (eds.), *Polysemy: Theoretical and computational approaches*, 91–110. Oxford: OUP.
- Geeraerts, Dirk & Hubert Cuyckens (eds.). 2007. *The Oxford handbook of cognitive linguistics*. New York, NY: OUP.

- Goddard, Cliff. 2003. 'Thinking' across languages and cultures: Six dimensions of variation. *Cognitive Linguistics* 14 (2/3). 109–140.
- Goddard, Cliff. 2010a. Semantic molecules and semantic complexity (with special reference to "environmental" molecules). *Review of Cognitive Linguistics* 8(1). 123–155.
- Goddard, Cliff. 2010b. *A piece of cheese, a grain of sand: The semantics of mass nouns and unitizers*. In Francis Jeffry Pelletier (ed.), *Kinds, things and stuff: Mass terms and generics*, 132–165. New York, NY: OUP.
- Goddard, Cliff. 2011. *Semantic analysis: A practical introduction*, 2nd edn. Oxford: OUP.
- Goddard, Cliff. 2012. Semantic primes, semantic molecules, semantic templates: Key concepts in the NSM approach to lexical typology. *Linguistics* 50(3). 711–743.
- Goddard, Cliff. In press. Verb classes and valency alternations (NSM approach), with special reference to English physical activity verbs. In Bernard Comrie & Andrej Malchukov (eds.), *Valency classes in the world's languages*. Berlin: Mouton.
- Goddard, Cliff & Anna Wierzbicka. 2009. Contrastive semantics of physical activity verbs: 'cutting' and 'chopping' in English, Polish, and Japanese. *Language Sciences* 31. 60–96.
- Goddard, Cliff & Anna Wierzbicka. 2014a. *Words and meanings: Lexical semantics across domains, languages and cultures*. Oxford: OUP.
- Goddard, Cliff & Anna Wierzbicka. 2014b. Semantic fieldwork and lexical universals. *Studies in Language* 38(1). 80–127.
- Goddard, Cliff, Anna Wierzbicka & Jock Wong. In press. "Walking" and "running" in English and German: The cross-linguistic semantics of verbs of human locomotion. *Review of Cognitive Linguistics*.
- Gladkova, Anna. 2010. *Russkaja kul'turnaja semantika: ėmocii, cennosti, žiznennye ustanovki* [Russian cultural semantics: Emotions, values, attitudes.] Moscow: Languages of Slavic Cultures.
- Hartmann, Iren, Martin Haspelmath & Bradley Taylor (eds.). 2013. *Valency Patterns Leipzig*. Leipzig: Max Planck Institute for Evolutionary Anthropology. (Available online at <http://valpal.info>, Accessed on 2014-12-21).
- Jackendoff, Ray. 1990. *Semantic structures*. Cambridge, MA: MIT Press.

- Jackendoff, Ray. 2002. *Foundations of language: Brain, meaning, grammar, evolution*. Oxford: OUP.
- Koptjevskaja-Tamm, Maria, Dagmar Divjak & Ekaterina V. Rakhilina. 2010. Aquamotion verbs in Slavic and Germanic. A case study in lexical typology. In Victoria Hasko & Renee Perelmmetter (eds.), *New approaches to Slavic verbs of motion*, 315–342. Amsterdam: Benjamins.
- Levin, Beth. 1993. *English verb classes and alternations*. Chicago, IL: Chicago UP.
- Levin, Beth & Malka Rappaport Hovav. 2005. *Argument realization*. Chicago, IL: University UP.
- Levisen, Carsten. 2012. *Cultural semantics and social cognition: A case study on the Danish universe of meaning*. Berlin: Mouton.
- Lyons, John. 1977. *Semantics*. Cambridge: CUP.
- Mel'čuk, Igor A. 2012. *Semantics: From meaning to text*. Vols 1 and 2. Amsterdam: Benjamins.
- Pauwels, Paul. 2000. *Put, set, lay, place: A cognitive linguistic approach to verbal meaning*. Lincom.
- Peeters, Bert (ed.) 2006. *Semantic primes and universal grammar: Evidence from the Romance languages*. Amsterdam: Benjamins.
- Pustejovsky, James. 1995. *The Generative Lexicon*. Cambridge, MA: MIT Press.
- Pustejovsky, James. 2013. Type theory and lexical decomposition. In James Pustejovsky, Pierrette Bouillon, Hitoshi Isahara, Kyoko Kanzaki & Chungmin Lee (eds.), *Advances in Generative Lexicon theory*, 9–38. Dordrecht: Springer.
- Rappaport Hovav, Malka & Beth Levin. 2010. Reflections on manner/result complementarity. In Malka Rappaport Hovav, Edit Doran & Ivy Sichel (eds.), *Lexical semantics, syntax, and event structure*, 21–38. Oxford: OUP.
- Ruppenhofer, Josef, Michael Ellsworth, Miriam R. L. Petruck, Christopher R. Johnson, & Jan Scheffczyk. 2010. *FrameNet II: Extended Theory and Practice*. <<http://framenet.icsi.berkeley.edu/book/book.pdf>>.
- Sibly, Anne. 2008. The semantics of physical contact verbs: Lexicographic sketches of *caress*, *fondle*, *hit*, *kick*, *kiss*, *punch*, *slap*, *smack*, *stroke* and *touch*. BA Hons thesis. Australian National University.
- Sibly, Anne. 2010. *Harry slapped Hugo, Tracey smacked Ritchie*: The semantics of *slap* and *smack*. *Australian Journal of Linguistics* 30(3). 323–348.

- Vendler, Zeno. 1967. *Linguistics in Philosophy*. Ithaca, NY: Cornell UP.
- Wierzbicka, Anna. 1975. Why “kill” does not mean “cause to die”: The semantics of action sentences. *Foundations of Language* 13(4). 491–528.
- Wierzbicka, Anna. 1980. *Lingua mentalis: The semantics of natural language*. Sydney: Academic.
- Wierzbicka, Anna. 1985. *Lexicography and Conceptual Analysis*. Ann Arbor, MI: Karoma.
- Wierzbicka, Anna. 1996. *Semantics: Primes and universals*. New York, NY: OUP.
- Wierzbicka, Anna. 2007. NSM semantics versus Conceptual Semantics: Goals and standards (a response to Jackendoff). *Intercultural Pragmatics* 4(4). 521–529.
- Wierzbicka, Anna. 2009. All people eat and drink: Does this mean that ‘eat’ and ‘drink’ are universal human concepts? In John Newman (ed.), *The linguistics of eating and drinking*, 65–89. Amsterdam: Benjamins.
- Wierzbicka, Anna. 2014. “Pain” and “suffering” in cross-linguistic perspective. *International Journal of Language & Culture* 1(2). 149–173.
- Wilks, Yorick. 1988. Reference and its role in computational models of mental representations. In U. Eco, M. Santambrogio & P. Violi (eds.), *Meaning and mental representations*, 221–237. Bloomington, IN: Indiana UP.
- Ye, Zhengdao. 2010. Eating and drinking in Mandarin and Shanghainese: A lexical-conceptual analysis. In E. Christensen, E. Schier & J. Sutton (eds.), *ASCS09: Proceedings of the 9th Conference of the Australasian Society for Cognitive Science*, 375–83. Sydney: Macquarie Centre for Cognitive Science.
- Ye, Zhengdao (ed.). In press. *The semantics of nouns*. Oxford: OUP.